

A TEXTBOOK OF

FINANCIAL,

COST AND

MANAGEMENT

ACCOUNTING

FUND FLOW STATEMENT

Dr. P. Periasamy

OVERHEADS

MATERIAL COST CONTROL

INVENTORY CONTROL

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A TEXTBOOK OF FINANCIAL COST AND MANAGEMENT ACCOUNTING

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CHAPTER 1

Accounting Principles and Concepts

Meaning and Scope of Accounting

Accounting is the language of business. The main objectives of Accounting is to safeguard the interests of the business, its proprietors and others connected with the business transactions. This is done by providing suitable information to the owners, creditors, shareholders, Government, financial institutions and other related agencies.

Definition of Accounting

The American Accounting Association defines accounting as “the process of identifying, measuring and communicating economic information to permit informed judgements and decisions by the users of the information.”

According to AICPA (American Institute of Certified Public Accountants) it is defined as “the art of recording, classifying and summarizing in a significant manner and in terms of money, transactions and events which are in part at least of a financial character and interpreting the result thereof.”

Steps of Accounting

The following are the important steps to be adopted in the accounting process:

- (1) **Recording:** Recording all the transactions in subsidiary books for purpose of future record or reference. It is referred to as “Journal.”
- (2) **Classifying:** All recorded transactions in subsidiary books are classified and posted to the main book of accounts. It is known as “Ledger.”
- (3) **Summarizing:** All recorded transactions in main books will be summarized for the preparation of Trail Balance, Profit and Loss Account and Balance Sheet.
- (4) **Interpreting:** Interpreting refers to the explanation of the meaning and significance of the result of final accounts and balance sheet so that parties concerned with business can determine the future earnings, ability to pay interest, liquidity and profitability of a sound dividend policy.

Functions of Accounting

From the definition and analysis of the above the main functions of accounting can be summarized as:

- (1) Keeping systematic record of business transactions.
- (2) Protecting properties of the business.
- (3) Communicating the results to various parties interested in or connected with the business.
- (4) Meeting legal requirements.

Objectives of Accounting

- (1) Providing suitable information with an aim of safeguarding the interest of the business and its proprietors and others connected with it.
- (2) To emphasis on the ascertainment and exhibition of profits earned or losses incurred in the business.
- (3) To ascertain the financial position of the business as a whole.
- (4) To ensure accounts are prepared according to some accepted accounting concepts and conventions.
- (5) To comply with the requirements of the Companies Act, Income Tax Act, etc.

Definition of Bookkeeping

Bookkeeping may be defined as “the art of recording the business transactions in the books of accounts in a systematic manner.” A person who is responsible for and who maintains and keeps a record of the business transactions is known as Bookkeeper. His work is primarily clerical in nature.

On the other hand, Accounting is primarily concerned with the recording, classifying, summarizing, interpreting the financial data and communicating the information disclosed by the accounting records to those persons interested in the accounting information relating to the business.

Limitations of Accounting

- (1) Accounting provides only limited information because it reveals the profitability of the concern as a whole.
- (2) Accounting considers only those transactions which can be measured in terms of money or quantitatively expressed. Qualitative information is not taken into account.
- (3) Accounting provides limited information to the management.
- (4) Accounting is only historical in nature. It provides only a post mortem record of business transactions.

Branches of Accounting

The main function of accounting is to provide the required informations for different parties who are interested in the welfare of that enterprise concerned. In order to serve the needs of management and outsiders various new branches of accounting have been developed. The following are the main branches of accounting:

- (1) Financial Accounting.
- (2) Cost Accounting.
- (3) Management Accounting.

- (1) **Financial Accounting:** Financial Accounting is prepared to determine profitability and financial position of a concern for a specific period of time.
- (2) **Cost Accounting:** Cost Accounting is the formal accounting system setup for recording costs. It is a systematic procedure for determining the unit cost of output produced or service rendered.
- (3) **Management Accounting:** Management Accounting is concerned with presentation of accounting information to the management for effective decision making and control.

Accounting Principles

Various accounting systems and techniques are designed to meet the needs of the management. The information should be recorded and presented in such a way that management is able to arrive at right conclusions. The ultimate aim of the management is to increase profitability and losses. In order to achieve the objectives of the concern as a whole, it is essential to prepare the accounting statements in accordance with the generally accepted principles and procedures.

The term principles refers to the rule of action or conduct to be applied in accounting. Accounting principles may be defined as “those rules of conduct or procedure which are adopted by the accountants universally, while recording the accounting transactions.”

The accounting principles can be classified into two categories:

- I. Accounting Concepts.
- II. Accounting Conventions.

I. Accounting Concepts

Accounting concepts mean and include necessary assumptions or postulates or ideas which are used to accounting practice and preparation of financial statements. The following are the important accounting concepts:

- (1) Entity Concept;
- (2) Dual Aspect Concept;
- (3) Accounting Period Concept;
- (4) Going Concern Concept;
- (5) Cost Concept;
- (6) Money Measurement Concept;
- (7) Matching Concept;
- (8) Realization Concept;
- (9) Accrual Concept;
- (10) Rupee Value Concept.

II. Accounting Conventions

Accounting Convention implies that those customs, methods and practices to be followed as a guideline for preparation of accounting statements. The accounting conventions can be classified as follows:

- (1) Convention of Disclosure.
- (2) Convention of Conservatism.

- (3) Convention of Consistency.
- (4) Convention of Materiality.

The following table summarizes classifications of Accounting Principles:

Accounting Principles

<i>Accounting Concept</i>	<i>Accounting Conventions</i>
<ol style="list-style-type: none"> (1) Entity Concept (2) Dual Aspect Concept (3) Accounting Period Concept (4) Going Concern Concept (5) Cost Concept (6) Money Measurement Concept (7) Matching Concept (8) Realization Concept (9) Accrual Concept (10) Rupee Value Concept 	<ol style="list-style-type: none"> (1) Convention of Disclosure (2) Convention of Conservatism (3) Convention of Consistency (4) Convention of Materiality

The classification of accounting concepts and conventions can be explained in the following pages.

I. Accounting Concepts

(1) Entity Concept: Separate entity concept implies that business unit or a company is a body corporate and having a separate legal entity distinct from its proprietors. The proprietors or members are not liable for the acts of the company. But in the case of the partnership business or sole trader business no separate legal entity from its proprietors. Here proprietors or members are liable for the acts of the firm. As per the separate entity concept of accounting it applies to all forms of business to determine the scope of what is to be recorded or what is to be excluded from the business books. For example, if the proprietor of the business invests Rs.50,000 in his business, it is deemed that the proprietor has given that much amount to the business as loan which will be shown as a liability for the business. On withdrawal of any amount it will be debited in cash account and credited in proprietor's capital account. In conclusion, this separate entity concept applies much larger in body corporate sectors than sole traders and partnership firms.

(2) Dual Aspect Concept: According to this concept, every business transaction involves two aspects, namely, for every receiving of benefit and, there is a corresponding giving of benefit. The dual aspect concept is the basis of the double entry book keeping. Accordingly for every debit there is an equal and corresponding credit. The accounting equation of the dual aspect concept is:

$$\begin{aligned} \text{Capital} + \text{Liabilities} &= \text{Assets} \\ & \text{(or)} \\ \text{Assets} &= \text{Equities (Capital)} \end{aligned}$$

The term Capital refers to funds provide by the proprietor of the business concern. On the other hand, the term liability denotes the funds provided by the creditors and debenture holders against the assets of the business. The term assets represents the resources owned by the business. For example, Mr.Thomas Starts business with cash of Rs.1,00,000 and building of Rs.5,00,000, then this fact is recorded at two places ; Assets Accounts and Capital Account. In other words, the business acquires assets of Rs.6,00,000 which is equal to the proprietor's capital in the form of cash of Rs.1,00,000 and building worth of Rs.5,00,000. The above relationship can be shown in the form of accounting equation:

$$\begin{aligned} \text{Capital} + \text{Liabilities} &= \text{Assets} \\ \text{Rs.1,00,000} + \text{Rs.5,00,000} &= \text{Rs.6,00,000} \end{aligned}$$

(3) Accounting Period Concept: According to this concept, income or loss of a business can be analysed and determined on the basis of suitable accounting period instead of wait for a long period, i.e., until it is liquidated. Being a business in continuous affairs for an indefinite period of time, the proprietors, the shareholders and outsiders want to know the financial position of the concern, periodically. Thus, the accounting period is normally adopted for one year. At the end of the each accounting period an income statement and balance sheet are prepared. This concept is simply intended for a periodical ascertainment and reporting the true and fair financial position of the concern as a whole.

(4) Going Concern Concept: It is otherwise known as Continue of Activity Concept. This concept assumes that business concern will continue for a long period to exit. In other words, under this assumption, the enterprise is normally viewed as a going concern and it is not likely to be liquidated in the near future. This assumption implies that while valuing the assets of the business on the basis of productivity and not on the basis of their realizable value or the present market value, at cost less depreciation till date for the purpose of balance sheet. It is useful in valuation of assets and liabilities, depreciation of fixed assets and treatment of prepaid expenses.

(5) Cost Concept: This concept is based on "Going Concern Concept." Cost Concept implies that assets acquired are recorded in the accounting books at the cost or price paid to acquire it. And this cost is the basis for subsequent accounting for the asset. For accounting purpose the market value of assets are not taken into account either for valuation or charging depreciation of such assets. Cost Concept has the advantage of bringing objectivity in the preparation and presentation of financial statements. In the absence of cost concept, figures shown in accounting records would be subjective and questionable. But due to inflationary tendencies, the preparation of financial statements on the basis of cost concept has become irrelevant for judging the true financial position of the business.

(6) Money Measurement Concept: According to this concept, accounting transactions are measured, expressed and recorded in terms of money. This concept excludes those transactions or events which cannot be expressed in terms of money. For example, factors such as the skill of the supervisor, product policies, planning, employer-employee relationship cannot be recorded in accounts in spite of their importance to the business. This makes the financial statements incomplete.

(7) Matching Concept: Matching Concept is closely related to accounting period concept. The chief aim of the business concern is to ascertain the profit periodically. To measure the profit for a particular period it is essential to match accurately the costs associated with the revenue. Thus, matching of costs and revenues related to a particular period is called as Matching Concept.

(8) Realization Concept: Realization Concept is otherwise known as Revenue Recognition Concept. According to this concept, revenue is the gross inflow of cash, receivables or other considerations arising in the course of an enterprise from the sale of goods or rendering of services from the holding of assets. If no sale takes place, no revenue is considered. However, there are certain exceptions to this concept. Examples, Hire Purchase / Sale, Contract Accounts etc.

(9) Accrual Concept: Accrual Concept is closely related to Matching Concept. According to this concept, revenue recognition depends on its realization and not accrual receipt. Likewise cost are recognized when they are incurred and not when paid. The accrual concept ensures that the profit or loss shown is on the basis of full fact relating to all expenses and incomes.

(10) Rupee Value Concept: This concept assumes that the value of rupee is constant. In fact, due to inflationary pressures, the value of rupee will be declining. Under this situations financial statements are prepared on the basis of historical costs not considering the declining value of rupee. Similarly depreciation is also charged on the basis of cost price. Thus, this concept results in underestimation of depreciation and overestimation of assets in the balance sheet and hence will not reflect the true position of the business.

II. Accounting Conventions

(1) **Convention of Disclosure:** The disclosure of all material information is one of the important accounting conventions. According to this conventions all accounting statements should be honestly prepared and all facts and figures must be disclosed therein. The disclosure of financial informations are required for different parties who are interested in the welfare of that enterprise. The Companies Act lays down the forms of Profit and Loss Account and Balance Sheet. Thus convention of disclosure is required to be kept as per the requirement of the Companies Act and Income Tax Act.

(2) **Convention of Conservatism:** This convention is closely related to the policy of playing safe. This principle is often described as “anticipate no profit, and provide for all possible losses.” Thus, this convention emphasise that uncertainties and risks inherent in business transactions should be given proper consideration. For example, under this convention inventory is valued at cost price or market price whichever is lower. Similarly, bad and doubtful debts is made in the books before ascertaining the profit.

(3) **Convention of Consistency:** The Convention of Consistency implies that accounting policies, procedures and methods should remain unchanged for preparation of financial statements from one period to another. Under this convention alternative improved accounting policies are also equally acceptable. In order to measure the operational efficiency of a concern, this convention allows a meaningful comparison in the performance of different period.

(4) **Convention of Materiality:** According to Kohler’s Dictionary of Accountants Materiality may be defined as “the characteristic attaching to a statement fact, or item whereby its disclosure or method of giving it expression would be likely to influence the judgment of a reasonable person.” According to this convention consideration is given to all material events, insignificant details are ignored while preparing the profit and loss account and balance sheet. The evaluation and decision of material or immaterial depends upon the circumstances and lies at the discretion of the Accountant.

QUESTIONS

1. Define Accounting.
2. Explain nature and scope of accounting.
3. What are the important functions of accounting?
4. What are the objectives of accounting?
5. Define bookkeeping.
6. Briefly explain the basic accounting concept and conventions.
7. What are the important classification of accounting concepts? Explain them briefly.
8. Write short notes on :
 - (a) Convention of Disclosure.
 - (b) Convention of Conservatism.
 - (c) Convention of Consistency.
9. What do you understand by Dual Aspect Concept?
10. Explain Going Concern Concept.
11. Write short notes on:
 - (a) Cost Concept.
 - (b) Money Measurement Concept.
 - (c) Accounting Period Concept.
12. What are the limitations of Accounting?

CHAPTER 2

Double Entry System of Accounting

System of Accounting

The following are the main system of accounting for recording the business transactions:

- (a) Cash System of Accounting.
- (b) Mercantile or Accrual System of Accounting.
- (c) Mixed System of Accounting.

(a) Cash System of Accounting: Under this system, only actual cash receipts and cash payments are recorded. No credit transaction is made for a payment or receipt until cash is actually received or paid. This system usually adopted by the Government Organizations and Financial Institutions. The non-trading concerns are preparing Receipts and Payment Accounts based on the Cash Systems Accounting.

(b) Mercantile or Accrual System of Accounting: Under this system, all business transactions are recorded in the books of accounts for a particular period inclusive of cash receipts and cash payments or any amount having become due for payment or receipt. In other words, both cash transactions and credit transactions are recorded in the books of accounts.

(c) Mixed System of Accounting: This system is applicable only where a concern adopting combination of Cash System and Mercantile System. Under Mixed System of Accounting, some records are made under cash system whereas others are recorded under mercantile system.

Further, Accounting records can be prepared under any one of the following system:

1. Single Entry System.
2. Double Entry System.

(1) Single Entry System: Under this system, all transactions relating to a personal aspect are recorded in the books of accounts but leaves all impersonal transactions. Single Entry System is based on the Dual Aspect Concept and is incomplete and inaccurate.

(2) Double Entry System: This system was introduced by Iuco Pacioli, an Italian merchant during the year 1494. According to this system, every transaction has two aspects. Both the aspects are recorded in the books of accounts. Accordingly one is giving aspect and the other one is receiving aspect. Each aspect will be recorded in one account and this method of writing every transactions in two accounts is known as Double Entry System of bookkeeping. For example, Purchase of machinery for cash, in this transaction receiving machinery is one aspect is said to be an account is debited and giving cash is another aspect is said to be an account is credited with an equal amount. Thus, the basic principle of this system is that for every debit there must be a corresponding and equal credit and for every credit there must be a corresponding and equal debit.

Advantages of Double Entry System

- (1) This system provides information about the concern as a whole.
- (2) It is possible to evaluate the operational efficiency of the concern.
- (3) This system helps to ascertain the profit or loss by preparing profit and loss account and balance sheet.
- (4) Accuracy of accounting records can be verified by preparing a Trail Balance.
- (5) This system helps to know the financial position of a concern for a particular period.
- (6) It provides information for meeting various legal requirements.
- (7) The values of assets and liabilities can be known at any time by preparing the balance sheet.

Factors Common to Every Business

In order to understanding the Double Entry System, it is essential to consider the following important factors which are common to every business.

- (1) Every business has to enter into business transactions with a number of persons or firms. To record the transactions dealing with whom, accounts are opened in the name of each person or firm. Such accounts are known as Personal Accounts.
- (2) Every business must necessarily have certain assets such as buildings, stocks, cash etc. for carrying on its activities. Therefore, an account of each asset is opened and such account is known as Real or Property Accounts.
- (3) Every business earn incomes and gains in various sources and certain expenses and losses incurred to carry on its activities. Therefore, an account of each expense and income or gain is opened in the books. Such accounts are known as Nominal or Fictitious Accounts.

Types of Accounts

In order to keep a complete record of all transactions in the business the following are the important type of accounts, namely:

I. Personal Account

- (a) Natural Person's Accounts.
- (b) Artificial Person's Accounts.
- (c) Representative Personal Accounts.

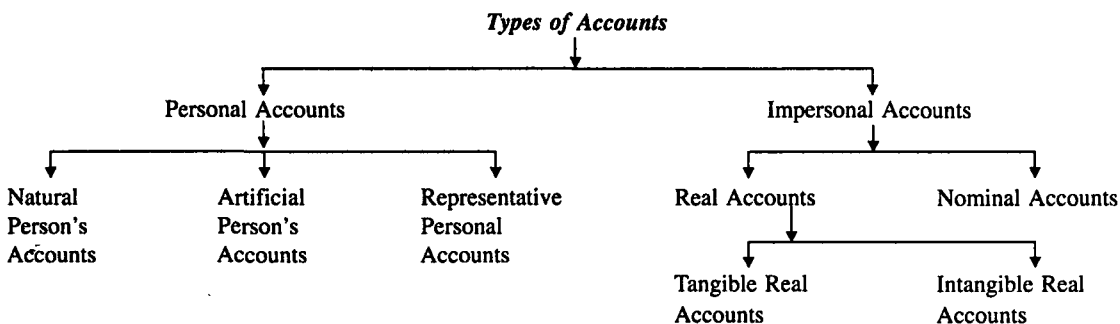
II. Impersonal Accounts

(1) Real Accounts

- (a) Tangible Real Accounts.
- (b) Intangible Real Accounts.

(2) Nominal Accounts

The following chart gives more explanation about the types of accounts:



I. Personal Accounts

An account recording transactions of business deals with person or firms or company is known as Personal Account. It takes the following forms:

- (a) **Natural Person's Account:** Natural Person's Accounts are meant for recording transactions of business deals with individual persons. For example, Thomas Account, Raman's Account, Nancy Account etc.
- (b) **Artificial Persons or Legal Bodies:** An account recording financial transaction of business deals with an artificial persons or legal bodies created by law or otherwise called an Artificial Personal Account. For example, Firm's Account, Limited Companies, Bank Account etc.
- (c) **Representative Personal Account:** An account indirectly representing a person or persons is known as a Representative Personal Account. All accounts recording financial transactions of outstanding expenses and accrued or prepaid incomes are Representative Personal Account. For example, Salaries Outstanding Account is a personal account representing salaries payable to the staff.

II. Real Accounts (or) Property Accounts

Real Account refers to an account recording financial transactions of business connected with assets is known as Real Account or Property Accounts. The Real Accounts may be Tangible Real Account and Intangible Real Account. Tangible Real Account refers to an account relates to an asset which can be touched, felt and measured. For example, Building, Goods, Furniture, Machinery etc. On the other hand, Intangible Real Account refers to an account which relates to an asset which cannot be touched and measured physically. For example, Trade Mark, Goodwill, Patent, Copy Rights etc.

III. Nominal Account

Nominal Accounts are recording transactions of business connected with expenses, incomes, profit or losses etc. are known as Nominal Accounts. For example, Rent Account, Salaries Account, and Interest Account, etc.

Accounting Rules

According to Double Entry System of accounting every transaction of the business has two aspects. The transaction should be recorded in the books of accounts according to the two aspects. The two aspects are:

- (1) Receiving Aspect otherwise known as Debit Aspect.
- (2) Giving Aspect otherwise known as Credit Aspect.

Thus, every transaction involves two aspects:

- (1) Debit Aspect.
- (2) Credit Aspect.

There are three different rules for making entries under Double Entry System in respect of Personal Account, Real Account and Nominal Account.

- (1) **Personal Account:** Debit the Receiver
Credit the Giver
- (2) **Real Account:** Debit What comes in
Credit What goes out
- (3) **Nominal Account:** Debit all expenses and losses
Credit all incomes and gains

The rule of double entry are show in the following chart:

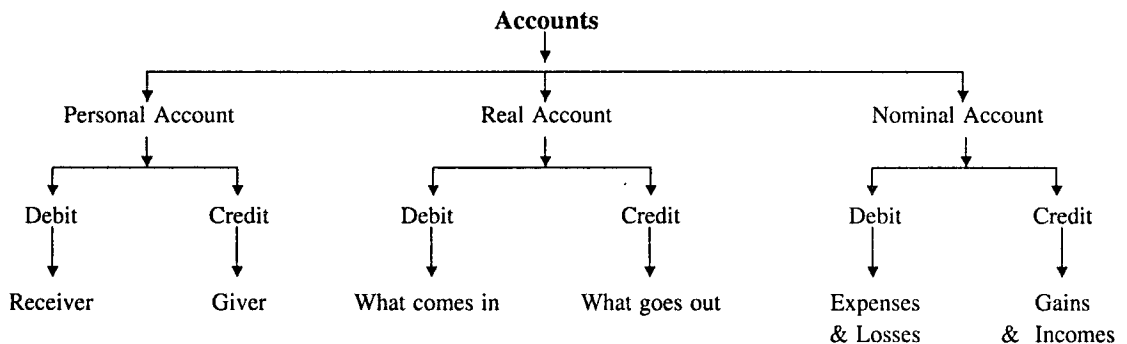


Illustration: 1

From the following transactions find out the nature of account and also state which account should be debited and which account should be credited:

- (1) Salary paid
- (2) Interest received
- (3) Machinery purchased for cash
- (4) Building sold
- (5) Outstanding salary
- (6) Received cash from Ramesh
- (7) Proprietor introduced capital
- (8) Dividend received
- (9) Commission paid
- (10) Furniture purchased for cash

Analysis of Transactions

Solutions:

<i>Transactions</i>	<i>Accounts Involved</i>	<i>Types of Accounts</i>	<i>Rules of Debit and Credit</i>
(1) Salaries	Salary A/c Cash A/c	Nominal Real	Debit all expenses and losses Credit what goes out
(2) Interest received	Cash A/c Interest A/c	Real Nominal	Debit what comes in Credit all incomes and gains
(3) Machinery Purchase	Machinery A/c Cash A/c	Real Real	Debit what comes in Credit what goes out
(4) Building Sold	Cash A/c Building A/c	Real Real	Debit what comes in Credit what goes out
(5) Outstanding Salary	Salary A/c Outstanding Salary A/c	Nominal Personal	Debit all expenses and losses Credit the giver
(6) Received cash Cash from Remesh }	Cash A/c Ramesh A/c	Real Personal	Debit what comes in Credit the giver
(7) Capital introduced	Cash A/c Capital A/c	Real Personal	Debit what comes in Credit the giver
(8) Dividend received	Cash A/c Dividend A/c	Real Nominal	Debit what comes in Credit all incomes and gains
(9) Commission paid	Commission A/c Cash A/c	Nominal Real	Debit all expenses and losses Credit what goes out
(10) Furniture purchased	Furniture A/c Cash A/c	Real Real	Debit what comes in Credit what goes out

Illustration: 2

Classify the following under Personal, Real and Nominal accounts:

- | | | | |
|-----------------------|--------------------------|------------------------|----------------------|
| (1) Stock. | (2) Loan. | (3) Insurance. | (4) Salary. |
| (5) Interest. | (6) Bank. | (7) Cash. | (8) Capital. |
| (9) Prepaid Interest. | (10) Salary Outstanding. | (11) Drawing. | (12) Bank Overdraft. |
| (13) Salary Prepaid. | (14) Fixtures. | (15) Bills Receivable. | (16) Machinery. |
| (17) Building. | (18) Goodwill. | | |

Solution:

- | | | |
|-------------------------|---|------------------|
| (1) Stock | = | Real Account |
| (2) Loan | = | Personal Account |
| (3) Insurance | = | Nominal Account |
| (4) Salary | = | Nominal Account |
| (5) Interest | = | Nominal Account |
| (6) Bank | = | Personal Account |
| (7) Cash | = | Real Account |
| (8) Capital | = | Personal Account |
| (9) Prepaid Interest | = | Personal Account |
| (10) Salary Outstanding | = | Personal Account |
| (11) Drawings | = | Personal Account |
| (12) Bank Overdraft | = | Personal Account |

(13)	Salary Prepaid	=	Personal Account
(14)	Fixtures	=	Real Account
(15)	Bills Receivable	=	Real Account
(16)	Machinery	=	Real Account
(17)	Building	=	Real Account
(18)	Goodwill	=	Real Account

QUESTIONS

1. What are the important system of accounting?
2. What do you understand by Double Entry System?
3. Explain the advantages of Double Entry System.
4. Explain the three important types of accounts.
5. What do you understand by Accounting Rules?
6. Write short notes on:
 - (a) Single Entry System
 - (b) Double Entry System
 - (c) Personal Accounts
 - (d) Nominal Accounts
7. Classify the following under Personal Account, Real Account and Nominal Account:
 - (1) Cash Account. (2) Bank Account. (3) Capital Account. (4) Drawing Account. (5) Salaries Account. (6) Rent Account (7) Inventory Account. (8) William Account. (9) Goodwill Account. (10) Commission Account.

[Ans : Personal Account – 2, 3, 4, 8;
 Real Account – 1, 7, 9;
 Nominal Account – 5, 6, 10.]
8. Which account is to be debited and credited in the following transactions?
 - (1) Cash from Ramesh
 - (2) Rent paid in cash
 - (3) Goods purchased by cash
 - (4) Salary paid by cheque
 - (5) Bought furniture from Prem on credit
 - (6) Received cash from Kumar
 - (7) Cash paid to Ramesh
 - (8) Goods sold to Ramesh
 - (9) Cash paid in to Bank

[Ans : (1) Debit Cash A/c and Credit Ramesh's A/c (2) Debit Rent A/c and Credit Cash A/c (3) Debit Purchase A/c and Credit Cash A/c (4) Debit Salary A/c and Credit Bank A/c (5) Debit furniture A/c and Credit Prem's A/c (6) Debit Cash A/c and Credit Kumar's A/c (7) Debit Ramesh A/c and Credit Cash A/c (9) Debit Bank A/c and Credit Cash A/c]
9. What accounts should be debited and credited in the following transactions?
 - (1) Goods sold for cash
 - (2) Goods sold to Siva on Credit
 - (3) Cash paid to Ramesh
 - (4) Cash paid in to Bank
 - (5) Goods purchased for cash
 - (6) Goods purchased from Ram on Credit
 - (7) Interest received on investment
 - (8) Drew cash from bank for office use
 - (9) Paid rent in cash
 - (10) Discount received on sales
 - (11) Received cash from Ramesh
 - (12) Started business with cash

[Ans : (1) Debit Cash A/c and Credit Sales A/c (2) Debit Siva's A/c and Credit Sales A/c (3) Debit Ramesh's A/c and Credit Cash A/c (4) Debit Bank's A/c and Credit Cash A/c (5) Debit purchase A/c and Credit Cash A/c (6) Debit purchase A/c and Credit Ram's A/c (7) Debit cash Account and Bank's A/c (9) Debit Rent A/c and Credit Cash A/c (10) Debit Cash A/c and Credit Sales A/c (11) Debit Cash A/c and Credit Ramesh's A/c (12) Debit Cash A/c and Credit Capital A/c]

CHAPTER 3

Accounting Books and Records

The purpose of preparation of Trading, Profit and Loss Account and Balance Sheet to ascertain the profit or loss made by business and to know the financial soundness of the concern as a whole. In order to achieve the objectives of the firm, it is essential to maintain several books and records. The number of books and records are maintained by an enterprise for the evidence of the recording business transactions. Cash Receipts, Invoice, Cash Memo, Cheque and other vouchers are the examples of documentary evidence supported for preparation of income statements.

According to double entry system of accounting each transaction is recorded in the books of accounts to ascertain the profits earned during a particular period. "Transaction" of a business refers to an event the recognition of which gives rise to an entry in account records.

While analyzing the review of accounting cycle, the whole process of accounting consists of the following important stages :

- (1) Recording the transactions are done through Journals or Subsidiary Books.
- (2) Classifying the transactions are achieved by Ledger.
- (3) Summarizing the transactions are done through Trial Balance.
- (4) The last stage is concerned with preparing Income Statements (Trading, Profit and Loss Account and Balance Sheet).

JOURNAL

In the first stage of double entry system each transactions are recorded in the 'Journal' or "Subsidiary Books." Journal is the book of "Original Entry or First Entry" which is used for recording of all business transactions in chronological order. Then it is posted to ledger. This process is known as "Entering." In other words record of the each transaction is called as "Journal Entry." The process of recording in the Journal is called as "Journalizing."

Specimen Ruling of Journal

The specimen ruling of Journal is shown below :

<i>Date</i> (1)	<i>Particulars</i> (2)	<i>L.F.</i> (3)	<i>Dr.</i> (4) <i>Rs.</i>	<i>Cr.</i> (5) <i>Rs.</i>
Date, Month	Name of Accounts to be Debited
a Year	Name of Accounts to be Credited

From the above specimen ruling of Journal, we can observe the following points:

- Column 1* : It indicates the date, month and year on which each transaction takes place.
- Column 2* : It represents (a) name of account to be debited; (b) name of account to be credited.
- Column 3* : L.F. Stands for Ledger Folio, i.e., reference to the main book.
- Column 4* : Dr. Stands for Debit, i.e., amount to be debited.
- Column 5* : Cr. Stands for Credit, i.e., amount to be credited.

If two or more transactions of similar nature occur on the same day and either the debit account or credit account is common, such transactions can be conveniently entered in the Journal in the form of a Combined Journal Entry instead of making a separate entry for each transaction. Such type of entry is a "Compound Journal Entry."

Types of Journals

Journals broadly classified into (1) General Journals and (2) Special Journals. Special Journals are subsidiary books which are as follows :

1. Sales Book
2. Purchase Book
3. Purchase Returns Book
4. Sales Returns Book
5. Bills Receivable Book
6. Bills Payable Book
7. Cash Book.

These subsidiary books which are used for recording of each transactions. The following points to be considered before making journal entry :

(1) Capital Account : The initial influx of capital in the form of cash provided by the proprietor is known as "Capital." It may be further converted into plant and machinery, building etc. Hence it should be debited to Cash A/c or Plant & Machinery Property A/c and credited to Proprietor's A/c.

(2) Drawing Account : When proprietors withdrawn money or goods from business for personal use, it should be debited to Drawing A/c and credited Cash A/c or Purchase A/c.

(3) Goods Account : If any transactions relating to purchase or sale of goods, instead of making journal entries in one Goods Account, separate accounts may be maintained as Sales A/c, Purchase A/c, Sales Returns A/c, and Purchase Returns A/c.

- (a) **Sales Account:** is meant for recording sale of goods. It should be credited to Sales A/c.
- (b) **Purchase Account:** is meant for recording purchase of goods. It should be debited to Purchase A/c.
- (c) **Sales Returns Account:** is concerned with recording return of the goods from customers. It should be debited to Sales Return A/c.
- (d) **Purchase Return Account:** is meant for recording purchased goods return to suppliers. It should be credited to Purchase Return A/c.
- (4) While making journal entry, a brief explanation will be given is known as "Narration."
- (5) To apply the rule of debit and credit in each type of account such as :
- (a) **Personal Account:** Debit the Receiver, Credit the Giver.
- (b) **Real Account:** Debit what comes in, Credit what goes out.
- (c) **Nominal Account:** Debit all Expenses & Losses, Credit all Incomes and Gains.

Illustration: 1

Journalize the following transactions in the books of Nancy Ltd.

2003 March		<i>Rs. in lakhs</i>
1	Started business with Cash	4,500
1	Paid into bank	2,500
2	Goods purchased for Cash	1,500
3	Purchase of furniture and payment by cheque	500
5	Sold goods for cash	600
8	Sold goods to Rosy	400
10	Goods Purchased from Thomas	700
12	Goods Return to Thomas	100
15	Sold goods to Rahavan for cash	250
18	Cash received from Rosy Rs.396 & discount allowed to her Rs.4	
21	Withdraw from bank for private use	100
21	Withdraw from bank for use in the business	500
25	Paid telephone rent for one year	40
28	Cash paid to Rosy in full settlement of her account	594
30	Paid for Stationery	20
	Rent paid	100
	Salaries to Staff	250

Journal of Nancy Ltd.*(Rs. in lakhs)*

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
2003 March 1	Cash Account Dr. To Capital Account (Being cash brought in to start business)		4,500	4,500
March 1	Bank Account Dr. To Cash Account (Being Cash paid into Bank)		2,500	2,500

2	Purchased Account To Cash Account (Being goods purchased for cash)	Dr.	1,500	1,500
3	Furniture Account To Bank Account (Being purchase of furniture and payment made by cheque)	Dr.	500	500
5	Cash Account To Sales Account (Being the goods sold for cash)	Dr.	600	600
8	Rosy Account To Sales Account (Being the goods sold for credit)	Dr.	400	400
12	Thomas Account To Returns Outward Account (Being the goods returned)	Dr.	100	100
15	Cash Account To Sales Account (Being the goods sold for cash)	Dr.	250	250
18	Cash Account Discount Account Dr. To Rosy Account (Being Rs. 396 received from Rosy and Rs. 4 discount allowed to her)	Dr.	396 4	400
21	Drawing Account Cash Account To Bank Account (Being cash withdrawn for both office and personal use)	Dr. Dr.	100 500	600
25	Telephone Rent Account To Cash Account (Being payment of telephone rent)	Dr.	40	40
28	Rosy Account To Cash Account To Discount Account (Being cash paid to Rosy and discount allowed to her)	Dr.	600	596 4
30	Stationery Account Rent Account Salaries Account To Cash Account (Being payment of stationery, rent and salaries)	Dr. Dr. Dr.	20 100 250	370
	Total		13,060	13,060

Illustration: 2

Journalize the following transactions:

<i>2003 Jan.</i>	<i>Rs. in lakhs</i>
1 Purchased machinery for cash	5,000
2 Sold goods to Ramesh for cash	2,000
3 Sold goods to Kannan	1,000
4 Cash received from Murugan	700
5 Cash withdrawn from bank	500
6 Paid salaries	800
7 Purchased goods worth of Rs. 1000 less 10% trade discount	
8 The erection charges of machinery amounted to Rs. 500 which were paid in cash	
9 Cash paid to Ramasamy	400
10 Paid interest	400
11 Returned goods to Premkumar	300
12 Returned goods by Periasamy	200
13 Received dividend on shares	500
14 Paid rent	400
15 Old furniture sold for	200

Journal*(Rs. in lakhs)*

<i>Date</i>	<i>Particulars</i>	<i>L.F.</i>	<i>Debit Rs.</i>	<i>Credit Rs.</i>
2003 Jan.				
1	Machinery Account Dr. To Cash Account (Being Machinery purchased for cash)		5,000	5,000
2	Cash Account Dr. To Sales Account (Being goods sold for cash)		2,000	2,000
3	Kannan Account Dr. To Sales Account (Being goods sold for credit)		1,000	1,000
4	Cash Account Dr. To Murugan Account (Being cash received from Murugan)		700	700
5	Cash Account Dr. To Bank Account (Being cash withdrawn from Bank)		500	500
6	Salaries Account Dr. To Cash Account (Being cash paid for salaries)		800	800
Jan. 7	Purchase of goods Account Dr. To Cash Account To Discount Account (Being goods Purchased and discount allowed for Rs. 100)		1,000	900 100

8	Machinery Account To Cash Account (Being the erection charges paid for machinery)	Dr.	500	500
9	Ramasamy Account To Cash Account (Being cash paid to Ramasamy)	Dr.	400	400
10	Interest Account To Cash Account (Being cash paid for Interest)	Dr.	400	400
11	Premkumar Account To Purchase Return Account (Being goods returned to Premkumar)	Dr.	300	300
12	Sales Return Account To Periyasamy Account (Being goods returned by Periyasamy)	Dr.	200	200
13	Cash Account To Dividend on Shares Account (Being dividend received on shares)	Dr.	500	500
14	Rent Account To Cash Account (Being rent paid for cash)	Dr.	400	400
15	Cash Account To Old Furniture Account (Being old furniture sold for cash)	Dr.	200	200
	Total		13,900	13,900

Illustration: 3

Journalize the following transactions in the books of Mr. Sharma:

Jan. 2003

- 1 Sharma started business by investing cash of Rs. 40,000. He brought goods of Rs. 10,000, Furniture Rs. 5,000 and Machinery Rs. 10,000
- 2 Purchase building Rs. 5,000
- 3 Sale of goods worth Rs. 7,000 less 10% trade discount
- 4 Purchase of goods worth Rs. 6,000 less 5% cash discount
- 5 Sold goods to William on credit Rs. 2,500
- 6 Amount withdrawn from bank Rs. 800 for office use
- 7 Paid freight Rs. 500
- 8 Sold 50 shares in National Ltd @ Rs. 20 per share and commission paid Rs. 30
- 9 Received cheque from Vijay and deposited in Bank Rs. 5,000
- 10 Paid to Anderson in full settlement of Rs. 1,500
- 11 Amount withdrawn from bank for personal use Rs. 500
- 12 Paid rent Rs. 400 and Salaries Rs. 1,000
- 13 Paid insurance premium Rs. 300
- 14 Dividend received Rs. 300
- 15 Cheque for Rs. 1,000 received from Murgan in settlement of a debt of Rs. 1,250 returned dishonoured

- 16 Bank collected interest on our investments Rs. 1,500
 17 Charge of depreciation on Machinery @ 10% for six months (Machinery Rs. 20,000)
 18 Sold goods to Balu Rs. 2,000

Journal of Mr. Sharma Account

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
2003. Jan.				
1	Cash Account Goods Account Machinery Account Furniture Account To Capital Account (Being the cash, goods, furniture and machinery brought to start business)	Dr. Dr. Dr. Dr.	40,000 10,000 10,000 5,000	65,000
2	Buildings Account To Cash Account (Being the buildings purchased)	Dr.	5,000	5,000
3	Cash Account Discount Account To Sales Account (Being the goods sold and discount allowed)	Dr. Dr.	6,300 700	7,000
4	Purchase Account To Cash Account To Discount Allowed Account (Being the goods purchased and discount allowed)	Dr.	6,000	5,700 300
5	William Account To Sales Account (Being goods sold on credit)	Dr.	2,500	2,500
6	Cash Account To Bank Account (Being amount withdrawn for office use)	Dr.	800	800
7	Freights Account To Cash Account (Being cash paid for freight)	Dr.	500	500
8	Cash Account To Investment in Shares Account (Being 50 shares in National Ltd. sold @ Rs.20 per share less commission)	Dr.	970	970
9	Bank Account To Vijay Account (Being cheque received and deposited in bank)	Dr.	5,000	5,000

10	Anderson Account To Cash Account (Being the cash paid in full settlement)	Dr.	1,500	1,500
11	Drawing Account To Bank Account (Being amount withdrawn for personal use)	Dr.	500	500
12	Rent Account Salaries Account To Cash Account (Being paid rent and salaries)	Dr. Dr.	400 1,000	1,400
13	Bank Account To Dividend Account (Being Dividend received)	Dr.	300	300
14	Murugan Account To Bank Account To Discount Allowed Account (Being Cheque received from Murugan in settlement of a debt of Rs.1250 dishonoured and discount allowed)	Dr.	1,250	1,000 250
15	Bank Account To Interest on Investment account (Being Bank collected interest on investment)	Dr.	1,500	1,500
16	Depreciation Account To Machinery Account (Being depreciation on machinery charged @ 10% P.a. on Rs. 2000 for six months)	Dr.	1,000	1,000
17	Balu Account To Sales Account (Being goods sold to Balu)	Dr.	2,000	2,000

Illustration: 4

Journalize the following transactions :

Jan. 2003		Rs.
1	Ravi Commenced business with	42,000
3	Goods purchased for cash	18,400
6	Goods sold to Ramesh on credit	11,200
7	Brought goods from Ram	6,600
10	Cash received from Ramesh	7,200
12	Paid Ram on account	4,200
16	Goods sold to Rajive	7,500
20	Goods sold for cash	15,000
27	Amount paid to Ram	2,400
29	Cash received from Rajive	7,500
31	Paid rent in cash	900
31	Salary paid to office staff	1,400

Solution:**Journal**

<i>Date</i>	<i>Particulars</i>	<i>L.F.</i>	<i>Debit Rs.</i>	<i>Credit Rs.</i>
2003 Jan.1	Cash Account Dr. To Capital Account (Being the amount invested in cash)		42,000	42,000
3	Purchase Account Dr. To Cash Account (Being cash purchased of goods)		18,400	18,400
6	Ramesh Account Dr. To Sales Account (Being credit sales of goods)		11,200	11,200
7	Purchase Account Dr. To Ram Account (Being credit purchase of goods)		6,600	6,600
10	Cash Account Dr. To Ramesh Account (Being cash received from Ramesh)		7,200	7,200
12	Ram Account Dr. To Cash Account (Being cash paid to Ram)		4,200	4,200
16	Rajive Account Dr. To Sales Account (Being Credit Sales)		7,500	7,500
20	Cash Account Dr. To Sales Account (Being Goods sold for cash)		15,000	15,000
27	Ram Account Dr. To Cash Account (Being amount paid to Ram)		2,400	2,400
29	Cash Account Dr. To Rajive Account (Being cash received from Rajive)		7,500	7,500
31	Rent Account Dr. To Cash Account (Being cash paid for rent)		900	900
31	Salaries Account Dr. To Cash Account (Being cash paid for salaries)		1,400	1,400

Illustration: 5

Journalize the transactions given below in the books of Sakesha & Co. :

2003

- Jan.1 Sakesha starts business with Rs. 40,000
 1 Paid in to bank Rs. 36,000
 2 Bought furniture for 1,700 and typewriter for Rs. 3,000, payment made by cheque
 5 Goods purchased from Ramasamy & Co. for 11,200 on credit
 7 Goods purchased from Porwal & Co. for Cash Rs. 2,200
 8 Goods sold on credit to Gupta & Co. Rs. 3,000
 10 Goods sold on credit to Chandra & Co. Rs. 5,600
 11 Paid for office stationery Rs. 500
 12 Paid rent Rs. 400
 14 Brought fixtures for Rs. 2,000
 17 Received cash from Gupta & Co. Rs. 2940; allowed them discount Rs. 60
 20 Issued cheque for Rs. 11,000 in full settlement (i.e., nothing more is due them) to Ramasamy & Co.
 25 Paid in to bank Rs. 2,400
 30 Paid insurance premium Rs. 900 by cheque

Solution:**Journal of Sakesha & Co.**

<i>Date</i>	<i>Particulars</i>	<i>L.F.</i>	<i>Debit Rs.</i>	<i>Credit Rs.</i>
Jan.1	Cash Account Dr. To Capital Account (Being commenced with business Rs. 40,000)		40,000	40,000
1	Bank Account Dr. To Cash Account (Being cash paid in to bank)		36,000	36,000
2	Furniture Account Dr. Typewriter Account Dr. To Bank Account (Being bought furniture & typewriter)		1,700 3,000	4,700
5	Goods Purchased Account Dr. To Ramasamy & Co. (Being goods purchased on credit)		11,200	11,200
7	Good Purchased Account Dr. To Cash Account (Being goods received from Porwal & Co.)		2,200	2,200
8	Gupta & Co. Account Dr. To Sales Account (Being goods sold on credit)		3,000	3,000
10	Chandra & Co. Account Dr. To Sales Account (Being goods sold on credit)		5,600	5,600
11	Office Stationery Account Dr. To Cash Account (Being bought office stationery)		500	500

12	Rent Account To Cash Account (Being Rent Paid)	Dr.	400	400
14	Fixtures Account To Cash Account (Being bought fixtures)	Dr.	2,000	2,000
17	Cash Account To Gupta & Co. Account To Discount Allowed A/c (Being cash received in full statement)	Dr.	3,000	2,940 60
20	Ramasamy & Co. Account To Bank Account (Being cheque issued to Ramasamy & Co.)	Dr.	11,000	11,000
25	Bank Account To Cash Account (Being cash paid into bank)	Dr.	2,400	2,400
30	Insurance Premium Account To Bank Account (Being insurance premium paid by cheque)	Dr.	900	900

Illustration: 6

Journalize the following transactions :

2003

- March 1 K. Singh started business with cash Rs. 80,000
 2 Paid in to bank Rs. 4,000
 4 Goods purchased from Prasad & Co. for cash Rs. 30,000
 7 Goods sold for cash Rs. 12,000
 9 Bought furniture from Kapur & Co. for Rs. 10,000 and paid by cheque
 11 Goods sold to Sethi & Co. for Rs. 8000 on credit
 13 Goods purchased from Gupta & Co. Rs. 20,000 on credit
 15 Damaged goods returned to Gupta & Co. Rs. 10,000
 16 Cash received from Sethi & Co. Rs. 7880 in full settlement
 17 Withdraw goods for personal use Rs. 2000
 19 Withdraw cash from business for personal use Rs. 4000
 21 Paid telephone rent Rs. 2000
 24 Paid cash to Gupta & Co. in full settlement of Rs. 9800
 29 Brought stationery Rs. 400
 Paid rent to office building Rs. 1000
 Paid salaries to office staff Rs. 4000
 31 Paid advertisement expenses of Rs. 2000

Journal

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
2003 Mar. 1	Cash Account Dr. To Capital Account (Being commenced of business)		80,000	80,000
2	Bank Account Dr. To Cash Account (Being cash paid in to bank)		4,000	4,000
4	Purchase Account Dr. To Cash Account (Being goods purchased for cash)		30,000	30,000
7	Cash Account Dr. To Sales Account (Being goods sold for cash)		12,000	12,000
9	Furniture Account Dr. To Bank Account (Being purchase of furniture)		10,000	10,000
11	Sethi & Co. Account Dr. To Sales Account (Being goods sold on credit)		8,000	8,000
13	Purchase Account Dr. To Gupta & Co. Account (Being goods purchased on credit)		20,000	20,000
15	Gupta & Co. Account Dr. To Purchase Return Account (Being damaged goods returned)		10,000	10,000
16	Cash Account Dr. Discount Account Dr. To Sethi & Co. Account (Being cash received from Sethi & Co. in full settlement and allowed Rs. 140 as discount)		7,880 120	8,000
17	Drawings Account Dr. To Purchases Account (Being withdrawal of goods for personal use)		2,000	2,000
19	Drawings Account Dr. To Cash Account (Being cash withdrawal from the business for personal use)		4,000	4,000
21	Telephone Rent Account Dr. To Cash Account (Being telephone rent paid)		2,000	2,000
24	Gupta & Co. Account Dr. To Cash Account To Discount Account (Being cash paid to Gupta & Co. and allowed discount Rs. 200)		10,000	9,800 200

29	Stationery Account	Dr.	400	
	Rent Account	Dr.	1,000	
	Salaries Account	Dr.	4,000	
	To Cash Account (Being expenses paid)			5,400
31	Advertisement Expenses A/c	Dr.	2,000	
	To Cash Account (Being advertisement expenses paid)			2,000

QUESTIONS

1. What do you understand by accounting books and records?
2. What is meant by Journal?
3. Explain the different types of Journals.
4. Draw a specimen ruling of Journal.
5. What are the factors to be considered while making journal entry?
6. What do you understand by source of document? Explain briefly various sources of documents.

PRACTICAL PROBLEMS

- (1) Journalize the following transactions in the books of Mrs. Sharma & Co. :

2003

		Rs.
Jan. 1	Commenced business with cash	2,00,000
1	Purchased Machinery	25,000
2	Purchased goods on Credit from Ram	10,000
3	Purchase goods for cash	20,000
5	Sold goods for cash	10,000
7	Goods purchased from Ramesh	5,000
9	Goods return to Ram	500
10	Goods sold to Murugan	15,000
13	Goods returned by Murugan	300
15	Draw cash from bank for office use	1,000
17	Draw cash from bank for private use	2,000
19	Purchased furniture	5,000
22	Paid for office rent	1,500
25	Paid for Salaries	20,000
27	Paid for Advertisement	4,000
30	Sold goods Rs. 25,000 less 10% Discount.	

- (2) Pass the necessary Journal entries of Mrs. Gupta & Co.:

April 2003

		Rs.
1	Paid into Bank	50,000
2	Purchased Furniture for cash	10,000
5	Deposited into Bank	15,000
6	Purchased goods from Rahul	5,000
7	Sold goods on credit to Siva	7,000
9	Cash Sales	9,000
10	Cash Purchases	15,000
11	Amount withdrawn from bank for office use	3,000
15	Paid insurance premium	5,000
17	Dividend received	3,000
19	Paid rent	2,000
22	Paid Salaries	15,000
24	Drawn cash from bank for personal use	4,000
25	Goods returned from Siva	300
27	Goods returned to Rahul	200
30	Paid for Advertisement	1,000

- (3) Journalize the following transactions in the books of Ramesh & Co.:

2003

- Jan. 1 Started business with Rs. 50,000 and paid into Bank Rs. 25,000
 3 Sold goods for cash Rs. 20,000
 5 Brought Furniture for Rs. 7,000
 7 Purchased goods from Pandey & Co. Rs. 15,000
 9 Withdrawn Rs. 700 from bank for office use
 11 Sold goods to Jain & Co. Rs. 10,000
 13 Paid Salaries Rs. 20,000
 15 Paid Telephone charges Rs. 1,000
 17 Paid into Bank Rs. 50,00
 19 Sold goods to Mrs. Gowda on credit for Rs. 15,000 less 10% Discount
 21 Goods returned from Pandey Rs. 500
 25 Received cash from Jain & Co. Rs. 5,500 Discount allowed Rs. 250
 27 Withdraw Rs. 1,500 from bank for personal use
 31 Paid for advertisement Rs. 2,000

- (4) Journalize the following transactions in the books of Mrs. Sam & Co.:

2003

	Rs.
Jan. 1 Started business with cash	2,00,000
1 Paid in to Bank	50,000
2 Furniture purchased for cash	25,000
5 Machinery purchased	30,000
7 Goods sold for cash	10,000
9 Purchased goods from Reddy & Co.	20,000
10 Goods returned to Gupta.	500
13 Goods Returned from Reddy & Co.	1,000
15 Cash received from Jain Rs. 8,000 and discount allowed to him Rs. 100	
17 Withdrawn from bank for office use	3,000
19 Paid Telephone rent	4,000
21 Paid Salaries	25,000
23 Goods sold to Ram on credit for	8,000
25 Paid rent and rates	1,000
27 Withdrawn from bank for personal use	2,000
29 Cash paid to Reddy & Co. for full settlement of his account	15,000
31 Goods sold to Ramesh for 10,000 less 10% trade discount.	

- (5) Journalize the following transactions, in the books of Hariprasad & Co.:

2003

- Jan. 1 Business started with cash Rs. 2,50,000
 1 Cash deposited into Bank Rs. 25,000
 2 Machinery purchased from Krishna on credit for Rs. 10,000
 2 Furniture purchased for cash Rs. 5,000
 3 Sold goods to Murugan less trade discount of 10% for Rs. 20,000
 5 Goods purchased from Jain for Rs. 5,000 at 10% trade discount.
 7 Goods returned from Murugan for Rs. 250
 9 Goods returned to Jain for Rs. 100
 11 Withdrawn Rs. 5,000 from bank for office use
 13 Paid for Advertisement Rs. 2,000
 15 Goods purchased for cash Rs. 5,000
 17 Paid salaries for Rs. 30,000
 19 Goods sold for cash Rs. 10,000
 21 Paid interest Rs. 2,000
 23 Dividend received for Rs. 4,000
 25 Withdrawn cash from bank for personal use for Rs. 1,000
 27 Cash paid to Jain in full settlement of his account for Rs. 5,000
 29 Deposited cash into Bank Rs. 3,000
 31 Sold goods to Karthik on credit Rs. 7,000

(6) Journalize the following transactions :

2003

- Jan. 1 Started business with Rs. 2,00,000; paid in to Bank Rs. 1,00,000
 3 Purchased furniture for cash Rs. 10,000
 7 Goods Purchased for cash Rs. 60,000
 8 Goods Sold for cash Rs. 12,000
 10 Purchased one typewriter for Rs. 4,000 from Ram & Co. on credit
 12 Goods sold to Kannan & Co. for Rs. 10,000 on credit
 15 Bought goods from Mahandra & Co. for Rs. 20,000 on credit
 16 Paid Rs. 5,000 for advertisement
 24 Goods sold to Varma & Co. Rs. 8,000 for cash
 25 Paid salaries to office staff Rs. 5,000
 27 Paid telephone rent Rs. 1,000
 30 Withdraw from bank Rs. 2,500 for private use
 31 Bought one delivery van for Rs. 40,000 from Mumbai Motor Co. on credit.

(7) Journalize the following transactions :

2003

- Aprl. 1 Gill Commenced business with Rs. 1,00,000
 2 Paid in to Bank Rs. 60,000
 3 Purchased goods from Lindo Rs. 40,000
 5 Sold goods to Moorthi Rs. 30,000
 7 Purchased Furniture for Rs. 2,500
 8 Returned goods to Lindo Rs. 5,000
 10 Stationery purchased for Rs. 250
 11 Paid Lindo Rs. 35,000 by cheque
 14 Moorthi returned goods worth Rs. 2,000
 16 Moorthi paid us Rs. 28,000
 18 Cash sales Rs. 1,500
 19 Purchased goods from Gopal Rs. 10,000
 20 Sales to Meenashi & Co. Rs. 6,000
 21 Cash purchases Rs. 3,000
 22 Returned goods to Gopal Rs. 2,000
 23 Paid Gopal by cheque Rs. 8,000
 25 Received cheque from Meenashi & Co. Rs. 6,000
 26 Drawings Rs. 2,500
 27 Sold goods to Valen and cash received Rs. 1,500
 28 Paid rent Rs. 1,500 by cheque
 30 Paid Salary Rs. 2,000

(8) Journalize the following transactions :

2003

- Mar. 1 Goods purchased for cash from Murthy Rs. 34,000
 3 Goods sold to Narayan Rs. 34,000 on credit
 5 Returned damaged goods to Dinkar Rs. 1,000
 7 Paid salaries Rs. 1,700
 10 Commission received for Rs. 1,400
 15 Goods sold to Rajendra for cash Rs. 4,000
 19 Goods sold on cash Rs. 10,000
 23 Purchased furniture from Prasad & Co. at Rs. 9,000 on credit
 25 Paid cash to Prasad & Co. Rs. 9,000
 31 Paid Rent Rs. 2,500

(9) Journalize the following transactions :

2003

- Mar. 1 P.S. Rao started business with cash Rs. 10,000 and bank balance Rs. 1,60,000,
 building Rs. 60,000 and furniture Rs. 4,000
 2 Purchased goods from Rajendra Rs. 1,00,000
 3 Goods sold to Prasad Rs. 24,000

- 5 Goods purchased from Ghosh and paid by cheque Rs. 10,000
- 6 Damaged goods returned to Rajendra Rs. 10,000
- 7 Received goods returned by Prasad Rs. 4,000
- 8 Received cheque from Prasad Rs. 20,000
- 10 Paid in to bank to Rs. 20,000
- 11 Paid Rajendra by cheque Rs. 90,000
- 12 Commission received Rs. 6,000
- 14 Purchased plant and machinery
- 15 Withdrawn from bank Rs. 4,000
- 17 Goods sold to Rajan and cheque received Rs. 4,000
- 20 Paid in to bank Rs. 6,000
- 23 Cash received from Ashok Rs. 40,000
- 25 Commission paid to broker Rs. 1,000
- 30 Paid advertisement Rs. 5,000

- (10) The following are the transactions of Rajan Nair & Co. for the month of April 2003, Journalize the transactions :

2003

- Aprl. 1 Capital paid in to bank Rs. 50,000
- 1 Bought stationery for cash Rs. 300
 - 2 Bought office furniture from Gupta & Co. Rs. 5,000
 - 3 Goods sold to Anand Rs. 10,000
 - 5 Goods purchased for cash Rs. 21,000
 - 7 Received cheque from Bharathan Rs. 10,000
 - 10 Bought postage stamps Rs. 100
 - 12 Goods sold for cash Rs. 7,500
 - 15 Paid salaries to office staff Rs. 2,500
 - 16 Paid Gupta & Co. by cheque Rs. 5,000
 - 17 Goods sold to Ashok & Co. Rs. 5,000
 - 19 Goods purchased from Lakshman & Co. Rs. 7,000
 - 21 Goods purchased for cash from Thaker & Co. Rs. 2,250
 - 25 Goods sold to Anand Rs. 3,500
 - 27 Cheque received from Ashok & Co. Rs. 5,000
 - 29 Paid Thaker & Co. by cheque in full settlement of Rs. 2,250
 - 30 Withdrawn from bank Rs. 2,500

- (11) Pass journal entries in the books of Jain & Co. from the following transactions :

2004

- Mar. 1 Jain & Co. started business with cash Rs. 80,000; Goods Rs. 80,000 and furniture Rs. 20,000
- 5 Goods sold to Ravi for cash Rs. 20,000
 - 7 Damaged goods returned from Ravi Rs. 4,000
 - 9 Received from Ravi Rs. 15,980 in full settlement of his account
 - 13 Bought goods from Sherlekar of the list price of Rs. 20,000 at Rs. 15 trade discount
 - 17 Goods returned to Sherlekar of the list price of Rs. 2,000
 - 22 Settled the account of Sherlekar by paying cash, under a discount of 10%
 - 25 Bought a furniture for Rs. 2,400 for the domestic use of Jain & Co.
 - 31 Paid for trade expenses Rs. 1,400
 - 31 Paid for travelling expenses Rs. 760

- (12) Journalize the following transactions :

2004

- Jan. 1 Nataraj started with cash Rs. 2,00,000
- 2 Paid in to bank Rs. 2,00,000
 - 4 Purchased goods from Thangam & Co. on credit Rs. 10,000
 - 5 Paid Postage & Telegram Rs. 500
 - 7 Bought furniture Rs. 10,000
 - 8 Purchased adding machine Rs. 20,000
 - 9 Goods sold for cash Rs. 25,000
 - 15 Sold goods on credit to Mohan & Co. Rs. 50,000
 - 16 Paid to Thangam & Co. Rs. 9,950 and discount allowed by him Rs. 50
 - 20 Sold goods to Ramesh & Co. Rs. 15,000

- 24 Received cheque from Mohan & Co. in full settlement of amount due to them Rs. 49,500
- 31 Paid rent by cheque Rs. 5,000

(13) Pass journal entries for the following transactions :

- (1) Goods purchased from Kapil Dev for Rs. 80,000 at a trade discount of 10% and cash discount of 2% paid 75% of the amount immediately
- (2) Received a cheque from Prem Kumar for Rs. 16,000 this cheque was deposited in to bank the next day
- (3) Cheque received from Premkumar was dishonoured
- (4) Sold old news papers Rs. 100
- (5) Bought goods from Raj & Co. and paid by cheque Rs. 14,000
- (6) Sold half of the above goods to Sam & Co. at a profit of 35% on cost

(14) Record the following transactions in the account of Hari & Co. :

2004

- Jan. 1 Goods sold to Swaminathan Rs. 12,000
- 3 Cash received from Swaminathan Rs. 11,600
and allowed him discount Rs. 400
- 15 Bought goods from Rajan on Credit Rs. 16,000
- 20 Paid cash to Rajan in full settlement of his account Rs. 15,900
- 25 Paid cash for trade expenses Rs. 200
- 27 Paid cash for stationery Rs. 375
- 29 Paid wages Rs. 500
- 30 Cash Sales Rs. 12,000

(15) Journalize the following transactions :

- (1) Bought goods for cash Rs. 50,000
- (2) Paid cash for stationery Rs. 500
- (3) Bought furniture for cash Rs. 4,000
- (4) Sold goods for cash Rs. 16,000
- (5) Sold goods to Jhon on credit Rs. 5,000
- (6) Sold goods to William for cash Rs. 7,000
- (7) Paid rent Rs. 1,500
- (8) Paid salary Rs. 1,000
- (9) Paid freight on goods purchased Rs. 500
- (10) Paid wages Rs. 700
- (11) Received from James Rs. 5,000
- (12) Received Interest from James Rs. 1,000

LEDGER

Meaning and Definition

Ledger refers to the book of Main Entry and it contains various accounts such as Personal Accounts, Real Accounts and Nominal Accounts. In the first stage of accounting cycle, all business transactions are recorded separately through Journal or Subsidiary Books during a particular date or period. Hence, Journal fails to bring the similar transactions together and it is not useful for any reference. In order to have a consolidated view of the similar transactions, the transactions entered in the journal will have to be posted to Ledger Account.

A Ledger Account may be defined as a “Summary Statement of all transactions relating to a person, asset, expense or income which have taken place during a given period of time and showing their net effect.” From the above definition, we can observe that Ledger is designed as the book of second stage in the accounting cycle which is used for recorded transactions which are classified and grouped into different heads of accounts.

Specimen Rulings of Ledger

The specimen of ruling of each account in the ledger is as follows :

Dr.				Name of Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
	To Name of Debit A/c				By Name of Credit A/c						

From the above specimen rulings of ledger account, we can observe the following points :

- (1) Ledger Account is usually in the "T" form which contain two sides—Debit side and Credit side.
- (2) Left hand side is called Debit Side (Dr.)
- (3) Right hand side is called Credit Side (Cr.)
- (4) Each side further divided into four columns :
 - (a) Column 1 meant for date, month and year.
 - (b) Column 2 meant for particulars.
 - (c) 'F' stands for Folio (Page Number) of the Journal or Subsidiary Books.
 - (d) Accounts to be Debited or Credited.
- (5) The name of accounts to be debited find an entry on the left side.
- (6) The name of accounts to be credited find an entry on the right side.

Posting of Journal to Ledger

The term "Posting" refers to the process of entering in the ledger the information given in the journal. In other words, the process of transferring the transactions from the journal to the ledger during the particular period is known as "Posting." Accordingly separate account should be opened into the ledger for posting the transactions relating to the individual persons, assets, expenses or losses as shown in the journal. The following example will make you clear the process of posting.

Jan.1

2003, Kannan Sold goods to Gupta Rs. 5,000.

Journal Entry

2003	Particulars	Debit Rs.	Credit Rs.
Jan.1	Gupta Account Dr. To Sales Account (Being goods Sold to Gupta on Credit)	5,000	5,000

Dr.				Gupta Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.1	To Sales A/c		5,000								

Dr.				Sales Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
				2003 Jan.1	By Gupta A/c		5,000	

Balancing of Ledger Account

In order to prepare the financial statements, balancing of various accounts in the ledger is essential. The following procedure to be adopted while balancing of various accounts in the ledger.

- (1) Debit and Credit sides of an accounts are totalled separately.
- (2) Find the difference between the total of both sides.
- (3) The difference is entered on the side on which the total is smaller and this difference is the closing balance shown by the account and this will be carried forward to the next year as the "opening balance" in the account.
- (4) If the debit side of an amount is more, it is called Debit Balance and it is entered on the credit side to close the account and written as by balance c/d.
- (5) If the credit side of an amount is more it is called Credit Balance and it is entered on the debit side to close the account and written as To Balance c/d.

Difference between Journal and Ledger

In the process of accounting cycle, both the Journal and Ledger serve as important books which are indispensable for each other. The following are the important points that differentiate the Journal and Ledger:

<i>Journal</i>	<i>Ledger</i>
(1) Journal is the book of Original Entry or First Entry	(1) Ledger is the book of Second entry
(2) It is the book of Chronological Record	(2) It is the book of Analytical Record
(3) The process of recording in the journal is called journalizing	(3) The process of recording in ledger is posting
(4) Journal as a book supported by greater sources of evidence	(4) Ledger is dependent on journal
(5) Journal lays focus on recording transactions	(5) Ledger focuses on process of classification of grouping of different heads of accounts.
(6) The process of Journalizing is a continuous one.	(6) The process of posting in ledger to be done according to the needs and convenience.

Illustration: 7

By Solving illustration 1, Chapter 3, "Accounting Books and Records."

Solution:**Ledger****Dr. Capital Account (Rs. In lakhs) Cr.**

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Balance c/d		4,500	2003 Mar.1	By Cash A/c		4,500
			4,500				4,500
				Apr.1	By Balance b/d		4,500

Dr. Cash Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 1	To Capital A/c		4,500	2003 Mar. 1	By Bank A/c		2,500
5	To Sales A/c		600	2	By Purchase A/c		1,500
15	To Sales A/c		250	25	By Telephone rent A/c		40
18	To Rosy A/c		396	28	By Rosy A/c		594
21	To Bank A/c		500	30	By Stationery A/c		20
				30	By Rent A/c		100
				30	By Salaries A/c		250
				31	By Balance c/d		1,242
			6,246				6,246
Apr. 1	To Balance b/d		1,242				

Dr. Bank Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar.1	To Cash A/c		2,500	2003 Mar.3	By Furniture A/c		500
				3	By Cash A/c		500
				21	By Drawings A/c		100
				31	By Balance c/d		1,400
			2,500				2,500
Apr. 1	To Balance b/d		1,400				

Dr. Purchases Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar.2	To Cash A/c		1,500	2003 Mar.31	By Balance c/d		1,500
			1,500				1,500
Apr.1	To Balance b/d		1,500				

Dr.				Furniture Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 2	To Bank A/c		500	Mar.31	By Balance c/d		500	
			500				500	
Apr. 1	To Balance b/d		500					

Dr.				Sales Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar.31	To Balance c/d		1,250	Mar.6	By Cash A/c		600	
				8	By Rosy A/c		400	
				15	By Cash A/c		250	
			1,250				1,250	
				Apr.1	By Balance b/d		1,250	

Dr.				Thomas Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 12	To Return onwards A/c		100	Mar.31	By Balance c/d		100	
			100				100	
Apr. 1	To Balance b/d		100					

Dr.				Return Outwards Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar.31	To Balance c/d		100	Mar.12	By Thomas A/c		100	
			100				100	
				Apr.1	By Balance b/d		100	

Dr.				Rosy Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 31	To Sales A/c		400	Mar. 18	By Cash A/c		396	
28	To Cash A/c		594	18	By Discount A/c		4	
28	To Discount A/c		6	31	By Balance c/d		600	
			1,000				1,000	
Apr. 1	To Balance b/d		1,000					

Dr.				Discount Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar.18	To Rosy A/c		4	Mar.28	By Rosy A/c		6	
31	To Balance c/d		2					
			6				6	
				Aprl.1	By Balance b/d		2	

Dr.				Drawings Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 21	To Bank A/c		100	Mar. 31	By Balance c/d		100	
			100				100	
Aprl. 1	To Balance b/d		100					

Dr.				Telephone Rent Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 25	To Cash A/c		40	Mar. 31	By Balance c/d		40	
			40				40	
Aprl. 1	To Balance b/d		40					

Dr.				Stationery Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar. 30	To Cash A/c		20	Mar.31	By Balance c/d		20	
			20				20	
Aprl. 1	To Balance b/d		20					

Dr.				Rent Account				Cr.
Date	Particulars	J.F.	Amounts Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Mar.30	To Cash A/c		100	Mar.31	By Balance c/d		100	
			100				100	
Aprl.1	To Balance b/d		100					

Dr.				Salaries Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Mar.30	To Cash A/c		250	2003 Mar.31	By Balance c/d		250				
			250				250				
Apr.1	To Balance b/d		250								

Illustration: 8

By Solving illustration 2, Chapter 3, "Accounting Books and Records."

Solution:**Ledger***(Rs. in lakhs)*

Dr.				Machinery Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.1	To Cash A/c		5,000	2003 Jan.31	By Balance c/d		5,500				
31	To Cash A/c		500				5,500				
			5,500								
Feb.1	To Balance b/d		5,500								

Dr.				Cash Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.1	To Sales A/c		2,000	2003 Jan.1	By Machinery A/c		5,000				
4	To Murugan A/c		700	6	By Salaries A/c		800				
5	To Bank A/c		500	7	By Purchase of goods A/c		900				
13	To Dividend A/c		500	8	By Machinery A/c		500				
15	To Old Furniture A/c		200	9	By Ramasamy A/c		400				
31	To Balance c/d		4,500	10	By Interest A/c		400				
			8,400	14	By Rent A/c		400				
				Api. 1	By Balance b/d		4,500				

Dr.				Sales Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan. 31	To Balance c/d		3,000	2003 Jan. 2	By Cash A/c		2,000				
			3,000	2	By Kannan A/c		1,000				
							3,000				
				Feb. 1	By Balance b/d		3,000				

Dr. Kannan Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 2	To Sales A/c		1,000	2003 Jan. 31	By Balance c/d		1,000
			1,000				1,000
Feb. 1	To Balance b/d		1,000				

Dr. Murugan Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		700	2003 Jan. 4	By Cash A/c		700
			700				700
				Feb. 1	By Balance b/d		700

Dr. Bank Account Cr.

Date	Particulars	J.F.	Amounts Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		500	2003 Jan. 5	By Cash A/c		500
			500				500
				Feb. 1	By Balance b/d		500

Dr. Salaries Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 6	To Cash A/c		800	2003 Jan. 31	By Balance c/d		800
			800				800
Feb. 1	To Balance b/d		800				

Dr. Purchases of Goods Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 7	To Cash A/c		900	2003 Jan. 31	By Balance c/d		1,000
Jan. 7	To Discount A/c		100				1,000
			1,000				
Feb. 1	To Balance b/d		1,000				

Dr. Discount Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		100	2003 Jan. 7	By Purchase of Goods A/c		100
			100				100
				Feb. 1	By Balance b/d		100

Dr. Ramasamy Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.9	To Cash A/c		400	2003 Jan.4	By Balance c/d		400
			400				400
Feb.1	To Balance b/d		400				

Dr. Interest Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.10	To Cash A/c		400	2003 Jan.31	By Balance c/d		400
			400				400
Feb.1	To Balance b/d		400				

Dr. Premkumar Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.11	7 To Purchase Return A/c		300	2003 Jan.31	By Balance c/d		300
			300				300
Feb.1	To Balance b/d		300				

Dr. Purchases Return Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.31	To Balance c/d		300	2003 Jan.11	By Premkumar A/c		300
			300				300
				Feb.1	By Balance b/d		300

Dr. Sales Return Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.12	To Periyasamy A/c		200	2003 Jan.31	By Balance c/d		200
			200				200
Feb.1	To Balance b/d		200				

Dr. Periyasamy Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.31	To Balance c/d		200	2003 Jan.12	By Sales Return A/c		200
			200				200
				Feb.1	By Balance b/d		200

Dr.				Dividend on Shares Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.31	To Balance c/d		500	2003 Jan.13	By Cash A/c		500				
			500				500				
				Feb.1	By Balance b/d		500				

Dr.				Rent Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.14	To Cash A/c		400	2003 Jan.31	By Balance c/d		400				
			400				400				
Feb.1	To Balance b/d		400								

Dr.				Old Furniture Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.31	To Balance c/d		200	2003 Jan.15	By Cash A/c		200				
			200				200				
				Feb.1	By Balance b/d		200				

Illustration: 9

By Solving illustration 3, Chapter 3 of "Accounting Books and Records."

Solution:**Ledger**

Dr.				Capital Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003 Jan.31	To Balance c/d		65,000	2003 Jan.1	By Cash A/c		40,000				
				1	By Goods A/c		10,000				
				1	By Machinery A/c		10,000				
				1	By Furniture A/c		5,000				
			65,000				65,000				
				Apr.1	By Balance b/d		65,000				

Dr.				Bank Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan.1	To Capital A/c		40,000	Jan.2	By Buildings A/c		5,000				
3	To Sales A/c		6,300	4	By Purchase A/c		5,700				
6	To Bank A/c		800	7	By Freight A/c		500				
8	To Share Capital A/c		970	10	By Anderson A/c		1,500				
				12	By Rent A/c		400				
				12	By Salaries A/c		1,000				
				31	By Balance c/d		33,970				
			48,070				48,070				
Feb.1	To Balance b/d		33,970								

Dr.				Goods Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan.1	To Capital A/c		10,000	Jan.31	By Balance c/d		10,000				
			10,000				10,000				
Feb.1	To Balance b/d		10,000								

Dr.				Machinery Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan.1	To Capital A/c		10,000	Jan.19	By Depreciation A/c		1,000				
			10,000	31	By Balance c/d		9,000				
Feb.1	To Balance b/d		9,000				10,000				

Dr.				Furniture Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan.1	To Capital A/c		5,000	Jan.31	By Balance c/d		5,000				
			5,000				5,000				
Feb.1	To Balance b/d		5,000								

Dr.				Buildings Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan.1	To Cash A/c		5,000	Jan.31	By Balance c/d		5,000				
			5,000				5,000				
Feb.1	To Balance b/d		5,000								

Dr. Discount Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.3	To Sales A/c		700	Jan.4	By Purchases A/c		300
15	By Murugan A/c		250	31	By Balance c/d		150
			700				700
Feb.1	To Balance b/d		150				

Dr. Sales Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.31	To Balance c/d		11,500	Jan.3	By Cash A/c		6,300
				3	By Discount A/c		700
				5	By William A/c		2,500
				20	By Balu A/c		2,000
			11,500				11,500
				Feb.1	By Balance b/d		11,500

Dr. Purchases Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.4	To Cash A/c		5,700	Jan.31	By Balance c/d		6,000
4	To Discount A/c		300				6,000
			6,000				
Feb.1	To Balance b/d		6,000				

Dr. William Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.5	To Sales A/c		2,500	Jan.31	By Balance c/d		2,500
			2,500				2,500
Feb.1	To Balance b/d		2,500				

Dr. Bank Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan. 9	To Vijay A/c		5,000	Jan.6	By Cash A/c		800
14	To Dividend A/c		300	11	By Drawings A/c		500
16	To Interest on Investment A/c		1,500	15	By Murugan A/c		1,000
			6,800	31	By Balance c/d		4,500
							6,800
Feb.1	To Balance b/d		4,500				

Dr.				Cr.			
Freight Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.7	To Cash A/c		500	Jan.31	By Balance c/d		500
			500				500
Feb.1	To Balance b/d		500				

Dr.				Cr.			
Share Capital Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.31	To Balance c/d		970	Jan.31	By Cash A/c		970
			970				970
				Feb.1	By Balance b/d		970

Dr.				Cr.			
Vijay Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.31	To Balance c/d		5,000	Jan.9	By Bank A/c		5,000
			5,000				5,000
				Feb.1	By Balance b/d		5,000

Dr.				Cr.			
Anderson Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.10	To Cash A/c		1,500	Jan.31	By Balance c/d		1,500
			1,500				1,500
Feb.1	To Balance b/d		1,500				

Dr.				Cr.			
Drawings Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.11	To Bank A/c		500	Jan.31	By Balance c/d		500
			500				500
Feb.1	To Balance b/d		500				

Dr.				Cr.			
Rent Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Jan.12	To Cash A/c		400	Jan.31	By Balance c/d		400
			400				400
Feb.1	To Balance b/d		400				

Dr. Salaries Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.12	To Cash A/c		1,000	2003 Jan.31	By Balance c/d		1,000
			1,000				1,000
Feb.1	To Balance b/d		1,000				

Dr. Dividend Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.31	To Balance c/d		300	2003 Jan.14	By Bank A/c		300
			300				300
				Feb.1	By Balance b/d		300

Dr. Murugan Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.15	To Bank A/c		1,000	2003 Jan.31	By Balance c/d		1,250
15	To Discount A/c		250				1,250
			1,250				
Feb.1	To Balance b/d		1,250				

Dr. Interest on Investment Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.31	To Balance c/d		1,500	2003 Jan.16	By Bank A/c		1,500
			1,500				1,500
				Feb.1	By Balance b/d		1,500

Dr. Depreciation Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.19	To Machinery A/c		1,000	2003 Jan.31	By Balance c/d		1,000
			1,000				1,000
Feb.1	To Balance b/d		1,000				

Dr. Balu Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan.20	To Sales A/c		2,000	2003 Jan.31	By Balance c/d		2,000
			2,000				2,000
Feb.1	To Balance b/d		2,000				

QUESTIONS

1. What do you understand by Ledger?
2. Draw a specimen ruling of ledger. Explain it briefly.
3. What are the differences between Journal and Ledger?

PRACTICAL PROBLEMS

- (1) Record the following transactions in the Ledger of Mrs. Pandey & Co.:

2003		Rs.
Jan.	1 Commenced business with cash	4,00,000
	1 Purchased Machinery	50,000
	2 Purchased goods on credit from Ram	20,000
	3 Purchased goods for cash	20,000
	5 Sold goods for cash	10,000
	7 Goods purchased from Ramesh	10,000
	9 Goods Return to Ram	1,000
	10 Goods Sold to Murugan	30,000
	13 Goods returned by Murugan	500
	15 Draw cash from bank for office use	2,000
	17 Draw cash from bank for private use	5,000
	19 Purchased furniture	10,000
	22 Paid for office rent	4,000
	25 Paid for Salaries	30,000
	27 Paid for Advertisement	4,000
	30 Sold goods of Rs. 35,000 less 10% discount	

- (2) From the following transactions, you are required to prepare Journal and Ledger Account of Ram & Co.:

2003		Rs.
Jan.	1 Paid into Bank	50,000
	2 Purchased Furniture for cash	10,000
	5 Deposited into Bank	15,000
	6 Purchased goods from Rahul	5,000
	7 Sold goods on credit to Siva	7,000
	9 Cash Sales	9,000
	10 Cash Purchases	15,000
	11 Amount withdrawn from Bank for office use	3,000
	15 Paid insurance premium	5,000
	17 Dividend paid by cheque	2,000
	17 Dividend received	5,000
	19 Paid rent	1,500
	22 Paid salaries to office staff	15,000
	24 Draw cash from bank for personal use	4,000
	25 Goods returned from Siva	300
	27 Goods returned to Rahul	200
	30 Paid for Advertisement	1,000

- (3) Enter the following transactions in a Ledger Account of Ramesh & Co.:

2003	
Jan.	1 Started business with Rs. 50,000 and paid into Bank Rs. 25,000
	3 Sold goods for cash Rs. 20,000
	5 Brought Furniture for Rs. 7,000
	7 Purchased goods from Pandey & Co. Rs. 15,000
	9 Withdrawn Rs. 700 from bank for office use
	11 Sold goods to Jain & Co. Rs. 10,000
	13 Paid Salaries Rs. 20,000
	15 Paid Telephone charges of Rs. 1,000
	17 Paid into Bank Rs. 5,000
	19 Sold goods to Mrs. Gowda & Co. on Credit for Rs. 15,000 less 10% discount

- 21 Goods returned from Pandey Rs. 500
- 25 Received cash from Jain & Co. Rs. 5,500 discount allowed Rs. 250
- 27 Withdrawn Rs. 1,500 from bank for personal use
- 31 Paid for advertisement Rs. 2,000

(4) From the following transactions, you are required to prepare Journal and Ledger Account of Mrs. Sam & Co.:

2003

- Jan. 1 Started business with cash Rs. 2,00,000
- 1 Paid into Bank Rs. 50,000
- 2 Goods sold to Ramesh for Rs. 10,000 less 10% trade discount
- 4 Furniture purchased for cash Rs. 25,000
- 7 Withdrawn from bank for personal use Rs. 2,000
- 9 Machinery Purchased for cash Rs. 30,000
- 11 Goods sold to Ram on credit for Rs. 8,000
- 13 Good sold for cash Rs. 10,000
- 15 Purchased goods from Reddy & Co. Rs. 20,000
- 17 Goods returned from Reddy & Co. Rs. 1,000
- 20 Goods returned to Gupta Rs. 500
- 23 Cash paid to Reddy & Co. for full settlement of his account Rs. 15,000
- 25 Withdrawn cash from bank for office use Rs. 3,000
- 27 Paid telephone rent Rs. 1,500
- 27 Paid salaries to office staff Rs. 25,000
- 29 Cash received from John & Co. Rs. 8,000 and discount allowed to him Rs. 100
- 31 Goods sold for cash Rs. 5,000

(5) From the following transactions, you are required to prepare Journal and Ledger Account in the books of Hari Prasad & Co.:

2003

- Jan. 1 Business started with cash Rs. 3,00,000
- 1 Cash paid into Bank Rs. 25,000
- 1 Purchased Furniture Rs. 5,000
- 2 Machinery purchased from Krishna on credit for Rs. 10,000
- 3 Goods sold for cash Rs. 10,000
- 5 Goods sold to Murugan less trade discount of 10% for Rs. 20,000
- 7 Goods purchased from Ramesh for Rs. 5,000 at 10% trade discount
- 9 Goods returned from Murugan for Rs. 500
- 11 Goods returned to Ramesh for Rs. 3,000
- 14 Paid for Advertisement Rs. 2,000
- 15 Withdrawn Rs.4,000 from bank for office use
- 17 Goods purchased for cash Rs. 5,000
- 19 Paid salaries to office staff Rs. 18,000
- 21 Goods sold for cash Rs. 10,000
- 23 Paid interest Rs. 1,500
- 25 Dividend received Rs. 3,400
- 27 Withdrawn cash from bank for personal use for Rs. 1,400
- 29 Cash paid to Ramesh in full settlement of his account for Rs. 5,000
- 30 Deposited cash into bank Rs. 3,000
- 31 Sold goods to Karthik on credit for Rs. 5,000

TRIAL BALANCE

Meaning

To ensure the proof of completion and arithmetical correctness of the books of account, it is essential to prepare the trial balance. In the first stage of accounting all business transactions are recorded in Journal or Subsidiary Books. Then they are transferred to ledger by posting to relevant accounts. The fundamental principle of double entry system of accounting is that for every debit, there must be a corresponding and equal credit. Therefore, when all the accounts of a concern are thus balanced in the ledger at the end of the

period, a statement is prepared to show the list of debit balances on one side and credit balances on the other side. This list so prepared is called as "Trial Balance." Accordingly the total of the debit side of trial balance must be equal to that of its credit side.

Objectives of Trial Balance

The following are the important objectives of preparing the Trial Balance:

- (1) To ensure the arithmetical correctness of the book of accounts.
- (2) It is the statement that shows a summary of all business transactions recorded in the ledger accounts and reveals the net position at glance.
- (3) To ensure that the preparation of Journal and Ledger are based on the principles of double entry system.
- (4) To have a basis for preparation of income statements such as Trading, Profit and Loss Accounts.

Errors Not Disclosed by Trial Balance

The statement of Trial Balance is not a final and conclusive proof of the complete correctness of books. This is because, there are certain errors in the books of accounts which may be committed while recording, classifying or summarizing the financial transactions which are not disclosed by the trial balance. The following are some of the errors which will not affect the agreement of Trial Balance:

Classification of Errors

Errors can be classified on the basis of its nature :

- I. Errors of Omission.
- II. Errors of Commission.
- III. Errors of Principles.
- IV. Compensating Errors.

I. Errors of Omission : Errors of Omission refers to recording the transaction which is completely omitted in the books of journal or subsidiary books. Therefore errors are not disclosed by trial balance due to the transactions not being recorded and omitted in the book of original entry.

II. Errors of Commission : Errors of Commission may be occurred by wrong recording in the books of original entry. The committed errors arise due to the negligence of the Accountant while recording, totaling, carrying forward and balancing the accounting process. Therefore errors not disclosed by Trial Balance due to the errors committed by the negligence of the Accountants. The errors of commission may arise due to the following ways :

- (1) Entering the wrong amount to the correct side of correct subsidiary books
- (2) Entering the correct amount to the wrong side of correct subsidiary books
- (3) Entering the correct amount to the correct side of wrong subsidiary books
- (4) Posting wrong amount to the correct side of the accounts
- (5) Posting correct amount to the wrong side of the accounts
- (6) Posting to the correct side of the account but making double posting.

III. Errors of Principles : Transactions are recorded on the basis of the fundamental principles of double entry system of accounting. Errors of principles arise due to ignorance of the principles of accounting. Such errors do not affect the agreement of trial balance. The errors of principles occur due to the following ways :

- (1) Errors committed due to inability to properly allocate between revenue and capital items.
- (2) Errors committed due to inability to make the difference between capital expenditure and revenue expenditure.
- (3) Errors committed due to inability to make the difference between productive expenses and unproductive expenses.

IV. Compensating Errors : Compensating errors refer to those errors which are compensated by each other. In other words, the effect of one error is compensated by the other. Such errors which do not affect the agreement of the trial balance. For example, if wage paid Rs. 1,000 is debited in the Wage Account at Rs. 1,500 and dividend received Rs. 1,500 is credited in the Dividend Account at Rs. 2,000, the excess debit in Wage Account is compensated by an excess credit of Rs. 500 in Dividend Account.

Errors Disclosed by Trial Balance

A Trial Balance disclosed any errors due to affect the one side of account. The following are the examples of errors disclosed by the trial balance :

- (a) Errors committed in casting the books of subsidiary books.
- (b) Errors committed in carrying forward the total amount from one page to another.
- (c) Errors committed during posting from the books of journal or subsidiary books to ledger.
- (d) Errors committed in balancing the ledger accounts.
- (e) Errors committed during preparation of debtors' and creditors' list of accounts.
- (f) Errors committed due to ignorance in carrying forward a balance of an account to the Trial Balance.

Location of Errors

If the trial balance disagrees, it is essential to find out errors before proceeding further. The following is the usual procedure adopted to find out the errors :

- (1) Check the total of two side of the trial balance once again.
- (2) Divide the difference of the two sides of the trial balance by two and find out whether there appears an entry for the same amount either sides of the trial balance. It is possible that a balance may have been recorded in the wrong side of the trial balance thus resulting in the difference of double the amount.
- (3) If the mistake is not located by the first step then divide difference by 9. If the difference is evenly divisible by 9, the error can be an error of transposition of figure. For example, if Rs. 816 is written as Rs. 618 the difference is Rs. 198, and Rs. 198 is evenly divisible by 9. Thus, it can be concluded that where the difference is divisible by 9 there can be a possibility of this type of error.
- (4) Check the list of total balances of all debtors and creditors to find out the errors.
- (5) Check whether balances of cash and balances of bank have been taken in the trial balance or not.

- (6) Check the totals of different ledger accounts and carry forward to trial balances.
- (7) See the casting and carrying forward of subsidiary books.
- (8) Check the posting from the subsidiary books to ledger.

Suspense Account

If the efforts are not to locate the errors, the difference of the trial balance is temporarily transferred to the Suspense Account. This is made because, the preparation of financial statements cannot be delayed further. In Suspense Account all those errors can be rectified only by making suitable journal entries.

Methods of Preparation of Trial Balance

The following are the two methods of preparing the Trial Balance :

- I. Total Method.
- II. Balance Method.

I. Total Method: Under this method, the total of debits and credits of all accounts are shown in the respective debit and credit side of the trial balance.

II. Balance Method: In this method, only balance of each account of ledger is recorded in trial balance. In other words, all the list of debit balances recorded in one column and the list of credit balances recorded in the other. Of the two methods, this method is very widely used in practice.

Specimen Ruling of Trial Balance

The following is the specimen ruling of Trial Balance:

Trial Balance as on Mrs. I. M. Pandey's Book

S. No.	Name of Accounts	L.F.	Debit Balance Rs.	Credit Balance Rs.

Illustration: 10

From the accounts prepared in illustration 7, of Chapter 3 [Accounting Books and Records], you are required to prepare a Trial Balance :

Solution:**Trial Balance as on 30th April 2003***(Rs. in Lakhs)*

S. No.	Name of Accounts	L.F.	Debit Balance Rs.	Credit Balance Rs.
1	Capital Account		—	4,500
2	Cash Account		1,242	
3	Bank Account		1,400	
4	Purchase Account		1,500	
5	Furniture Account		500	
6	Sales Account		—	1,250
7	Thomas Account		100	—
8	Return Outwards Account		—	100
9	Rosy Account		600	—
10	Discount Account		—	2
11	Drawing Account		100	
12	Telephone Account		40	
13	Stationery Account		20	
14	Rent Account		100	
15	Salaries Account		250	
	Total		5,852	5,852

Illustration: 11

From the accounts prepared in illustration 8, of Chapter 3 [Accounting Books and Records], you are required to prepare a Trial Balance :

Solution:**Trial Balance as on Feb. 2003***(Rs in Lakhs)*

S. No.	Name of Accounts	L.F.	Debit Balance Rs.	Credit Balance Rs.
1	Machinery Account		5,500	—
2	Cash Account		—	4,500
3	Sales Account		—	3,000
4	Kannan Account		1,000	—
5	Murugan Account		—	700
6	Bank Account		—	500
7	Salaries Account		800	—
8	Purchase of Goods Account		1,000	—
9	Discount Account		—	100
10	Ramasamy Account		400	—
11	Interest Account		400	—
12	Premkumar Account		300	—
13	Purchase Return Account		—	300
14	Sales Return Account		200	—
15	Periasamy Account		—	200
16	Dividend on Shares Account		—	500
17	Rent Account		400	—
18	Old Furniture Account		—	200
	Total		10,000	10,000

Illustration: 12

From the accounts prepared in illustration 9, of Chapter 3 [Accounting Books and Records], you are requested to prepare a Trial Balance :

Solution:**Trial Balance as on 29th Feb. 2003**

S. No.	Name of Accounts	L.F.	Debit Balance Rs.	Credit Balance Rs.
1	Capital Account		–	65,000
2	Cash Account		33,970	–
3	Goods Account		10,000	–
4	Machinery Account		9,000	–
5	Furniture Account		5,000	–
6	Buildings Account		5,000	–
7	Discount Account		150	–
8	Sales Account		–	11,500
9	Purchase Account		6,000	–
10	William Account		2,500	–
11	Bank Account		4,500	–
12	Freight Account		500	–
13	Share Capital Account		–	970
14	Vijay Account		–	5,000
15	Anderson Account		1,500	–
16	Drawings Account		500	–
17	Rent Account		400	–
18	Salaries Account		1,000	–
19	Dividend Account		–	300
20	Murugan Account		1,250	–
21	Interest on Investment		–	1,500
22	Depreciation Account		1,000	–
23	Balu Account		2,000	–
	Total		84,270	84,270

Illustration: 13

Journalize the following transactions. Post in the ledger. Extract balances and prepare list of such balances:

2003

- Mar.1 Jain commenced business with Rs. 80,000 cash and also brought into business furniture worth Rs. 10,000; motor car valued for Rs. 24,000 and stock worth Rs. 40,000
- 4 Paid in to bank Rs. 76,000
- 5 Goods purchased from Ramesh on credit for Rs. 18,000
- 7 Goods sold to James on credit for Rs. 12,000
- 8 Brought stationery from Javier & Co. for cash Rs. 400
- 10 Goods Sold to Ram & Co. for cash Rs. 4,000
- 11 Paid traveling expenses to manager for Rs. 1,200
- 13 Withdrawn cash Rs. 2,000 from bank for personal use
- 15 Withdrawn from the bank Rs. 6,000 for office use
- 17 Issued by cheque Rs.17,600 to Ramesh in full settlement of his account

- 21 Paid clearing charges Rs. 800
 24 Received cheque for Rs. 12,000 from James
 29 Paid Rs. 600 by cheque to owner's house being the house rent of Jain
 30 Interest credit by bank for Rs. 400
 31 Bank charges Rs. 50 debited in Jain A/c

Journal

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
2003 Mar. 1	Cash A/c Furniture A/c Motor Car A/c Stock A/c To Jain's Capital A/c (Being Jain's commenced business)	Dr. Dr. Dr.	Dr. 10,000 24,000 40,000	80,000 1,54,000
4	Bank A/c To Cash A/c (Being cash paid in to bank)	Dr.	76,000	76,000
5	Purchases A/c To Ramesh A/c (Being goods purchased on credit)	Dr.	18,000	18,000
7	James A/c To Sales A/c (Being goods sold on credit)	Dr.	12,000	12,000
8	Stationery A/c To Cash A/c (Being office stationery purchased)	Dr.	400	400
10	Cash A/c To Sales A/c (Being goods sold for cash)	Dr.	4,000	4,000
11	Traveling expenses A/c To Cash A/c (Being payment of traveling expenses)	Dr.	1,200	1,200
13	Drawing A/c To Bank A/c (Being amount withdrawn for personal use)	Dr.	2,000	2,000
15	Cash A/c To Bank A/c (Being amount withdrawn for office use)	Dr.	6,000	6,000
17	Ramesh A/c To Bank A/c To Discount A/c (Being received cheque in full settlement)	Dr.	18,000	17,600 400
21	Clearing Charges A/c To Cash A/c (Being expenses paid)	Dr.	800	800

24	Bank A/c To James A/c (Being cheque received from James)	Dr.	12,000	12,000
29	Drawing A/c To Bank A/c (Being payment to owner's house towards rent)	Dr.	600	600
30	Bank A/c To Interest A/c (Being interest credited by bank)	Dr.	400	400
31	Bank Charges A/c To Bank A/c (Being bank charges debited to Jain A/c)	Dr.	50	50

Ledger

Dr. **Cash Account** Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 1	To Capital		80,000	2003 Mar. 4	By Bank		76,000
" 10	To Sales		4,000	" 8	By Stationery		400
" 15	To Bank		6,000	" 11	By Traveling Expenses	}	1,200
				" 21	By Clearing charges		800
				" 31	By Balance c/d		11,600
			90,000				90,000
Apr. 1	To Balance b/d		11,600				

Dr. **Bank Account** Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 4	To Cash		76,000	2003 Mar. 13	By Drawings		2,000
" 24	To James		12,000	" 15	By Cash		6,000
" 30	To Interest		400	" 17	By Ramesh		17,600
				" 29	By Drawings		600
				" 31	By Bank charges		50
				" 31	By Balance c/d		62,150
			88,400				88,400
Apr. 1	To Balance b/d		62,150				

Dr. **Purchase Account** Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 5	To Ramesh		18,000	2003 Mar. 31	By Balance c/d		18,000
			18,000				18,000
Apr. 1	To Balance b/d		18,000				

Dr. Sales Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Balance c/d		16,000	2003 Mar. 7 "10	By James By Ram & Co		12,000 4,000
			16,000				16,000
				Apr. 1	By Balance b/d		16,000

Dr. Ramesh Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31 " 17	To Bank To Discount		17,600 400	2003 Mar. 5	By Purchases		18,000
			18,000				18,000

Dr. Jain's Capital Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Balance c/d		1,54,000	2003 Mar. 1 " 1 " 1 " 1	By Cash By Furniture By Motor car By Stock		80,000 10,000 24,000 40,000
			1,54,000				1,54,000
Apr. 1	By Balance b/d		1,54,000				

Dr. Furniture Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 1	To Capital		10,000	2003 Mar. 31	By Balance c/d		10,000
			10,000				10,000
Apr. 1	To Balance b/d		10,000				

Dr. Motor Car Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 1	To Capital		24,000	2003 Mar. 31	By Balance c/d		24,000
			24,000				24,000
Apr. 1	To Balance b/d		24,000				

Dr.				Stock Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 1	To Capital A/c		40,000	2003 Mar. 31	By Balance c/d		40,000	
			40,000				40,000	
Apr. 1	To Balance b/d		40,000					

Dr.				James Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 7	To Sales		12,000	2003 Mar. 24	By Bank		12,000	
			12,000				12,000	

Dr.				Stationery Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 8	To Cash		400	2003 Mar. 31	By Balance c/d		400	
			400				400	
Apr. 1	To Balance b/d		400					

Dr.				Traveling Expenses Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 11	To Cash		1,200	2003 Mar. 31	By Balance c/d		1,200	
			1,200				1,200	
Apr. 1	To Balance b/d		1,200					

Dr.				Drawing Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 13	To Bank		2,000	2003 Mar. 31	By Balance c/d		2,600	
"29	To Bank		600				2,600	
			2,600					
Apr. 1	To Balance b/d		2,600					

Dr.				Discount Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003 Mar. 31	To Balance c/d		400	2003 Mar. 17	By Ramesh		400	
			400				400	
				Apr. 1	By Balance b/d		400	

Dr.				Cr.			
Clearing Charges Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 21	To Cash		800	2003 Mar. 31	By Balance c/d		800
			800				800
Apr. 1	To Balance b/d		800				

Dr.				Cr.			
Interest Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Balance c/d		400	2003 Mar. 30	By Bank		400
			400				400
				Apr. 1	By Balance b/d		400

Dr.				Cr.			
Bank Charges Account							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Bank		50	2003 Mar. 31	By Balance c/d		50
			50				50
Apr. 1	By Balance b/d		50				

Trial Balance

Name of Accounts	Debit Balance Rs.	Credit Balance Rs.
Cash Account	11,600	—
Bank Account	62,150	—
Purchases Account	18,000	—
Sales Account	—	16,000
Jain's Capital Account	—	1,54,000
Furniture Account	10,000	—
Motor Car Account	24,000	—
Stock Account	40,000	—
Stationery Account	400	—
Traveling Expenses Account	1,200	—
Drawing Account	2,600	—
Discount Account	—	400
Clearing Charges Account	800	—
Interest Account	—	400
Bank Charges Account	50	—
	1,70,800	1,70,800

QUESTIONS

1. What is a Trial Balance?
2. What are the important objectives of Trial Balance?
3. Explain the errors which are disclosed by the Trial Balance.
4. Discuss the classification of Errors.
5. What do you mean by Suspense Account?
6. What are the procedures adopted for locating errors?

7. Explain the methods of preparation of Trial Balance.
8. Explain the errors disclosed by Trial Balance.
9. Write short notes on :
 - (a) Errors of Commission
 - (b) Errors of Principles
 - (c) Suspense Account

PRACTICAL PROBLEMS

- (1) From the following incorrect Trial Balance of Gupta & Co., you are required to prepare a correct Trial Balance :

<i>Name of Accounts</i>	<i>Dr. Rs.</i>	<i>Cr. Rs.</i>
Sales	5,00,000	-
Sales Return	10,000	-
Purchases	-	3,00,000
Purchase Return	-	5,000
Sundry Debtors	4,00,000	-
Sundry Creditors	1,50,000	-
Fixed Assets	-	2,50,000
Opening Stock	-	1,50,000
Closing Stock	2,00,000	-
Capital	-	4,70,000
Operating Expenses	1,00,000	-
General Reserve	-	1,00,000
Outstanding Expenses	-	10,000
Cash at Bank	-	25,000
Suspense Account	-	50,000
Total	13,60,000	13,60,000

[Ans : Total Trial Balance Rs. 12,35,000]

- (2) From the following wrong trial balance of Mrs. Sharma & Co., you are required to prepare a correct Trial Balance:

<i>Name of Accounts</i>	<i>Dr. Rs.</i>	<i>Cr. Rs.</i>
Sales	-	42,000
Purchase	1,76,000	-
Stock	-	4,00,000
Furniture	40,000	-
Buildings	2,00,000	-
Cash in hand	-	11,600
Interest	4,000	-
Bank A/c	5,00,000	-
Plant	-	1,06,000
Kumar	20,000	-
Capital	40,000	-
Govind's Loan A/c	-	2,00,000
Ramesh A/c	-	1,00,000
Bad Debits	6,000	-
Discount Account	-	7,600
Jain A/c	-	1,00,000
Salary	40,000	-
Drawings	4,000	-
Interest on Loan	10,000	-
Total	10,40,000	9,67,200

- (3) From the following information, you are required to prepare a Trial Balance of M & S & Co.:

	Rs.
Purchases	35,400
Purchase Return	550
Sales	64,000

Sales Return	500
Opening Stock	23,500
Manufacturing Expenses	1,250
Salaries	4,750
Interest paid	2,300
Dividend paid	50
Discount received	2,000
Rent and Rates	1,000
Tax paid	1,750
Bank Overdraft	3,000
Cash in hand	6,700
Sundry Debtors	25,000
Bills Payable	2,000
Bills Receivable	2,600
Drawings	3,000
Machinery	2,250
Debenture	5,000
Capital	12,000
Sundry Creditors	21,500

[Ans : Total of Trial Balance Rs. 2,20,100]

- (4) The following balances are extracted from the books Patel & Co. as on 31st December 2003.

	Rs.		Rs.
Capital	1,00,000	Salaries	25,000
Drawings	25,000	Rent	10,000
Purchases	4,50,000	Taxes	1,500
Sales	6,50,000	Insurance	3,000
Return Inwards	3,500	Sundry Debtors	40,000
Return Outwards	4,500	Sundry Creditors	30,000
Carriage Inwards	5,500	Cash on hand	2,500
Carriage Outwards	4,000	Cash at bank	12,500
Duty on Purchases	10,000	Furniture	5,000
Stock on (31.12.2003)	55,000	Land	1,02,000
Motor Van	30,000		

Prepare a Trial Balance as at 31.12.2003

[Ans : Total Trial Balance of Rs.7,84,500]

- (5) Prepare the Trial Balance of Ramesh as at 31st March 2004

	Rs.		Rs.
Cash	3,700	Land and Buildings	2,80,000
Opening Stock	57,000	Rent Received	50,000
Debtors	32,000	Electricity	65,000
Sales	6,39,000	Bills Receivable	17,000
Wages	1,32,000	Traveling Expenses	23,000
Sundry Creditors	52,000	Insurance	36,000
Bad Debts Reserve	4,000	Purchases	1,20,000
Carriage	3,000	Purchases Returns	5,000
Trade Marks	53,000	Discount	3,000
Advertising	12,500	Bad Debts	7,000
Salaries	1,09,000	Bank	85,000
Machinery	2,89,000	Capital	5,87,200

[Ans : Trial Balance Total Rs.13,32,200]

(6) The following trial balance² of Rajive & Co., although it adds up to the same total on both sides, is incorrect :

	Dr. Rs.	Cr. Rs.
Capital 1 st Jan. 2003	8,950	—
Drawings	—	1,050
Stock 1 st Jan. 2003	3,725	—
Purchases	23,100	—
Sales	—	39,425
Wages and Salaries	6,205	—
Lighting and heating	310	—
Equipment	3,600	—
Carriage Outward	—	230
Return Inwards	105	—
Return Outwards	—	290
Provision for bad debts	350	—
Discount allowed	285	—
Discount received	—	315
Rent, Rates and Insurance	1,115	—
Motor Vehicles	1,475	—
Cash in hand	110	—
Sundry Creditors	4,925	—
Sundry Debtors	—	13,920
Bank overdraft	975	—
	55,230	55,230

(7) The following Trial Balance of a firm as on 31st March 2004 is not correct. Recast it correctly.

	Debit Balances Rs.		Credit Balances Rs.
Debtors	65,000	Discount allowed	26,000
Purchases	3,20,000	Carriage	5,500
Wages	1,30,000	Cash in hand	4,500
Salaries	40,000	Bank Balances	60,500
Traveling Expenses	10,000	Repairs	2,100
Insurance	3,000	Sundry Expenses	1,100
Mortgage Interest	3,000	Sales	6,00,000
Buildings	80,000	Capital	2,50,000
Machinery	1,30,000	Rent & Taxes	16,500
Furniture	15,000		
Stock	54,000		
Mortgage loan	70,000		
Creditors	42,000		
Commission earned	4,200		
	9,66,200		9,66,200

(8) Prepare a Trial Balance from the following balances :

	Rs.		Rs.
Opening Stock	1,20,000	Cash at bank	2,41,000
Machinery	3,00,000	Sundry Debtors	2,35,000
Sales	9,00,000	Wages	1,18,000
Sundry Creditors	1,88,000	Postage & Telegrams	1,000
Rent Received	27,000	Advertising	9,100
Repairs	5,500	Printing & Stationery	6,200
Salaries	60,000	Cash on hand	5,200
Purchases	5,30,000	Land & Buildings	6,50,000
General Expenses	22,000	Furniture	12,000
Capital	12,00,000		

[Ans : Trial Balance Total Rs. 23,15,000]

(9) From the following balance, prepare a Trial Balance as on December 31, 2003:

	Rs.		Rs.
Capital (1.1.2003)	1,80,000	Purchases	1,60,000
Stock of goods	50,000	Plant	1,80,000
Insurance	3,000	Discount earned	2,000
Wages	80,000	Creditors	65,000
Bad Debts	3,250	Salaries	8,000
Sales	3,80,000	Debtors	56,500
Cash at bank	34,000	Rent	20,000
Returns Inwards	10,750	General Expenses	13,000
Cash in hand	6,000	Discount allowed	2,500

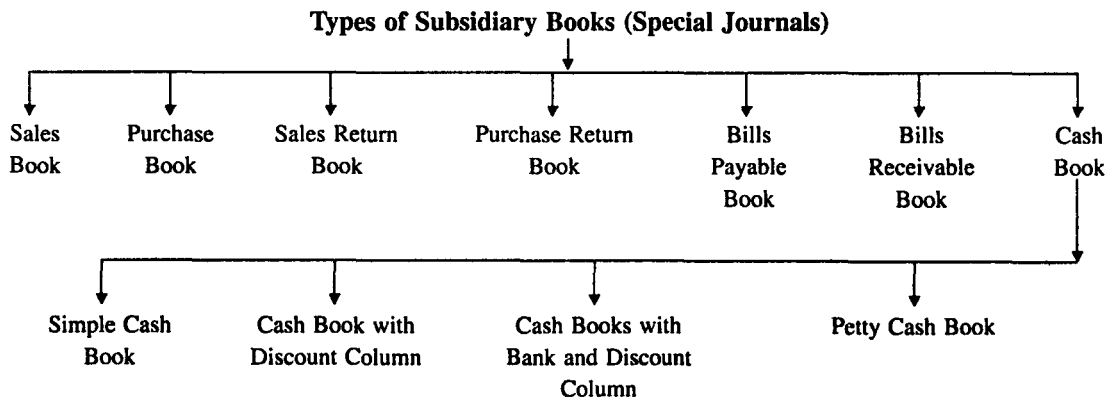
[Ans : Trial Balance Total Rs. 6,27,000]

Subsidiary Books (Special Journals)

In order to understand the procedure of recording transactions of business, it is necessary to consider the special journals of each book are given below:

- (1) Sales Book
- (2) Purchase Book
- (3) Sales Returns Book
- (4) Purchase Returns Book
- (5) Bills Receivable Book
- (6) Bills Payable Book
- (7) Cash Book :
 - (a) Simple Cash Book
 - (b) Cash Book with Discount Column
 - (c) Cash Book with Bank and Discount Column
 - (d) Petty Cash Book

These Books can be exhibited in the following chart :



Purpose of Subsidiary Books

The following are the purpose of subsidiary books summarized as :

- (1) Sales Book : To record credit sales of goods.
- (2) Purchase Book : To record credit purchases of goods.
- (3) Sales Return Book : To record return outwards to suppliers.
- (4) Purchase Return Book : To record return inwards from customers.
- (5) Bills Receivable Book : To record bills received.
- (6) Bills Payable Book : To record bills payable accepted.
- (7) Cash Books : To record all cash receipts and payments.

(1) Sales Book: Sales Book is also termed as “Day Book.” This book deals with recording sale of goods on credit. In other words all credit sales are recorded in this book. Cash Sales are not recorded in Sales Journal.

(2) Purchases Book: Purchases Book is also known as “Brought Day Book” or “Invoice Book” or “Invoice Journal.” This book deals with recording purchase of goods on credit. In other words all credit purchases are recorded in this book. The purchase of goods which are meant for resale. Cash purchase of goods are not recorded in Purchase Books, it will be recorded in the Cash Books only.

(3) Sales Returns Book: This book is also called as “Return Inwards Book.” This book is meant for recording transactions relating to sales return made by the customers to whom the goods have been sold on credit. As soon as goods return from the customers a ‘Credit Notes’ sent to the customers indicating that his account has been credited.

(4) Purchase Returns Book: It is also known as “Purchase Outward Book” or “Purchase Outward Journal.” This book is maintained to record of transactions relating to return of purchased goods on credit. As soon as goods are return to the supplier a “Debit Note” has been prepared and sent to the supplier indicating that his account has been debited.

(5) Bills Receivable Book: This is otherwise termed as “Bills Receivable Journal.” This book is used for recording the details of bills received from the customers. In other words, it is the document acknowledge the amount of receivable from the customer or drawer.

(6) Bills Payable Book: This book is also called as “Bills Payable Journal.” It is used for recording the details of bills accepted by the firm. In other words, it is the written proof prepared by the firm to acknowledge the amount payable to supplier.

Illustration: 14

Enter the following transactions in the purchase book of Ravi & Co. :

2003

January 1 Goods purchased from Raju & Co., Mumbai on credit 100 bags rice @ Rs.200, trade discount allowed 10%.

” 10 Bought goods from Gupta & Co., New Delhi on credit 200 bags coffee @ Rs.100, less 10% Trade Discount.

” 30 Bought goods from Ram & Co., Bangalore on credit 100 tins of ghee @ Rs. 500 less 10% discount

Solution:**Purchase Journal**

Date	Name of Suppliers	L.F.	Debit Note	Amount	
2003 Jan. 1	Raju & Co. 100 bags of rice @ 200 Less : 10% Trade Discount			20,000 2,000	18,000
" 10	Gupta & Co. 200 bags coffee & 100 Less : 10% Trade Discount			20,000 2,000	18,000
" 30	Ram & Co. 100 tins of ghee @ 500 Less : 10% discount			50,000 5,000	45,000
	Purchase A/c				81,000

Illustration: 15

Record the following transactions in the Sales Day Book and post them in to the ledger :

2003

- March 1 Sold to James & Co.
10 Meters Silk @ Rs.20
10 Meters Wool @ Rs.30
- March 15 Sold to William & Co.
10 Meters Cotton @ Rs.100
20 Meters Velvet @ Rs.50
- March 30 Sold to Ram & Co.
10 Meters Silk @ Rs.30
30 Meters Knitted @ Rs.50

Solution:**Sales Journal**

Date	Name of Suppliers	L.F.	Outward Invoice No.	Amount
2004 Mar. 1	James & Co. 10 Meters Silk @ Rs.20 10 Meters Wool @ Rs.30			200 300
" 15	Williams & Co. 10 Meters Cotton @ Rs.100 20 Meters Velvet @ Rs.50			1,000 1,000
" 30	Ram & Co. 10 Meters Silk @ Rs.50 30 Meters Knitted @ Rs.50			500 1,500
	Sales A/c			4,500

Dr.**Ledger
James & Co.****Cr.**

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 1	To Sales A/c		500	2003 Mar. 31	By Balance c/d		500
			500				500
Apr. 1	To Balance b/d		500				

Dr. Williams & Co. Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 15	To Sales A/c		2000	2003 Mar.31	By Balance c/d		2000
			2000				2000
Aprl. 1	To Balance b/d		2000				

Dr. Ram & Co. Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 30	To Sales A/c		2000	2003 Mar. 31	By Balance c/d		2000
			2000				2000
Aprl. 1	To Balance b/d		2000				

Dr. Williams & Co. Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Mar. 31	To Balance c/d		4500	2003 Mar. 31	By James & Co.		500
				" 15	By William & Co.		2000
				" 30	By Ram & Co.		2000
			4500				4500
				Aprl. 1	By Balance b/d		4500

Illustration: 16

From the following transaction of M/s J. Chandra, you are required to prepare a Bills Receivable Book and Bills Payable Book

2003

- Jan. 1 Acceptance received from Jhon payable six months after date for Rs. 13,000
- 7 Accepted Mary Ellen's draft for Rs. 8,000 for 4 months
- 10 Draw a bill on Dixon for Rs. 5,000 for 6 months
- 21 Gave Ram our acceptance for Rs. 10,000 payable 6 months after date
- 25 Jhon's acceptance for Rs. 13,000 was retired under a rebate of Rs. 200
- 26 Received a bill from Reddy for Rs. 2,000 for 2 months
- 27 Accepted a bill of Edward for Rs. 9,000 for 3 months
- 30 Accepted May Ellen's draft Rs. 4,000 for 2 months
- 31 Drew a bill on Dixon for 4,000 for 3 months and accepted by him payable at State Bank of India, Madras.

Solution:

Bills Receivable Book

Bills Payable Book

Bills Receivable Book

<i>Bills S.No</i>	<i>Date of Receipts</i>	<i>From Whom Received</i>	<i>Name of Acceptor</i>	<i>Date of Bill</i>	<i>Term</i>	<i>Date of Maturity</i>	<i>Where Payable</i>	<i>L.F.</i>	<i>Amount</i>	<i>Remarks</i>
1	2003 Jan. 1	Jhon	Self	2003 Jan. 1	6 Months	2003 June 4	SBI, Madras		13,000	Retired
2	" 10	Dixon	Self	" 10	6 Months	June 13			5,000	
3	" 26	Reddy	Self	" 26	2 Months	March 29			2,000	
4	" 31	Dixon	Self	" 31	13 Months	May 3			4,000	
									24,000	

Bills Payable Book

<i>Bills S.No.</i>	<i>Date of Bill</i>	<i>Name of the Drawer</i>	<i>Name of the Payee</i>	<i>Term</i>	<i>When Due</i>	<i>L.F.</i>	<i>Where Payable</i>	<i>Amount</i>	<i>Remarks</i>	
1	2003 Jan. 7	Mary - Ellens	Mary - Ellens	4 Months	2003 May - 10			8,000		
2	" 21	Ram	Ram	6 Months	July - 24			10,000		
3	" 27	Edward	Edward	2 Months	April - 30			9,000		
4	" 30	Mary - Ellens	Mary - Ellens	3 Months	April - 3			4,000		
									31,000	

**Ledger Account
Jhon Account**

Dr.

Cr.

<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>
2003 Jan. 31	To Balance c/d		13,000	2003 Jan. 1	By Bills Receivable A/c]		13,000
			13,000				13,000
				Feb. 1	By Balance b/d		13,000

**Ledger A/c
Jhon A/c**

Dr.

Dixon Account

Cr.

<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>
2003 Jan. 31	To Balance c/d		9,000	2003 Jan. 10	By Bills Receivable A/c]		5,000
				" 31	By Bills Receivable A/c]		4,000
			9,000				9,000
				Feb. 1	By Balance b/d		9,000

Dr.

Reddy Account

Cr.

<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>
2003 Jan. 31	To Balance c/d		2,000	2003 Jan. 26	By Bills Receivable A/c]		2,000
			2,000				2,000
				Feb.1	By Balance b/d		2,000

Dr.

Bills Receivable Account

Cr.

<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>
2003 Jan. 1	To Jhon		13,000	2003 Jan. 31	By Balance c/d		24,000
" 10	To Dixon		5,000				
" 26	To Reddy		2,000				
" 31	To Dixon		4,000				
			24,000				24,000
Feb. 1	By Balance b/d		24,000				

Dr.				Mary Ellens Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Jan. 7	To Bills Payable A/c		8,000	Jan. 31	By Balance c/d		12,000	
" 30	To Bills Payable A/c		4,000					
			12,000				12,000	
Feb. 1	By Balance b/d		12,000					

Dr.				Ram Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Jan. 21	To Bills Payable A/c		10,000	Jan. 31	By Balance c/d		10,000	
			10,000				10,000	
Feb. 1	By Balance b/d		10,000					

Dr.				Edward Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Jan. 27	To Bills Payable A/c		9,000	Jan. 31	By Balance c/d		9,000	
			9,000				9,000	
Feb. 1	To Balance B/d		9,000					

Dr.				Bills Payable Account				Cr.
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.	
2003				2003				
Jan. 31	To Balance c/d		31,000	Jan. 7	By Mary Ellens		8,000	
				" 21	By Ram		10,000	
				" 27	By Edward		9,000	
				" 30	By Mary Ellens		4,000	
			31,000				31,000	
				Feb. 1	By Balance b/d		31,000	

Illustration: 17

Enter the following transactions in proper subsidiary books and post in to ledger:

2003

- January 1 Goods purchased from Ahuja & Co. Rs. 40,000
 3 Goods sold to Sharma & Co. Rs. 20,000
 5 Kumar & Co Sold Goods to us Rs. 20,000
 10 William purchased goods from us Rs. 14,000
 15 Damaged goods returned by Sharma & Co. Rs. 1,600
 20 Damaged gods returned to Ahuja & Co. Rs. 1,000
 22 Damaged goods returned by William 1,800
 25 Goods sold to Ravi & Co. for cash Rs.10,000
 27 Bought goods from Jhon & Co. Rs.12,000
 29 Damaged goods returned to James & Co. Rs.2000
 31 Goods sold to Ram & Co. Rs.12,000

Solution:**Purchases Book**

<i>Date</i>	<i>Name of suppliers</i>	<i>L.F.</i>	<i>Inward Invoice No.</i>	<i>Amount Rs.</i>
2003 Jan. 1	Ahuja & Co.			40,000
" 5	Kumar & Co.			20,000
" 27	Jhon & Co.			12,000
				72,000

Sales Book

<i>Date</i>	<i>Name of Customers</i>	<i>L.F.</i>	<i>Outward Invoice No.</i>	<i>Amount Rs.</i>
2003 Jan. 3	Sharma & Co.			20,000
" 10	William			14,000
" 25	Ravi & Co.			10,000
" 31	Ram & Co.			12,000
				56,000

Purchases Return Book

<i>Date</i>	<i>Name of Suppliers</i>	<i>L.F.</i>	<i>Debit Note No.</i>	<i>Amount Rs.</i>
2003 Jan. 20	Ahuja & Co.			1,000
" 29	James & Co.			2,000
				3,000

Sales Return Book

<i>Date</i>	<i>Name of Customers</i>	<i>L.F.</i>	<i>Credit Note No.</i>	<i>Amount Rs.</i>
2003 Jan. 15	Sharma & Co.			1,600
" 22	William & Co.			1,800
				3,400

Ledger

Dr.				Ahuja & Co. Account				Cr.			
<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>J.F.</i>	<i>Amount Rs.</i>				
2003 Jan. 20	To Purchase Return		1,000	2003 Jan. 31	By Purchases		40,000				
" 31	To Balance c/d		39,000				40,000				
			40,000	Feb. 1	By Balance b/d		39,000				

Dr. Kumar & Co. Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		20,000	2003 Jan. 31	By Purchases		20,000
			20,000				20,000
				Feb. 1	By Balance b/d		20,000

Dr. Jhon & Co. Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		12,000	2003 Jan. 27	By Purchases		12,000
			12,000				20,000
				2003 Feb. 1	By Balance b/d		12,000

Dr. Purchases Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 1	To Ahuja & Co		40,000	2003 Jan. 31	By Balance c/d		72,000
" 5	To Kumar & Co		20,000				
" 27	To Jhon & Co		12,000				
			72,000				72,000
Feb. 1	To Balance b/d		72,000				

Dr. Sharma & Co. Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 3	To Sales		20,000	2003 Jan. 15	By Sales Return		1,600
				" 31	By Balance c/d		18,400
			20,000				20,000
Feb. 1	To Balance b/d		18,400				

Dr. William Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 10	To Sales		14,000	2003 Jan. 22	By Sales Return		1,800
				" 31	By Balance c/d		12,200
			14,000				14,000
Feb. 1	To Balance b/d		12,200				

Dr. Ravi & Co. Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 25	To Ravi & Co.		10,000	2003 Jan. 31	By Balance c/d		10,000
			10,000				10,000
Feb. 1	To Balance b/d		10,000				

Dr. Sales Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Ram & Co.		12,000	2003 Jan. 31	By Balance c/d		12,000
			12,000				12,000
Feb. 1	To Balance b/d		12,000				

Dr. Sales Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		56,000	2003 Jan. 3	By Sharma & Co.		20,000
				" 10	By William		14,000
				" 25	By Ravi & Co.		10,000
				" 31	By Ram & Co.		12,000
			56,000				56,000
				Feb. 1	By Balance b/d		56,000

Dr. James & Co. Account				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Purchase Return		2,000	2003 Jan. 31	By Balance c/d		2,000
			2,000				2,000
Feb. 1	To Balance b/d		2,000				

Dr. Purchase Return A/c				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 Jan. 31	To Balance c/d		3,000	2003 Jan. 20	By Ahuja & Co.		1,000
				" 29	By James & Co.		2,000
			3,000				3,000
				Feb. 1	To Balance b/d		3,000

Dr.				Sales Return A/c				Cr.			
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.				
2003				2003							
Jan. 15	To Sharma & Co.		1,600	Jan. 31	By Balance c/d		3,400				
" 22	To William & Co.		1,800								
			3,400				3,400				
Feb. 1	To Balance b/d		3,400								

Illustration: 18

From the following transactions, you are required to enter in the related subsidiary books and post them in the ledger :

2003

- March 1 Purchase of goods from Sharma Rs. 2,000
- 2 Sold goods to Varma Rs. 5,000
- 3 Goods return to Sharma Rs. 200
- 4 Sold goods to Murugan Rs. 10,000
- 5 Goods return by Varma Rs. 400
- 16 Goods return by Murugan Rs. 200
- 28 Goods Purchased from Aravind Rs. 4,000
- 30 Sold goods to Mahesh Rs. 7,000

Solution:**Purchases Book**

Date	Name of Suppliers	L.F.	Inward Invoice No.	Amount Rs.
2003				
March 1	Sharma	...		2,000
28	Aravind	...		4,000
				6,000

Sales Book

Date	Name of Customers	L.F.	Outward Invoice No.	Amount Rs.
2003				
March 1	Varma	...		5,000
4	Murugan	...		10,000
30	Mahesh	...		7,000
				22,000

Purchases Return Book

Date	Name of Suppliers	L.F.	Debit Note No.	Amount Rs.
2003				
March 3	Sharma	...		200
		...		200

Sales Return Book

Date	Name of Customers	L.F.	Credit Note No.	Amount Rs.
2003 March 5	Varma	...		400
16	Murugan	...		200
				600

Ledger

Dr. Sharma Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 March 31	1 to Purchase Return To Balance c/d		200 1,800	2003 March 1	By Purchases		2,000
			2,000				2,000
				Feb. 1	By Balance b/d		1,800

Dr. Aravind Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 March 31	To Balance c/d		4000	2003 Mar. 28	By Purchases		4000
			4000				4000
				Feb. 1	By Balance b/d		4000

Dr. Purchase Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003 March 1 28	To Sharma To Aravind		2,000 4,000	2003 Mar. 31	By Balance c/d		6,000
			6,000				6,000
Feb. 1	To Balance b/d		6,000				

Dr. Varma Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Mar. 2	To sales		5,000	Mar. 5	By Sales Returns		400
				" 31	By Balance c/d		4,600
			5,000				5,000
Feb. 1	To Balance b/d		4,600				

Dr. Murugan Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
March 4	To Sales		10,000	Mar. 16	By Sales Return		200
				" 31	By Balance c/d		9,800
			10,000				10,000
Feb.1	To Balance b/d		9,800				

Dr. Mahesh Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
March 4	To Sales		7,000	Mar. 31	By Balance c/d		7,000
			7,000				7,000
Feb. 1	To Balance b/d		7,000				

Dr. Sales Account Cr.

Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
March 2	To Balance c/d		22,000	Mar. 31	By Varma		5,000
31				" 4	By Murugan		10,000
				" 30	By Mahesh		7,000
			22,000				22,000
				Feb. 1	By Balance b/d		22,000

From the above specimen of Simple Cash Book Journal the following points can be observed :

- (1) It has divided into two parts, i.e., Debit Side and Credit Side.
- (2) All receipts of cash are recorded in Debit Side and all payments of cash are recorded in Credit Side of Cash Book.
- (3) L.F. – Stands for Ledger Folio, i.e., reference to Main Book
- (4) R.N. – Stands for Receipt No., i.e., reference for Receipts.
- (5) V.N. – Stands for Voucher No., i.e., reference for Payments

Illustration: 19

From the information given below, you are required to prepare Simple Cash Book of Mr. John :

2003

Jan. 1	Cash in hand Rs. 10,000
1	Cash paid into Bank Rs. 20,000
3	Goods purchased for cash Rs. 15,000
5	Cash received from David Rs. 10,000
7	Goods sold for cash Rs. 30,000
9	Paid for stationery Rs. 5,000
10	Paid to rent Rs. 4,000
13	Paid into Bank Rs. 15,000
15	Cash received from Govind Rs. 7,000
17	Paid for advertisement Rs. 5,000
18	Sold goods for cash Rs. 10,000
20	Dividend received Rs. 3,000
23	Paid Interest Rs. 2,000
25	Bought goods for cash Rs. 10,000
27	Cash received from Ram Rs. 15,000
31	Paid for repair charges Rs. 1,000

Solution:

Dr.					Cr.				
Cash Book of John (Single Column)									
Date	Receipts Particulars	V.N.	L.F.	Amount Rs.	Date	Payment Particulars	V.N.	L.F.	Amount Rs.
2003					2003				
Jan.1	To Balance b/d			10,000	Jan.1	By Bank			20,000
5	To David			10,000	3	By Purchases			15,000
7	To Sales			30,000	9	By Stationery			5,000
15	To Govind			7,000	10	By Rent			4,000
18	To Sales			10,000	13	By Bank			15,000
20	To Dividend			3,000	17	By Advertisement			5,000
27	To Ram			15,000	23	By Interest			2,000
					25	By Purchases			10,000
					31	By Repair Charges			1,000
					31	By Balance c/d			8,000
				85,000					85,000
Feb.1	To Balance b/d			8,000					

Illustration: 20

Enter the following transactions in the cash book of James & Co.:

2003

- Mar. 1 James & Co. commences business with Rs. 60,000 in cash
 3 Goods purchased for cash from Pande & Co. Rs. 7,400
 16 Cash Sales Rs. 9,000
 25 Paid cash to Chandra & Co. Rs. 3,000
 26 Paid cash for furniture Rs. 4,000
 27 Paid commission Rs. 300
 28 Paid salaries to office staff Rs. 500
 29 Paid for Advertising Rs. 400
 30 Received commission Rs. 500
 31 Paid office rent Rs. 1,000

Solution:

Dr.				Cr.			
Simple Cash Book							
Date	Particulars	J.F.	Amount Rs.	Date	Particulars	J.F.	Amount Rs.
2003				2003			
Mar. 1	To Capital		60,000	Mar. 3	By Purchases		7,400
" 16	To Sales		9,000	" 25	By Chandra & Co.		3,000
" 30	To Commission		500	" 26	By Furniture A/c		4,000
				" 27	By Commission		300
				" 29	By Salaries		500
				" 29	By Advertising		400
				" 31	By Office Rent		1,000
				" 31	By Balance c/d		52,900
			69,500				69,500
Apr. 1	To Balance b/d		52,900				

(2) Two Column Cash Book

It is also known as Cash Book with Discount Column. This Cash Book is meant for recording transactions relating to all receipts and payments of cash and discount. In the two column cash book, on each side there are two columns which are as follows :

- (1) Two columns with each side:
 Cash and Discount Columns with Debit Side.
 Cash and Discount Columns with Credit Side.
- (2) Discount Column indicates: recording all discounts allowed and received:
Debit Side: recording all discounts allowed by firm.
Credit Side: recording all discounts received by firm.
- (3) Cash Column indicates : recording all cash receipts and cash payments:
Debit Side: recording all cash receipts.
Credit Side: recording all cash payments.

Illustration: 21

From the following transactions, you are required to prepare a Cash Book with Cash and Discount Columns:

2003

- March 1 Balance of cash in hand Rs. 10,000
 2 Paid into Bank Rs. 8,000
 3 Purchased goods and paid by cheque Rs. 2,000
 4 Paid for advertising Rs. 100
 5 Purchased furniture and paid by cheque Rs. 200
 6 Received for cash sales Rs. 1,000
 7 Received a cheque for Rs. 1,400 from Mr. M and allowed him a discount of Rs. 15
 8 Gave a cheque for Rs. 1,700 and was allowed a discount of Rs. 20
 10 Mr. R directly paid into Bank in our account Rs. 900
 14 Paid into Bank Rs. 2,000
 17 Withdraw for office use Rs. 100
 27 Received from Mr. K by money order Rs. 95
 29 Withdraw by cheque for personal use Rs. 75

Solution:

Dr.					Cr.				
Cash Book (Double Columns)									
Date	Particulars	L.F.	Discount Rs.	Cash Rs.	Date	Particulars	L.F.	Discount Rs.	Cash Rs.
2003					2003				
Mar.1	To Balance b/d			10,000	Mar.2	By Bank			8,000
6	To Sales			1,000	3	By Purchases			2,000
7	To Mr. M		15	1,400	4	By Advertisement			100
17	To Bank			100	5	By Furniture			200
27	To Mr. K			95	8	By Bank		20	1,700
					10	By Mr. R			900
31	To Balance c/d			2,380	14	By Bank			2,000
					29	By Drawings			75
			15	14,975				20	14,975
					Apr.1	By Balance b/d			2,380

Illustration: 22

From the following particulars, you are required to prepare a Cash Book with Cash and Discount Columns only :

2003

- Jan.1 Cash in hand Rs. 20,000
 2 Paid into Bank Rs. 10,000
 3 Purchase office furniture by cheque Rs. 5,000
 4 Sold goods for cash Rs. 3,000
 7 Paid Sharma Rs.1,000 and was allowed a discount of Rs. 60
 10 Received Rs. 2,000 from cash Sales
 11 Paid for cash purchases Rs. 2,840 and received Rs. 160 as discount
 13 Withdrawn for personal use Rs. 2,000
 20 Drawn from bank for office use Rs. 500

- 25 Paid salaries in cash Rs. 500
 29 Received for cash sales Rs. 1,500
 31 Deposited in bank Rs. 5,000

Solution:

Dr.					Cr.				
Cash Book (Double Columns)									
Date	Particulars	L.F.	Discount Rs.	Cash Rs.	Date	Particulars	L.F.	Discount Rs.	Cash Rs.
2003					2003				
Jan.1	To Balance b/d			20,000	Jan.2	By Bank			10,000
4	To Sales			3,000	3	By Furniture			5,000
10	To Sales			2,000	7	By Sharma		60	1,000
20	To Bank			500	11	By Purchases		160	2,840
29	To Sales			1,500	13	By Drawings			2,000
					25	By Rent			500
					31	By Bank			5,000
					31	By Balance c/d			660
				27,000				220	27,000
Feb.1	To Balance b/d			660					

Illustration: 23

From the following transactions of Chandha & Co., you are required to prepare a Double Column Cash Book :

2003

- Mar.1 Balances of cash in hand Rs. 3,200
 4 Paid to Srivastava (discount allowed Rs. 40) Rs. 1,460
 6 Goods sold to Ram for cash Rs. 800
 8 Brought furniture for cash Rs. 3,000
 10 Sale of old newspapers Rs. 40
 12 Received cash from Basu & Co. in full settlement of his debt Rs. 1,200 (Rs. 1,140)
 13 Received cash from Shukla & Co. (discount allowed Rs. 30) Rs. 800
 15 Paid Salaries to office staff Rs. 1,000
 20 Received from Tandan & Co. against debt previously written off Rs. 300
 25 withdraw from bank Rs. 800
 31 Sale of old furniture Rs. 600

Dr.					Cr.				
Cash Book (Double Column)									
Date	Particulars	L.F.	Discount Rs.	Cash Rs.	Date	Particulars	L.F.	Discount Rs.	Cash Rs.
2003					2003				
Mar.1	To Balance b/d			3,200	Mar.4	By Srivastava A/c		40	1,560
"6	To Sales A/c			800	"8	By Furniture A/c			3,000
"10	To Old Newspaper's A/c (Sales for Cash)]			40	"15	By Salaries A/c			1,000
"12	To Basu & Co. A/c		60	1,140	"31	By Balance c/d			3,120
"13	To Shukla & Co. A/c		30	800					

"20	To Bad Debts A/c		300				
"25	To Bank A/c (Withdrawals)	}	800				
"31	To Old Furniture A/c (Sale of Old furniture)		600				
			90	7,680		40	7,680
Apr. 1	To Balance b/d			3,120			

(3) Three Column Cash Book

Three Column Cash Book is also known as "Cash Book with Discount and Bank Column." This cash book has divided into three columns on each side which are as follows :

(1) **Three Columns with Each Side:**

- (a) Cash, Discount and Bank Columns with Debit Side.
- (b) Cash, Discount and Bank Columns with Credit Side.

(2) **Cash Column Indicates :** Recording all Cash Receipts and Cash Payments.

Debit Side : Recording all Cash Receipts.

Credit Side : Recording all Cash Payments.

(3) **Discount Column Indicates :** Recording all discounts allowed and discounts received.

Debit Side : Recording all discounts allowed by firm.

Credit Side : Recording all discounts received by firm.

(4) **Bank Column Indicates :** Recording all deposits and withdrawals made in the bank.

Debit Side : Recording all deposits (both cash and cheque) are made in the bank.

Credit Side : Recording all withdrawals from the bank.

(5) **'C'** – Stands for reference.

(6) **L.F.** – Stands for Ledger Folio reference to main book.

(7) **Contra Entries :** When the deposit is made in the bank, it is entered in debit side (receipts side) and credited in cash column on the credit side of the cash book. Similarly, when any amount withdrawn from bank for business purposes, it is recorded in debit side (receipts side) of cash column and bank column is credited on the payment side. Thus, both cash column and bank column in the cash book serves as Cash Account and Bank Account. There is no need to post them in ledger. Such type of entry appearing on both sides of the cash book is known as "Contra Entry." The capital letter 'C' is used for this purpose.

(8) **Cheque Received :** When the cheque is received and it is encashed or deposited on the same day then it is directly recorded in the transactions on the debit side of bank column without entering in the cash column. If the cheques are received and they are encashed or deposited on the different dates, Contra Entry will be recorded in the cash book by entering debited in bank column and credited in cash column on the debit side of the cash book. Similarly, cheque payments are recorded on the credit side of the bank column in cash book.

(9) **Cheques Dishonoured :** When the cheque is dishonoured, it should be recorded transactions credited in the bank column on the credit side of the cash book.

Illustration: 24

From the following transactions, you are required to Prepare Three Column Cash Book of Ramesh for the month of Jan. 2003:

2003

- Jan.1 Cash balance Rs. 10,000
 1 Bank balance Rs. 5,000
 2 Paid into Bank Rs. 2,000
 3 Paid office rent by cheque Rs. 500
 5 Paid Salaries Rs. 5,000
 7 Goods sold for cash Rs. 10,000
 8 Goods purchased by cheque Rs. 7,000
 11 Deposited into bank Rs. 5,000
 14 Goods purchased by cash Rs. 2,000
 17 Withdrawn from bank for office use Rs. 500
 18 Withdrawn from bank for personal use Rs. 400
 20 Nancy settled her account for Rs. 4,000 by giving a cheque for Rs. 3,850
 23 Received from Sharma Rs. 4,900 in full settlement of Rs. 5,000
 25 Paid into bank Rs. 4,000
 26 Goods purchased from Murugan for Rs. 1,500 by cheque
 30 Paid telephone charges Rs. 500

Solution:**CASH BOOK OF RAMESH (Three Columns)**

Date	Particulars	V.N.	L.F.	Dis- count Rs.	Cash Rs.	Bank Rs.	Date	Particulars	V.N.	L.F.	Dis- count Rs.	Cash Rs.	Bank Rs.
2003							2003						
Jan.1	To Balance b/d				10,000	5,000	Jan.2	By Bank A/c (c)				2,000	
2	To Cash A/c (c)					2,000	3	By Rent					500
7	To Sales A/c				10,000		5	By Salaries A/c				5,000	
11	To Cash (c)					5,000	8	By Purchase					7,000
17	To Bank (c)				500		11	By Bank A/c (c)				5,000	
20	To Nancy A/c			150		3,850	14	By Purchase				2,000	
23	To Sharma A/c			100		4,900	17	By Cash A/c (c)					500
25	To Cash A/c (c)					4,000	18	By Drawings					400
							25	By Bank A/c (c)				4,000	
							26	By Murugan					1,500
							30	By Telephone Charges					500
						500							500
							31	By Balance c/d				2,500	14,350
				250	20,500	24,750						20,500	24,750
Feb1	To Balance b/d				2,500	14,350							

Illustration: 25

Enter the following transactions in Cash Book with Bank and Discount Columns :

2003

- Jan.1 Jhon commenced business with Rs. 4,500
 3 Remitted in to current account with Indian Bank Rs. 3,500
 5 Issued a cheque to William for acquired a building Rs. 2,500
 8 Paid to Ram for office furniture by cheque Rs. 500
 12 Purchased goods by cheque Rs. 400
 14 Drawn Rs. 50 from bank
 17 Goods sold to Kumar for Rs. 600
 22 Deposits in to bank Rs. 1,000
 24 Goods purchased for Rs. 500
 25 Goods sold to Wilson by Cheque Rs. 750
 27 Paid Rs. 50 by cheque as the premium for insuring building against fire
 28 Paid office rent Rs. 25
 29 Withdrew from bank for personal use Rs. 250
 30 Paid wages Rs. 45
 31 Paid to James Rs. 540 in full settlement by cheque we owed to James Rs. 550 for goods purchased
 31 Received from Ravi & Co. a cheque for Rs.740 in full settlement of Rs. 755

Solution:

Dr.						Cr.					
Cash Book (Three Column)											
Date	Particulars	L.F.	Dis- count Rs.	Bank Rs.	Cash Rs.	Date	Particulars	L.F.	Dis- count Rs.	Bank Rs.	Cash Rs.
2003						2003					
Jan. 1	To Capital				4,500	Jan.3	By Bank	C			3,500
" 3	To Cash	C		3,500		" 5	By Building			2,500	
" 14	To Bank	C			50	" 8	By Office Furniture			500	
" 17	To Sales				600	" 12	By Purchases			400	
" 22	To Cash	C		1,000		" 14	By Cash	C		50	
" 25	To Sales		15	750		" 22	By Bank	C			1,000
" 31	To Ravi & Co			740		" 24	By Purchases				500
						" 27	By Insurance Premium			50	
						" 28	By Office rent				25
						" 29	By Drawings			250	
						" 30	By Wages				45
						" 31	By James		10	540	
						" 31	By Balance c/d			1,700	80
				15	5,990				10	5,990	5,150
Feb. 1	To Balance b/d			1,700	80						

Illustration: 26

Enter the following transactions in the appropriate type of cash books :

2003

- Mar.1 Opening balance :
 Cash in hand Rs. 15,000
 Cash at Bank Rs. 20,000
 3 Rent paid by cheque Rs. 10,000
 5 Cash received on account of sale of merchandise Rs. 15,000
 10 Paid to Mahesh & Co. by cheque Rs. 10,000 and earned Rs. 1,000 as cash discount

Illustration: 27

Enter the following transactions in a columnar Petty Cash book of Ram & Co. The cashier Mr. Anand started with an imprest of Rs. 250 on 1st March 2003, and was reimbursed the total amount expected at the end of the month.

2003

March 2	Typing papers Rs. 10, Telegrams Rs. 15
3	Postage Rs. 6, Conveyance Rs. 17
5	Traveling Rs. 18, Postage Rs. 14
7	Postage Rs. 10
10	Typing Papers Rs. 7
12	Telephone Charges Rs. 10
15	Office Cleaning Rs. 8
17	Telegrams Rs. 9
19	Miscellaneous Expenses Rs. 15
20	Stationery Rs. 16
23	Conveyance Rs. 15
27	Postage Rs. 16
29	Ink and Typing Paper Rs. 10
30	Telegrams Rs. 10

Solution:

Petty Cash Book

Date	Particulars of Receipts	C.F.	Total Rs.	Date	Particulars of Payments	V. No.	Stationery Rs.	Postage Rs.	Telegrams Rs.	Travelling Rs.	Conveyance Rs.	Office Cleaning Rs.	Misces. Rs.	Total Rs.
2003 Mar. 1	Cash from Cashier		250	2003 Mar. 2	By Typing paper & Telegram		10		15					25
				3	Postage & Conveyance			6			17			23
				5	Traveling & Postage			14		18				32
				7	Postage			10						10
				10	Typing paper		7							7
				12	Telephone Expenses			10						10
				15	Office Cleaning							8		8
				17	Telegrams				9					9
				19	Miscellaneous								15	15
				20	Stationery		16							16
				23	Conveyance						15			15
				27	Postage			16						16
				29	Ink and Type Paper		10							10
				30	Telegrams				10					10
			250				43	56	34	18	32	8	15	206
2003 Apr. 1	To balance b/d		44		By Balance c/d									44
1	To cash from Cashier		206											250

Illustration: 28

A petty cashier received Rs.300 as the petty cash imprest on Monday, the 2nd January 2004. During the week his expenses were as under :

- Jan. 3 Paid for carriage Rs. 12
- 4 Postage stamps purchased Rs. 25
- 6 Purchased stationery Rs. 30
- 8 Purchased stationery for office use Rs. 40
- 10 Paid newspaper Rs. 15
- 15 Paid Telegram Rs. 15
- 19 Paid for cool drinks Rs. 20
- 25 Purchased postal stamps Rs. 25
- 30 Wages to Clerk Ram Rs. 40

You are required to prepare a Petty Cash Book for the month of January 2004.

Solution:

Petty Cash Book

<i>Date</i>	<i>Particulars of receipts</i>	<i>C.F.</i>	<i>Total Rs.</i>	<i>Date</i>	<i>Particulars of Payments</i>	<i>V. No.</i>	<i>Stationery Rs.</i>	<i>Telegrams Rs.</i>	<i>Postages Rs.</i>	<i>Carrage Rs.</i>	<i>Sundry Expenses</i>	<i>Wages Rs.</i>	<i>Total Rs.</i>
2004 Jan. 2	To Cash from Cashier		300	2004 Jan.3	Carriage					12			12
				" 4	Postage				25				25
				" 6	Stationery		30						30
				" 8	Stationery		40						40
				" 10	News Papers					15			15
				" 15	Telegram			15					15
				" 19	Cold Drinks						20		20
				" 25	Postage Stamps				25				25
				" 30	Wages							40	40
			300				70	15	50	27	20	40	222
2004 Feb. 1 "1	To Balance b/d To Cash from Cashier		78 222	Jan.31	To Balance c/d								78 300

QUESTIONS

1. What do you understand by Special Journal?
2. What are the different types of Subsidiary Books?
3. Briefly explain the purpose of Subsidiary Books?
4. What are the types of Cash Book? Explain it briefly.
5. What do you understand by Contra Entries?
6. Write short notes on :
 - (a) Two Column Cash Book.
 - (b) Contra Entries.
 - (c) Sales Return Book.
 - (d) Bills Payable Book.
7. Draw a specimen ruling of Three Column Cash Book? Explain it briefly.
8. What do you understand by Petty Cash Book?
9. How do you prepare a Petty Cash Book? Explain it briefly.

PRACTICAL PROBLEMS

- (1) From the following particulars, you are required to prepare a Cash Book with Cash and Discount Columns:

2003

- Jan. 1 Cash in hand Rs. 5,000
 3 Cash received from Ramesh Rs. 600 and discount allowed of Rs. 15
 5 Purchased goods for cash Rs. 1,800
 7 Paid Ramkumar Rs. 200 and was allowed a discount of Rs. 20
 10 Purchased stationery Rs. 40
 12 Received from Cash Sales Rs. 1,300
 15 Brought furniture for Rs. 250
 17 Paid for Advertisement Rs. 175
 19 Ramesh who owed Rs. 535 settled his account by paying Rs. 600
 29 Received from William Rs. 400 and allowed him a discount of Rs. 10
 31 Paid Salaries Rs. 120

[Ans : Cash Balance : Rs. 4515]

- (2) From the following particulars, you are required to prepare a Cash Book with Cash and Discount Columns :

2003

- Jan. 1 Cash in hand Rs. 15,000
 2 Paid into Bank Rs. 20,000
 4 Cash withdrawn for personal use Rs. 2,400
 6 Cash Sales Rs. 15,000
 8 Paid Kumar Rs. 10,850 and discount allowed of Rs. 50
 9 Goods sold for cash Rs. 18,000
 11 Goods purchased from Ram on Credit Rs. 10,000
 13 Paid Kumar Rs. 5,000 in full settlement of his account
 15 Goods purchased from Ram on Credit of Rs. 4,000
 22 Paid Salaries Rs. 8,000
 23 Paid rent Rs. 4,000
 24 Purchased goods from Ram on Credit Rs. 4,300
 25 Cash Purchases Rs. 13,500
 25 Paid interest Rs. 600
 26 Cash withdrawn for office use Rs. 17,500
 27 Paid into Bank Rs. 6,250
 28 Paid cash to Ram less discount Rs. 14,200
 29 Cash received from William Rs. 19,000 and was discount allowed him for Rs. 200
 31 Paid cash to Sharma Rs. 2,950 and was discount received from him for Rs. 50

[Ans : Cash Balance Rs. 3,750]

- (3) From the given informations, you are required to prepare Cash Book with Discount and Bank Columns :

2003

- Jan. 1 Cash in hand Rs. 5,000
 Cash paid into Bank Rs. 5,900

- 5 Purchased goods for cash Rs. 700
- 7 Cash received from Bank for office use Rs. 350
- 9 Goods sold for cash Rs. 100 and cheque Rs. 190
- 11 Paid into Bank Rs. 4,000
- 13 Received from William Rs. 1,500 and allowed him a discount of Rs. 20
- 15 Paid James by cheque Rs. 570 in settlement of his account for Rs. 600
- 17 Received commission by cheque Rs. 220
- 19 Paid advertisement expenses Rs. 50
- 23 Cash received from Bank for personal use Rs. 170
- 25 Paid rent by cheque Rs. 200
- 27 Sam paid direct into our account in the Bank Rs. 620
- 29 Received from Kumar a cheque for Rs. 490 and allowed a discount of Rs. 10
- 30 Cash in excess of Rs. 400 was paid into Bank

[Ans : Cash Balance Rs. 400, Bank Balance Rs. 11,640]

- (4) From the following transactions, you are required to prepare Simple Cash Book :

2003

- Jan. 1 Cash in hand Rs. 4,000
- 3 Goods sold for cash Rs. 7,500
- 5 Goods purchased for cash Rs. 3,000
- 7 Cash received from Govind Rs. 20,000
- 8 Goods sold to Ramesh for cash Rs. 7,500
- 12 Purchased goods from John for cash Rs. 3,500
- 15 Paid salaries to office staff Rs. 6,000
- 18 Paid rent Rs. 2,000
- 19 Paid advertisement expenses Rs. 3,000
- 20 Goods sold for cash Rs. 10,000
- 21 Dividend received Rs. 6,000
- 23 Paid interest Rs. 3,000
- 25 Goods purchased from Murugan for cash Rs. 30,000
- 26 Cash paid into Bank Rs. 1,00,000
- 29 Goods purchased for cash Rs. 20,000
- 31 Cash received from John Rs. 90,000

[Ans : Closing Cash Balance : Rs. 75,500]

- (5) Enter the following transactions in the Purchase Book and Sales Book of Mr. Jain:

2003

- Jan. 1 Goods sold to Murugan Rs. 50,000
- 3 Goods purchased from Ramu Rs. 25,000
- 5 Sold goods to Govind Rs. 10,000
- 7 Bought goods from Ramesh Rs. 20,000
- 9 Goods purchased from John Rs. 30,000
- 11 Goods sold to Sharma Rs. 50,000
- 15 Bought goods from Srinivasan Rs. 25,000
- 17 Goods sold to Ram Rs. 15,000

[Ans : Total of Purchase Book Rs. 1,00,000

Total of Sales Book Rs. 1,25,000]

- (6) From the following particulars, you are required to prepare Purchase Book, Sales Book, Purchase Return Book and Sales Return Book :

2003

- Jan. 1 Goods Purchased from Gupta Rs. 15,000
- 2 Brought goods from Jain Rs. 25,000
- 3 Returned goods to Gupta Rs. 700
- 5 Goods sold to Reddy Rs. 5,000
- 7 Sold goods to Sultan Rs. 15,000
- 15 Purchased goods from Pandey Rs. 20,000
- 17 Goods returned from Reddy Rs. 500
- 19 Received goods returned by Sultan Rs. 1,000

- 22 Sold goods to Kalyani Rs. 25,000
- 23 Bought goods from Gowda Rs. 30,000
- 25 Kalyani returned goods worth Rs. 1,500
- 29 Returned goods to Gowda Rs. 1,700
- 31 Goods sold to Ramesh Rs. 10,000

[Ans : Total of Purchase book Rs. 90,000
Purchase Returns Books Rs. 2,400
Sales Book Rs. 55,000, Sales Returns Book Rs. 3,000]

- (7) From the following information, you are required to prepare a Petty Cash Book under Imprest System:

2003

- Jan. 1 Amount received from Cashier for Petty Payments Rs. 400
- 3 Office cleaning Rs. 25
- 4 Postage Rs. 10
- 5 Stationery Rs. 15
- 6 Telegram Rs. 9
- 7 Cartage Rs. 12
- 10 Conveyance Rs. 15
- 12 Postage Rs. 10
- 13 Traveling Expenses Rs. 15
- 15 Cartage Rs. 10
- 16 Office Cleaning Rs. 15
- 19 Stamp Rs. 10
- 21 Telegrams Rs. 20
- 25 Stationery Rs. 17
- 27 Typing Paper Rs. 10
- 29 Ink and Typing Paper Rs. 15
- 31 Entertainment Rs. 20

[Ans : Closing Balance Rs. 172]

- (8) From the information given below, you are required to Prepare a Petty Cash Book Under Imprest System :

2003

- Jan. 1 Cash received from Cashier Rs. 500
- 2 Postage Rs. 20
- 3 Stationery Rs. 15
- 4 Office Cleaning Rs. 15
- 6 Typing Paper Rs. 10
- 7 Entertainment Rs. 25
- 9 Conveyance Rs. 30
- 10 Telegram Rs. 15
- 12 Cartage Rs. 20
- 14 Traveling expenses Rs. 15
- 17 Postage Rs. 10
- 19 Telegram Rs. 20
- 21 Typewriting ribbon Rs. 10
- 22 Office cleaning Rs. 14
- 23 Windowpanes Rs. 17
- 25 Ink Bottle Rs. 22
- 27 Cartage & Coolie Rs. 14
- 29 Postage Rs. 15
- 31 Stationery Rs. 10

[Ans : Closing Balance Rs. 203]

- (9) Enter the following transactions in the Bills Receivable Book and Bills Payable Book and Post them in to ledger :

2003

- Mar. 1 Received from Ravi his Promissory Note for Rs. 600
- 10 Accepted a bill of 3 months for Rs. 1,500 drawn by Vimal & Co.
- 15 Sent out acceptance to Rahul & Co. for Rs. 750
- 20 Jawahar & Co. drew upon us for 4 months and acceptance given for Rs. 690

- 25 Sent our draft to Kannan who returned it to us duly accepted for Rs. 300
 30 Did not accept a bill drawn by Kumar & Co. for Rs. 400 payable after 3 months

(10) From the following particulars, you are required to prepare a purchase book :

2004

- Jan. 1 Bought of Ramesh & Co. Mumbai 20 bags of rice @ Rs. 1,200 per bag 40 tons of wheat @ Rs. 1,500 per ton, Trade discount 15%
 7 Purchased from Sharma & Co. Bangalore Desi Ghee 20 tins, each containing 16kg @ Rs.120 per kg. Lubricant oil 1,000 litre @ Rs. 6 per litre Trade discount 10%
 15 Purchased from Pandey & Co, Madras wheat 30 quintals @ Rs. 500 per quintal; Gram 20 quintals @ Rs. 1,200 per quintal; rice 10 quintals @ Rs. 1,400 per quintal; cartage and other expenses paid in cash Rs. 700
 25 Purchased goods from Moorthi & Co. for cash New Delhi, 50 bales of cotton @ Rs. 1,500 per bale
 30 Brought furniture for office use from cartage house, Cochin, on credit, 20 Godraj chairs @ Rs. 300 per chair, 20 Godraj Tables @ Rs. 1600 per table

[Ans : Total of purchase book Rs. 1,64,360]

(11) Enter the following transactions in the Sales Book and Post them in to ledger :

2004

- Mar. 1 Sold Goods to Murthy & Co. : 200 pieces long cloth @ 100
 200 pieces shirting @ 75 Packaging and delivery Rs.50
 15 Sold goods to Raman & Co.
 30 pieces coating @ Rs.100
 20 Sold to Srivastava & Co.
 250 blankets @ Rs.75
 125 blankets @ Rs.100

[Ans : Total Sales Book Rs. 69,350]

(12) Record the following transactions in Bills Receivable Book and Bill Payable Book of Ram Lal & Co. and post them in to ledger :

2004

- Jan. 1 Received a bill from Govind at 2 months for Rs. 3,000
 7 Accepted a bill for Rs. 8,000 drawn by Kumaram & Co. for 3 months
 15 Drew a bill for Rs. 2,600 by Murugan & Co. was accepted this date for one month
 20 Acceptance received from Ram & Co. for 3 months for Rs. 2,500
 25 Gave acceptance to Gopal's bill for Rs. 2,400 payable for 2 months
 30 Did not accept a bill drawn by Kumar & Co. for Rs. 2,500 payable after 3 months

(13) Vasudavan & Co. start business with Rs. 20,000 on 1st January 2003. Of this he pays Rs. 18,000 in to his bank account. His cash transactions during the month of July were :

- July 1 Bought furniture for cash Rs. 4,000
 4 Purchased goods for cash Rs. 65,000
 7 Purchase stationery fixtures Rs. 20,000
 9 Goods sold for cash Rs. 15,000
 13 Received from Mishra & Co. Cash as advance Rs. 20,000
 15 Paid to Varma & Co, cash Rs. 14,000
 25 Paid for signboard Rs. 13,000
 27 Goods sold for cash Rs. 16,000
 30 Purchased old machinery Rs. 30,000
 Make out the cash book (Single Column)

[Ans : Balance in hand Rs. 5,000]

(14) Tandon & Co. owned Rs. 28,000 to the bank and had cash in hand Rs. 4,600 on 1st April 2003. During the month his cash transactions were as under :

2003

- Aprl. 2 Drew cash for office use Rs. 16,000
 3 Paid salaries Rs. 10,000
 5 Paid rent Rs. 2,000
 6 Drew for domestic use cash Rs. 3,000

- 7 Goods sold for cash Rs. 4,000
- 8 Goods purchased for cash Rs. 5,000
- 8 Received cheque from Basu & Co. Rs. 13,000 in full settlement of his debt of Rs. 14,000
- 9 Issued cheque in favour of Sundram & Co. in full settlement of the amount due to them of Rs. 8,000 and 2.5 per cent discount
- 9 Received by sale of old packing cases etc. Rs. 2,000 Received from Kapur & Co. cheque for Rs. 8000; discount allowed Rs. 200
- 10 Bought fixtures, paid by cheque Rs. 5,000
- 15 Paid rent in cash Rs. 2,000
- 17 Cheque received from Dewett & Co. returned dishonoured by bank. The bank charges Rs. 100 as expenses
- 23 Issued cheque in favour of Singh & Co. for Rs. 9,600 discount received 4 per cent
- 24 Received from the estate of Varma & Co. against debt previously written off Rs. 5,000
- 27 Own cheque to Singh & Co. returned dishonoured because of wrong stamping
- 30 Issued new cheque to Singh & Co. for full amount of original debt

Prepare triple column cash book from the above particulars. Also post the ledger accounts.

- (15) Enter the following transactions in a cash book with cash, Bank and discount columns. Balance the cash book and bring down the balance :

2003

- July 1 Cash Balance Rs.350
 1 Bank Balance Rs.2,450
 2 Cash received on sale of shares Rs.4,000
 3 Paid in to bank Rs.3,150
 4 Paid to Mani & Co Rs.750 Discount allowed by him Rs.25
 5 Paid wages Rs.50
 6 Received from Kannan Rs.350 Allowed him discount Rs.50
 12 Sold goods for cash Rs.510
 15 Bought goods for cash Rs.1,000
 18 Cash withdrawn for personal expenses Rs.200
 20 Paid in to bank Rs.500
 22 Received from Kishore Rs.1,250 Allowed him discount Rs.60
 25 Paid cheque for cash purchase Rs.350
 28 Drew cheque for office use Rs.200
 31 Paid cheque for office rent Rs.80

[Ans : Cash Balance Rs.1010 ; Bank balance Rs.5,470]

- (16) Enter the following transactions in Kapur's Cash Book with cash, bank and discount columns and strike the balances at the end of the period :

2003

- July 1 Balances of Cash Rs.13,600
 1 Balance at Bank Rs.36,800
 4 Paid Kumar by cheque Rs.12,500
 7 Goods sold for cash Rs.5,300
 10 Paid in to bank Rs.4,200
 15 Goods purchased and paid by cheque less 8% discount Rs.24,000
 20 Received Rs.630 from Kannan in settlement of his debt for Rs.6,500
 25 Bought fixtures for cash Rs.1,800
 31 Withdrawn Rs.2,200 from bank and paid for purchases Rs.2,000

[Ans : Balances Rs.19,400 ; Bank Balance Rs.4,220]

- (17) Record the following transactions in Peter's Three columnar cash book :

2003

- Jan.1 Cash Balance Rs.1,200
 1 Bank Balance Rs.14,600
 5 Goods sold to Jhon for cash Rs.4,000
 7 Paid in to bank Rs.2,000
 14 Withdrew from bank Rs.10,000
 17 Paid wages in cash Rs.12,000
 20 Received cheque Rs.16,000 from Raman & Co. and allowed discount Rs.1,600

- 23 Withdrew from bank Rs.1,600
 - 25 Brought furniture by cheque Rs.400
 - 31 Paid salary to office staff by cheque Rs.3,000
- [Ans : Cash Balance Rs.18,800 ; Bank Balance Rs.1,600]

(18) Prepare a petty cash book on the imprest system from the following :

2003

- Mar.1 A Petty cashier in a firm received a cash of Rs.150 for petty cash
- 2 Traveling expenses Rs.5
- 3 Wages to casual workers Rs.15
- 4 Bus fare to workmen Rs.2
- 5 Stationery purchased Rs.10
- 6 Paid for postage Rs.4
- 8 Paid for Telegram Rs.10
- 10 Paid for revenue stamps Rs.5
- 12 Repairs to typewriter Rs.4
- 17 Paid electric lighting charges Rs.17
- 20 Paid wages to coolies Rs.4
- 23 Bus fare Rs.5
- 25 Paid Telegram Rs.10
- 27 Locks purchased Rs.8
- 29 Paid for stationery Rs.4
- 31 Refreshment to customers Rs.2

(19) Record the following transactions in an analytical petty cash book and balance the same. On 1st January 2003, the petty cashier started with an imprest of Rs.100 :

2003

- Jan.1 Postage stamp purchased Rs.5
- 3 Sweeper and scavenger paid Rs.5
- 5 Conveyance to manager Rs.2
- 6 Telegram to Delhi Rs.1
- 7 Stationery purchased Rs.5
- 10 Lorry hire for goods sent Rs.15
- 11 Greeting cards purchased Rs.5
- 13 Cartage and coolly Rs.7
- 17 Salary to office boy Rs.15
- 18 Repairs to cycles Rs.9
- 19 Serving charges to Typewriters Rs.6
- 22 Ink and Gum purchased Rs.3
- 24 Advertisement charges Rs.8
- 27 Subscription paid to newspaper Rs.7
- 30 Tea to customers Rs.3



CHAPTER 4

Final Accounts

Meaning

Preparation of final account is the last stage of the accounting cycle. The basic objective of every concern maintaining the book of accounts is to find out the profit or loss in their business at the end of the year. Every businessman wishes to ascertain the financial position of his business firm as a whole during the particular period. In order to achieve the objectives for the firm, it is essential to prepare final accounts which include Manufacturing and Trading, Profit and Loss Account and Balance Sheet. The determination of profit or loss is done by preparing a Trading, Profit and Loss Account. The purpose of preparing the Balance Sheet is to know the financial soundness of a concern as a whole during the particular period. The following procedure and important points to be considered for preparation of Trading, Profit and Loss Account and Balance Sheet.

(1) Manufacturing Account

Manufacturing Account is the important part which is required to preparing Trading, Profit and Loss Account. Accordingly, in order to calculate the Gross Profit or Gross Loss, it is essential to determine the Cost of Goods Manufactured or Cost of Goods Sold. The main purpose of preparing Manufacturing Account is to ascertain the cost of goods manufactured or cost of goods sold, which is transferred to the Trading Account. This account is debited with opening stock and all items of costs including purchases related to production and credited with closing balance of work in progress and cost of goods produced transferred to Trading Account. The term “Cost of Goods Sold” refers to cost of raw materials consumed plus direct related expenses.

Components of Manufacturing Account

The following are the important components to be considered for preparation of Manufacturing Accounts:

- (1) Opening Stock of Raw Materials.
- (2) Purchase of Raw Materials.
- (3) Purchase Returns.
- (4) Closing Stock of Raw Materials.

- (5) Work in Progress (semi-finished goods).
- (6) Factory Expenses.
- (7) Opening Stock of Finished Goods.
- (8) Closing Stock of Finished Goods.

(1) **Opening Stock:** The term Opening Stock refers to stock on hand at the beginning of the year which include raw materials, work-in-progress and finished goods.

(2) **Purchases:** Purchases include both cash and credit purchase of goods. If any purchase is returned, the same will be deducted from gross purchases.

(3) **Direct Expenses:** Direct expenses are chargeable expenses or productive expenses which include factory rent, wages, freight on purchases, manufacturing expenses, factory lighting, heating, fuel, customs duty, dock duty and packing expenses. In short, all those expenses incurred in bringing the raw materials to the factory and converting them into finished goods will constitute the direct expenses that are to be shown on the debit side of the trading account.

Calculation of Cost of Goods Sold

Cost of Goods Sold can be calculated as under :

$$\text{Cost of Goods Sold} = \text{Value of Opening Stock} + \text{Cost of Purchases} + \text{Direct Expenses} - \text{Value of Closing Stock}$$

Illustration: 1

From the following information, calculate cost of goods sold :

	Rs.
Stock of materials on 1.1.2003	35,000
Stock of materials on 31.12.2003	5,000
Purchases of materials	62,000
Purchase Returns	2,000
Wages	10,000
Factory expenses	3,500
Freight and Carriage	4,000
Other direct expenses	2,500

Solution :

Calculation of Cost of Goods Sold

Particulars	Rs.	Rs.
Opening Stock of raw materials		35,000
Add : Purchases	62,000	
Less : Purchase Return	2,000	60,000
Freight and Carriage		4,000
		99,000
Less : Closing stock of raw materials		5,000
Cost of Raw Materials Consumed		94,000
Add : Direct Expenses :		
Wages	10,000	
Factory Expenses	3,500	
Other direct expenses	2,500	16,000
Cost of Goods Sold		1,10,000

Trading, Profit and Loss Account

Trading Account and Profit and Loss Account are the two important parts of income statements. Trading Account is the first stage in the final account which is prepared to know the trading results of gross profit or loss during a particular period. In other words, it is a summary of the purchases, and sale of a business or production cost of goods sold and the value of sales. The difference between the elements establishes the gross profit or loss which is then carried forward to the profit or loss account for calculation of net profit or net loss. Accordingly, if the sales revenue is higher than the cost of goods sold the difference is known as 'Gross Profit,' Similarly, if the sales revenue is less than the cost of goods sold the difference is known as 'Gross Loss.'

Specimen Proforma of Trading Account

The following Specimen Proforma of a Trading Account which is widely used in practice :

TRADING ACCOUNT

For the year ended 31st

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	* * *	By Gross Sales	
To Purchases	* * *	<i>Less</i> : Sales Return	
<i>Less</i> : Purchase Return		Net Sales	* * *
To Direct Expenses :		By Closing Stock	
Carriage Inward	* * *	By Gross Loss c/d	* * *
Wages		(Transferred to Freight	
Freight		P & L A/c)	
Custom Duty			
Fuel and Power			
Factory Expenses			
Royalty on Production			
Other Direct Expenses			
To Gross Profit c/d	* * *		
(Transferred to P & L A/c)			
	* * *		* * *

Balancing figure will be either Gross Profit or Gross Loss

Elements of Trading Account (*Debit Side*)

- (1) Opening Stock.
- (2) Purchases and Purchase Returns.
- (3) Direct Expenses.
- (4) Gross Profit is the excess value of sales over the cost of Sales.

Elements of Trading Account (*Credit Side*)

(1) **Sales:** The term sales refers to the total of sales of goods which include both cash sales and credit sales during the particular period.

(2) **Sales Return:** If any goods returned from the customers will be deducted from the total sales.

(3) **Closing Stock:** Closing Stock refers to the goods remaining unsold at the end of the particular period. The closing stock may be raw materials, work-in-progress and finished goods. Generally closing stock does not appear in the Trial Balance. Therefore, the closing stock is not brought into the books of

accounts but it is credited to Trading Account and also recorded in the assets side of the Balance Sheet. The value of closing stock is ascertained by means of stock taking and the value is brought in the books by means of an adjusting entry as

Closing Stock Account	Dr.	* * *	
To Trading Account			* * *

The closing stock is valued at cost price or market price whichever is less.

Gross Loss: Gross Loss refers to excess of cost of sales over the sales revenue.

Equation of Trading Account

The purpose of preparing the Trading Account is to calculate the Gross Profit or Gross Loss of a concern during a particular period. The following equations are highly useful for determination of Gross Profit or Gross Loss :

Calculation of Gross Profit or Loss

Gross Profit = Sales – Cost of Sales

Sales = Cost of Sales + Gross Profit

(or)

Sales = Stock in the beginning + Purchases + Direct Expenses
– Stock at the end + Gross Profit

(or)

Stock in the beginning + Purchases + Direct Expenses
+ Gross Profit = Sales + Stock at the end

PROFIT AND LOSS ACCOUNT

The determination of Gross Profit or Gross Loss is done by preparation of Trading Account. But it does not reveal the Net Profit or Net Loss of a concern during the particular period. This is the second part of the income statement and is called as Profit and Loss Account. The purpose of preparing the profit and loss account to calculate the Net Profit or Net Loss of a concern. Net profit refers to the surplus which remains after deducting related trading expenses from the Gross Profit. The trading expenses refer to inclusive of office and administrative expenses, selling and distribution expenses. In other words, all operating expenses such as office and administrative expenses, selling and distribution expenses and non-operating expenses are shown on the debit side and all operating and non operating gains and incomes are shown on the credit side of the Profit and Loss Account. The difference of two sides is either Net Profit or Net Loss. Accordingly, when total of all operating and non-operating expenses is more than the Gross Profit and other non-operating incomes, the difference is the Net Profit and in the reverse case it is known as Net Loss. This Net Profit or Net Loss is transferred to the Capital Account of Balance Sheet.

Specimen Proforma of a Profit and Loss Account

The following Specimen Proforma which is used for preparation of Trading, Profit and Loss Account.

Trading, Profit and Loss Account
for the year ending 31st Dec

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	* * *	By Sales	* * *
To Purchases		Less : Sales Returns	
Less : Purchases Returns	* * *	By Closing Stock	
To Carriage Inwards	* * *	By Gross Loss c/d	* * *
To Wages			
To Gross Profit c/d			
	* * *		* * *
To Gross Loss b/d	* * *	By Gross Profit b/d	* * *
To Office & Administrative Expenses :	* * *	By Non-Operating Incomes :	* * *
Office Salaries		Interest Received	
Office Rent and Rates		Discount Received	
Printing and Stationery		Dividend Received	
Telephone Charges		Income from Investment	
Legal Charges		Interest on Debenture	
Audit fees		Any other incomes	
General Expenses		By Net Loss c/d	* * *
To Selling Expenses :	* * *	(Transferred to Capital Account)	
Advertisement			
Discount Allowed			
Commission Paid			
Salesmen Salaries			
Godown Rent			
Carriage Outward			
Agent Commission			
Traveling Expenses			
To Distribution Expenses :	* * *		
Depreciation on Vehicle			
Upkeep of Motor Van			
Travelers' Salaries			
Repairs and Maintenance			
To Non-Operating Expenses :	* * *		
Discount on Issue of Shares			
Preliminary Expenses			
To Net Profit c/d	* * *		
(Transferred to Capital A/c)	* * *		* * *

Components appearing on Debit Side of the P & L A/c

Those expenses incurred during the manufacturing process of conversion of raw materials into finished goods will be treated as direct expenses which are recorded in the debit side of Trading Account. Any expenditure incurred subsequent to that will be known as indirect expenses to be shown in the debit side of the Profit and Loss Account. The indirect expenses may be classified into: (1) Operating Expenses and (2) Non-Operating Expenses.

(1) Operating Expenses: It refers to those expenses as the day-to-day expenses of operating a business include office & administrative expenses, selling and distribution expenses.

(2) Non-Operating Expenses: Those expenses incurred other than operating expenses. Non-Operating expenses which are related to a financial nature. For example, interest payment on loans and overdrafts, loss on sale of fixed assets, writing off fictitious assets such as preliminary expenses, under writing commission etc.

Components appearing on Credit Side of P&L A/c

The following are the components as shown on the Credit Side :

(1) Gross Profit brought down from Trading Account

(2) Operating Income: It refers to income earned from the operation of the business excluding Gross Profit and Non-Operating incomes.

(3) Non-Operating Income: Non-Operating incomes refer to other than operating income. For example, interest on investment of outside business, profit on sale of fixed assets and dividend received etc.

BALANCE SHEET

According to AICPC (The American Institute of Certified Public Accountants) defines Balance Sheet as a tabular Statement of Summary of Balances (Debit and Credits) carried forward after an actual and constructive closing of books of accounts and kept according to principles of accounting. The purpose of preparing balance sheet is to know the true and fair view of the status of the business as a going concern during a particular period. The balance sheet is one of the important statement which is used to owners or investors to measure the financial soundness of the concern as a whole. A statement is prepared to show the list of liabilities and capital of credit balances of the business on the left hand side and list of assets and other debit balances are recorded on the right hand side is known as "Balance Sheet."

The Balance Sheet is also described as a statement showing the sources of funds and application of capital or funds. In other words, liability side shows the sources from where the funds for the business were obtained and the assets side shows how the funds or capital were utilized in the business. Accordingly, it describes that all the assets owned by the concern and all the liabilities and claims it owes to owners and outsiders.

Specimen Form of Balance Sheet

Companies Act 1956 has prescribed a particular form for showing assets and liabilities in the Balance Sheet for companies registered under this Act. There is no prescribed form of Balance Sheet for a sole trader and partnership firm. However, the assets and liabilities can be arranged in the Balance Sheet into

(a) In the Order of Liquidity

(b) In the Order of Performance

(a) In the Order of Liquidity: When assets and liabilities are arranged according to their order of liquidity and ability to meet its short-term obligations, such an arrangement of order is called "Liquidity Order." The Specimen form of Balance Sheet arranged in the Order of Liquidity is given below :

Balance Sheet (I) as on

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Current Liabilities :	***	Current Assets :	***
Sundry Creditors		Cash in Hand	
Bills Payable		Cash at Bank	
Bank Overdraft		Sundry Debtors	
Outstanding Expenses		Short Term Investments	
Long-Term Liabilities :	***	Stock in Trade	
Loan from Bank		Bills Receivable	
Loan from Mortgage		Prepaid Expenses	
Debenture		Accrued Incomes	
Any other Long Term		Fixed Assets :	***
Total Liabilities	***	Plant and Machinery	
Capital Account :	***	Furniture & Fixtures	
Add : Net Profit		Buildings	
Add : Interest on Capital		Loose Tools	
Less : Drawings		Motor Cars	
Reserves and Surplus :	***	Intangible Assets :	***
General Reserve		Goodwill	
Reserve for Contingency		Patents	
Reserve for Sinking Fund		Copy Rights	
		Trade Marks	
		Fictitious Assets :	***
		Preliminary Expenses	
		Advertisement	
		Misc. Expenses	
	***		***

(b) **In the order of Performance:** This method is commonly used by the companies. The specimen form of Balance Sheet arranged in the order of Performance is given below :

Balance Sheet (II) as on

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Current Liabilities	***	Current Assets	***
Fixed Liabilities	***	Fixed Assets	***
Long-Term Liabilities	***	Fictitious Assets	***
Capital, Reserves and Surplus	***	Any other Investments	***
	***		***

Classification of Assets and Liabilities**I. Assets**

Business assets are resources or items of values owned by the business and which are utilized in the normal course of business operations to produce goods for sale in order to yield a profit. The assets are grouped into:

- (1) Fixed Assets
- (2) Current Assets or Floating Assets
- (3) Fictitious Assets
- (4) Liquid Assets
- (5) Contingent Assets

(1) **Fixed Assets** : This class of assets include those of a tangible nature having a specific value and which are not consumed during the normal course of business and trade but provide the means for producing saleable goods or providing services.

Components of Fixed Assets

- (1) Goodwill
- (2) Land and Buildings
- (3) Plant and Machinery
- (4) Furniture and Fixtures
- (5) Patents and Copy Rights
- (6) Livestock
- (7) Leaseholds
- (8) Long-term Investments
- (9) Vehicles

(2) **Current Assets or Floating Assets** : The assets of a business of a transitory nature which are used for resale or conversion into a cash during the course of business operation. In other words, those assets which are easily converted into cash in normal course of business during the shorter period say, less than one year are treated as current or floating assets.

Components of Current Assets

- (1) Cash in hand
- (2) Cash at Bank
- (3) Inventories :
 - Stock of raw materials
 - Stock of work-in-progress
 - Stock of finished goods.
- (4) Sundry Debtors
- (5) Bills Receivable
- (6) Short-Term Marketable Securities
- (7) Short-Term Investments
- (8) Prepaid Expenses

(3) **Fictitious Assets** : Fictitious Assets refer to any deferred charges. They are really not assets. Preliminary expenses, Share issue expenses, discount on issue of shares and debentures, and debit balance of profit and loss account etc. are the important components of fictitious assets.

(4) **Contingent Assets** : It refers to a right to property which may come into existence on the happening of some future event. For example, a right to obtain for shares in another company on favourable terms, a right to sue for infringement of patents and copy rights etc.

(5) **Liquid Assets** : Liquid Assets which are immediately converted into cash. In other words, these assets are easily encashable in the normal course of business. Cash in hand, Cash at bank, Bills Receivable,

Sundry debtors, Marketable Securities, Short-term investments etc. are the important components of liquid assets. While measuring Liquid Assets, Stock of raw materials, work-in-progress, finished goods and prepaid expenses are excluded from the components of Current assets.

II. Liabilities

According to Accounting Principles Board, define liabilities as an economic obligations of an enterprise that are recognized and measured in conforming with generally accepted accounting principles. The liabilities are classified into :

- (1) Non-Current Liabilities
- (2) Capital
- (3) Current Liabilities

(1) Non-Current Liabilities: Non-Current Liabilities otherwise known as Long-Term Liabilities. Liabilities which are become due for payment beyond a period of one year say, five to ten years, are treated as Long-Term Liabilities. The following are the examples of

Non-Current Liabilities:

- (a) Long-Term Debit.
- (b) Debenture.
- (c) Long-Term Loan from Bank.
- (d) Long-Term Loan from Financial Institutions.
- (e) Long-Term Loan raised by Issue of Public Deposits.
- (f) Long-Term Debt raised by Issue of Securities.

(2) Capital: Capital refers to the value of assets owned by a business and which are used during the course of business operations to generate additional Capital or Wealth. It is also known as Owner's Equity or Net Worth. When a business first comes into existence the initial capital may be provided by the proprietor. The initial influx of capital will normally be in the form of cash which need to be converted into plant and machinery, building and stock of materials prior to commencing operations. Thus, capital is equal to the total assets.

(3) Current Liabilities: Any amount owing by the business which are currently due for payment are referred to as current liabilities. In other words, these liabilities which are paid within one year are treated as current liabilities. The following are the components of current liabilities :

- (1) Bills Payable.
- (2) Sundry Creditors.
- (3) Short-Term Bank Loans.
- (4) Dividend Payable.
- (5) Provision for Taxes Payable.
- (6) Short-Term Bank Overdraft.
- (7) Trade Liabilities and Accrued Expenses.
- (8) Outstanding Expenses.

ADJUSTMENT ENTRIES

The preparation of income statements, i.e., Trading, Profit and Loss Account and Balance Sheet is the last stage of accounting process. According to the principles of double entry system of accounting all the expenses and incomes relating to a particular period whether incurred or not should be taken into account. In order to give the true and fair view of the state of affairs of the business concern, it is essential to consider various adjustments while preparing Trading, Profit and Loss Account and Balance Sheet. The following are the various adjustments usually related to :

- (1) Closing Stock
- (2) Outstanding Expenses
- (3) Prepaid Expenses
- (4) Accrued Income
- (5) Income Received in Advance
- (6) Depreciation
- (7) Interest on Capital
- (8) Interest on Drawings
- (9) Bad Debts
- (10) Provision for Doubtful Debts
- (11) Provision for Discount on Debtors
- (12) Provision for Discount on Creditors

(1) Closing Stock: The term Closing Stock refers to stock of raw materials, work in progress and finished goods at the end of the year valued at cost price or market price whichever is less. The following adjustment entry is

Closing Stock Account	Dr.	* * *	
To Trading Account			* * *

The stock at the end appears in the balance sheet and the balance in the stock is carried forward to the next year as opening stock. The opening stock account balance will appear in the Trial Balance and would be closed and transferred to the debit of the Trading Account.

(2) Outstanding Expenses: Outstanding expenses refer to those expenses incurred and remain unpaid during the accounting period. For example, salary, rent, interest etc. are expenses which are incurred but remain unpaid during the accounting period. In order to ascertain the correct profit and loss made during the year, it is essential that such related expenses are treated as Salary Outstanding, Interest Outstanding and Rent Outstanding etc. The following necessary adjustment entry is :

Expenses (Salaries) Account	Dr.	* * *	
To Outstanding Expenses (Salaries) A/c			* * *

As per the rules, respective expenses are nominal account therefore it be charged to profit and loss account and also shown in the balance sheet on the liability side.

(3) Prepaid Expenses: Prepaid expenses are also known as unexpired expenses. Those expenses which are incurred and paid in advance. Such expenses are actually related to a future period. In order to

ascertain the correct picture of the profit and loss accounts the following adjustment entry is required for adjusting such prepaid expenses.

Prepaid Expenses Account	Dr.	* * *	
To Expenses Account			* * *

The amount paid in advance will be deducted from the actual amount paid because it is related to the future accounting period. And the net amount will be debited to profit and loss account and the balance in the prepaid expenses account is shown the advance payment indicates as an amount due to the business concern.

(4) Accrued Income: Accrued Income otherwise known as Outstanding Income. Such incomes are accrued during the accounting period but not actually received in cash during that period. The adjustment entry will be as follows :

Accrued Income Account	Dr.	* * *	
To Concerned Income Account			* * *

The accrued income is added to the respective income account. And the total accrued amount will be credit to profit and loss account and is shown on the asset side of the balance sheet.

(5) Income Received in Advance: Any income received in advance which is not earned during the accounting period. Therefore, if any income received in advance, it should be treated as income for the subsequent year. The adjustment entry will be :

Income Account	Dr.	* * *	
To Income Received in Advance Account			* * *

The Income Received in Advance is treated as a liability because an amount due to the party. Therefore, it shown on the liability side of the balance sheet. The income actually earned alone will appear on the credit side of Profit and Loss Account.

(6) Depreciation: The term depreciation refers to loss on account of reduced value of assets due to wear and tear, obsolescence, effluxion of time or accident. Depreciation is treated as the cost or loss arised when the asset is used in the normal course of time. In order to ascertain the correct value of the assets in the balance sheet, it is essential to make to following adjustment entry as :

Depreciation Account	Dr.	* * *	
To Fixed Assets Account			* * *

The amount of depreciation is charged to debit side of the profit and loss account and is deducted from the respected assets shown on the asset side of the balance sheet.

(7) Interest on Capital: In order to ascertain true profitability of the business concern, it is essential that profit is determined after deducting interest on the capital provided by proprietor. Interest on capital is included in the capital expenditure and thus the adjustment entry will be :

Interest on Capital Account	Dr.	* * *	
To Capital Account			* * *

Interest on Capital is an expenditure charged to debit side of profit and loss account and it is added to capital shown on the liability side of the balance sheet.

(8) Interest on Drawings: It is like an interest on capital provided by the proprietor. Any amount charged as interest on drawings made by the proprietors for his personal use during the particular period is treated as interest on drawings. Interest on drawings should be taken as an income for ascertaining the true profit for a period. The adjustment entry will be :

Capital Account	Dr.	***
To Interest on Drawings Account		***

Interest on drawings is charged on the credit side of the profit and loss account and it is deducted from the capital account shown on the liability side of the Balance Sheet.

(9) Bad Debts: The term bad debts refer to any amount which are definitely irrecoverable are termed as Bad Debts. It may be treated as actual loss of the business. Any amount irrecoverable due to inability of the debtors, it should be written off from the accounts of debtors. The necessary adjustment entry will be :

Bad Debts Account	Dr.	***
To Debtor's Personal Account		***

Being bad debts are treated as expenses is charged to debit side of profit and loss account. And the amount deducted from debtors account shown on the assets side of the balance sheet.

(10) Provision for Doubtful Debts: It is like a bad debt but recovery is doubtful. Thus doubtful debts should not be written off from the books of accounts. Doubtful debts are treated as anticipated loss therefore making suitable provisions required to be made in the books of accounts. In order to ascertain the correct picture of the debtor's balance, it is essential to make an adjustment entry :

Profit and Loss Account	Dr.	***
To Provision for Doubtful Account		***

The provision for doubtful debts is an anticipated expenses charged to the debit side of the profit and loss account and it is deducted from the debtor's account shown on the asset side of the balance sheet.

(11) Provision for Discount on Debtor: Discount allowed to debtor is treated as expenses of a business concern. Such discounts are allowed to encourage for prompt payment made by the debtors on credit sales. When discount allowed, an adjustment entry is :

Discount Allowed Account	Dr.	***
To Debtor's Personal Account		***

The provision for discount is charged to debit side of profit and loss account and it is deducted from the debtor's account shown on the assets side of balance sheet.

(12) Provision for Discount on Creditors: It is like a discount on debtors, such discounts are allowed to make prompt payment due to its creditors. The firm receives such discounts when the payment made to its creditors in time. It is an anticipated income or profit which is required to create a suitable provision's in order to ascertain the correct picture of the creditor's balance, to make an adjustment entry will be :

(a) For Receipt of Discount :

Sundry Creditor's Account	Dr.	***
To Discount Received Account		***

(b) For Provision for Discount on Creditors :

Provision for Discount on Creditor's Account	Dr.	***	
To Profit and Loss Account			***

The provision for discount on creditors treated as an anticipated profit charged to the credit side of profit and loss account. And it is deducted from sundry creditors shown on the liability side of the balance sheet.

Summary of Adjustment Entries :

(1) For Closing Stock:			
Closing Stock A/c	Dr.	***	
To Trading Account			***
(2) For Outstanding Expenses:			
Expenses Account	Dr.	***	
To Outstanding Expenses Account			***
(3) For Prepaid Expenses:			
Prepaid Expenses Account	Dr.	***	
To Expenses Account			***
(4) For Accrued Incomes:			
Accrued Income Account	Dr.	***	
To Concerned Income Account			***
(5) For Income Received in Advance:			
Income Account	Dr.	***	
To Income Received in Advance Account			***
(6) For Depreciation on Fixed Assets:			
Depreciation Account	Dr.	***	
To Fixed Assets Account			***
(7) For Interest on Capital:			
Interest on Capital Account	Dr.	***	
To Capital Account			***
(8) For Interest on Drawings:			
Capital Account	Dr.	***	
To Interest on Drawing Account			***
(9) For Bad Debts:			
Bad Debts Account	Dr.	***	
To Debtor's Personal Account			***

(10) For Provision for Doubtful Debts:		
Profit and Loss Account	Dr.	***
To Provision for Bad and Doubtful Debts Account		***
(11) For Provision for Discount on Debtor:		
Discount Allowed Account	Dr.	***
To Debtors Personal Account		***
(12) Provision for Discount on Creditors:		
(a) For Receipt of Discount:		
Sundry Creditor Account	Dr.	***
To Discount Received Account		***
(b) For Provision for Discount on Creditors:		
Provision for Discount on Creditor's Account	Dr.	***
To Profit and Loss Account		***

Difference between Profit and Loss Account and Balance Sheet

<i>Profit and Loss Account</i>	<i>Balance Sheet</i>
(1) It is prepared with the debit or credit balance of Nominal Account.	(1) It shows the assets and liabilities on a particular date.
(2) Profit and Loss Account reveals the Net Profit or Net Loss of a concern during the particular period.	(2) It is a statement of financial position on a particular date.
(3) The difference between the two sides of Trading Account will be gross profit transferred to Profit and Loss Account.	(3) The difference between the two sides of profit and loss account will be Net Profit or Net Loss transferred to liability side of Balance Sheet.
(4) The debit or credit balances of nominal accounts are closed by transferring Profit and Loss Account.	(4) It is the statement of static in nature thus, accounts do not require to close them.

Illustration: 2

From the following informations of Jansons Ltd. on 31st March, 2003 you are required to prepare the Trading, Profit and Loss A/c and Balance Sheet:

Rs.	Rs.		
Opening Stock	5,000	Capital	89,500
Bills Receivable	22,500	Commission (Cr.)	2,000
Purchases	1,95,000	Return Outward	2,500
Wages	14,000	Trade Expenses	1,000
Insurance	5,500	Office Fixtures	5,000
Sundry Debtors	1,50,000	Cash in Hand	2,500
Carriage Inward	4,000	Cash at Bank	23,750
Commission (Dr.)	4,000	Rent & Rates	5,500
Interest on Capital	3,500	Carriage Outward	7,250
Stationery	2,250	Sales	2,50,000
Return Inward	6,500	Bills Payable	15,000
		Creditors	98,250
		Closing Stock	12,500

Solution:**Dr. Trading, Profit & Loss A/c of Jansons Ltd. for the year ending 31st March, 2003 Cr.**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	5,000	By Sales	2,50,000
To Purchase	1,95,000	<i>Less</i> : Sales Return	6,600
<i>Less</i> : Purchase Return	2,500	By Closing Stock	
To Wages	14,000		
To Carriage Inward	4,000		
To Gross Profit c/d	1,53,000		
	3,68,500		3,68,500
To Insurance	5,500	By Gross Profit b/d	1,53,000
To Commission	4,000	By Commission	2,000
To Interest on Capital	3,500		
To Stationery	2,250		
To Trade Expenses	1,000		
To Rent & Taxes	5,500		
To Carriage Outward	7,250		
To Net Profit c/d	1,26,000		
	1,55,000		1,55,000

Balance Sheet of Jansons Ltd.

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Creditors	98,250	Cash in Hand	2,500
Bills Payable	15,000	Cast at Bank	23,750
Capital	89,000	Bills Receivable	22,500
Add : Net Profit	1,26,000	Stock	1,25,000
	2,15,500	Sundry Debtors	1,50,000
		Office Fixtures	5,000
	3,28,750		3,28,750

Illustration: 3

From the Trial Balance in illustration 12 of Chapter on Trial Balance you are required to prepare a Trading, Profit and Loss Account and Balance Sheet.

Solution:**Dr. Trading, Profit and Loss Account for the year ending 31.4.2003 (Rs. in lakhs) Cr.**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Purchase	1,500	By Sales	1,250
		Less: Sales Return	100
		To Gross Loss c/d	350
	1,500		1,500
To Gross Loss b/d	350	By Discount	2
To Telephone Rent	40	By Net Loss c/d	758
To Stationery	20	(Balancing figure)	
To Rent	100		
To Salaries	250		
	760		760

Balance Sheet as on 31.4.2003

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Capital	4,500	Cash	1,242
Less : Net Profit	758	Bank	1,400
	3,742	Furniture	500
Less: Drawings	100	Sundry Debtors	600
Sundry Creditors	100		
	3,742		3,742

Illustration: 4

From the Trial Balance in illustration 14 of Chapter on Trial Balance you are required to Prepare Trading, Profit and Loss Account and Balance Sheet :

Solution :**Dr. Trading, Profit and Loss Account for the year ending 31.3.2003 Cr.**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Purchases	6,000	By Sales	11,500
To Freight	500		
To Gross Profit c/d	5,000		
	11,500		11,500
To Discount allowed	150	By Gross Profit b/d	5,000
To Rent Paid	400	By Dividend Received	300
To Salaries	1,000	By Interest on Investment	1,500
To Depreciation	1,000		
To Net Profit c/d	4,250		
(Balancing figure)	6,800		6,800

Balance Sheet as on 31.3.2003

<i>Liabilities</i>		<i>Amount Rs.</i>	<i>Assets</i>		<i>Amount Rs.</i>
Capital	65,000		Cash Account		33,970
Add : Net Profit	4,250		Stock		10,000
	69,250		Machinery		9,000
Less: Drawings	500	68,750	Furniture		5,000
Sundry Creditors		5,000	Building		5,000
Share Capital		970	Bank		4,500
			Sundry Debtors		7,250
		74,720			74,720

Illustration: 5

From the following particulars of Mrs. Raman & Co., you are required to prepare Trading, Profit and Loss Account and Balance Sheet for the year ended 31st Dec. 2003 :

	<i>Rs.</i>		<i>Rs.</i>
Sales	65,000	Discount Allowed	100
Sales Return	500	Discount Received	500
Stock at the beginning	8,000	Salaries	3,000
Purchases	29,000	Interest paid	400
Purchases Return	300	Furniture	3,000
Direct Wages	5,000	Buildings	20,000
Direct Expenses	5,000	Plant and Machinery	20,000
Carriage Inwards	4,000	Cash in Hand	1,000
Capital at the beginning	30,000	Bills Payable	6,200
Drawings	5,000	Reserve for Bad and Doubtful Debts	500
Sundry Debtors	10,000	Bad Debts	300
Sundry Creditors	12,000	Closing stock at the end	8,000

Additional Information

- (1) Outstanding Salaries Rs. 500
- (2) Interest on Capital at 10% P.A.
- (3) Depreciation on Plant and Machinery at 10% P.A. and Buildings at 5% P.A.
- (4) Prepaid of Interest Rs. 100
- (5) Provision for Bad and Doubtful Debts at 10% on Debtors

Solution:

Dr. Trading, Profit and Loss Account for the year ended 31st Dec. 2003 Cr.

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	8,000	By Sales	65,000
To Purchases	29,000	<i>Less</i> : Sales Return	500
<i>Less</i> : Purchases Return	300	By Closing Stock	8,000
To Carriage Inward	4,000		
To Direct Wages	5,000		
To Direct Expenses	5,000		
To Gross Profit c/d	21,800		
	72,500		72,500
To Discount allowed	100	By Gross Profit b/d	21,800
To Salaries	3,000	By Discount Received	500
<i>Add</i> : Outstanding	500		
To Interest paid	400		
<i>Less</i> : Prepaid Expenses	100		
To Bad Debts	300		
<i>Add</i> : 10% of Provision			
For Doubtful Debts	1,000		
	1,300		
<i>Less</i> : Existing of			
Doubtful Debts	500		800
To Interest on Capital			
at 10% P.A			3,000
To Depreciation :			
10% on Plant and			
Machinery			2,000
5% on Buildings			1,000
To Net Profit c/d	11,600		
	22,300		22,300

Balance Sheet as on 31st Dec. 2003

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Capital	30,000	Cash in hand	1,000
<i>Add</i> : Net Profit	11,600	Furniture	3,000
	41,600	Closing Stock	8,000
<i>Add</i> : Interest on Capital	3,000	Plant and Mach.	20,000
	44,600	<i>Less</i> : Depreciation	2,000
<i>Less</i> : Drawings	5,000	Buildings	20,000
Sundry Creditors	12,000	<i>Less</i> : Depreciation	1,000
Outstanding Salary	500	Prepaid Interest	100
Bills Payable	6,200	Sundry Debtors	10,000
		<i>Less</i> : Provision for	
		Doubtful Debts	800
	58,300		9,200
			58,300

Illustration: 6

From the following transactions of Mrs. Sharma & Co., you are required to Prepare Trading, Profit and Loss Account and Balance Sheet for the year ended 31st Dec. 2003 :

	Rs.		Rs.
Sales	3,55,000	Sundry Debtors	30,000
Sales Return	5,000	Rent Received	3,000
Purchases	2,52,000	Discount Received	3,000
Return Outwards	2,000	Discount Allowed	2,000
Carriage Outward	1,000	Commission Allowed	1,000
Carriage Inward	5,000	Taxes and Insurance	3,000
Opening Stock	40,000	Provision for Doubtful Debts	2,000
Direct Expenses	5,000	Bad Debts	1,500
Capital	60,000	Salaries	20,000
Furniture	5,000	Dividend Paid	5,000
Bank Overdraft	10,000	General Expenses	5,000
Buildings	45,000	Rent Paid	3,000
Plant and Machinery	40,000	Bills Receivable	21,500
Sundry Creditors	25,000		
Bills Payable	30,000		

Additional Informations

- (1) Stock at the end Rs. 42,000
- (2) Depreciation made on
 - Plant and Machinery Rs. 2000
 - Buildings Rs. 1000
- (3) Provision for Doubtful Debts at 5% on Sundry Debtors
- (4) Outstanding Rent Rs. 1000
- (5) Prepaid Salaries Rs. 1000
- (6) Interest on Capital at 5%

Solution:**Trading, Profit and Loss Account for the year ended 31st Dec. 2003**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	40,000	Sales	3,55,000
To Purchases	2,52,000	Less : Sales Return	5,000
Less : Purchase Return	2,000	By Closing Stock	42,000
To Carriage Inward	5,000		
To Direct Expenses	5,000		
To Gross Profit c/d	92,000		
	3,92,000		3,92,000
To Carriage outward	1,000	By Gross Profit b/d	92,000
To Discount allowed	2,000	By Rent Received	3,000
To Commission allowed	1,000	By Discount Received	3,000
To Dividend Paid	5,000		
To General Expenses	5,000		

To Depreciation on Plant & Machinery	2,000		
Buildings	1,000		
To Salaries	20,000		
<i>Less</i> : Prepaid	1,000	19,000	
To Rent Paid	3,000		
<i>Add</i> : Outstanding Rent	1,000	4,000	
To Bad Debts	1,500		
<i>Add</i> : Bad & Doubtful Debts	1,500		
	3,000		
<i>Less</i> : Existing Doubtful Debts	2,000	1,000	
To Taxes and Insurance		3,000	
To Interest on Capital		3,000	
To Net Profit c/d		51,000	
		98,000	98,000

Balance Sheet as on 31st Dec. 2003

<i>Liabilities</i>		<i>Amount Rs.</i>	<i>Assets</i>		<i>Amount Rs.</i>
Capital	60,000		Sundry Debtors	30,000	
<i>Add</i> : Net Profit	51,000		<i>Less</i> : Provision for		
	1,11,000		Bad & Doubtful Debts	1,500	28,500
<i>Add</i> : Interest on Capital	3,000	1,14,000	Furniture		5,000
Bank Overdraft		10,000	Buildings		45,000
Sundry Creditors		25,000	<i>Less</i> : Depreciation	1,000	44,000
Bills Payable		30,000	Plant & Machinery	40,000	
Outstanding Rent		1,000	<i>Less</i> : Depreciation	2,000	38,000
			Prepaid Salaries		1,000
			Stock at end		42,000
			Bills Receivable		21,500
		1,80,000			1,80,000

Illustration: 7

The following are the particulars of Mr. I. M. Pandey for the year ended 31st Dec. 2003 :

Capital	1,00,000	Sundry Creditors	50,000
Land & Building	1,00,000	Plant & Machinery	30,000
Goodwill	30,000	Investments	25,000
Furniture & Fixtures	15,000	Cash in Hand	20,000
Bills Receivable	15,000	Cash at Bank	5,000
Bills Payable	24,000	Drawings	20,000
Sundry Debtors	40,000	Long-Term Loan	2,00,000
Commission Paid	5,000	Salaries	20,000
Dividend Paid	4,000	Coal and Fuel	15,000
Bank Overdraft	23,000	Factory rent & rates	20,000
Discount Allowed	3,000	General Expenses	4,000
Carriage Inwards	15,000	Advertisement	5,000
Carriage Outwards	7,000	Provision for Bad & Doubtful Debts	2,000
Opening Stock :		Sales	8,50,000
Raw Materials	1,50,000	Sales Return	10,000
Finished goods	75,000		
Purchase of Raw Materials	5,00,000		

Purchase Returns	5,000
Direct Wages (Factory)	80,000
Power	30,000

Additional Information

- (1) Stock at the end of the year Rs. 1,00,000
- (2) A provision for doubtful debts. at 5% on Sundry Debtors
- (3) Interest on Capital at 5% P.A.
- (4) Depreciation on building Rs. 1,000 and Rs. 3,000 on Machinery to be provided
- (5) Accrued commission Rs. 12,500
- (6) Interest has accrued on investment Rs. 15,000
- (7) Salary Outstanding Rs. 2,000
- (8) Prepaid Interest Rs. 1,500

You are required to prepare Manufacturing, Trading and Profit and Loss Account for the year ended 31st Dec. 2003.

Solution:**Manufacturing Account**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock of Raw Materials	1,50,000	By Cost of Manufactured goods transferred to Trading A/c	8,05,000
To Purchase 5,00,000			
<i>Less</i> : Purchase Return 5,000	4,95,000		
To Carriage Inwards	15,000		
To Direct Wages	80,000		
To Power	30,000		
To Coal and Fuel	15,000		
To Factory Rent and Rates	20,000		
	8,05,000		8,05,000

Trading, Profit and Loss Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock of finished goods	75,000	Sales 8,50,000	
To Cost of goods transferred from Manufacturing A/c]	8,05,000	<i>Less</i> : Sales Return 10,000	8,40,000
To Gross Profit c/d	60,000	By Closing Stock	1,00,000
	9,40,000		9,40,000
To Carriage Outward	7,000	By Gross Profit b/d	60,000
To Discount Allowed	3,000	By Accrued Commission	12,500
To Commission Paid	5,000	By Accrued Interest	15,000
To Dividend Paid	4,000		
To General Expenses	4,000		
To Advertisement	5,000		

To Salaries	20,000		
Add : Outstanding	2,000	22,000	
To Interest Paid	7,000		
Less : Prepaid	1,500	5,500	
To Provision for Bad & Doubtful Debts	2,000		
Add : Bad Debts	4,000		
	6,000		
Less : Old Provision for Doubtful Debts	2,000	4,000	
To Depreciation on Building	1,000		
Machinery	3,000	4,000	
To Interest on Capital @ 5% P.A.		5,000	
To Net Profit c/d		19,000	
		87,500	87,500

Balance Sheet as on 31st Dec. 2003

<i>Liabilities</i>		<i>Amount Rs.</i>	<i>Assets</i>		<i>Amount Rs.</i>
Capital	1,00,000		Sundry Debtors	40,000	
Add : Net Profit	19,000		Less : Provision for		
	1,19,000		Bad & Doubtful Debts	2,000	38,000
Add : Interest on Capital	5,000		Goodwill		30,000
	1,24,000		Furniture & Fixtures		15,000
Less : Drawings	20,000	1,04,000	Bills Receivable		15,000
Bills Payable		24,000	Land & Building	1,00,000	
Sundry Creditors		50,000	Less : Depreciation	1,000	99,000
Salary Outstanding		2,000	Plant & Machinery	30,000	
Long-Term Loans		2,00,000	Less : Depreciation	3,000	27,000
Bank Overdraft		23,000	Accrued Commission		12,500
			Accrued Interest		15,000
			Prepaid Interest		1,500
			Cash in Hand		20,000
			Cash at Bank		5,000
			Investments		25,000
			Stock at the end		1,00,000
		4,03,000			4,03,000

Illustration : 8

From the following information, you are required to prepare Trading and Profit and Loss Account and Balance Sheet

	<i>Rs.</i>		<i>Rs.</i>
Raman's Capital	2,28,800	Stock 1.4.2003	38,500
Raman's Drawings	13,200	Wages	35,200
Plant and Machinery	99,000	Sundry Creditors	44,000
Freehold Property	66,000	Postage and Telegram	1,540
Purchases	1,10,000	Insurance	1,760
Purchase Return	1,100	Gas and Fuel	2,970

Salaries	13,200	Bad Debts	660
Office Expenses	2,750	Office Rent	2,860
Office Furniture	5,500	Freight	9,900
Discount allowed	1,320	Loose Tools	2,200
Sundry Debtors	29,260	Factory Lighting	1,100
Loan to Mr. Kumar	44,000	Provision for bad and doubtful debts	880
At 10% p.a. balance on 1.4.2003			
Cash at Bank	29,260	Interest on loan to Mr. Kumar	1,100
Bills Payable	5,500	Cash on hand	2,640
		Sales	2,31,440

Additional Information

- (1) Stock on 1.3.2004 was valued at Rs.72,600
- (2) A new machine was installed during the year costing Rs.15,400 but it was not recorded in the books as no payment was made for it. Wages Rs.1,100 paid for its erection have been debited to wage account
- (3) Depreciation on plant and machinery by 33 1/3% ; furniture by 10% ; Freehold property by 5%
- (4) Loose Tools were valued at Rs.1,760 on 31.3.2004
- (5) Of the sundry debtors Rs.600 are bad and should be written off
- (6) Maintain a provision of 5% on sundry debtors for doubtful debts
- (7) The manager is entitled to a commission of 10% of the net profit after charging such commission

[CA Inter, 2001]

Solution :

Shri Raman
Trading, Profit and Loss Account
for the year ended 31.3.2004

Dr.	Particulars	Amount Rs.	Cr.	Particulars	Amount Rs.
	To Opening Stock (1.4.2003)	38,500		By Sales	2,31,440
	To Purchases	1,10,000		By Closing Stock	72,600
	Less : Returns	1,100			
	To Wages	35,200			
	Less : Erection of Machinery	1,100			
	To Gas and Fuel	2,970			
	To Freight	9,900			
	To Factory Lighting	1,100			
	To Gross Profit c/d	1,08,570			
		3,04,040			3,04,040
	To Salaries	13,200		By Gross Profit b/d	1,08,570
	To Office Expenses	2,750		By Interest	1,100
	To Postage & Telegram	1,540		Add : Outstanding	3,300
	To Insurance	1,760			
	To Office Rent	2,860			
	To Discount	1,320			
	To Bad Debts	660			
	Add : Bad debts	600			
	Add : New Provision	1,430			
		2,690			

Less : Old Provision	880	1,870	
To Depreciation :			
Machinery	38,500		
Furniture	550		
Freehold Property	3,300		
Loose Tools	440	42,790	
To Commission to Manager		4,080	
To Net Profit c/d (Transferred to Balance sheet)]		40,800	
		1,12,970	1,12,970

Balance Sheet**As at 31.3.2004**

<i>Liabilities</i>		<i>Amount Rs.</i>	<i>Assets</i>		<i>Amount Rs.</i>
Capital	2,28,800		Plant & Machinery	99,000	
Add : Net Profit	40,800		Add : New Machinery	16,500	
	2,69,600		(15400 +1100)	1,15,500	
Less : Drawings	13,200	2,56,400	Less : Depreciation	38,500	77,000
Bills Payable		5,500	Freehold property	66,000	
Sundry Creditors		59,400	Less : Depreciation	3,300	62,700
Manager's Commission Outstanding]		4,080	Office Furniture	5,500	
			Less : Depreciation	550	4,950
			Loose Tools	2,200	
			Less : Depreciation	440	1,760
			Closing Stock		72,600
			Sundry Debtors	29,260	
			Less : bad debts	660	
				28,600	
			Less : Provision for doubtful debts]	1,430	27,170
			Loan to Mr. Kumar	44,000	
			Add : Interest accrued And outstanding]	3,300	47,300
			Cash at Bank		29,260
			Cash in hand		2,640
		3,25,380			3,25,380

Illustration: 9On 31st December, 2003 the Trial Balance of William & Co. was as follows :

<i>Debit Balance</i>	<i>Rs.</i>	<i>Credit Balances</i>	<i>Rs.</i>
Stock on 1 st January 2003 :			
Raw Materials	21,000	Sundry Creditors	15,000
Work in Progress	9,500	Bills Payable	7,500
Finished goods	15,500	Sale of Scrap	2,500
Sundry Debtors	24,000	Commission	450
Carriage on Purchases	1,500	Provision for doubtful debts	1,650

Bills Receivable	15,000	Capital Account	1,00,000
Wages	13,000	Sales	1,67,200
Salaries	10,000	Current Asset of William	8,500
Telephone, Postage etc.	1,000	Repairs to Plant	1,100
Repairs to Office Furniture	350	Purchases	85,000
Cash at Bank	17,000	Plant and Machinery	70,000
Office Furniture	10,000	Rent	6,000
Lighting	1,350	General Expenses	1,500
	3,02,800		3,02,800

The following additional information is available :

- Stocks on 31st December, 2003 were :
Raw Materials 16,200
Finished goods 18,100
Semi finished goods 7,800
- Salaries and wages unpaid for December 2003 were respectively, Rs. 900 and Rs. 2,000
- Machinery is to be depreciated by 10% and office furniture by $7\frac{1}{2}\%$
- Provision for doubtful debts is to be maintained @ 1% of sales
- Office premises occupy $\frac{1}{2}$ of total area. Lighting is to be charged as to $\frac{2}{3}$ to factory and $\frac{1}{3}$ to office.
Prepare the Manufacturing Account Trading Account, Profit and Loss Account and the Balance Sheet relating to 2003.

Solution:

Manufacturing Account of William & Co.
for the year ended 31st December 2003

Dr.	Particulars	Amount	Particulars	Amount	Cr.
	Raw material consumed :				
	To Opening Stock		By Closing Stock of		
	of Raw Materials	21,000	Work in Progress	7,800	
	Add : Purchases	85,000	By Sale of Scrap	2,500	
		<u>1,06,000</u>	By Cost of goods		
	Less : Closing Stock	16,200	Manufactured (Transferred		
	To Opening Stock of WIP		to Trading Account)	1,19,000	
	To Wages	13,000			
	Add : Outstanding				
	Wages	2,000			
	To Carriage on Purchases	1,500			
	To Repairs to Plant	1,100			
	To Rent (3/4)	4,500			
	To Lighting (2/3)	900			
	To Depreciation of Plant	7,000			
		1,29,300		1,29,300	

Trading, Profit and Loss Account of William & Co. for the year ended 31st December 2003

Dr.

Cr.

<i>Particulars</i>	<i>Amount</i>	<i>Particulars</i>	<i>Amount</i>
To Opening Stock of Finished Goods	15,500	By Sales	1,67,200
To Cost of goods Manufactured	1,19,000	By Closing Stock (finished goods)	18,100
To Gross Profit c/d	50,800		
	1,85,300		1,85,300
To Salaries 10,000 Add: Outstanding 900	10,900	By Gross Profit b/d	50,800
To Telephone & Postage	1,000	By Commission	450
To Repairs to Furniture	350		
To Depreciation of furniture	750		
To Rent (1/4)	1,500		
To Lighting (1/3)	450		
To General Expenses	1,500		
To Provision for doubtful Debts: Required (1% of Rs. 1,67,200) 1,672 Less: Existing Provision 1,650	22		
To Net Profit transferred to William's A/C	34,778		
	51,250		51,250

Dr.

Balance Sheet of William & Co. as at December 31.2003

Cr.

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Sundry Creditors	15,000	Fixed Assets :	
Bills Payable	7,500	Plant & Machinery	
Expenses Payable : Rs.		Balance	70,000
Salaries 900		Less: Depreciation	7,000
Wages 2,000	2,900	Office Furniture	10,000
Current Account of William	8,500	Less: Depreciation	750
Capital Account	1,00,000	Current Assets :	
Net Profit	34,778	Sundry Debtors	24,000
		Less: Provision for Doubtful debts	1,672
		Bill Receivable	15,000
		Closing Stock of :	
		Raw Materials	16,200
		Working Progress	7,800
		Finished goods	18,100
	1,68,678		1,68,678

QUESTIONS

1. What do you understand by Manufacturing Account?
2. What is the Significance of Preparing Manufacturing Account?
3. Briefly explain the components of Manufacturing Account.
4. What do you understand by Trading Account?
5. Briefly explain the Profit and Loss Account.
6. What do you understand by Balance Sheet?
7. What are the main features of final accounts?
8. What are adjusting entries? Why are these necessary for preparing final accounts?
9. Write Short notes on :
 - (a) Closing Stock
 - (b) Outstanding Expenses
 - (c) Prepaid Expenses
 - (d) Accrued Income
 - (e) Provision for Discount on Creditors.
10. What is the difference between Profit and Loss Account?
11. What do you understand by Provision for Bad and Doubtful Debts?
12. Briefly explain the classification of Assets and Liabilities.
13. Write short notes on :
 - (a) Liquid Assets (b) Current Assets (c) Current Liabilities
 - (d) Fictitious Assets (e) Capital
14. Explain briefly the equation of Trading Account.
15. What do you understand by cost of goods sold?
16. Draw a specimen ruling of Manufacturing, Trading and Profit and Loss Account and Balance Sheet. Explain them Briefly.

PRACTICAL PROBLEMS

- (1) From the following informations, you are required to prepare Trading, Profit and Loss Account and Balance Sheet :

	<i>Dr.</i> <i>Rs.</i>		<i>Cr.</i> <i>Rs.</i>
Salaries	5,500	Creditors	9,500
Rent	1,300	Sales	32,000
Cash in hand	1,000	Capital	30,000
Debtors	40,000	Loans	10,000
Trade Expenses	600		
Purchases	25,000		
Advances	2,500		
Bank Balance	5,600		
	81,500		81,500

Additional Information

- (1) The Closing Stock amounted to Rs. 9000
- (2) One month's salary outstanding
- (3) One month's rent has been paid in advance
- (4) Provide 5 per cent for doubtful debts

[Ans : Gross Profit Rs. 16,000 ; Net Profit Rs. 6,200 and Balance Sheet Rs. 56,200]

- (2) From the following information, you are required to Prepare Trading, Profit and Loss Account and Balance Sheet of Mrs. D.P. Pandey & Co. Ltd. for the year ending 31st Dec. 2003 :

	<i>Dr.</i> <i>Rs.</i>		<i>Cr.</i> <i>Rs.</i>
Sundry Debtors	30,600	Sundry Creditors	10,000
Bills Receivable	5,000	Capital Account	70,000
Plant and Machinery	75,000	Bad Debts Provision	350
Purchases	1,90,000	Bills Payable	7,000
Freehold Premises	50,000	Reserve	20,000

Salaries	21,000	Sales	3,31,700
Wages	24,400		
Postage and Stationery	1,750		
Carriage Inward	1,750		
Carriage Outward	1,000		
Bad Debts	950		
Office General Charges	1,500		
Cash at Bank	5,300		
Cash in hand	800		
Closing Stock	30,000		
	4,39,050		4,39,050

The following adjustments are required :

- Pandey gets a salary of Rs. 12,000 per annum
- Allow 10% interest on Capital
- Bad Debts provision to be adjusted to 2 ½ % on debts
- 10% of the Net Profit to be credited to the reserve
- It was discovered in April, 2002 that stock sheets as on 31st March 2002 were less valued by Rs. 1000. However, no entry was passed in April 2002.
- Depreciate Plant and Machinery by 10% p.a and Freehold Premises @ 2% p.a.

[Ans : Gross Profit Rs. 1,14,550 ; Net Profit Rs. 60,435 ; Balance Sheet Rs. 1,87,435]

(3) From the following Trial Balanc of M & S Co., you are required to Prepare Trading, Profit and Loss Account and Balance Sheet for the year ended 31st Dec. 2003:

	Rs.		Rs.
Opening Stock	20,000	Sales	1,09,000
Purchases	25,500	Purchase Returns	1,325
Factory Wages	13,000	Creditors	2,000
Carriage Inwards	500	Bills Payable	10,000
Salaries	17,500	Short-Term Loan	7,500
Carriage Outwards	250	Bank Overdraft	1,500
General Expenses	225	Capital	80,000
Rent	1,750	General Reserve	13,500
Sales Returns	1,000		
Interest	1,500		
Commission	550		
Maintenance	1,150		
Bad Debts	600		
Drawings	22,500		
Good will	20,000		
Loose Tools	5,000		
Copy Rights	20,000		
Land & Buildings	30,000		
Machinery	20,000		
Bills Receivable	3,000		
Furniture	3,000		
Debtors	22,500		
Cash at Bank	13,300		
	2,42,825		2,42,825

Additional Information

- Make Provision 5% on debtors for bad debts.
- Depreciation on Machinery & Furniture by 10%.
- Stock at the end Rs. 17,500.
- Prepaid Rent Rs. 250.
- Outstanding Wages Rs. 750.

[Ans : Gross Profit Rs. 67,075;
Net Profit Rs. 40,375;
Balance Sheet Rs. 1,51,123]

(4) From the following particulars of M/s Ramesh & Co as on 31st March 2003, you are required to prepare Trading, Profit and Loss Account and Balance Sheet as on that date :

	Dr. Rs.		Cr. Rs.
Drawings	18,000	Capital	1,00,000
Buildings	15,000	Loan from Ravi @ 12% interest	15,000
Furniture & Fittings	7,500	Sales	1,00,000
Motor Van	25,000	Commission Received	7,500
Interest paid on Loan	900	Sundry Creditors	10,000
Purchases	75,000		
Opening Stock	25,000		
Establishment Charges	15,000		
Wages	2,000		
Insurance	1,000		
Sundry Debtors	28,100		
Bank Balance	20,000		
	2,32,500		2,32,500

Adjustments

- (a) The value of stock on 31st March 2003 was Rs.32000
- (b) Outstanding wages Rs.500
- (c) Prepaid Insurance Rs.300
- (d) Commission received in advance Rs.800
- (e) Allow interest on Capital @ 10%
- (f) Depreciate : Building 2½ %, Furniture & Fittings 10%, Motor Van 10%
- (g) Charge interest on drawings Rs. 500

[Ans : Gross Profit Rs. 29,500;
 Net Profit Rs. 5,575;
 Balance Sheet total Rs. 1,24,275]

(5) From the following Trial Balance, prepare Trading and Profit and Loss Account for the year ended 31st Dec. 2003 and Balance Sheet as on that date :

	Dr. Rs.		Cr. Rs.
Purchase	2,75,000	Sales	5,20,000
Return Inwards	15,000	Return Outwards	9,000
Carriage	12,400	Rent Received	13,000
Wages	58,600	Creditors	62,100
Trade Expenses	2,200	Bills Payable	2,200
Insurance	2,000	Commission	1,000
Audit Fees	1,200	Bank Loan	20,000
Debtors	1,10,000	Capital	2,50,000
Bills Receivable	3,300		
Advertising	5,500		
Opening Stock	36,000		
Cash in hand	12,800		
Cash at Bank	26,800		
Interest on Loan	1,500		
Drawings	15,000		
Fixed Assets	3,00,000		
	8,77,300		8,77,300

Adjustments

- (1) Stock at the end Rs. 60,000
- (2) Depreciation on fixed assets is 10%
- (3) Commission earned but not received amounts to Rs. 400
- (4) Rent received in advance Rs. 1,000
- (5) Interest on bank loan @ 15% p.a. is unpaid for the last six months
- (6) Allow 8% interest on capital and charge Rs. 900 as interest on drawings

[Ans : Gross Profit Rs.1,92,000; Net Profit Rs. 1,42,400; Balance Sheet Rs. 4,83,400]

(6) On 31st March 2003, the following Trial Balance was extracted from the books of ABC Ltd.:

	Dr. Rs.	Cr. Rs.
Capital Account	—	50,000
Plant & Machinery	80,000	—
Sales	—	1,77,000
Purchases	60,000	—
Returns	1,000	750
Opening Stock	30,000	—
Discount	350	—
Bank Charges	75	—
Sundry Debtors	45,000	—
Sundry Creditors	—	25,000
Salaries	6,000	—
Manufacturing Wages	10,000	—
Carriage Inward	750	—
Carriage Outward	1,200	—
Bad Debts Provision	—	525
Rent, Rates and Taxes	10,000	—
Advertisement	2,000	—
Cash in hand	900	—
Cash at Bank	6,000	—
	2,53,275	2,53,275

You are required to prepare, Trading, Profit and Loss account for the year ended 31st March 2003 and the balance sheet as on that date.

The following adjustments are required :

- (1) Closing Stock Rs.35,000
- (2) Depreciate Plant and Machinery at 6%
- (3) Bad debts provision to be adjusted to Rs.500
- (4) Interest on Capital to be allowed at 5% per annum

[Ans : Gross Profit Rs.1,11,000

Net Profit Rs.84,100

Balance sheet total Rs.1,61,600]

(7) M/s Patel starts business on 1st April 2003 with a Capital of Rs.30,000. The following trial balance was drawn up from his book at the end of the year:

	Dr. Rs.	Cr. Rs.
Capital	—	40,000
Salaries	—	1,60,000
Sundry Creditors	—	12,000
Bills Payable	—	9,000
Drawings	4,500	—
Plant & Fixtures	8,000	—
Purchases	1,16,000	—
Carriage Inwards	2,000	—
Returns Inwards	4,000	—
Wages	8,000	—
Salaries	10,000	—
Printing and Stationery	800	—
Advertisement	1,200	—
Trade Charges	600	—
Rent and Taxes	1,400	—
Sundry Debtors	25,000	—
Bills Receivable	5,000	—
Investments	15,000	—
Discount	500	—
Cash at Bank	16,000	—
Cash in hand	3,000	—
	2,21,000	2,21,000

The value of stock as at 31st March 2004 was Rs.26,000. You are required to prepare Trading, Profit and Loss Account for the year ended 31st March 2004, and a Balance Sheet as on that date after taking the following facts into account :

- (1) Interest on capital is to be provided @ 6% p.a.
- (2) An additional capital of Rs.10,000 was introduced by M/s Patel on 1st October 2003
- (3) Plant and fixtures are to be depreciated by 10%
- (4) Salaries outstanding on 31.3.2004 amounted to Rs.500
- (5) Accrued interest on investment amounted to Rs.750
- (6) Rs.500 are bad debts and a reserve for doubtful debts is to be created at 5% of the balance of debtors

[Ans : Gross profit Rs.56,000 ; Net Profit Rs.37,125 ; Balance Sheet total Rs.96,225]

(8) The following balances extracted from the books of Rajan & Co. as on 31st December 2003; you are required to prepare Trading, Profit and Loss Account and Balance Sheet:

	Rs.		Rs.
Rajan & Co's Capital	2,00,000	Loan on Mortgages	1,50,000
Interest (Dr)	7,500	Wages	1,50,000
Office Rent	2,500	Stock (1.1.2003)	25,000
Taxes & Insurance	1,000	Salaries	35,000
Machinery & Plant	1,00,000	Bills Payable	20,000
Sundry Debtors	2,00,000	Loose Tools	5,000
Bank Balances (Cr)	10,000	Cash on hand	5,000
Bills Receivable	15,000	Stock of books and Stationery	2,500
Sundry Creditors	1,00,000	Office Expenses	3,500
Purchases	2,10,000	Sales	4,82,000

Additional Information

- (1) The Stock at close was Rs.40,000
- (2) Wages Outstanding Rs.3,000
- (3) Salary Outstanding Rs.1,000
- (4) Rent Outstanding Rs.750
- (5) Insurance prepaid amounted to 250

[Ans: Gross Profit Rs.1,34,000, Net Profit Rs. 83,000, Total of Balance Sheet Rs.5,67,750]

(9) The following are the Balances extracted from the ledger of Meenakshi & Co. as on 31st March 2004 :

	Rs.		Rs.
Capital A/C	2,00,000	Reserves for discount on debtors	2,000
Drawings	35,000	Loans at 9%	50,000
Buildings	1,00,000	Salaries	44,000
Machinery	25,000	Wages	75,000
Furniture & Fixtures	6,000	Rent	27,500
Loose Tools	4,000	Traveling Expenses	12,500
Opening Stock	1,25,000	Postage and Telegrams	1,350
Purchases	7,50,000	Rates and Taxes	900
Sales	12,50,000	Carriage Inwards	25,000
Sales Returns	50,000	Carriage Outwards	7,500
Duty Paid Purchase	1,50,000	General Charges	9,000
Sundry Debtors	1,00,000	Interest Paid	3,750
Sundry Creditors	75,000	Bad Debts	3,000
Reserve for Bad and Doubtful debts	4,000	Cash on hand	2,500
		Cash at bank	24,000

Additional Information

- (1) Stock as on 31.3.2004 Rs.1,40,000
- (2) Rent Outstanding Rs.2,500
- (3) Wages Outstanding Rs.6,000
- (4) Salary Outstanding Rs.4,000
- (5) Maintain the reserve for doubtful debts are 5% and reserve for discounts on debtors at 2.5%

- (6) Provide Depreciations:
 Building – 2 ½%
 Machinery – 10%
 Furniture – 6%
 Loose Tools – 15%

Prepare Trading, Profit and Loss Account for the year ended 31st March 2004 and a Balance Sheet as on that date.

(10) Prepare Trading, Profit and Loss Account for the year ended 31st March 2004 and Balance Sheet as at that date from the following Trial Balance of Gupta & Co. :

	<i>Debit Balance Rs.</i>	<i>Credit Balances Rs.</i>
Drawings	45,000	—
Goodwill	90,000	—
Capital	—	1,60,000
Bills Payable	—	33,800
Land & Building	60,000	—
Plant & Machinery	40,000	—
Creditors	—	70,000
Purchase Returns	—	2,650
Loose Tools	3,000	—
Bills Receivable	3,000	—
Sales	—	21,800
Stock (1.4.2003)	40,000	—
Purchases	51,000	—
Wages	20,000	—
Carriage Outwards	500	—
Carriage Inward	1,000	—
Coal	5,800	—
Salaries	35,000	—
Rent, Rates & Taxes	2,800	—
Discount	1,500	—
Cast at bank	25,000	—
Cash in hand	400	—
Sundry Debtors	45,000	—
Repairs	1,800	—
Printing and Stationery	500	—
Bad Debts	1,200	—
Advertisement	3,500	—
Sales Returns	2,000	—
Furniture	1,200	—
General expenses	5,250	—

Additional Information

- (1) Closing Stock on 31st March 2004 was 35,000
- (2) Depreciate Plant & Machinery, Tools and Furniture by 10% and Land and Building by 2 ½%
- (3) Provide Rs.1,500 for Wages Outstanding
- (4) Advertisement prepaid are Rs.500
- (5) Provide 5% on Debtors against bad debts and 2% against discount.



CHAPTER 5

Depreciation

Meaning and Definition

The term depreciation refers to fall in the value or utility of fixed assets which are used in operations over the definite period of years. In other words, depreciation is the process of spreading the cost of fixed assets over the number of years during which benefit of the asset is received. The fall in value or utility of fixed assets due to so many causes like wear and tear, decay, effluxion of time or obsolescence, replacement, breakdown, fall in market value etc.

According to the Institute of Chartered Accountant of India, "Depreciation is the measure of the wearing out, consumption or other loss of value of a depreciable asset arising from use, effluxion of time or obsolescence through technology and market changes.

Depreciation, Depletion and Amortization

In order to correct measuring of depreciation it is essential to know the conceptual meaning of depreciation, depletion and amortization.

Depreciation: Depreciation is treated as a revenue loss which is recorded when expired utility fixed assets such as plant and machinery, building and equipment etc.

Depletion: The term depletion refers to measure the rate of exhaustion of the natural resources or assets such as mines, iron ore, oil wells, quarries etc. While comparing with depreciation, depletion is generally applied in the case of natural resources to ascertain the rate of physical shrinkage but in the case of depreciation is used to measure the fall in the value or utility of fixed assets such as plant and machinery and other general assets.

Amortization: The term Amortization is applied in the case of intangible assets such as patents, copyrights, goodwill, trade marks etc., Amortization is used to measure the reduction in value of intangible assets.

Obsolescence: Obsolescence means a reduction of usefulness of assets due to technological changes, improved production methods, change in market demand for the product or service output of the asset or legal or other restrictions.

Purpose of Charging Depreciation

The following are the purpose of charging depreciation of fixed assets:

- (1) To ascertain in the true profit of the business.
- (2) To show the true presentation of financial position.
- (3) To provide fund for replacement of assets.
- (4) To show the assets at its reasonable value in the balance sheet.

Factors Affecting the Amount of Depreciation

The following factors are to be considered while charging the amount of depreciation :

- (1) The original cost of the asset.
- (2) The useful life of the asset.
- (3) Estimated scrap or residual value of the asset at the end of its life.
- (4) Selecting an appropriate method of depreciation.

Methods of Charging Depreciation

The following are the various methods applied for measuring allocation of depreciation cost :

- (1) Straight Line Method
- (2) Written Down Value Method
- (3) Annuity Method
- (4) Sinking Fund Method
- (5) Revaluation or Appraisal Method
- (6) Insurance Policy Method
- (7) Depletion Method
- (8) Sum of the Digits Method
- (9) Machine Hour Rate Method

(1) Straight Line Method

This method is also termed as Constant Charge Method. Under this method, depreciation is charged for every year will be the constant amount throughout the life of the asset. Accordingly depreciation is calculated by deducting the scrap value from the original cost of an asset and the balance is divided by the number of years estimated as the life of the asset. The following formula for calculating the periodic depreciation charge is :

$$\text{Depreciation} = \frac{\text{Original Cost of Asset} - \text{Scrap Value}}{\text{Estimated Life of Asset}}$$

(or)

$$\text{Depreciation} = \frac{C - S}{N}$$

Where
 D = Depreciation Rate
 C = Original Cost of Asset
 S = Salvage or Scrap Value
 N = Estimated Useful Life

Illustration: 1

From the following information you are required to calculate depreciation rate :

Cost of the Machine	Rs. 30,000
Erection Charges	Rs. 3,000
Estimated useful life	10 years
Estimated Scarp Value	Rs. 3000

Solution:

Calculation of depreciation rate for every year :

$$\begin{aligned} \text{Depreciation} &= \frac{\text{Original Cost of Asset} - \text{Scrap Value}}{\text{Estimated Life of an Asset}} \\ &= \frac{\text{Rs. 33,000} - \text{Rs. 3,000}}{10} = \frac{\text{Rs. 30,000}}{10} = \text{Rs. 3,000} \end{aligned}$$

Thus, the amount of depreciation would be Rs. 3,000 for every year.

Merits

- (1) Simple and easy to calculate.
- (2) Original cost of asset reduced up to Scrap Value at the end of estimated life.
- (3) Estimated useful life of the asset can be estimated under this method.

Demerits

- (1) It does not consider intensity of use of assets.
- (2) It ignores any additions or opportunity cost while calculating depreciations.
- (3) It ignores effective utilization of fixed assets, it becomes difficult to calculate correct depreciation rate.
- (4) Under the assumption of constant charges of maintenance of assets it is impossible to calculate true depreciation.

Illustration: 2

A company charges depreciation on plant and machinery under constant charge method @ 25% per annum. On 1st January, 2000 Machinery was Purchased for Rs. 1,00,000 is estimated to have a life of four years.

From the above information, you are required to prepare a Machinery account.

Solution:

Dr.			Machinery Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2000 Jan. 1	To Bank A/c	1,00,000	2000 Dec. 31	By Depreciation 25% on Rs.1,00,000	25,000			
			"	By Balance c/d	75,000			
		1,00,000			1,00,000			
2001 Jan. 1	To Balance b/d	75,000	2001 Dec. 31	By Depreciation 25% on Rs.1,00,000	25,000			
			"	By Balance c/d	50,000			
		75,000			75,000			
2002 Jan. 1	To Balance b/d	50,000	2002 Dec. 31	By Depreciation 25% on Rs.1,00,000	25,000			
			"	By Balance c/d	25,000			
		50,000			50,000			
2003 Jan. 1	To Balance b/d	25,000	2003 Dec. 31	By Depreciation 25% on Rs.1,00,000	25,000			
					25,000			
		25,000			25,000			

Illustration: 3

On 1st January, 2000, a firm purchased Ist January, 2001 and on Ist July 2003 to the value of Rs. 28,500 and Rs. 25,200. Residual values being Rs. 1,500 and Rs. 1,200 respectively. You are required to prepare a Machinery Account for the first four years if depreciation is written off according to Straight Line Method assuming that the estimated Working life of the asset is 10 years and its Scrap Value Rs. 15,000 at the end of its life.

Solution:

Calculation of depreciation for every year:

$$\text{Depreciation} = \frac{\text{Original Cost of Asset} - \text{Scrap Value}}{\text{Estimated Life of an Asset}}$$

$$\text{I year Depreciation (Original Cost of Asset)} = \frac{\text{Rs.1,65,000} - \text{Rs.15,000}}{10}$$

$$= \frac{\text{Rs.1,50,000}}{10} \quad \text{Rs.15,000 P.A.}$$

$$\text{II year Depreciation (for additional Value of Asset)} = \frac{\text{Rs.28,500} - \text{Rs.1,500}}{10}$$

$$\frac{\text{Rs. 27,000}}{10} = \text{Rs. 2,700 P.A.}$$

$$\text{III year Depreciation (for additional Value of Asset)} = \frac{\text{Rs. 25,200} - \text{Rs. 1,200}}{10}$$

$$\frac{\text{Rs. 24,000}}{10} = \text{Rs. 2,400 P.A.}$$

Dr.			Machinery Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2000 Jan. 1	To Bank A/C (for original Cost of machine)	1,65,000	2000 Dec. 31	By Depreciation By Balance c/d	15,000 1,50,000			
		1,65,000			1,65,000			
2001 Jan. 1	To Balance b/d	1,50,000	2001 Dec. 31	By Depreciation (Original Machine) By Depreciation (for additional Machine)	15,000 2,700			
	To Bank A/c (Additional Cost of machine)	28,500						
	By Balance c/d	1,60,800						
		1,78,500			1,78,500			
2002 Jan. 1	To Balance b/d	1,60,800	2002 Dec. 31	By Depreciation By Depreciation (Additional Cost of Machine) By Balance c/d	15,000 2,700 1,43,100			
		1,60,800			1,60,800			
2003 Jan. 1	To Balance b/d To Bank A/c (Additional Cost of Machine)	1,43,100 25,200	2003 Dec. 31	By Depreciation (for Original Cost Machine) By Depreciation (for additional Cost Machine) By Depreciation (for additional Machine) By Balance c/d	15,000 2,700 1,200 1,49,400			
		1,68,300			1,68,300			
2004 Jan. 1	To Balance b/d	1,49,400						

Note: Depreciation Calculated for additional cost of machine of Rs. 25,200 is only six months for Rs. 1,200.

(2) Written-Down Value Method (WDV)

This method is also known as Fixed Percentage On Declining Base Method (or) Reducing Installment Method. Under this method depreciation is charged at fixed rate on the reducing balance (i.e., Cost less depreciation) every year. Accordingly the amount of depreciation gradually reducing every year.

The depreciation charge in the initial period is high and negligible amount in the later period of the asset. The following formula used for computing depreciation rate under Written-Down Value Method.

$$r = I - n \sqrt[n]{\frac{S}{C}} \times 100 = \left[I - \frac{S}{C} \right] \times 100$$

Where ,

- R = Rate of Depreciation
- S = Estimated Scrap Value
- N = Estimated Life of the Asset
- C = Original Cost of the Machine or Asset

Illustration: 4

From the following information you are required to calculate depreciation rate under WDV Method.

Cost of the Machine	Rs. 10,000
Estimated Useful Life	3 years
Estimated Scrap or Salvage Value	Rs. 1,000

Solution:

Calculation of Depreciation Rate Under Declining Base Method

$$r = I - n \sqrt[n]{\frac{S}{C}} \times 100$$

Where

- R = Rate of Depreciation
- S = Scrap Value
- C = Cost of the Machine
- n = Estimated Useful Life

$$r = I - 3 \sqrt[3]{\frac{1,000}{10,000}}$$

$$r = I - \left[\frac{1}{10} \right]^{\frac{1}{3}} = \left[n \sqrt[n]{\frac{S}{C}} \text{ is the same as } \left[\frac{S}{C} \right]^{\frac{1}{n}} \right]$$

$$r = I - \frac{1}{10^{\frac{1}{3}}} = I - \frac{1}{2.154} = I - 464 = 0.536$$

$$\begin{aligned} \text{Rate of Depreciation} &= 0.536 \times 100 = 53.6 \% \\ \text{Amount of Depreciation} &= 10,000 \frac{53.6}{100} = \text{Rs. } 5,360 \end{aligned}$$

Illustration: 5

From the following information you are required to calculate depreciation rate for two years under Written Down Value Method:

Original Cost of the Machine	Rs. 30,000
Erection Charges	Rs. 3,000
Estimated Useful Life	10 years
Estimated Scrap Value	Rs. 3,000

Depreciation to be charged at 10% on the WDV Method.

Solution:

Calculation of Depreciation charges under Written Down Value Method.

Original Cost of the Machine	33,000
<i>Less</i> : Salvage Value at the end	<u>3,000</u>
	30,000
Depreciation for the First year at 10% of Rs. 10,000	<u>3,000</u>
	27,000
Depreciation for the Second year at 10% of Rs. 9,000	<u>2,700</u>
	<u>24,300</u>

Merits

- (1) This method is accepted by Income Tax Authorities.
- (2) Impact of obsolescence will be reduced at minimum level.
- (3) Fresh calculation is not required when additions are made.
- (4) Under this method the depreciation amount is gradually decreasing and it will affect the smoothing out of periodic profit.

Demerits

- (1) Residual Value of the asset cannot be correctly estimated.
- (2) It ignores interest on investment on opportunity cost which will lead to difficulty while determining the rate of depreciation.
- (3) It is difficult to ascertain the true profit because revenue contribution of the asset are not constant.
- (4) The original cost of the asset cannot be brought down to zero.

Illustration: 6

On 1st January 2001, Hindustan Ltd. purchased machinery for Rs. 12,00,000 and on 30th June 2002, one more machine of worth Rs. 2,00,000. On 31st March 2003, one of the original machinery which had cost Rs. 50,000 was found to have become obsolete and was sold as scrap for Rs. 7,000. It was replaced on that date by a new machine costing Rs. 80,000. Depreciation is to be provided @ 15% p.a. on written down value (WDV) Method. Accounts are closed on 31st December every year. Show machinery account for 3 years.

Solution:**Machinery Account**

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2001 Jan. 1	To Bank A/c	12,00,000	2001 Dec. 31	By Depreciation	1,80,000
			"	By Balance c/d	10,20,000
		12,00,000			12,00,000
2002 Jan. 1	To Balance b/d	10,20,000	2002 Dec. 31	By Depreciation	1,68,000
2002 June. 30	To Bank A/c	2,00,000	"	By Balance c/d	10,52,000
		12,20,000			12,20,000
2003 Jan. 1	To Balance b/d	10,52,000	2003 Dec. 31	By Bank (Sale)	7,000
2003 Mar. 31	To Bank A/c	80,000	"	By Depreciation	1,350
			"	By P & L A/c Loss	27,770
			"	By Depreciation (1,52,380 + 9,000)	1,61,380
				By Balance c/d	9,34,500
		11,32,000			11,32,000
2004 Jan. 1	To Balance b/d	9,34,500			

Illustration: 7

On 1st April 2000, Machinery was purchased by Modi Ltd., for Rs. 1,00,000. The rate of depreciation was charged at 20% under diminishing balance method. Show the machinery account for four years from 2000 to 2004.

Solution :**Under Diminishing Balance Method
Machinery Account**

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2000 Aprl.	To Bank A/c	1,00,000	2001 Mar. 31	By Depreciation (20% on Rs. 1,00,000)	20,000
			"	By Balance c/d	80,000
		1,00,000			1,00,000
2001 Aprl. 1	To Balance b/d	80,000	2001 Mar. 31	By Depreciation (20% on Rs.80,000)	16,000
			"	By Balance c/d	64,000
		80,000			80,000

2002 Apr.1	To Balance b/d	64,000	2002 Mar. 31	By Depreciation (20% on Rs. 64,000)	12,800
			"	By Balance c/d	51,200
		64,000			64,000
2003 Apr.1	To Balance b/d	51,200	2004 Mar. 31	By Depreciation (20% on Rs. 51,200)	10,240
			"	By Balance c/d	40,960
		51,200			51,200
2004 Apr.1	To Balance b/d	40,960			

(3) Annuity Method

This method is most suitable for a firm where capital is invested in the least hold properties. Under this method, while calculating the amount of depreciation, a fixed amount of depreciation is charged for every year of the estimated useful life of the asset in such a way that at a fixed rate of interest is calculated on the same amount had been invested in some other form of capital investment. In other words, depreciation is charged for every year refers to interest losing or reduction in the original cost of the fixed assets. Under the annuity method where the loss of interest is due to the investment made in the form of an asset is considered while calculating the depreciation. The amount of depreciation is calculated with the help of an Annuity Table.

Illustration: 8

A firm purchases a lease for 5 years for Rs. 40,000. It decides to write off depreciation on the Annuity Method charging the rate of interest at 5% per annum. The annuity table shows that annual amount necessary to write off Re.1 for 5years at 5% is 0.230975.

Solution:

Dr.		Lease Account		Cr.	
Particulars	Amount Rs.	Particulars	Amount Rs.		
To Cash A/c	40,000.00	By Depreciation A/c	9,239.00		
To Interest A/c	2,000.00	By Balance c/d	32,761.00		
	42,000.00		42,000.00		
To Balance b/d	32,761.00	By Depreciation A/c	9,239.00		
To Interest A/c	1,638.05	By Balance c/d	25,160.05		
	34,399.05		34,399.05		
To Balance b/d	25,160.05	By Depreciation A/c	9,239.00		
To Interest A/c	1,258.00	By Balance c/d	17,179.05		
	26,418.05		26,418.05		
To Balance b/d	17,179.05	By Depreciation A/c	9,239.00		
To Interest A/c	858.95	By Balance c/d	8,799.00		
	18,038.00		18,038.00		
To Balance b/d	8,799.00	By Depreciation A/c	9,239.00		
To Interest A/c	440.00		9,239.00		
	9,239.00		9,239.00		

Illustration: 9

On 1st April 2001, a firm purchased a three year lease of premises for Rs.10,000 and it was decided to depreciate the lease by annuity method calculating interest at 5 per cent per annum. Show the lease hold property account for 3 years. The annuity table shows that annual amount necessary to write off Re.1 for 3 years at 5% is 0.367208.

Solution :

Machinery Account

Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.
2000 Apr. 1	To Cash A/c	1,0000	2001 Mar. 31	By Depreciation A/c	3,672.08
Mar.31	To Interest A/c	500	"	By Balance c/d	6,827.92
		10,500			10,500
2001 Apr.1	To Balance b/d	6,827.92	2001 Mar.31	By Depreciation	3,672.08
Mar.31	To Interest A/c	341.40	"	By Balance c/d	3,497.24
		7169.32			7,169.32
2002 Apr. 1	To Balance b/d	3,497.32	2001 Mar. 31	By Depreciation	3,672.08
Mar.31	To Interest A/c	174.84			
		3672.08			3,672.08

Note : The annual depreciation is calculated as = 0.367208 x 10,000 = Rs.3672.08

(4) Sinking Fund Method

Like the Annuity Method, the amount of depreciation is charged with the help of Sinking Fund Table. Under this method an amount equal to the amount written off as depreciation is invested in outside securities in order to facilitate to replace the asset at the expiry useful life of the asset. In other words, the amount of depreciation charged is debited to depreciation account and an equal amount is credited to Sinking Fund Account. At the estimated expiry useful life of the asset, the amount of depreciation each year is invested in easily realizable securities which can be readily available for the replacement of the asset.

Journal Entries Under this Method: The following are the journal entries recorded under this method:

First Year

(1) When the asset is purchased:

Asset Account	Dr.	***	
To Bank Account			***

(2) For Providing depreciation at the end of first year:

Depreciation Account	Dr.	***	
To Sinking Fund Account			***

(3) For investing the amount:

Sinking Fund Investment Account	Dr.	* * *	
To Bank Account			* * *

Subsequent Years**(1) For Receipt of Interest on Investment:**

Bank Account	Dr.	* * *	
To Sinking Fund Account			* * *

(2) For Transferring Interest to Sinking Fund:

Interest on Sinking Fund Account	Dr.	* * *	
To Sinking Fund Account			* * *

(3) For Providing Depreciation:

Depreciation Account	Dr.	* * *	
To Sinking Fund Account			* * *

(4) For Investing the Amount:

Sinking Fund Investment Account	Dr.	* * *	
To Bank Account			* * *

Last Years**(1) For Receipt of Interest on Investment:**

Bank Account	Dr.	* * *	
To Sinking Fund Account			* * *

(2) For Transferring Interest to Sinking Fund Account:

Interest on Sinking Fund Account	Dr.	* * *	
To Sinking Fund Account			* * *

(3) For Providing Depreciation:

Depreciation Account	Dr.	* * *	
To Sinking Fund Investment Account			* * *

(4) For Sale of Investment:

Bank Account	Dr.	* * *	
To Sinking Fund Investment Account			* * *

(5) For Transferring Profit and Sale of Investment:

Sinking Fund Investment Account	Dr.	* * *	
To Sinking Fund Account			* * *

(6) For Transferring Loss on Sale of Investment:

Sinking Fund Account	Dr.	***	
To Sinking Fund Investment Account			***

(7) For Closing the Asset Account by Transferring Balance of Sinking Fund Account to Asset Account:

Sinking Fund Account	Dr.	***	
To Asset Account			***

Illustration: 10

A company purchased a machinery on January 1 1998 for a sum of Rs. 1,00,000 for a useful life of 5 years. It is decided to provide for the replacement of machinery at the end of 5 years by setting up a depreciation fund. It is expected that the investment will fetch interest at 5%. Sinking fund table shows that Re.0.180975 if invested yearly at 5% p.a. produces Re. 1 at the end of 5th year. It is also estimated that the machinery will have a scrap value of Rs. 16,000. On 31st December 2002, the investment was sold for Rs. 65,000. On 1st January 2004, the new machinery was purchased for Rs. 1,20,000. The scrap of the old machinery realizes Rs. 17,000.

Show the Journal entries and give the machinery account, depreciation fund account; depreciation fund investment account and the new machinery account.

Solution:

The amount to be charged to the profit and loss A/c has been arrived as follows:

	<i>Rs.</i>
Original Cost of the Machinery	1,00,000
Less : Estimated Scrap Value	16,000
	<hr/>
Depreciation on the plant for its whole life	84,000

The amount to be charged to the Profit and Loss A/c = Rs. 84,000 x 0.180975
= Rs. 15,201.90 (or)
= Rs. 15,202

Journal Entries

<i>Date</i>	<i>Particulars</i>	<i>L.F.</i>	<i>Debit Rs.</i>	<i>Credit Rs.</i>
1998 Jan.1	Machinery A/c Dr. To Bank A/c (Being the purchase of Machinery)		1,00,000	1,00,000
Dec.31	Depreciation A/c Dr. To Depreciation Fund A/c (Being annual depreciation as per sinking fund table)		15,202	15,202
Dec.31	Depreciation Fund Investment A/c Dr. To Bank a/c (Being investment purchased from depreciation fund)		15,502	15,502

Dec.31	Profit and Loss A/c To Depreciation A/c (Being depreciation charged from Profit and Loss A/c)	Dr.	15,502	15,502
1999 Dec. 31	Bank A/c To Depreciation Fund A/c (Being interest received @ 5% on Rs. 15,202)	Dr.	760	760
Dec. 31	Depreciation A/c To Depreciation Fund A/c (Being annual depreciation as per sinking fund table)	Dr.	15,502	15,202
Dec. 31	Depreciation Fund Investment A/c To Bank A/c (Being the purchase of investment)	Dr.	15,962	15,962
Dec. 31	Profit and Loss A/c To Depreciation A/c (Being depreciation charged from	Dr.	15,962	15,962
2000 Dec.31	Bank A/c To Depreciation Fund A/c (Being interest received @ 5% on Rs. 31,164)	Dr.	1,558	1,558
Dec.31	Depreciation A/c To Depreciation Fund A/c (Being annual depreciation as per sinking fund table)	Dr.	15,202	15,202
Dec.31	Depreciation Fund Investment A/c To Bank A/c (Being the purchase of investment) 15,202 + 1,558)	Dr.	16,760	16,760
Dec.31	Profit and Loss A/c To Depreciation A/c (Being depreciation charged from	Dr.	16,760	16,760
2001 Dec. 31	Bank A/c To Depreciation Fund A/c (Being interest received @ 5% on Rs. 47,924)	Dr.	2,396	2,396
Dec. 31	Depreciation A/c To Depreciation Fund A/c (Being annual depreciation as per sinking fund table)	Dr.	15,202	15,202
Dec.31	Depreciation Fund Investment A/c To Bank A/c (Being the purchase of investment) (15,202 + 2,396)	Dr.	17,598	17,598
Dec. 31	Profit and Loss A/c To Depreciation A/c (Being depreciation charged from, P & L A/c)	Dr.	17,598	17,598
2002 Dec.31	Bank A/c To Depreciation Fund A/c (Being interest receive @ 5% on Rs. 65,522)	Dr.	3,726	3,726

Dec.31	Depreciation A/c To Depreciation Fund A/c (Being annual depreciation as per sinking fund table)	Dr.	15,202	15,202
Dec. 31	Bank A/c To Depreciation Fund Investment (Being the sale investments)	Dr.	65,000	65,000
Dec. 31	Depreciation Fund A/c To Depreciation Fund Investment A/c (Being the loss on sale of investment transferred to depreciation fund A/c (65,522 – 65,000))	Dr.	522	522
Dec.31	Depreciation Fund A/c To Machinery A/c (Amount of Machinery written off by transfer to depreciation fund A/c)	Dr.	1,00,000	1,00,000
Dec.31	Profit and Loss A/c To Depreciation Fund A/c (Being balance left in depreciation fund a/c transferred to P & L A/c)	Dr.	478	478
2003 Jan. 1	New Machinery A/c To Bank A/c (Being the purchase of new machinery)	Dr.	1,20,000	1,20,000

Dr. Machinery Account Cr.

Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.
1998 Jan.1	To Bank A/c	1,00,000	1998 Dec. 31	By Balance c/d	1,00,000
		1,00,000			1,00,000
1999 Jan. 1	To Balance b/d	1,00,000	1999 Dec. 31	By Balance c/d	1,00,000
		1,00,000			1,00,000
2000 Jan.1	To Balance A/c	1,00,000	2000 Dec.31	By Balance c/d	1,00,000
		1,00,000			1,00,000
2001 Jan.1	To Balance A/c	1,00,000	2001 Dec.31	By Balance c/d	1,00,000
		1,00,000			1,00,000
2002 Jan.1	To Balance b/d	1,00,000	2002 Dec.31	By Depreciation Fund A/c	83,478
Dec.31	To P & L A/c (Profit)	478	"	By Bank (Scrap Sold)	17,000
		1,00,478			1,00,478

Dr. Depreciation Fund Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
1998 Dec.31	To Balance c/d	15,502	1998 Dec. 31	By Profit & Loss A/c	15,502
		15,502			15,502
1999 Dec.31	To Balance c/d	31,164	1999 Jan.1	By Balance b/d	15,502
Mar.31	To Interest A/c		Dec.31	By Bank (Interest)	760
		31,164	Dec.31	By Profit & Loss A/c	15,502
					31,164
2000 Dec.31	To Balance c/d	47,924	2000 Jan.1	By Balance b/d	31,164
		47,924	Dec.31	By Bank (Interest)	1,558
			" 31	By Profit & Loss A/c	15,202
					47,924
2001 Dec.31	To Balance c/d	65,522	2001 Jan.1	By Balance b/d	47,294
		65,522	Dec.31	By Bank (Interest)	2,396
			" 31	By Profit & Loss A/c	15,202
					65,522
2002 Dec.31	To Depreciation Fund Investment A/c (loss on sale of investment)	522	2002 Jan.1	By Balance b/d	65,522
Dec.31	To Machinery A/c (accumulated depreciation)	83,478	Dec.31	By Bank (Interest)	3,276
		84,000	" 31	By Profit & Loss A/c	15,202
					84,000

Dr. Machinery Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2003 Jan.1	To Bank A/c	1,20,000			

Dr. Depreciation Fund Investment Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
1998 Dec.31	To Bank A/c	15,202	1998 Dec.31	By Balance c/d	15,202
		15,202			15,202
1999 Jan.1	To Balance b/d	15,202	1999 Mar.31	By Balance c/d	31,164
Mar.3	To Bank (15202 + 760)	15,962			31,164
		31,164			
2000 Jan.1	To Balance b/d	31,164	2000 Mar.31	By Balance c/d	47,924
Mar.31	To Bank (15202+1558)	16,760			47,924
		47,924			

2001 Jan.1	To Balance b/d	47,924	2001 Mar.31	By Balance c/d	65,522
Mar.31	To Bank (15202+2396)	17,598			
		65,522			65,522
2002 Jan.1	To Balance b/d	65,522	2002 Mar.31	By Bank A/c	65,000
				By Depreciation Fund A/c	522
		65,522		(loss on sale of investment)	
					65,522

Illustration: 11

Mr. Sharma brought a plant on 1.1.2001 for a sum of Rs. 2,00,000 having useful life of 3 years. The estimated Scrap Value of machine is Rs. 20,000. Depreciation is calculated on the basis of Sinking Fund Method. The Sinking Fund Investments are expected to earn interest @ 5 % P.A. Sinking Fund Table shows that Re. 0.317208 if invested yearly at 5% P.A. produces Re.1 at the end of 3 years. The investments are sold at the end of 3rd year for a sum of Rs. 1,50,000. A new plant is purchased for Rs. 2,30,000 on 1.1.2004. The scrap of the old Plant sold for Rs. 15,000, you are required to prepare the necessary accounts in the books of James.

Dr.			Plant Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Jan.1	To Bank A/c	2,00,000	2001 31 st Dec.	By Balance c/d	2,00,000			
		2,00,000			2,00,000			
2001 Jan.1	To Balance b/d	2,00,000	2001 31 st Dec.	By Balance c/d	2,00,000			
		2,00,000			2,00,000			
2001 Jan.1	To Balance b/d	2,00,000	2003 Dec.31	By Depreciation Fund Account	1,50,000			
			Dec.31	By Bank A/c (scrap sold)	15,000			
			Dec.31	By Profit & Loss A/c (Loss)	35,000			
		2,00,000			2,00,000			

Dr.			New Plant Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2004 Jan.1	To Bank A/c	2,30,000						

Dr.			Sinking Fund Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Dec.31	To Balance c/d	57,097	2001 Dec. 31	By Profit & Loss A/c	57,097			
		57,097			57,097			
2002 Dec.31	To Balance c/d	1,17,049	2002 Jan.1	By Balance b/d	57,097			
		1,17,049	2002 Dec.31	By Bank (Interest 5%)	2,855			
			2002 Dec.31	By Profit & Loss A/c	57,097			
					1,17,049			
2003 Dec.31	To Depreciation Fund Investment A/c (loss on sale of investment)	30,000	2003 Jan.1	By Balance b/d	1,17,049			
			2003 Dec.31	By Bank (Interest 5%)	5,854			
2003 Dec.31	To Plant A/c (Accumulated Depreciation)	1,50,000	2003 Dec.31	By Profit & Loss A/c	57,097			
		1,80,000			1,80,000			

Dr.			Sinking Fund Investment Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Dec.31	To Bank A/c	57,097	2001 Dec.31	By Balance c/d	57,097			
		57,097			57,097			
2002 Jan.1	To Balance b/d	57,097	2002 Dec.31	By Balance c/d	2,00,000			
2002 Dec.31	To Bank A/c (57097 + 2855)	59,952						
		1,17,049			1,17,049			
2003 Jan.1	To Balance b/d	1,17,049	2003 Dec.31	By Bank A/c	1,50,000			
2003 Dec.31	To Bank A/c (57097 + 5854)	62,951	2003 Dec.31	By Depreciation Fund A/c (Loss on sale of Investment)	30,000			
		1,80,000			1,80,000			

Working Notes

The amount charged to the Profit and Loss Account calculated is as follows :

		Rs.
Original cost of the plant	=	2,00,000
Less : Estimated Scrap Value	=	20,000
Depreciation on the plant for its whole life	=	1,80,000
The amount charged to the Profit and Loss Account	=	1,80,000 x 0.317208
	=	Rs. 57097.44
The Amount Charged to the Profit and Loss Account is	=	Rs. 57097.44

(5) Revaluation Method

This method is specially designed to revalue the assets in the case of livestock, loose tools, patents etc. This method also termed as Appraisal Method. The calculation of depreciation of these assets is valued at the end of the accounting year by comparing the opening value of the asset of the additional if any, the difference is treated as depreciation.

Illustration: 12

From the following particulars you are required to calculate depreciation of Loose Tools under Revaluation Method and Prepare a Loose Tools Account. The Loose Tool is estimated as follows :

	<u>2001</u>	<u>2002</u>	<u>2003</u>
Loose Tools Ist Jan.	50,000	12,000	24,000
Loose Tools revalued on 31 Dec.	25,000	32,000	40,000

Solution:

Dr.			Loose Tools Account			Cr.		
<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>			
2001 1 st Jan.	To Bank A/c	50,000	2001 Dec.31 st	By Depreciation (Balancing Figure)	25,000			
			Dec.31 st	By Balance c/d	25,000			
		50,000			50,000			
2002 1 st Jan.	To Balance b/d	25,000	2002 Dec.31 st	By Depreciation (Balance Figure)	5,000			
1 st Jan.	To Bank A/c	12,000	Dec.31 st	By Balance c/d	32,000			
		37,000			37,000			
2003 1 st Jan.	To Balance b/d	32,000	2003 Dec.31 st	By Depreciation (Balance Figure)	16,000			
1 st Jan.	To Bank A/c	24,000	Dec.31 st	By Balance c/d	40,000			
		56,000			56,000			
2004 Jan.1	To Balance b/d	40,000						

(6) Insurance Policy Method

Under this method an asset to be replaced by taking required amount of insurance policy from an Insurance Company. A fixed premium is paid which is equal to the amount of depreciation for every year. At the end of the agreed sum, i.e., on the maturity of the policy, the amount will be used for replacing the existing assets.

Accounting Entries

First Year and Subsequent Years

(1) When Premium paid in the beginning of the year:

Depreciation Insurance Policy Account	Dr.	* * *
To Bank Account		* * *

(2) When Depreciation provided at the end of the year:

Profit and Loss Account	Dr.	* * *	
To Depreciation Reserve Account			* * *

In the Last Year (In addition to above two entries):**(3) When Policy amount received from Insurance Company:**

Bank Account	Dr.	* * *	
To Depreciation Insurance Policy Account			* * *

(4) When Profit is made on Policy:

Depreciation Insurance Policy Account	Dr.	* * *	
To Depreciation Reserve Account			* * *

(5) When Closing down of Old Asset:

Depreciation Reserve Account	Dr.	* * *	
To Old Asset Account			* * *

(6) When Purchase of New Asset:

New Asset Account	Dr.	* * *	
To Bank Account			* * *

Illustration: 13

Misra Ltd. Purchased a machinery for Rs. 2,00,000 on 1st January 2000, and it is decided to make provision for replacement of the machinery by taking an Insurance policy for an annual premium of Rs. 64,000. After three years the machinery is to be replaced. You are required to prepare a Journal and show the ledger account of (a) Machinery Account (b) Depreciation fund Account and (c) Depreciation Insurance Policy Account.

Solution:**Journal**

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
2000 Jan.1	Machinery Account Dr. To Bank Account (Being Machinery purchased for 3 years)		2,00,000	2,00,000
"	Depreciation Insurance Policy A/c Dr. To Bank A/c (Being insurance policy taken for replacement)		64,000	64,000
2000 Dec.31	Profit and Loss Account Dr. To Depreciation Fund A/c (Being charge of premium against profit)		64,000	64,000
2001 Jan.1	Depreciation Insurance Policy A/c Dr. To Bank Account (Being premium paid on machinery insurance policy)		64,000	64,000

2001 Dec.31	Profit and Loss Account To Depreciation Fund A/c (Being charge of premium against profit)	Dr.	64,000	64,000
2002 Jan.1	Depreciation Insurance Policy A/c To Bank Account (Being premium paid on machinery insurance policy)	Dr.	64,000	64,000
2002 Dec.31	Profit and Loss Account To Depreciation Fund A/c (Being charge of premium against profit)	Dr.	64,000	64,000
"	Depreciation Fund A/c To Machinery Account (Being closing down of old asset)	Dr.	2,00,000	2,00,000
"	Bank Account To Depreciation Fund Account (Being policy money received on maturity)	Dr.	2,00,000	2,00,000
"	Depreciation Insurance Policy A/c To Depreciation Fund A/c (Being transfer of policy account to depreciation fund A/c)	Dr.	8,000	8,000

Dr. Depreciation Fund Investment Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2000 Dec.31	To Balance c/d	64,000	2000 Dec.31	By Profit & Loss A/c	64,000
		64,000			64,000
2001 Dec.31	To Balance c/d	1,28,000	2001 Jan. 1	By Balance b/d	64,000
		1,28,000	2001 Dec.31	By Profit & Loss A/c	64,000
					1,28,000
2002 Dec.31	To Balance c/d	2,00,000	2002 Jan. 1	By Balance b/d	1,28,000
			2002 Dec.31	By Profit & Loss A/c	64,000
			"	By Depreciation Insurance Policy A/c (Profit on the Realisation of Policy)	8,000
		2,00,000			2,00,000
			2003 Jan.1	By Balance b/d	2,00,000

Dr. Depreciation Insurance Policy Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2000 Jan.1	To Bank A/c	64,000	2000 Dec.31	By Balance c/d	64,000
		64,000			64,000
2001 Jan.1	To Balance b/d	64,000	2001 Dec.31	By Balance c/d	1,28,000
"	To Bank A/c	64,000			1,28,000
		1,28,000			
2002 Jan.1	To Balance b/d	1,28,000	2002 Dec.31	By Balance c/d	2,00,000
"	To Bank A/c	64,000			
Dec.31	To Depreciation Fund A/c (Profit on the Realisation of Policy)	8,000			
		2,00,000			2,00,000
2003 Jan.1	To Balance b/d	2,00,000			

Dr. Machinery Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2000 Jan.1	To Bank A/c	2,00,000	2000 Dec.31	By Balance c/d	2,00,000
		2,00,000			2,00,000
2001 Jan.1	To Balance b/d	2,00,000	2001 Dec.31	By Balance c/d	2,00,000
		2,00,000			2,00,000
2002 Jan.1	To Balance b/d	2,00,000	2002 Dec.31	By Balance c/d	2,00,000
		2,00,000			2,00,000
2003 Jan.1	To Balance b/d	2,00,000			

Illustration: 14

On 1st Jan. 2001 Mrs. Murugan & Co. Purchases a lease for three years on payment of Rs. 1,00,000. And it is decided to make provision for its replacement by means of an insurance policy for Rs. 1,00,000. The annual premium is Rs. 30,000. On 1st Jan. 2004, the lease is renewed for further period of 3 years for Rs. 1,00,000. You are required to prepare the necessary ledger account.

Solution:

Dr. Lease Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2001 Jan.1	To Bank A/c	1,00,000	2001 Dec.31	By Balance c/d	1,00,000
		1,00,000			1,00,000
2002 Jan.1	To Balance b/d	1,00,000	2002 Dec.31	By Balance c/d	1,00,000
		1,00,000			1,00,000
2003 Jan.1	To Balance b/d	1,00,000	2003 Dec.31	By Depreciation A/c (Reserve A/c)	1,00,000
		1,00,000			1,00,000

Dr. Depreciation Reserve Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2001 Dec.31	To Balance c/d	30,000	2001 Jan. 31	By Profit & Loss A/c	30,000
		30,000			30,000
2002 Dec.1	To Balance c/d	60,000	2002 Jan.1	By Balance b/d	30,000
		60,000	2002 Dec.31	By Profit & Loss A/c	30,000
					60,000
2003 Dec.31	To Lease A/c	1,00,000	2003 Jan.1	By Balance b/d	60,000
			2003 Dec.31	By Profit & Loss A/c	30,000
			2003 Dec.31	By Depreciation Insurance Policy A/c	10,000
		1,00,000			1,00,000

Dr. Depreciation Insurance Policy Account Cr.

<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>	<i>Date</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2001 Jan.1	To Bank Premium	30,000	2001 Dec.31 st	By Balance c/d	30,000
		30,000			30,000
2002 Jan.1	To Balance b/d	30,000	2002 Jan.1	By Balance c/d	60,000
2002 Jan.1	To Bank Premium	30,000			60,000
		60,000			
2003 Jan.1	To Balance b/d	60,000	2003 Dec.31 st	By Bank A/c	1,00,000
2003 Jan.1	To Bank Premium	30,000			
2003 Dec.31	To Depreciation Reserve A/c (Profit Transferred)	10,000			
		1,00,000			1,00,000

Dr.			Lease (New) Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Jan.1	To Bank A/c	1,00,000						

(7) Depletion Method

Depletion Method is mostly used for natural resources such as mines, quarries, oil and gas etc. from which certain quantity of the resources can be obtained on the basis of the availability of minerals. The quantity of output exhaust to reaches a stage of depletion. The rate of depreciation is determined on the basis of the quantity obtained for every year. The formula is :

$$\text{Rate of Depreciation} = \frac{\text{Cost of Mines}}{\text{Estimated Minerals to be Extracted}}$$

$$\text{Depreciation} = \text{Annual Quantity} \times \text{Rate of Depreciation}$$

Illustration: 15

A mine was purchased for Rs. 20,00,000 on 1st Jan. 2000. And it was estimated content of being 1,00,000 tones. The actual quantity was 2001 – 20,000 tonnes, 2002 – 25,000 tonnes and 2003 – 30,000 tonnes. You are required to prepare a Mine Account using Depletion Method of depreciation for the above said years.

Solution:**Calculation for Rate of Depreciation**

$$\begin{aligned} \text{Rate of Depreciation} &= \frac{\text{Cost of Mines}}{\text{Estimated Minerals to be Extracted}} \\ &= \frac{\text{Rs. 20,00,000}}{\text{Rs. 1,00,000}} = \text{Rs. 20 Per tone} \end{aligned}$$

$$\text{Rate of Depreciation} = \text{Rs. 20 Per tone.}$$

Dr.			Mine Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Jan.1	To Bank A/c	20,00,000	2001 Dec.31	By Depreciation A/c (20,000 x 20)	4,00,000			
			Dec.31	By Balance c/d	16,00,000			
		20,00,000			20,00,000			
2002 Jan.1	To Balance b/d	16,00,000	2002 Dec.31	By Depreciation A/c (25,000 x 20)	5,00,000			
			Dec.31	By Balance c/d	11,00,000			
		16,00,000			16,00,000			

2003 Jan.1	To Balance b/d	11,00,000	2003 Dec.31	By Depreciation A/c (30,000 x 20)	6,00,000
			Dec.31	By Balance c/d	5,00,000
		11,00,000			11,00,000
2004 Jan.1	To Balance b/d	5,00,000			

(8) Sum of Years Digits (SYD) Method

This method also termed as SYD Method. The Sum of years Digits Method is designed on the basis of Written-Down Value Method. Under this method the amount of depreciation to be charged to the Profit and Loss Account goes on decreasing every year throughout the life of the asset. The formula for calculating the amount of depreciation is as follows :

$$\text{Rate of Depreciation} = \frac{\text{Remaining Life of the Asset (Including current year)}}{\text{Sum of all the digits of the life of the assets in years}} \times \text{Original Cost of the Asset}$$

Illustration: 16

A machine was purchased for a sum of Rs.20,000 having useful life of 3 years. From the above particulars, you are required to calculate depreciation under Sum of Years Digits Method.

Solution:

Calculation of Depreciation Under SYD Method :

$$\text{Rate of Depreciation} = \frac{\text{Remaining Life of the Asset (Including current year)}}{\text{Sum of all the digits of the life of the assets in years}} \times \text{Original Cost of the Asset}$$

$$\text{I Year} = \frac{3}{1 + 2 + 3} \times \text{Rs. 20,000}$$

$$= \frac{3}{6} \times \text{Rs. 20,000} = \text{Rs.10,000}$$

$$\text{II Year} = \frac{2}{6} \times \text{Rs. 20,000} = \text{Rs.6,667}$$

$$\text{III Year} = \frac{1}{6} \times \text{Rs. 20,000} = \text{Rs.3,333.33}$$

(9) Machine Hour Rate Method

This method is similar to the Depletion Method but instead of taking estimated available quantities in advance, the working life of the machine is estimated in terms of hours. The hourly rate of depreciation is determined by dividing the cost of the machine minus scrap value of the machine by the estimated total number of hours utilized every year.

Illustration: 17

A machine was purchased on 1st Jan. 2001 at a cost of Rs. 1,50,000, the cost of installation being Rs. 10,000. The estimated working life of the machine was 40,000 hours. During 2001 it was worked for 5,000 hours and during 2002 for 10,000 hours. You are required to prepare Machine Account for the above said years.

Solution:

Calculation of Machine Hour Rate :

$$\begin{aligned} \text{Machine Hour Rate} &= \frac{\text{Cost of the Machine}}{\text{Estimated Total Hours of Life}} \\ &= \frac{\text{Rs. 1,50,000} + \text{Rs. 10,000}}{\text{Rs. 40,000}} \\ &= \frac{\text{Rs. 1,60,000}}{\text{Rs. 40,000}} = \text{Rs. 4 Per hour.} \end{aligned}$$

Dr.			Machine Account			Cr.		
Date	Particulars	Amount Rs.	Date	Particulars	Amount Rs.			
2001 Jan.1	To Bank A/c (Rs.1,50,000 + 10,000)	1,60,000	2001 Dec.31	By Depreciation A/c (5000 hours x Rs.4)	20,000			
			Dec.31	By Balance c/d	1,40,000			
		1,60,000			1,60,000			
2002 Jan.1	To Balance b/d	1,40,000	2002 Dec.31	By Depreciation A/c (10,000 hrs x Rs.4)	40,000			
			Dec.31	By Balance c/d	1,00,000			
		1,40,000			1,40,000			
2003 Jan.1	To Balance b/d	1,00,000						

QUESTIONS

1. What do you understand by Depreciation?
2. Define Depletion and Amortization.
3. What are the purpose of charging depreciation?
4. Explain briefly the various methods of charging depreciation.
5. Write short notes on :
 - (a) Straight Line Method.
 - (b) Written - Down Value Method.
 - (c) Annuity Method.
 - (d) Insurance Policy Method.
 - (e) Depletion Method.
 - (f) Revaluation Method.
6. What do you understand by Sinking Fund Method? Explain it briefly.
7. Discuss the merits and demerits of Straight Line Method.
8. What do you understand by Machine Hour Rate method of depreciation?
9. What are the factors affecting the amount of depreciation?

PRACTICAL PROBLEMS

(1) On 1st March 2003, a machinery was purchased by Govind for Rs. 1,00,000 and installation expenses of Rs. 10,000. On 1st June 2003 a new machine was purchased for a sum of Rs. 40,000. Assuming that rate of depreciation is @ 15% p.a. You are required to prepare Machinery Account for 5 years under (1) Straight Line Method and (2) Diminishing Balance Method.

(2) On 1st Jan. 2003 A Ltd. Company purchased a lease for three years for Rs. 80,000. It is decided to provide write off depreciation on Annuity Method. Assuming that rate of depreciation is @ 5% P.A. Annuity Table shows that Re. 367208 at 5% rate of interest is required for an Annuity of Re.1 in three years.

[Ans : Balance for Rs. 27,978.40]

(3) You are asked to calculate the depreciation for the first three years under Sum of Years Digit Method. Mrs. Govind & Co. purchased an asset for Rs. 2,10,000. Estimated life of the asset is 6 years. The Scrap Value of an asset is estimated for Rs. 10,000.

[Ans : Balance at the end of third years Rs. 28571.41]

(4) Y Co. Ltd. purchased a lease of mine worth of Rs. 2,00,000 on 1st Jan. 2003. It is estimated that total quantity of output available in the mine is 50,000 tons. The annual output is as follows :

Year	Quantities
1999	8,000
2000	15,000
2001	12,000
2002	10,000

From the above information, you are required to prepare Mine Account using the Depletion Method of Depreciation.

(5) X Y Z Ltd. purchased a machine for Rs. 14,400 on 1st Jan. 2003. It is estimated that the Scrap Value of Rs. 3,400 at the end of ten years. Find out depreciation and written down value by equal installments of every year. And also you are required to calculate rate of depreciation and prepare Machinery Account for the above said years.

[Ans : Balance of Machinery A/c Rs. 11,100; Rate of Depreciation 7.64%]

(6) A Company purchased a lease worth of Rs. 60,000 on 1st Jan. 2000 for 3 years. It decided to provide for its replacement by means of Insurance policy for Rs. 60,000. The annual premium is Rs. 19,000. On 1st Jan. 2003 the lease is renewed for a further period of 3 years for Rs. 60,000. You are required to show the necessary ledger accounts.

[Ans : Lease A/c Balance at the end of 3rd year Rs. 60,000; Depreciation Reserve A/c Rs. 3,000; Depreciation Insurance Policy A/c Rs. 3000; (Profit transferred to Depreciation Reserve A/c)]

(7) A & B Ltd. purchased a lease for 3 years for Rs. 3,00,000. On 1st Jan. 2000 it decided to provide for its replacement by taking an insurance policy for Rs. 3,00,000. The annual premium was Rs. 95,000. On 1st Jan. 2003 the lease is renewed for a further period of 3 years for Rs. 3,00,000 show necessary accounts.

[Ans : Profit Rs. 15,000]

(8) Gowda & Co. purchased a machine for Rs. 2,00,000 on 1st Jan. 2000. The estimated useful life at 3 years with a Scrap Value Rs. 20,000. You are required to calculate depreciation charged from Profit and Loss Account by Sinking Fund Method. The Sinking Fund Table shows that 0.317208 at 5% P.A. will be in 3 years accumulate to Re.1.

[Ans : Depreciation Rs. 57097.44]

(9) Gupta Ltd. purchased a machine for sum of Rs. 9,000 on 1st April 2001 and it spend installation charge of Rs. 1000. Estimated total life of working hours will be 2000 hours. During 2001 it worked for 1600 hours and 2002 for 2400 hours. You are required to prepare Machinery Account for 2002 and 2003.

[Ans : Balance Rs. 8,000]

(10) Himalaya Ltd. purchased a lease worth of Rs. 2,00,000 on 1st Jan. 1999 for a term of 4 years. You find from Annuity tables that in order to write off lease on the Annuity Method at 6% P.A. interest, the amount to be written off annually works out to be Re. 0.288591 for every rupee. Prepare Lease A/c for 4 years.

[Ans : Balance at the end of 4th year is Rs.54452]

(11) A Company purchased an old lorry for Rs. 1,00,000 on 1st April 1996 and wrote off depreciation @ 15% on the diminishing value balance. At the end of 1996, it decided that the depreciation should be on the basis of 15% of the original cost from the very beginning and write off necessary amount in 1996. Assuming the company closes the books on 31st March, write up the lorry account up to the end of 2003.

[Ans: Balance Rs. 40,000; Excess depreciation to be written off for 1996-97 Rs. 6412.50]

(12) A Machinery was required on 1st January 2003 at a cost of Rs. 40,000. The life of the machinery was 5 years. It was decided to establish a depreciation fund to provide funds for replacement. Investments are expected to yield net 5% P.A. Sinking Fund Table shows that Rs. 1,80,975 invested annually at 5% provides Re.1 in five years. Prepare the necessary ledger accounts for all the five years, assuming that new machinery costs Rs. 43,000 on 1st January 2008.

(13) On 1st January 2002, Gupta Ltd. purchased machinery for Rs. 1,20,000 and on 30th June 2003, it acquired additional machinery at a cost of Rs. 20,000. On 31st March 2004 one of the original machines which had cost Rs. 5,000 was found to have become obsolete and was sold as scrap for Rs. 500. It was replaced by a new machine costing Rs. 8,000. Depreciation is provided at a rate of 15% on written down value method. Accounts are closed on 31st December every year. Prepare machinery account for 3 years.

(14) Rathasamy Ltd. bought one machine for Rs. 4,00,000 on 1st April 2003. The useful life was estimated at 3 years with a scrap value Rs. 40,000. Find out Depreciation charged from profit and loss account by sinking fund method. The sinking fund table shows that 0.317208 at 5% P.A. will be in 3 years accumulate to Re.1.

[Ans: Depreciation Rs.114194.88]

(15) A lease was purchased on 1.4.2004 for five years at a cost of Rs.50,000. It is proposed to depreciate the lease by Annuity method charging 5% interest. Show the lease account for 5 years and also the relevant entries in the profit and loss account. The reference of the annuity table shows that to depreciate Re.1 by annuity method over 5 years by charging interest @ 5 % one must write off a sum of Re.0.230975 every year.

[Ans: Annuity Depreciation Rs. 11549]

(16) A plant is purchased for Rs. 1,28,000. Depreciation is to be provided at 25% P.A. on written down value method. The turn in value of plant at the end of its economic life of 4 years.

(17) You are required to prepare the Machineries account in the books of Sharma & Co. for 3 years ending 31.12. 2003 from the following informations:

1. X machine was purchased on 1.4.2001 for Rs.40,000
2. Y machine was purchased on 1.4.2001 for Rs. 30,000
3. X machine was sold on 30.09.2002 for Rs. 35,000
4. R machine was purchased on 30.09.2003 for Rs. 40,000

All the machines are to be depreciated @ 10% on reducing balance method.

[Ans: Depreciation in 2001 Rs. 3,000; in 2002 Rs. 4,275; in 2003 Rs. 3,850; profit on sale Rs. 775; balance on 31.12.2003 Rs. 64,650]

CHAPTER 6

Financial Statements: Analysis and Interpretation

Meaning of Financial Statements

Every business concern wants to know the various financial aspects for effective decision making. The preparation of financial statement is required in order to achieve the objectives of the firm as a whole. The term financial statement refers to an organized collection of data on the basis of accounting principles and conventions to disclose its financial information. Financial statements are broadly grouped in to two statements:

- I. Income Statements (Trading, Profit and Loss Account)
- II. Balance Sheets

In addition to above financial statements supported by the following statements are prepared to meet the needs of the business concern:

- (a) Statement of Retained Earnings
- (b) Statement of Changes in Financial Position

The meaning and importance of the financial statements are as follows :

(1) Income Statements: The term 'Income Statements' is also known as Trading, Profit and Loss Account. This is the first stage of preparation of final accounts in accounting cycle. The purpose of preparing Trading, Profit and Loss Accounts to ascertain the Net Profit or Net Loss of a business concern during the accounting period.

(2) Balance Sheet: Balance Sheet may be defined as "a statement of financial position of any economic unit disclosing as at a given moment of time its assets, at cost, depreciated cost, or other indicated value, its liabilities and its ownership equities." In other words, it is a statement which indicates the financial position or soundness of a business concern at a specific period of time. Balance Sheet may also be described as a statement of source and application of funds because it represents the source where the funds for the business were obtained and how the funds were utilized in the business.

(3) Statement of Retained Earnings: This statement is considered to be as the connecting link between the Profit and Loss Account and Balance Sheet. The accumulated excess of earning over losses

and dividend is treated as Retained Earnings. The balance of retained earnings shown on the Profit and Loss Accounts and it is transferred to liability side of the balance sheet.

(4) **Statement of Changes in Financial Position:** Income Statements and Balance sheet do not disclose the operational efficiency of the concern. In order to measure the operational efficiency of the concern it is essential to identify the movement of working capital or cash inflow or cash outflow of the business concern during the particular period. To highlight the changes of financial position of a particular firm, the statement is prepared may emphasize of the following aspects :

- (c) Fund Flow Statement is prepared to know the changes in the firm's working capital.
- (d) Cash Flow Statement is prepared to understand the changes in the firm's cash position.
- (e) Statement of Changes in Financial Position is used for the changes in the firm's total financial position.

Nature of Financial Statements

Financial Statements are prepared on the basis of business transactions recorded in the books of Original Entry or Subsidiary Books, Ledger, and Trial Balance. Recording the transactions in the books of primary entry supported by document proofs such as Vouchers, Invoice Note etc.

According to the American Institute of Certified Public Accountants, "Financial Statement reflects a combination of recorded facts, accounting conventions and personal judgments and conventions applied which affect them materially." It is therefore, nature and accuracy of the data included in the financial statements which are influenced by the following factors :

- (1) Recorded Facts.
- (2) Generally Accepted Accounting Principles.
- (3) Personal Judgments.
- (4) Accounting Conventions.

Objectives of Financial Statements

The following are the important objectives of financial statements :

- (1) To provide adequate information about the source of finance and obligations of the finance firm.
- (2) To provide reliable information about the financial performance and financial soundness of the concern.
- (3) To provide sufficient information about results of operations of business over a period of time.
- (4) To provide useful information about the financial conditions of the business and movement of resources in and out of business.
- (5) To provide necessary information to enable the users to evaluate the earning performance of resources or managerial performance in forecasting the earning potentials of business.

Limitations of Financial Statements

- (1) Financial Statements are normally prepared on the basis of accounting principles, conventions and past experiences. Therefore, they do not communicate much about the profitability, solvency, stability, liquidity etc. of the undertakers to the users of the statements.

- (2) Financial Statements emphasise to disclose only monetary facts, i.e., quantitative information and ignore qualitative information.
- (3) Financial Statements disclose only the historical information. It does not consider changes in money value, fluctuations of price level etc. Thus, correct forecasting for future is not possible.
- (4) Influences of personal judgments leads to opportunities for manipulation while preparing of financial statements.
- (5) Information disclosed by financial statements based on accounting concepts and conventions. It is unrealistic due to difference in terms and conditions and changes in economic situations.

Analysis and Interpretations of Financial Statements

Presentation of financial statements is the important part of accounting process. To provide more meaningful information to enable the owners, investors, creditors or users of financial statements to evaluate the operational efficiency of the concern during the particular period. More useful information are required from the financial statements to make the purposeful decisions about the profitability and financial soundness of the concern. In order to fulfil the needs of the above, it is essential to consider analysis and interpretation of financial statements.

Meaning of Analysis and Interpretations

The term “Analysis” refers to rearrangement of the data given in the financial statements. In other words, simplification of data by methodical classification of the data given in the financial statements.

The term “interpretation” refers to “explaining the meaning and significance of the data so simplified.”

Both analysis and interpretations are closely connected and inter related. They are complementary to each other. Therefore presentation of information becomes more purposeful and meaningful—both analysis and interpretations are to be considered.

Metcalf and Tigard have defined financial statement analysis and interpretations as a process of evaluating the relationship between component parts of a financial statement to obtain a better understanding of a firm’s position and performance.

The facts and figures in the financial statements can be transformed into meaningful and useful figures through a process called “Analysis and Interpretations.”

In other words, financial statement analysis and interpretation refer to the process of establishing the meaningful relationship between the items of the two financial statements with the objective of identifying the financial and operational strengths and weaknesses.

Types of Analysis and Interpretations

The analysis and interpretation of financial statements can be classified into different categories depending upon :

I. The Materials Used

II. Modus Operandi (Methods of Operations to be followed)

I. On the basis of Materials Used:

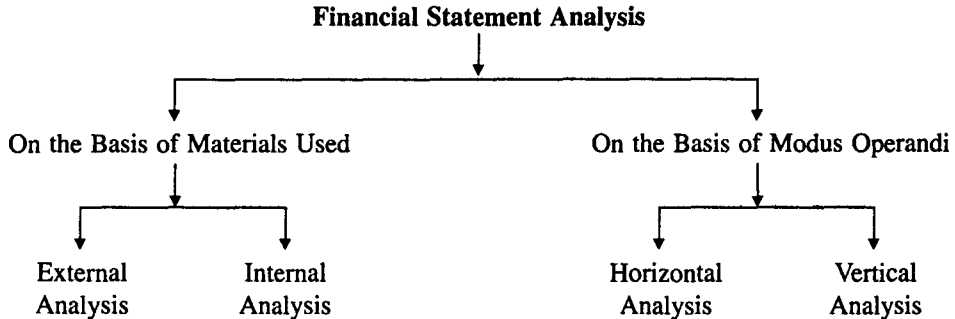
(a) External Analysis.

(b) Internal Analysis.

II. On the basis of Modus Operandi

- (a) Vertical Analysis.
- (b) Horizontal Analysis.

The following chart shows the classification of financial analysis:



I. On the Basis of Materials Used

On the basis of materials used the analysis and interpretations of financial statements may be classified into (a) External Analysis and (b) Internal Analysis.

(a) External Analysis: This analysis meant for the outsiders of the business firm. Outsiders may be investors, creditors, suppliers, government agencies, shareholders etc. These external people have to rely only on these published financial statements for important decision making. This analysis serves only a limited purpose due to non-availability of detailed information.

(b) Internal Analysis: Internal analysis performed by the persons who are internal to the organization. These internal people who have access to the books of accounts and other informations related to the business. Such analysis can be done for the purpose of assisting managerial personnel to take corrective action and appropriate decisions.

II. On the basis of Modus Operandi

On the basis of Modus operandi, the analysis and interpretation of financial statements may be classified into: (a) Horizontal Analysis and (b) Vertical Analysis.

(a) Horizontal Analysis: Horizontal analysis is also termed as Dynamic Analysis. Under this type of analysis, comparison of the trend of each item in the financial statements over the number of years are reviewed or analyzed. This type of comparison helps to identify the trend in various indicators of performance. In this type of analysis, current year figures are compared with base year for figures are presented horizontally over a number of columns.

(b) Vertical Analysis: Vertical Analysis is also termed as Static Analysis. Under this type of analysis, a number of ratios used for measuring the meaningful quantitative relationship between the items of financial statements during the particular period. This type of analysis is useful in comparing the performance, efficiency and profitability of several companies in the same group or divisions in the same company.

Rearrangement of Income Statements

Financial statements should be rearranged for proper analysis and interpretations of these statements. It enables to measure the performance of operational efficiency and profitability of a concern during

particular period. The items of operating revenues, non-operating revenues, operating expenses and non-operating expenses are rearranged into different heads and sub-heads are given below :

**Income Statement (Operating Statement)
for the year endings**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening stock of Raw Materials		...
<i>Add</i> : Purchases	...	
<i>Less</i> : Purchases Returns
Freight and Carriage		...
<i>Less</i> : Closing Stock of Raw Materials		...
		...
Raw Materials Consumed (1)		...
<i>Add</i> : Direct wages (Factory)	...	
Factory Rent and Rates	...	
Power and Coal	...	
Depreciation of Plant and Machinery	...	
Depreciation of Factory Building	...	
Work Manager's Salary	...	
Other Factory Expenses
	...	
<i>Add</i> : Opening Stock of working progress	...	
Opening Stock of Finished goods	...	
	...	
<i>Less</i> : Closing Stock of work in progress	...	
Closing Stock of Finished goods
		...
Cost of Goods Sold (2)		...
<i>Less</i> : Net Sales (Less sales return and Sales tax) (3)		...
		...
Gross Profit : (4) = (3 - 2)		...
(Net Sales - Cost of Goods Sold)		
<i>Less</i> : Operating Expenses : (5)		
Office Expenses	...	
Administrative Expenses	...	
Selling Expenses	...	
Distribution Expenses
		...
Net Operating Profit : (6) = (4 - 5)		...
<i>Add</i> : Non-Operating Income : (7)	...	
Interest Received	...	
Discount Received	...	
Dividend Received	...	
Income Form Investment	...	
Interest on Debenture	...	
Any other Non-Trading Income
		...

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Less : Non-Operating Expenses : (8)		
Discount on Issue of Shares Written off	...	
Interest on Payment on Loan and Overdraft	...	
Loss on Sale of Fixed Assets
Net Profit Before Interest and Tax (9)		...
Less : Interest on Debenture (10)		...
Net Profit Before Tax (11) = (9 - 10)		...
(Net Profit Before Interest and Tax - Interest on Debenture)		
Less : Tax Paid (12)		...
Net Profit After Interest and Tax (13)		...
or Net Loss After Interest and Tax		
(Transferred to Capital Account)		

Income Statement Equations

From the above rearrangement of operating statements, the following accounting equations may be given :

- | | | |
|--|---|--|
| (1) Net Sales | = | Cost of Sales + Operating Expenses
+ Non-Operating Expenses |
| (2) Gross Profit | = | Net Sales - Cost of Goods Sold |
| (3) Operating Expenses | = | Office and Administrative Expenses
+ Selling and Distribution Expenses |
| (or) | | |
| (4) Operating Expenses | = | Gross Profit - Net Operating Profit |
| (5) Sales - Net Operating Profit | = | Cost of Sales + Operating Expenses |
| (6) Net Operating Profit | = | Gross Profit - Operating Expenses |
| (7) Net Profit Before Interest and Tax | = | Net Operating Profit - Non-Operating Expenses |
| (8) Sales | = | Cost of Sales + Operating Expenses
+ Non-Operating Expenses |
| (9) Net Profit | = | Net Sales - (Cost of Sales + Operating Expenses
+ Non-Operating Expenses) |

Rearrangement of Balance Sheet

Balance sheet is a statement consisting of assets and liabilities which reflected the financial soundness of a concern at a given date. In order to judge the financial position of a concern, it is also necessary to rearrange the balance sheet in a proper set of form. For analysis and interpretation, the figures in Balance Sheet rearranged in a Vertical Form and given below.

Balance Sheet as on 31st Dec.

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Cash in Hand	...	
Cash at Bank	...	
Bills Receivable	...	
Sundry Debtors	...	
Marketable Securities	...	
Other Short-Term Investments
Liquid Assets (1)	...	
<i>Add</i> : Stock in Trade	...	
(Closing Stock of Raw Materials		
Closing Stock of Work in Progress		
Closing Stock of Finished goods)		
Prepaid Expenses
Current Assets (2)		...
<i>Less</i> : Current Liabilities :		
Bills Payable	...	
Sundry Creditors	...	
Bank Loans (Short-term)	...	
Bank Overdraft	...	
Outstanding Expenses	...	
Accrued Expenses	...	
Trade Liabilities	...	
Other Liabilities Payable within year
Total Current Liabilities : (3)		...
<i>Add</i> : Provisions : (4)		
Provision for Tax	...	
Proposed Dividend	...	
Provision for Contingent Liabilities	...	
Total Current Liabilities and Provisions (5) = (3 + 4)
Net Working Capital (6) = (2 - 5)		...
(Current Assets - Total Current Liabilities & Provision)		
<i>Add</i> : Fixed Assets : (6)		
Goodwill	...	
Land and Buildings	...	
Plant and Machinery	...	
Loose Tools	...	
Furniture and Fixtures	...	
Patents and Copyrights	...	
Live Stock	...	
Investment in Subsidiaries
Capital Employed (7) = (5 + 6)		...
(Net Working Capital + Fixed Assets)		
<i>Add</i> : Other Assets : (8)		
Investment in Govt. Securities	...	
Unquoted Investments	...	
Other Non-Trading Investments	...	
Advances to Directors
Company's Net Assets (9) = (7 + 8)		...
(Capital Employed + Other Assets)		

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Less : Long-Term Liabilities (10)		
Debenture	...	
Long-Term Debt	...	
Long-Term Loan from Bank & Financial Institutions]	...	
Long-Term Debt Raised by Issue of Securities & Public Deposits]	...	
Other Long-Term Loan payable after a year
Share Holders Net Worth (11) = (9 - 10)		
(or) Total Tangible Net Assets - Shareholders Net Worth]		...
Less : Preference Share Capital (12)		...
Equity Shareholders Net Worth (13) = (11 - 12)		...
(Total Tangible Net Worth - Preference Share Capital)		...

Balance Sheet Equations :

From the above Balance Sheet the following accounting equations may be drawn:

$$(1) \text{ Liquid Assets} = \text{Current Assets} - \text{Stock and Prepaid Expenses}$$

$$(2) \text{ Net Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

$$(3) \text{ Current Assets} = \text{Net Working Capital} + \text{Current Liabilities}$$

$$(4) \text{ Capital Employed} = \text{Net Working Capital} + \text{Fixed Assets}$$

(or)

$$\text{Capital Employed} = (\text{Current Assets} - \text{Current Liabilities}) + \text{Fixed Assets}$$

(or)

$$\text{Capital Employed} = \text{Total Assets} - \text{Current Liabilities}$$

$$(5) \text{ Shareholders' Net Worth} = \text{Company's Net Assets} - \text{Shareholders' Net Worth}$$

$$(6) \text{ Equity Shareholders' Net Worth} = \text{Total Tangible Net Worth} - \text{Preference Share Capital}$$

Methods or Tools of Analysis and Interpretations

The following are the various techniques can be adopted for the analysis and interpretations of financial statements.

- (1) Comparative Financial Statements.
- (2) Common Size Statements.
- (3) Trend Analysis.
- (4) Ratio Analysis.
- (5) Fund Flow Analysis.
- (6) Cash Flow Analysis.

(1) Comparative Financial Statements

Under this form of comparative financial statements both the comparative Profit and Loss Account and comparative Balance sheet are covered. Such comparative statements are prepared not only to the comparison of the various figures of two or more periods but also the relationship between various elements embodied in profit and loss account and balance sheet. It enables to measure operational efficiency and financial soundness of the concern for analysis and interpretations. The following information may be shown in the comparative statements:

- (a) Figures are presented in the comparative statements side by side for two or more years.
- (b) Absolute data in money value.
- (c) Increase or Decrease between the absolute figures in money value.
- (d) Changes or trend in various figures in terms of percentage.

Illustration: 1

From the following Profit and Loss Account AVS Ltd., for the years 2002 and 2003, you are required to prepare a Comparative Income Statement.

Statements of Profit and Loss Account

<i>Particulars</i>	2002 Rs.	2003 Rs.
Net sales	4,000	5,000
<i>Less</i> : Cost of goods sold	3,000	3,750
Gross Profit	1,000	1,250
<i>Less</i> : Operating Expenses		
Office and Administrative Expenses	200	250
Selling and Distribution Expenses	225	300
Total Operating Expenses	425	550
Net Profit	575	700

Solution:**AVS Ltd.****Statements of Profit and Loss Account**

<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Increase or Decrease in 2003</i>	
			<i>Absolute in 2003 Rs.</i>	<i>Percentage (%)</i>
Net sales	4,000	5,000	+ 1,000	+ 25
<i>Less</i> : Cost of Goods Sold	5,000	3,750	+ 1,500	+ 25
Gross Profit	1,000	1,250	+ 250	+ 25
<i>Less</i> : Operating Expenses :				
Office and Administrative Expenses	200	250	+ 50	+ 25
Selling and Distribution Expenses	225	300	+ 75	+ 33.33
Total Operating Expenses	425	550	+ 125	+ 29.41
Net Profit (Gross Profit–Total Operating Expenses)	575	700	+ 125	+ 21.73

Interpretation

From the above statement, it is observed that the sales has increased to the extent of 25%. The cost of goods sold and its percentage increased by 25%. Administrative and selling & distribution expenses have been increased by 25% and 33.33% respectively. The rate of net profit is also increased to the extent of 21.73%. This indicates that the overall profitability of the concern is good.

Illustration: 2

From the following Profit and Loss Account, you are required to convert into Comparative Profit and Loss Account for the year 2002 and 2003:

Dr.		Profit and Loss Account for the Year 2002 and 2003				Cr.
<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Particulars</i>	2002 Rs.	2003 Rs.	
To Cost of goods sold	1,18,000	1,47,000	By Net Sales	2,00,000	2,25,000	
To Gross Profit c/d	82,000	78,000		2,00,000	2,25,000	
	2,00,000	2,25,000	By Gross Profit b/d By Non-Operating Income	82,000	78,000	
To General & Administrative Expenses	5,000	6,000		10,000	15,000	
To Selling & Distribution Expenses	7,000	8,000				
To Non-Operating Expenses	5,000	7,000				
To Net Profit c/d	75,000	72,000				
	92,000	93,000		92,000	93,000	

Solution :
**Comparative Income Statement
for the year ending 2002 and 2003**

<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Increase or Decrease in 2003</i>	
			<i>Absolute in 2003 Rs.</i>	<i>Percentage (%)</i>
Net sales	2,00,000	2,25,000	+ 25,000	+ 12.5
Less : Cost of Goods Sold	1,18,000	1,47,000	+ 29,000	+ 24.57
Gross Profit	82,000	78,000	- 4,000	- 4.87
Less : Operating Expenses :				
General & Administrative Expenses	5,000	6,000	+ 1,000	+ 20
Selling & Distribution Expenses	7,000	8,000	+ 1,000	+ 14.28
Total Operating Expenses	12,000	14,000	+ 2,000	+ 16.66
Net Profit	70,000	64,000	- 6,000	- 8.57
Add : Non-Operating Income	10,000	15,000	+ 5,000	+ 50
Total Income	80,000	79,000	- 1,000	- 1.25
Less : Non-Operating Expenses	5,000	7,000	+ 2,000	+ 40
Net Profit	75,000	72,000	- 3,000	- 4

Interpretation

The rate of increase in sales is to extent of (12.5%) while cost of sales increased by (33.5%). The gross profit has declined by (– 4.87%). It indicates that performance of operational efficiency is not much better and the cost of sales has not been under control.

The Operating Profit and Net Profit have declined by (– 8.57%) and (– 4%) respectively. The increase in operating and non operating expenses are to extent of + 16.66 % and + 40%. This indicates that the overall profitability of a concern is not good.

Illustration: 3

From the following Balance sheet of ABC Ltd., for the year ending 31st Dec. 2002 and 2003, you are required to prepare a Comparative Balance Sheet :

<i>Particulars</i>	2002 Rs.	2003 Rs.
Assets :		
Cash in Hand	5,000	5,500
Cash at Bank	3,500	5,000
Sundry Debtors	45,000	40,000
Stock	35,000	40,000
Bills Receivable	11,000	11,500
Prepaid Expenses	2,500	3,000
Fixed Assets	1,50,000	1,65,000
	2,52,000	2,70,000
Liabilities & Capital :		
Share Capital	1,35,000	1,45,000
Short-Term Loan	32,000	35,000
Long-Term Debt	45,000	42,000
Bills Payable	7,000	5,000
Sundry Creditors	6,000	8,000
Bank Overdraft	27,000	35,000
	2,52,000	2,70,000

Solution:

Comparative Balance Sheet

<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Increase or Decrease in 2003 Rs.</i>	<i>Percentage of Increase or Decrease in 2003</i>
Assets :				
Liquid Assets :				
Cash in Hand	5,000	5,500	+ 500	+ 10 %
Cash at Bank	3,500	5,000	+ 1500	+ 42.85 %
Sundry Debtors	45,000	40,000	– 5000	– 11.11 %
Bills Receivable	11,000	11,500	+ 500	+ 4.54 %
Total Liquid Assets	64,500	62,000	– 2500	– 3.87 %
Add : Stock	35,000	40,000	+ 5000	+ 14.28 %
Prepaid Expenses	2,500	3,000	+ 500	+ 20 %
Total Current Assets	1,02,000	1,05,000	+ 3000	+ 2.94 %
Fixed Assets	1,50,000	1,65,000	+ 15000	+ 10 %

Particulars	2002 Rs.	2003 Rs.	Increase or Decrease in 2003 Rs.	Percentage of Increase or Decrease in 2003
Total Assets	2,52,000	2,70,000	+ 18000	+ 7.14 %
Liabilities and Capital				
Current Liabilities :				
Short-Term Loan	32,000	35,000	+ 3000	+ 9.37 %
Bills Payable	7,000	5,000	- 2000	- 28.57 %
Sundry Creditors	6,000	8,000	+ 2000	+ 33.33 %
Bank Overdraft	27,000	35,000	+ 8000	+ 29.62 %
Total Current Liabilities	72,000	83,000	+ 11000	+ 15.27 %
Long Term Liabilities :				
Long-Term Debts	45,000	42,000	- 3000	- 6.66 %
Total Liabilities	1,17,000	1,25,000	+ 8000	+ 6.83 %
Share Capital	1,35,000	1,45,000	+ 10000	+ 7.40 %
Total Liabilities & Capital	2,52,000	2,70,000	+ 18000	+ 7.14 %

Illustration: 4

The Following is the Balance Sheet ABC Ltd. for the year 2002 and 2003. Prepare Comparative Balance sheet:

Balance Sheet of ABC Ltd. for the year 2002 and 2003

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Current Liabilities	37,000	50,000	Cash in Hand	3,000	5,000
Debenture	50,000	60,000	Cash at Bank	10,000	20,000
Long-Term Debts	2,00,000	2,50,000	Bills Receivable	7,000	10,000
Capital :			Sundry Debtors	10,000	15,000
Preference Share Capital } Equity Capital General Reserve	1,00,000 1,25,000 28,000	1,50,000 1,60,000 30,000	Stock	20,000	25,000
			Fixed Assets	4,90,000	6,25,000
	5,40,000	7,00,000		5,40,000	7,00,000

Solution:**ABC Ltd.****Comparative Balance Sheet as on 31st Dec. 2002 & 2003**

Particulars	2002 Rs.	2003 Rs.	Increase or Decrease in 2003 Rs.	Percentage of Increase or Decrease in 2003 (%)
Assets :				
Cash in Hand	3,000	5,000	+ 2000	+ 66.66
Cash at Bank	10,000	20,000	+ 10000	+ 100
Bills Receivable	7,000	10,000	+ 3000	+ 42.85
Sundry Debtors	10,000	15,000	+ 5000	+ 50
Total Liquid Assets	30,000	50,000	+ 20000	+ 66.66
Add : Stock	20,000	25,000	+ 5000	+ 25
Total Current Assets	50,000	75,000	+ 25000	+ 50

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Increase or Decrease in 2003 Rs.</i>	<i>Percentage of Increase or Decrease in 2003 (%)</i>
Fixed Assets	4,90,000	6,25,000	+ 1,35,000	+ 27.55
Total Assets	5,40,000	7,00,000	+ 1,60,000	+ 29.62
Liabilities and Capital :				
Current Liabilities	37,000	50,000	+ 13,000	+ 35.13
Total Current Liabilities	37,000	50,000	+ 13,000	+ 35.13
Long-Term Liabilities :				
Debenture	50,000	60,000	+ 10,000	+ 20
Long-Term Debts	2,00,000	2,50,000	+ 50,000	+ 25
Total Long-term Liabilities	2,50,000	3,10,000	+ 60,000	+ 24
Total Liabilities	2,87,000	3,60,000	+ 73,000	+ 25.43
Capital and Reserve :				
Preference Share Capital	1,00,000	1,50,000	+ 50,000	+ 50
Equity Share Capital	1,25,000	1,60,000	+ 35,000	+ 28
General Reserves	28,000	30,000	+ 2,000	+ 7.14
Total Capital & Reserve	2,53,000	3,40,000	+ 87,000	+ 34.38
Total Liabilities & Capital	5,40,000	7,00,000	+ 1,60,000	+ 29.62

Interpretation

The total current assets of the company have increased by 50% in 2003 as compared to 2002. The current liabilities has increased only to the extent of 33.15 %. This indicates that the company will have no problem to meet the day-to-day expenses. It also observed that the current financial position of the concern has considerably increased.

The fixed assets has increased by 29.62% compared to 2002. At the same time, long-term liabilities, share capital and reserve have considerably increased by 34.38%. It shows that the company has taken up expansion plans in a big way.

(2) Common Size Statements

In order to avoid the limitations of Comparative Statement, this type of analysis is designed. Under this method, financial statements are analysed to measure the relationship of various figures with some common base. Accordingly, while preparing the Common Size Profit and Loss Account, total sales is taken as common base and other items are expressed as a percentage of sales. Like this, in order to prepare the Common Size Balance Sheet, the total assets or total liabilities are taken as common base and all other items are expressed as a percentage of total assets and liabilities.

Illustration: 5

From the following particulars of AVS Ltd., for the year 2002 and 2003, you are required to prepare a comparative Income Statement :

Statement of Profit and Loss Account

<i>Particulars</i>	2002 Rs.	2003 Rs.
Net Sales	4,000	5,000
<i>Less</i> : Cost of Goods Sold	3,000	3,750
Gross Profit	1,000	1,000
<i>Less</i> : Operating Expenses :		
Office & Administrative Expenses	200	250
Selling & Distribution Expenses	225	300
Total Operating Expenses	425	550
Net Profit	575	700

Solution:**Common Size Income Statement**

<i>Particulars</i>	2002 Rs.	Percentage (%)	2003 Rs.	Percentage (%)
Net sales	4,000	100	5000	100
<i>Less</i> : Cost of Goods Sold	3,000	75	3750	75
Gross Profit	1,000	25	1250	25
<i>Less</i> : Operating Expenses :				
Office and Administrative Expenses	100	2.5	100	2
Selling and Distribution Expenses	150	3.75	200	4
Total Operating Expenses	250	6.25	300	6
Net Profit	750	18.75	950	19

Illustration: 6

From the following Balance Sheet, prepare a Common Size Statement:

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	2,64,000	2,80,000	Cash in Hand	10,000	10,750
Current Liabilities	65,000	70,000	Cash at Bank	3,500	5,000
Long-term Debt	1,00,000	87,500	Bills Receivable	22,500	22,750
Bills Payable	12,500	—	Sundry Debtors	90,000	85,000
Sundry Creditors	10,000	16,000	Inventories	70,000	83,000
Bank Overdraft	50,000	71,500	Fixed Assets	3,00,000	3,07,500
			Prepaid Expenses	5,500	10,500
	5,01,500	5,25,000		5,01,500	5,25,000

Solution:**Common Size Balance Sheet**

<i>Particulars</i>	<i>2002 Rs.</i>	<i>Percentage (%)</i>	<i>2003 Rs.</i>	<i>Percentage (%)</i>
Assets :				
Current Assets :				
Cash in Hand	10,000	1.99	10,750	2.05
Cash at Bank	3,500	0.69	5,000	0.95
Sundry Debtors	90,000	17.95	85,000	16.29
Inventories	70,000	13.96	83,000	15.81
Bills Receivable	22,500	4.48	22,750	4.3
Prepaid Expenses	5,500	1.09	10,500	2.00
Total Current Assets	2,01,500	40.18	2,17,500	41.43
Fixed Assets	3,00,000	59.82	3,07,500	58.57
Total Assets	5,01,500	100 %	5,25,000	100%

Common Size Balance Sheet

<i>Particulars</i>	<i>2002 Rs.</i>	<i>Percentage (%)</i>	<i>2003 Rs.</i>	<i>Percentage (%)</i>
Liabilities & Capital :				
Current Liabilities	65,000	12.96	70,000	13.33
Bills Payable	12,500	2.50	—	—
Sundry Creditors	10,000	1.99	16,000	3.05
Bank Overdraft	50,000	9.97	71,500	13.62
Total Current Liabilities :	1,37,500	27.42	1,57,500	30
Long-Term Liabilities :				
Long-Term Debts	1,00,000	19.94	87,500	16.66
Capital and Reserve :				
Share Capital	2,64,000	52.64	2,80,000	53.34
Total Liabilities	5,01,500	100 %	5,25,000	100%

Illustration: 7

From the following Profit and Loss account and Balance sheet, you are required to prepare (a) Comparative Income Statements (b) Comparative Balance sheet (c) Common size Income Statement and (d) Common size Balance sheet.

Profit and Loss Account

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
To opening Stock of Materials]	25,000	30,000	By Net Sales	2,00,000	2,25,000
To Purchases	1,00,000	1,25,000	By Closing Stock	25,000	30,000
To Direct Wages	15,000	17,000	By Non-Operating		
To Freight and Carriage	2,000	3,000	Income]	10,000	15,000
To Other Factory Expenses]	1,000	2,000			

To Office & Admi. Expenses	5,000	6,000		
To Selling and Distribution Expn.	7,000	8,000		
To Non-Operating Expenses	5,000	7,000		
To Net Profit c/d	75,000	72,000		
	2,35,000	2,70,000	2,35,000	2,70,000

Balance Sheet as on 31st Dec.....

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Bills Payable	5,000	7,000	Cash in hand	3,000	5,000
Sundry Creditors	10,000	15,000	Cash at Bank	10,000	20,000
Provision for Tax	7,000	10,000	Bills Receivable	7,000	10,000
Proposed Dividend	5,000	8,000	Sundry Debtors	10,000	15,000
Bank Overdraft	10,000	10,000	Stock in Trade	20,000	25,000
Debenture	50,000	60,000	Land & Buildings	2,00,000	2,50,000
Preference Share			Goodwill	1,00,000	1,25,000
Capital	1,00,000	1,50,000	Furniture & Fixtures	40,000	50,000
Equity Share Capital	1,25,000	1,60,000	Plant & Machinery	1,50,000	2,00,000
Long-Term Loans	2,00,000	2,50,000			
General Reserve	28,000	30,000			
	5,40,000	7,00,000		5,40,000	7,00,000

Solution:

**(A) Comparative Income Statement
For the year ending**

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Increase or Decrease in 2003 Rs.</i>	<i>Percentage of Increase or Decrease in 2003</i>
Opening stock of Raw Material	25,000	30,000	+ 5,000	+ 20%
Add : Purchases	1,00,000	1,25,000	+ 25,000	+ 25%
	1,25,000	1,55,000	+ 30,000	+ 24%
Add : Freight and Carriage	2,000	3,000	+ 1,000	+ 50%
	1,27,000	1,58,000	+ 31,000	+ 24.40%
Less : Closing Stock	25,000	30,000	+ 5,000	+ 20%
Raw Materials Consumed (1)	1,02,000	1,28,000	+ 36,000	+ 35.29%
Add : Direct Wages	15,000	17,000	+ 2,000	+ 13.33%
Other Factory Expenses	1,000	2,000	+ 1,000	+ 50%
Cost of Goods Sold (2)	1,18,000	1,47,000	+ 39,000	+ 33.05%
Net Sales (3)	2,00,000	2,25,000	+ 25,000	+ 12.5%
Gross Profit (3 - 2) = (4)	82,000	78,000	- 4,000	- 4.87%
(Net Sales - Cost of Goods Sold)				
Less : Operating Expenses :				
Office & Administrative Expenses	5,000	6,000	+ 1,000	+ 20%
Selling & Distribution Expenses	7,000	8,000	+ 1,000	+ 14.28%
Total Operating Expenses (5)	12,000	14,000	+ 2,000	+ 16.66%

Net Operating Profit (4 – 5) = (6)	70,000	64,000	- 6,000	- 8.57%
(Gross Profit – Net Operating Profit)				
Add: Non-Operating Income	10,000	15,000	+ 5,000	+ 50%
Total Operating Income (7)	80,000	79,000	- 1,000	- 1.25%
Less: Non-Operating Expenses	5,000	7,000	+ 2,000	+ 40%
Net Profit (8)	75,000	72,000	- 3,000	- 4%

(B) Comparative Balance sheet
as on 31st

Particulars	2002 Rs.	2003 Rs.	Increase or Decrease in 2003 Rs.	Percentage of Increase or Decrease in 2003
Assets :				
Liquid Assets				
Cash in hand	3,000	5,000	+ 2,000	+ 66.66%
Cash at Bank	10,000	20,000	+ 10,000	+ 10%
Bills Receivable	7,000	10,000	+ 3,000	+ 42.85%
Sundry Debtors	10,000	15,000	+ 5,000	+ 50%
Total Liquid Assets (1)	30,000	50,000	+ 20,000	+ 66.66%
Add : Stock-in-trade	20,000	25,000	+ 5,000	+ 25%
Total Current Assets (2)	50,000	75,000	+ 25,000	+ 50%
Fixed Assets :				
Land and Buildings	2,00,000	2,50,000	+ 50,000	+ 25%
Plant and Machinery	1,50,000	2,00,000	+ 50,000	+ 33.33%
Goodwill	1,00,000	1,25,000	+ 25,000	+ 25%
Furniture and Fixtures	40,000	50,000	+ 10,000	+ 25%
Total Fixed Assets (3)	4,90,000	6,25,000	+ 1,35,000	+ 27.55%
Total Assets (2 + 3) = (4)	5,40,000	7,00,000	+ 1,60,000	+ 29.62%
(Total Current Assets + Fixed Assets)				
Liabilities and Capital :				
Current Liabilities :				
Bills Payable	5,000	7,000	+ 2,000	+ 40%
Sundry Creditors	10,000	15,000	+ 5,000	+ 50%
Bank Overdraft	10,000	10,000	—	—
Provision for tax	7,000	10,000	+ 3,000	+ 42.85%
Proposed Dividend	5,000	8,000	+ 3,000	+ 60%
Total Current Liabilities (1)	37,000	50,000	+ 13,000	+ 35.13%
Long-Term Liabilities :				
Debenture	50,000	60,000	+ 10,000	+ 20%
Long-Term Loans	2,00,000	2,50,000	+ 50,000	+ 25%
Total Long-Term Liabilities (2)	2,50,000	3,10,000	+ 60,000	+ 24%
Total Liabilities (2 + 1) = (3)	2,87,000	3,60,000	+ 73,000	+ 25.45%
Capital and Reserve :				
Preference Share Capital	1,00,000	1,50,000	+ 50,000	+ 50%
Equity Share Capital	1,25,000	1,60,000	+ 35,000	+ 28%
General Reserve	28,000	30,000	+ 2,000	+ 7.14%
Total Shareholders Fund (4)	2,53,000	3,40,000	+ 87,000	+ 34.38%
Total Liabilities and Capital (5) = (3 + 4)	5,40,000	7,00,000	+ 1,60,000	+ 29.62%

(C) Common Size Income Statements

<i>Particulars</i>	<i>2002 Rs.</i>	<i>Percentage (%)</i>	<i>2003 Rs.</i>	<i>Percentage (%)</i>
Opening stock of Raw Material	25,000	12.5%	30,000	13.33%
<i>Add</i> : Purchases	1,00,000	50%	1,25,000	55.55%
Freight and Carriage	2,000	1%	3,000	1.33%
	1,27,000	63.5%	1,58,000	70.22%
<i>Less</i> : Closing Stock	25,000	12.5%	30,000	13.33%
Raw Materials Consumed (1)	1,02,000	51%	1,28,000	56.88%
<i>Add</i> : Direct Wages	15,000	7.5%	17,000	7.55%
Other Factory Expenses	1,000	0.5%	2,000	0.88%
Cost of Goods Sold (2)	1,18,000	59%	1,47,000	65.33%
Gross Profit (4)	82,000	41%	78,000	34.67%
Net Sales (3)	2,00,000	100%	2,25,000	100%
<i>Less</i> : Operating Expenses :				
Office & Administrative Expenses	5,000	2.5%	6,000	2.66%
Selling & Distribution Expenses	7,000	3.5%	8,000	3.55%
Total Operating Expenses (5)	12,000	6%	14,000	6.22%
Net Operating Profit (6)	70,000	35%	64,000	28.44%
(Gross Profit – Total Operating Expenses)				
<i>Add</i> : Non-Operating Income	10,000	5%	15,000	6.66%
	80,000	40%	79,000	35.11%
<i>Less</i> : Non-Operating Expenses	5,000	2.5%	7,000	3.11%
Net Profit (7)	75,000	37.5%	72,000	32%
Current Liabilities :				
Short-Term Loan	65,000	12.96%	70,000	13.33%
Bills Payable	12,500	2.50%	—	—
Sundry Creditors	10,000	1.99%	16,000	3.05%
Bank Overdraft	50,000	9.97%	71,500	13.62%
Total Current Liabilities	1,37,500	27.42%	1,57,500	30%
Long-Term Liabilities :				
Long-Term debts	1,00,000	19.94%	87,500	16.66%
Capital and Reserve :				
Share Capital	2,64,000	52.64%	2,80,000	53.34%
Total Liabilities and Capital	5,01,500	100%	5,25,000	100%

(D) Common Size Balance Sheet

<i>Particulars</i>	<i>2002 Rs.</i>	<i>Percentage (%)</i>	<i>2003 Rs.</i>	<i>Percentage (%)</i>
Assets				
Liquid Assets:				
Cash in hand	3,000	0.55%	5,000	0.71%
Cash at Bank	10,000	1.85%	20,000	2.85%
Bills Receivable	7,000	1.29%	10,000	1.42%
Sundry Debtors	10,000	1.85%	15,000	2.14%
Total Liquid Assets (1)	30,000	5.55%	50,000	7.14%
<i>Add</i> : Stock in trade	20,000	3.70%	25,000	3.57%
Total Current Assets (2)	50,000	9.25%	75,000	10.72%

Fixed Assets:				
Land and Building	2,00,000	37.03%	2,50,000	35.71%
Plant and Machinery	1,50,000	27.78%	2,00,000	28.57%
Goodwill	1,00,000	18.50%	1,25,000	17.85%
Furniture and Fixtures	40,000	7.40%	50,000	7.14%
Total Fixed Assets (3)	4,90,000	90.75%	6,25,000	89.28%
Total Assets (2+3) = (4)	5,40,000	100	7,00,000	100%
(Current Assets + Fixed Assets)				
Liabilities and Capital:				
Current Liabilities:				
Bills Payable	5,000	0.92%	7,000	1%
Sundry Creditors	10,000	1.85%	15,000	2.14%
Bank Overdraft	10,000	1.85%	10,000	1.42%
Provision for Tax	7,000	1.29%	10,000	1.42%
Proposed Dividend	5,000	0.92%	8,000	1.14%
Total Current Liabilities (1)	37,000	6.85%	50,000	7.14%
Long-Term Liabilities:				
Debenture	50,000	9.25%	60,000	8.57%
Long-Term Loan	2,00,000	37.03%	2,50,000	35.71%
Total Liabilities (2)	2,87,000	53.14%	3,60,000	51.43%
Capital and Reserve:				
Preference Share Capital	1,00,000	18.51%	1,50,000	21.42%
Equity Share Capital	1,25,000	23.14%	1,60,000	22.85%
General Reserve	28,000	5.18%	30,000	4.28%
Total Share holders Fund (3)	2,53,000	46.85%	3,40,000	48.57%
Total Liabilities & Capital (2 + 3) = (4)	5,40,000	100%	7,00,000	100%

Interpretations

From the above statements, it is observed that the sales have gone up in 2003, the rate of increase to the extent of 34.67%. The cost of goods sold and its percentage increased by 65.33%. Administrative and selling and distribution expenses have been increased by 2.66% and 3.55% respectively. The rate of net profit is also increased to the extent of 32%. This indicates the overall profitability of the concern is good.

The total current assets of the company has increased by 10.72%. While current liabilities have increased only to the extent of 7.14%. This indication of liquidity position of the firm is highly satisfactory. The total fixed assets have increased by 89.28% but at the same time long-term liabilities, capital and reserves have increased by 48.57%. It is observed that overall financial position of the business concern is good.

(3) Trend Analysis

Trend Analysis is one of the important technique which is used for analysis and interpretations of financial statements. While applying this method, it is necessary to select a period for a number of years in order to ascertain the percentage relationship of various items in the financial statements comparing with the items in base year. When a trend is to be determined by applying this method, earliest year or first year is taken as the base year. The related items in the base year are taken as 100 and based on this trend percentage of corresponding figures of financial statements in the other years are concluded. This analysis is useful in framing suitable policies and forecasting in future also.

Illustration: 8

Calculate the trend percentage from the following figures of Ram & Co. Ltd. The year 1999 is taken as the base year.

Year	Sales	Cost of Goods Sold Rs.	Gross Profit Rs.
1999	2000	1400	600
2000	2500	1800	700
2001	3000	2200	800
2002	3500	2600	900
2003	4000	3000	1000

Solution:

**Ram & Co. Ltd.,
Trend Percentage**

Year	Sale		Cost of Goods Sold		Gross Profit	
	Amount Rs.	Trend (%) Percentage	Amount Rs.	Trend (%) Percentage	Amount Rs.	Trend (%) Percentage
1999	2000	100	1400	100	600	100
2000	2500	125	1800	128.57	700	116.66
2001	3000	150	2200	157.14	800	133.33
2002	3500	175	2600	185.71	900	150
2003	4000	200	3000	214.28	1000	166.66

(4) Fund Flow Analysis

Fund Flow Analysis is one of the important methods for analysis and interpretations of financial statements. This is the statement which acts as a supplementary statement to the profit and loss account and balance sheet. Fund Flow Analysis helps to determine the changes in financial position on working capital basis and on cash basis. It also reveals the information about the sources of funds and has been utilized or employed during particular period.

(5) Ratio Analysis

Ratio Analysis is one of the important techniques which is used to measure the establishment of relationship between the two interrelated accounting figures in financial statements. This analysis helps to Management for decision making. Ratio Analysis is an effective tool which is used to ascertain the liquidity and operational efficiency of the concern.

QUESTIONS

1. What is meant by Financial Analysis?
2. What do you understand by financial statements?
3. Explain briefly the nature and scope of financial statements.
4. Discuss the important objectives of financial statements.
5. What are limitations of financial statements?
6. Explain the analysis and interpretation of financial statements.
7. Explain different types of analysis and interpretations.
8. Write short notes on :
 - (a) Horizontal Analysis.
 - (b) Vertical Analysis.
 - (c) External and Internal Analysis.
9. Explain in brief the procedure for preparing the comparative financial statements.

10. Draw a specimen form of Methodical Classification of Income Statements and Balance Sheet.
11. Discuss the different techniques or tools of Financial Analysis.
12. What do you understand by Trend Analysis?
13. Write a brief note on Common Size Statements.
14. What is Fund Flow Analysis?

PRACTICAL PROBLEMS

(1) The following are the income statements of ABC Ltd. Madras for the years 2002 and 2003 convert into a Comparative Income Statements and Comment on the Profitability of the Company.

Income Statements

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
To Opening Stock	1,70,000	4,00,000	By Sales	20,00,000	24,00,000
To Purchases	10,00,000	11,00,000	By Closing stock	4,00,000	4,50,000
To Wages	1,20,000	1,60,000	By Income from Investment }]	24,000	30,000
To Salaries	84,000	1,28,000	By Dividend Received }]	10,000	15,000
To Rent & Rates	70,000	80,000			
To Depreciation	80,000	1,20,000			
To Selling Expenses	24,000	24,000			
To Discount Allowed	10,000	10,000			
To Loss on sales of Plant	—	16,000			
To Interest Paid	24,000	28,000			
To Net Profit	8,52,000	8,25,000			
	24,34,000	28,95,000		24,34,000	28,95,000

(2) The following are the particulars of Balance sheet for the year 2002 and 2003. You are required to convert into a Comparative Balance Sheet :

<i>Particulars</i>	<i>2002</i>	<i>2003</i>
Equity Share Capital	8,00,000	20,00,000
Preference Share Capital	4,00,000	4,00,000
General Reserve	2,00,000	5,00,000
Accounts Payable	2,00,000	4,00,000
Outstanding Expenses	1,00,000	1,00,000
Profit and Loss Account	4,00,000	6,00,000
	21,00,000	40,00,000
Fixed Assets	8,00,000	20,00,000
Investments	6,00,000	2,00,000
Bills Receivable	4,00,000	8,00,000
Stock	2,00,000	8,00,000
Cash at Bank	50,000	1,00,000
Cash in Hand	50,000	1,00,000
	21,00,000	40,00,000

(3) From the following Balance, Prepare a Common Size Statement:

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
<i>Asset:</i>		
Cash in Hand	20,000	21,500
Cash at Bank	7,000	10,000
Sundry Debtors	1,80,000	1,70,000
Inventories	1,40,000	1,66,000
Bills Receivable	45,000	45,500
Prepaid Expenses	11,000	21,000

Fixed Assets	6,00,000	1,05,000
Total Assets	10,03,000	10,05,000
Liabilities & Capital :		
Share Capital	5,28,000	5,60,000
Short-term Loans	1,30,000	1,40,000
Long-Term Debt	2,00,000	1,75,000
Bills Payable	25,000	—
Sundry Creditors	20,000	32,000
Bank Overdraft	1,00,000	1,43,000
	10,03,000	10,05,000

(4) From the following Income Statements, you are required to Convert into Common Size Statement and comment on the Prevailing Conditions :

Income Statement

Particulars	2002 Rs.	2003 Rs.
Sales	16,400	19,500
Less : Sales Return	400	450
Net Sales	16,000	19,100
Less : Cost of Sales	13,500	12,100
Gross Profit	2,500	7,000
Less : Operating Expenses :		
Administrative & General Expenses	750	1,550
Selling & Distribution Expenses	1,320	2,670
Total Operating Expenses	2,070	4,220
Operating Profit	430	6,780
Add : Non-Operating Income	50	175
Total Income	480	6,955
Less : Non-Operating Expenses	45	300
Net Profit for the year	435	6,655

(5) Following income statement of a business are given for the year ending 31st December 2002 and 2003, rearrange them in a comparative form and make comments.

Income Statements

Particulars	2002 Rs.	2003 Rs.	Particulars	2002 Rs.	2003 Rs.
To Cost of goods sold	9,00,000	9,50,000	By Sales	15,25,000	17,00,000
To Administrative Expenses	93,250	95,980	By Interest and Dividend	7,500	6,200
To Selling Expenses	1,90,000	2,09,000	By Profit from sale of old assets	6,000	8,000
To Interest Paid	8,000	7,000			
To Loss on Sale of Machinery	2,500	800			
To Income Tax	85,000	1,68,000			
To Net Profit	2,59,750	2,83,420			
	15,38,500	17,14,200		15,38,500	17,14,200

[Ans : Gross profit and Net profit have improved satisfactorily]

(6) From the following information, you are required to prepare a common size statement and make comments.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Sundry Creditors	42,000	1,54,000	Cash	27,000	72,000
Other liabilities	78,000	62,000	Sundry Debtors	2,20,000	2,26,000
Fixed liabilities	2,25,000	3,18,000	Stock	1,00,000	1,74,000
Capital	6,58,000	4,93,000	Prepaid Expenses	11,000	21,000
			Other Current Assets	10,000	21,000
			Fixed Assets	6,35,000	5,13,000
	10,03,000	10,27,000		10,03,000	10,27,000

(7) The following information is the Income Statement and Balance Sheet of Raman & Co. Ltd. for the year 2002 and 2003, you are required to prepare common size income statement and Balance sheet for the two years.

Dr.			Cr.		
Trading, Profit and Loss A/c					
<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Particulars</i>	2002 Rs.	2003 Rs.
To Cost of Sales	2,40,000	3,50,000	By Sales	4,00,000	5,00,000
To Gross Profit c/d	1,60,000	1,50,000			
	4,00,000	5,00,000		4,00,000	5,00,000
To Operating Expenses:			By Gross Profit b/d	1,60,000	1,50,000
Administration	25,000	30,000	By Interest on Investments }	20,000	50,000
Selling Expense	15,000	20,000			
Distribution Expenses	10,000	10,000			
To Non-Operating Expenses :					
Donation	20,000	20,000			
Goodwill Written off	10,000	—			
To Net Profit	1,00,000	1,20,000			
	1,80,000	2,00,000		1,80,000	2,00,000

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	2,00,000	3,00,000	Buildings	4,00,000	4,00,000
Reserves	6,00,000	7,00,000	Machinery	6,00,000	10,00,000
10% Debentures	2,00,000	3,00,000	Stock	2,00,000	3,00,000
Creditors	3,00,000	5,00,000	Debtors	2,00,000	2,50,000
Bills Payable	1,00,000	80,000	Cash at Bank	10,000	50,000
Tax Payable	1,00,000	1,20,000			
	15,00,000	20,00,000		15,00,000	20,00,000

[Ans : Gross profit 30% ; Operating profit 18%; Net Profit 24%; Total Current Assets 30%; Fixed Assets 70%; Current Liabilities 35%]

(8) From the following profit and loss account and Balance sheets for the year ended 31st Dec. 2002 and 2003, prepare comparative income statements and comparative Balance sheet.

Profit and Loss A/c

<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Particulars</i>	2002 Rs.	2003 Rs.
To Cost of Sales	3,00,000	3,75,000	By Sales	4,00,000	5,00,000
To Office & Administrative Expen.	10,000	10,000			
To Selling Expenses	15,000	20,000			
To Net Profit	75,000	95,000			
	4,00,000	5,00,000		4,00,000	5,00,000

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Bills Payable	25,000	37,500	Cash	50,000	70,000
Sundry Creditors	75,000	1,00,000	Debtors	1,00,000	1,50,000
Tax Payable	50,000	75,000	Stock	1,00,000	1,50,000
10% Debentures	50,000	75,000	Land	50,000	50,000
10% Preference Shares	1,50,000	1,50,000	Buildings	1,50,000	1,35,000
Equity Shares	2,00,000	2,00,000	Plant	1,50,000	1,35,000
Reserves	1,00,000	1,22,500	Furniture	50,000	70,000
	6,50,000	7,60,000		6,50,000	7,60,000



CHAPTER 7

Fund Flow Statement

Changes in Financial Position :

- (a) Fund Flow Statement
- (b) Cash Flow Statement

FUND FLOW STATEMENT

Introduction

The purpose of measuring trading performance, operational efficiency, profitability and financial position of a concern revealed by Trading, Profit and Loss Account and Balance Sheet. These financial statements are prepared to find out the Gross Profit or Gross Loss, Net Profit or Net Loss and financial soundness of a firm as a whole for a particular period of time. From the management point of view, the usefulness of information provided by these income statements functions effectively and efficiently. In the true sense they do not disclose the nature of all transactions. Management, Creditors and Investors etc. want to determine or evaluate the sources and application of funds employed by the firm for the future course of action. Based on these backgrounds, it is essential to analyse the movement of assets, liabilities, funds from operations and capital between the components of two year financial statements. The analysis of financial statements helps to the management by providing additional information in a meaningful manner.

Meaning of Fund

The term “Fund” refers to Cash, to Cash Equivalents or to Working Capital and all financial resources which are used in business. These total resources of a concern are in the form of men, materials, money, plant and equipments and others.

In a broader meaning the word “Fund” refers to Working Capital. The Working Capital indicates the difference between current assets and current liabilities. The term working capital may be :

- (a) Gross Working Capital and
- (b) Net Working Capital.

“Gross Working Capital” represents total of all Current Assets.

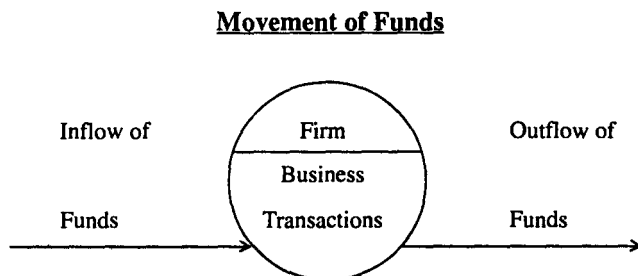
“Net Working Capital” refers to excess of Current Assets over Current Liabilities.

In a narrow sense the word “Fund” denotes cash or cash equivalents.

Meaning of Flow of Funds

The term “Flow of Funds” refers to changes or movement of funds or changes in working capital in the normal course of business transactions. The changes in working capital may be in the form of inflow of working capital or outflow of working capital. In other words, any increase or decrease in working capital when the transactions takes place is called as “Flow of Funds.” If the components of working capital results in increase of the fund, it is known as Inflow of Fund or Sources of Fund. Similarly, if the components of working capital effects in decreasing the financial position it is treated as Outflow of Fund. For example, if the fund raised by way of issue of shares will be taken as a source of fund or inflow of fund. This transaction results in increase of the financial position. Like this, the fund used for the purchase of machinery will be taken as application or use of fund or outflow of fund. Because it stands to reduce the fund position.

The following chart shows the movement of funds :



No Flow of Funds

Some transactions may not make any movement or changes in the fund position. Such transactions are involved within the business concern. Like the transaction which involves both between current assets and current liabilities or between non-current assets and non-current liabilities and hence do not result in the flow of funds. For example, conversion of shares in to debenture. Such transaction involves between non-current account only and this activity does not effect in increase or decrease of the working capital position.

Statement of Changes in Financial Position

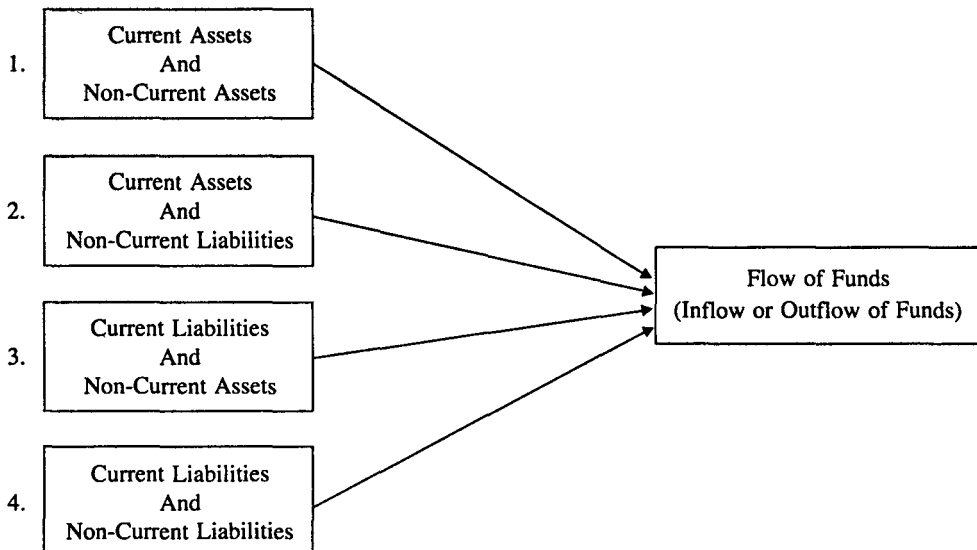
It is a statement prepared on the basis of all financial resources, i.e., assets, liabilities and capital. This statement is attempt to measure changes in both current and non-current accounts. The changes in financial position may occur in deal with following transactions:

- (a) Involves between current assets and non-current assets (fixed assets or permanent assets).
- (b) Involves between current liabilities and non-current assets.
- (c) Involves between current assets and non-current liabilities (long-term liabilities and capital).
- (d) Involves between current liabilities and non-current liabilities.

The following chart explains the flow of funds when transaction involves between current and non-current accounts:

Flow of Funds Chart

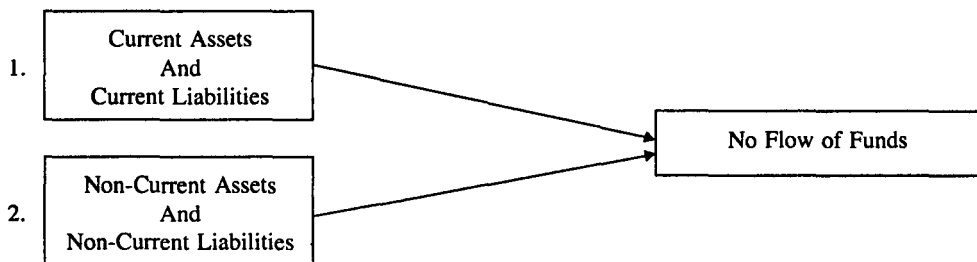
Transaction Involves between



When the transaction involves between non-current account and between current account it is not movement of funds. The following chart shows the no flow of funds :

No Flow of Funds Chart

Transaction Involves between



Examples of Flow of Funds and No Flow of Funds

The following are the few examples of flow of funds and no flow of funds:

Examples of “Flow of Funds”

<i>Examples</i>	<i>Transactions Involve Between</i>	<i>Flow of Funds From</i>
(1) Purchase of Machinery for Cash	Current Asset and Non-Current Asset	Current to Non-Current Account
(2) Issue of Share for Cash	Current Asset and Capital	Current to Capital Account
(3) Redemption of Debenture in Cash	Current Asset and Non-Current Liabilities	Current to Long-Term Liabilities Account
(4) Creditors Paid off in Debenture	Current Liabilities and Non-Current Liabilities	Non-Current Liabilities to Current Liabilities
(5) Land Transferred to Creditors for their Statement }	Current Liability and Non-Current Assets	Non-Current Assets to Current Liability

Examples of “No Flow of Funds”

<i>Examples</i>	<i>Transactions Involve Between</i>	<i>Flow of Funds From</i>
(1) Payment made to Creditors	Current Asset and Current Liabilities	No Flow of Funds
(2) Machinery Purchased and Payment made in Debenture }	Non-Current Assets and Non-Current Liabilities	No Flow of Funds
(3) Machinery Purchased and Payment made in Shares }	Non-Current Asset and Capital	No Flow of Funds

Components of Flow of Funds

In order to analyse the sources and application of funds, it is essential to know the meaning and components of flow of funds given below :

- (1) Current Assets
- (2) Non-Current Assets (Fixed or Permanent Assets)
- (3) Current Liabilities
- (4) Non-Current Liabilities (Capital & Long-Term Liabilities)
- (5) Provision for Tax
- (6) Proposed Dividend

(1) Current Assets: The term “Current Assets” refer to the assets of a business of a transitory nature which are intended for resale or conversion into different form during the course of business operations. For example, raw materials are purchased and the amount unused at the end of the trading period forms part of the current as stock on hand. Materials in process at the end of the trading period and the labour incurred in processing them also form part of current assets.

(2) Non-Current Assets (Permanent Assets): Non-Current Assets also refer to as Permanent Assets or Fixed Assets. This class of asset include those of tangible and intangible nature having a specific value and which are not consumed during the course of business and trade but provide the means for producing saleable goods or providing services. Land and Building, Plant and Machinery, Goodwill and Patents etc. are the few examples of Non-Current Assets.

(3) Current Liabilities: The term Current Liabilities refer to amount owing by the business which are currently due for payment. They consist of amount owing to creditors, bank loans due for repayment, proposed dividend and proposed tax for payment and expenses accrued due.

(4) Non-Current Liabilities: The term Non-Current Liabilities refer to Capital and Long-Term Debts. It is also called as Permanent Liabilities. Any amount owing by the business which are payable over a longer period time, i.e., after a year are referred as Non-Current Liabilities. Debenture, long-term loans and loans on mortgage etc., are the few examples of non-current liabilities.

(5) Provision for Taxation: Provision for taxation may be treated as a current liability or an appropriation of profit. When it is made during the year it is not used for adjusting the net profit, it is advisable to treat the same as current liability. Any amount of tax paid during the year is to be treated as application of funds or non-current liability. Because it is used for adjusting the net profit made during the year.

(6) Proposed Dividend: Like provision for taxation, it is also treated as a current liability and non-current liability, when dividend may be considered as being declared. And thus, it will not be used for adjusting the net profit made during the year. If it is treated as an appropriation, i.e., an non-current liability when the dividend paid during the year.

(7) Provisions Against Current Assets and Current Liabilities: Provision for bad and doubtful debts, provision for loss on inventories, provision for discount on creditors and provision made against investment etc. are made during the year, they may be treated separately as current assets or current liabilities or reduce the same from the respective gross value of the assets or liabilities.

The list of Current Accounts and Non-Current Accounts are given below :

Current Accounts

<i>Current Liabilities</i>	<i>Current Assets</i>
(1) Bills Payable	(1) Cash in Hand
(2) Sundry Creditors	(2) Cash at Bank
(3) Outstanding Expenses	(3) Bills Receivable
(4) Dividends Payable	(4) Sundry Debtors
(5) Bank Overdraft	(5) Short-Term Investments
(6) Short-Term Loans	(6) Marketable Securities
(7) Provisions against Current Assets	(7) Stock of Raw Materials, Work in Progress & Finished Goods
(8) Provision for Taxation	(8) Prepaid Expenses
(9) Proposed Dividend (May be Current or Non-Current Liabilities)	(9) Accrued Incomes

Non-Current Accounts

<i>Non-Current or Permanent Liabilities</i>	<i>Non-Current or Permanent Assets</i>
(1) Equity Share Capital	(1) Good will
(2) Preference Share Capital	(2) Land
(3) Debentures	(3) Building
(4) Long-Term Loans	(4) Plant and Machinery
(5) Share Premium	(5) Furniture and Fittings
(6) Share forfeited	(6) Trade Marks
(7) Profit and Loss Account	(7) Patent Rights
(8) Capital Reserve	(8) Long-Term Investments
(9) Capital Redemption Reserve	(9) Discount on Issue of Shares and Debentures
	(10) Preliminary Expenses
	(11) Other Deferred Expenses

Fund Flow Statement

It is a statement summarizing the significant financial changes in items of financial position which have occurred between the two different balance sheet dates. This statement is prepared on the basis of "Working Capital" concept of funds. Fund flow Statement helps to measure the different sources of funds and application of funds from transactions involved during the course of business.

The fund flow statement also termed as Statement of Sources and Application of Fund, Where Got and Where Gone Out Statement, Inflow of Fund or Outflow of Fund Statement.

Importance or Uses of Fund Flow Statement

Fund Flow Statements are prepared for financial analysis in order to meet the needs of people serving the following purposes:

- (1) It highlights the different sources and applications or uses of funds between the two accounting period.
- (2) It brings into light about financial strength and weakness of a concern.
- (3) It acts as a effective tool to measure the causes of changes in working capital.
- (4) It helps the management to take corrective actions while deviations between two balance sheet figure.
- (5) It is an instrument used by the investors for effective decisions at the time of their investment proposals.
- (6) It also presents detailed information about profitability, operational efficiency and financial affairs of a concern.
- (7) It serves as a guide to the management to formulate its dividend policy, retention policy and investment policy etc.
- (8) It helps to evaluate the financial consequences of business transactions involved in operational finance and investment.
- (9) It gives the detailed explanation about movement of funds from different sources or uses of funds during a particular accounting period.

Difference between Fund Flow Statement and Income Statement

<i>Fund Flow Statement</i>	<i>Income Statement</i>
(1) It explains the different sources and uses of funds during the particular period.	(1) It reveals the net profit or net loss in a particular period of time.
(2) No standard format is required for preparation of fund flow statement.	(2) As per the double entry book keeping, prescribed format is used for preparation of income statement.
(3) Fund Flow Statement considers both capital and revenue nature of income and expenditure.	(3) It considers only revenue nature of income and expenditure.
(4) It disclosed the exact flow of funds from operations. Thus, it is complementary to income statement.	(4) It is prepared not for fund flow statement.

Difference between Fund Flow Statement and Balance Sheet

<i>Fund Flow Statement</i>	<i>Balance Sheet</i>
(1) It presents significant financial Changes between two balance sheets.	(1) It is a statement that incorporates assets and liabilities prepared at the end of accounting period.
(2) It is prepared on the basis of Trading, Profit & Loss account and Balance sheet.	(2) It is prepared on the basis of Trial Balance.

<i>Fund Flow Statement</i>	<i>Balance Sheet</i>
(3) It provides additional information to the management to discharge its functions effectively.	(3) It explains the financial position of a concern as a whole in a particular period.
(4) Fund from operation, schedule of changes in working capital has to be required for preparation of fund flow statement.	(4) It is prepared after the Trading, Profit and Loss Account is completed.

Limitations of Fund Flow Statement

Fund Flow Statement has suffered with the following limitations :

- (1) It is prepared on the basis of information related to historical in nature. It ignores to project future operations.
- (2) This statement does not focus on transactions involved in non-fund items.
- (3) It also ignores when transactions involved between current accounts or non-current accounts.
- (4) It does not provide any additional information to the management because financial statements are simply rearranged and presented.

Preparation of Fund Flow Statement

Fund flow analysis involves the following important three statements such as :

- I. Fund From Operations
- II. Statement of Changes in Working Capital
- III. Fund Flow Statement.

I. FUND FROM OPERATIONS

Fund From Operation is to be determined on the basis of Profit and Loss Account. The operating profit revealed by Profit and Loss Account represents the excess of sales revenue over cost of goods sold. In the true sense, it does not reflect the exact flow of funds caused by business operations. Because the revenue earned and expenses incurred are not in conformity with the flow of funds. For example, depreciation charges on fixed assets, write up of fixed assets or fictitious assets, any appropriations etc. do not cause actual flow of funds. Because they have already been charged to such profits. Hence, fund from operation is prepared to find out exact inflow or outflow of funds from the regular operations on the basis of items which have readjusted to the current profit or loss. The balancing amount of adjusted profit and loss account is described as fund from operations.

Calculation of Fund From Operations

Fund from operations is calculated with the help of following adjustments. The adjustments may be shown in the specimen proforma of profit and loss account as given below :

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Net Profit or Retained Earnings (Closing balance of P & L A/c as given in the Balance Sheet)		* * *
<i>Add</i> : Non-Fund and Non-Operating items which have already been debited to P & L A/c :		
(1) Depreciation and Depletion	* * *	
(2) Amortization of Fictious and Intangible Assets etc.		
(a) Good will, Patents written off		
(b) Discount on Issue of shares written off		
(c) Preliminary Expenses written off		
(d) Premium on redemption of debenture		
(3) Appropriation of Retained Earnings :		
Profit transfer to General Reserve	* * *	
Profit transfer to Sinking Fund		
Profit transfer to Contingency		
Provision for Taxation (not taken as current liability)		
Provision for Proposed Dividend (not taken as current liability)]		
Loss on Sale of Fixed Assets		
Loss on Sale of Plant and Machinery		
Loss on Sales of Land and Building		
Loss on Sale of Furniture and Fixtures	* * *	* * *
Total (A)	* * *	* * *
<i>Less</i> : Non-Fund and Non-Operating items which have already been credited to P & L A/c :		
(1) Profit on sale of Fixed Assets	* * *	
Profit on sale of Land & Building		
Profit on sale of Plant & Machinery		
Profit on sale of Furniture & Fixtures		
(2) Appreciation or Revaluation of fixed assets	* * *	
(3) Dividend received on investment	* * *	
(4) Profit on redemption of Shares and Debentures	* * *	
(5) Excess provisions written back	* * *	
(6) Any other non-trading items already credited to P & L A/c]	* * *	
(7) Net Profit or Retained Earnings (Opening balance of P & L A/c)]	* * *	
Total (B)	* * *	* * *
Fund From Operations (Total A – B)		* * *

Alternative Specimen Format

The following is the specimen of adjusted profit and loss account to calculate fund from operations :

Adjusted Profit and Loss Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Depreciation on Fixed Assets		By Opening Balance of P & L A/c	
To Loss on Sale of Fixed Assets		By Profit on Sale of Fixed Assets	
To Loss on Sale Investments		By Excess provision written back	
To Goodwill written off		By Dividend received on investment	
To Discount on shares written off		By Revaluation of fixed assets	
To Transfer to reserve		By Fund From Operations	
To Preliminary expenses written off		(Balancing Figure)	
To Provision for Tax			
To Proposed Dividend			
To Closing Balance of P & L A/c			
	* * *		* * *

Illustration: 1

From the following Profit and Loss Account, Calculation fund from operation :

Profit and Loss Account

	<i>Rs.</i>		<i>Rs.</i>
To Rent	6,000	By Gross Profit b/d	50,000
To Salaries	14,000	By Transfers to General Reserve	7,000
To Advertisement	3,000	By Preliminary Expenses	1,000
To Office Expenses	2,000	By Profit on Sale of Investment	2,000
To Depreciation on Plant	5,000		
To Good will written off	3,000		
To Loss on Sales of Plant	2,000		
To Provision for Tax	4,000		
To Interim Dividend	3,000		
To Net Profit	18,000		
	60,000		60,000

Solution:**Calculation of Fund From Operations**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Net Profit or Retained Earnings (Closing Balance of P & L A/c)		18,000
Add : Non-Fund or Non-Trading items already debited to P & L A/c :		
Depreciation on Plant	5,000	
Goodwill written off	3,000	
Loss on Sale of Plant	2,000	
Provision for Tax	4,000	
Interim Dividend	3,000	

Particulars	Amount Rs.	Amount Rs.
Preliminary Expenses	1,000	
Transfer to General Reserve	7,000	25,000
		43,000
<i>Less</i> : Non-Fund or Non-Trading items already Credited to P & L A/c :		
Profit on Sale of Investments	2,000	2,000
Fund From Operations		41,000

Note : Provision for tax and Interim Dividend are not treated as current liability.

Alternatively

Adjusted Profit and Loss Account

To Depreciation on Plant	5,000	By Profit on sale of Investment	2,000
To Goodwill Written off	3,000	By Fund From Operations	41,000
To Loss on Sale of Plant	2,000	(Balancing figure)	
To Provision for Tax	4,000		
To Interim Dividend	3,000		
To Preliminary Expenses	1,000		
To Transfer General Reserve	7,000		
To Net Profit (Closing Balance of P & L A/c) }	18,000		
	43,000		43,000

Illustration: 2

Calculate Fund from Operations from the following Profit and Loss Account

To Salaries	45,000	By Gross Profit b/d	2,00,000
To Rent & Rates	15,000	By Profit on Sale of Plant	10,000
To Office Expenses	15,000	By Dividend received on Investment }	4,000
To Administrative Expenses	20,000	By Preliminary Expenses	2,000
To General Expenses	5,000	By Transfer to General Reserve }	4,000
To Depreciation on Machinery	25,000		
To Depletion of Natural Resources	10,000		
To Depreciation on Building	5,000		
To Loss on Sale of Building	10,000		
To Good will Written off	10,000		
To Discount Written off	3,000		
To Advertisement Written off	5,000		
To Net Profit	52,000		
	2,20,000		2,20,000

Solution:**Calculation of Fund from Operations**

<i>Particulars</i>	<i>Amount Rs</i>	<i>Amount Rs.</i>
Net Profit or Retained Earnings (Closing Balance of Profit & Loss A/c)]		52,000
Add : Non-fund or Non-Trading items already debited to P & L A/c :		
Depreciation on Plant & Machinery	25,000	
Depreciation on Building	5,000	
Depletion of Natural Resources	10,000	
Loss on Sale of Building	10,000	
Good will Written off	10,000	
Discount Written off	3,000	
Advertisement Written off	5,000	
Preliminary Expenses	2,000	70,000
		1,22,000
Less : Non-Fund or Non-Operating items already credited to P & L A/c :		
Profit on Sale of Plant	10,000	
Dividend received on Investment	4,000	
Transfer to General Reserve	4,000	18,000
Fund From Operations		1,04,000

Alternatively**Solution:****Adjusted Profit & Loss Account**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Depreciation on Plant and Machinery]	25,000	By Profit on Sale of Plant]	10,000
To Depreciation on Building	5,000	By Dividend received on Investment]	4,000
To Depletion of Natural Resources	10,000	By Transfer to General Reserve]	4,000
To Loss on Sale of Building	10,000	By Fund from Operations (Balancing figure)]	1,04,000
To Good will Written off	10,000		
To Discount Written off	3,000		
To Advertisement Written off	5,000		
To Preliminary Expenses	2,000		
To Net Profit (Closing Balance)]	52,000		
	1,22,000		1,22,000

II. STATEMENT OF CHANGES IN WORKING CAPITAL

It is also termed as Statement of Changes in Working Capital. Before preparation of fund flow statement, it is essential to prepare first the schedule of changes in working capital and fund from operations. Statement of changes in working capital is prepared on the basis of items in current assets and current liabilities of between two balance sheets. This statement helps to measure the movement or changes of working capital during a particular period. The term working capital refers to excess of current assets over

current liabilities. The working capital may be "Increase in working capital" or "Decrease in working capital." An increase in the amount of an item of current assets in the current year as compared to the previous year represents an increase in working capital. Similarly, a decrease in the amount of an item of current assets in the current year as compared to the previous year would represent decrease in working capital. In the same way over all changes in working capital is calculated and presented in the schedule of changes in working capital. The final result of Net Decrease in Working Capital refers to Source of Funds or Inflow of Funds. Like this, Net Increase in Working Capital represent Application of Fund or Uses of Funds.

Principle or Rules for Preparation of Working Capital Statement

The following rules may be kept in mind while preparing working capital statement:

- | | | |
|-----------------------------------|---|---------------------------|
| (1) Increase in Current Asset | → | Increases Working Capital |
| (2) Decrease in Current Asset | → | Decreases Working Capital |
| (3) Increase in Current Liability | → | Decreases Working Capital |
| (4) Decrease in Current Liability | → | Increases Working Capital |

Specimen Form of Schedule of Changes in Working Capital :

The following is a specimen form may be used for preparation of schedule of changes in working capital.

Schedule of Changes in Working Capital (or) Statement of Changes in Working Capital

<i>Particulars</i>	<i>Previous Year Rs.</i>	<i>Current Year Rs.</i>	<i>Effect on Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash in Hand				
Cash at Bank				
Sundry Debtors				
Bills Receivable				
Short-Term Investments				
Stock				
Prepaid Expenses				
Outstanding Incomes				
Total Current Assets (A)	* * *	* * *		
Current Liabilities :				
Sundry Creditors				
Bills Payable				
Bank Overdraft				
Outstanding Expenses				
Short-Term Loans				
Total Current Liabilities (B)	* * *	* * *		
Working Capital (A - B)	* * *	* * *		
Net Increase / Decrease In Working Capital]	* * *	—	—	* * *
Total	* * *	* * *	* * *	* * *

Illustration: 3

From the following Balance Sheet of Gupta Ltd., prepare Schedule of Changes in Working Capital:

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Creditors	55,000	83,000	Cash in Hand	15,000	10,000
Bills Payable	20,000	16,000	Cash at Bank	10,000	8,000
Share Capital	1,00,000	1,50,000	Debtors	1,60,000	2,00,000
General Reserve	7,000	8,000	Stock	77,000	1,09,000
Debenture	1,00,000	1,00,000	Bills Receivable	20,000	30,000
	2,82,000	3,57,000		2,82,000	3,57,000

Solution:**Schedule of Changes in Working Capital**

<i>Particulars</i>	2002 Rs.	2003 Rs.	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash in Hand	15,000	10,000	—	5,000
Cash at Bank	10,000	8,000	—	2,000
Debtors	1,60,000	2,00,000	40,000	—
Stock	77,000	1,09,000	32,000	—
Bills Receivable	20,000	30,000	10,000	—
Total (A)	2,82,000	3,57,000		
Current Liabilities :				
Creditors	55,000	83,000	—	28,000
Bills Payable	20,000	16,000	4,000	—
Total (B)	75,000	99,000		
Working Capital (A – B)	2,07,000	2,58,000		
Net Increase in Working Capital	51,000	—	—	51,000
	2,58,000	2,58,000	86,000	86,000

Illustration: 4

You are required to prepare a Schedule of changes in working capital from the following Balance sheet of Nancy Ltd., at the end of 2002 and 2003.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	50,000	75,000	Cash at Bank	15,000	25,000
General Reserve	25,000	30,000	Plant	50,000	70,000
Bill Payable	10,000	15,000	Building	50,000	60,000
Debenture	30,000	50,000	Stock	30,000	35,000
Trade Creditors	40,000	50,000	Bills Receivable	25,000	40,000
Short-Term Loans	30,000	40,000	Trade Debtors	15,000	30,000
	1,85,000	2,60,000		1,85,000	2,60,000

Solution:**Schedule of Changes in Working Capital**

Particulars	2002 Rs.	2003 Rs.	Changes in Working Capital	
			Increase	Decrease
Current Assets :				
Cash at Bank	15,000	25,000	10,000	—
Stock	30,000	35,000	5,000	—
Bills Receivable	25,000	40,000	15,000	—
Trade Debtors	15,000	30,000	15,000	—
Total (A)	85,000	1,30,000		
Current Liabilities :				
Bills Payable	10,000	15,000	—	5,000
Trade Creditors	40,000	50,000	—	10,000
Short-Term Loans	30,000	40,000	—	10,000
Total (B)	80,000	1,05,000		
Working Capital (Total A – B)	5,000	25,000		
Net Increase in Working Capital	20,000	—	—	20,000
	25,000	25,000	45,000	45,000

Illustration: 5

From the following Balance Sheet of John Ltd. prepare a Schedule of changes in working capital:

Balance Sheet

Particulars	2002 Rs.	2003 Rs.
Assets :		
Cash Balances	30,000	40,000
Debtors	60,000	56,000
Stock	1,10,000	1,44,000
Building	1,60,000	2,00,000
Machinery	30,000	20,000
	3,90,000	4,60,000
Liabilities :		
Capital	1,26,000	2,00,000
Long-Term Loans	1,00,000	1,20,000
Sundry Creditors	84,000	78,000
Bank Overdraft	70,000	50,000
Outstanding Expenses	10,000	12,000
	3,90,000	4,60,000

Solution:**Schedule of Changes in Working Capital**

Particulars	2002 Rs.	2003 Rs.	Changes in Working Capital	
			Increase	Decrease
Current Assets :				
Cash Balances	30,000	40,000	10,000	—
Debtors	60,000	56,000	—	4,000
Stock	1,10,000	1,44,000	34,000	—
Total (A)	2,00,000	2,40,000		
Current Liabilities :				
Sundry Creditors	84,000	78,000	6,000	—
Bank Overdraft	70,000	50,000	20,000	—
Outstanding Expenses	10,000	12,000	—	2,000
Total (B)	1,64,000	1,40,000		
Working Capital (Total A – B)	36,000	1,00,000		
Net Increase in Working Capital	64,000	—	—	64,000
	1,00,000	1,00,000	70,000	70,000

III. FUND FLOW STATEMENT

In the analysis and interpretation of financial statements fund flow statement is one of the important technique. The statement of changes in working capital is prepared with the help of current assets and current liabilities. Similarly, fund from operation is prepared on the basis of profit and loss account to find out the exact movement of funds in different operations. After preparing schedule of changes in working capital and fund from operations, at the last stage a comprehensive fund flow statement can be prepared on the basis of component of non-current assets, non-current liabilities of balance sheet and relevant information. In other words, this statement is prepared with the help of the changes in non-current assets and non-current liabilities of balance sheet.

Components of Sources and Application of Funds

The following are the components of different sources and applications of funds:

Components of Sources of Funds

- (1) Fresh Issue of Equity Share Capital.
- (2) Fresh Issue of Preference Share Capital.
- (3) Issue of Debentures and Bonds.
- (4) Long-Term Loans raised from bank, financial institutions and public.
- (5) Long-Term Loans on Mortgage.
- (6) Sale of Fixed Assets.
- (7) Sale of Long-Term Investments.
- (8) Non-Trading Incomes.
- (9) Fund From Operations.
- (10) Net Decrease in Working Capital (as per schedule of changes in working capital).

Components of Applications of Funds

Generated funds from various sources may be utilized in the following ways for meeting the future productive programmes of the business:

- (1) Redemption of shares and debentures.
- (2) Repayment of loans raised from bank, financial institutions and public.
- (3) Purchase of Fixed Assets.
- (4) Purchase of Long-Term Investments.
- (5) Non-Trading Expenditure.
Payment of Tax;
Payment of Dividend.
- (6) Fund Lost in Operations.
- (7) Net Increase in Working Capital (as per schedule of changing in working capital).

Specimen Form of Fund Flow Statement

The following are the two usual formats for preparation of Sources and Application of Fund is presented below:

- (1) Statement Form.
- (2) Account Form.

(1) Statement Form

Fund Flow Statement

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Sources of Funds :		
Fund From Operations		
Issue of Share Capital		
Issue of Debentures		
Long-Term Loans		
Sale of Fixed Assets		
Sale of Investments		
Non-Trading Incomes		
Decrease in Working Capital (as per schedule of changes in working capital)	* * *	* * *
Total Sources (or) Total Inflows (A)		* * *
Application or Uses of Funds :		
Fund Lost in Operations		
Redemption of Shares		
Redemption of Debentures		
Purchase of Fixed Assets		
Repayment of Long-Term Investments		
Non-Trading Expenditure		
Payment of Tax		
Payment of dividend		
Increase in Working Capital (as per schedule of changes in working capital)	* * *	* * *
Total Application or Total Outflows (B)		* * *

(2) Account Form**Fund Flow Statement**

<i>Sources of Funds</i>	<i>Amount Rs.</i>	<i>Application of Funds</i>	<i>Amount Rs.</i>
Fund From Operations Issue of Share Capital Issue of Debentures Long-Term Loans Sale of Fixed Assets Sale of Investments Non-Trading Incomes Decrease in Working Capital (As per schedule of changes in working capital)		Fund Lost in Operations Redemption of Shares Redemption of Debenture Purchase of Fixed Assets Repayment of Long-Term Loans Non-Trading Expenditure Payment of Tax Payment of Dividend Increase in Working Capital (as per schedule of changes in working capital)	
Total Inflow	***	Total Outflow	***

Illustration: 6

From the following Balance sheet of William & Co. Ltd., you are required to prepare a Schedule of Changes in Working Capital and Statement of Sources and Application of Funds.

Balance sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Capital	80,000	85,000	Cash in Hand	4,000	9,000
P & L A/c	14,500	24,500	Sundry Debtors	16,500	19,500
Sundry Creditors	9,000	5,000	Stock	9,000	7,000
Long-Term Loans	—	5,000	Machinery	24,000	34,000
			Building	50,000	50,000
	1,03,500	1,19,500		1,03,500	1,19,500

Solution:**Schedule of Changes in Working Capital**

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash at Bank	4,000	9,000	5,000	—
Sundry Debtors	16,500	19,500	3,000	—
Stock	9,000	7,000	—	2,000
Total (A)	29,500	35,500		
Current Liabilities :				
Sundry Creditors	9,000	5,000	4,000	—
Total (B)	9,000	5,000		
Working Capital (Total A – B)	20,500	30,500		
Net Increase in Working Capital	10,000	—	—	10,000
	30,500	30,500	12,000	12,000

Fund Flow Statement

<i>Sources of Fund</i>	<i>Rs.</i>	<i>Application of Fund</i>	<i>Rs.</i>
Issue of Capital (80000 – 85000)	5,000	Purchase of Machinery (24,000 – 34,000)	10,000
Long-Term Loans	5,000	Net Increase in Working Capital	10,000
Fund From Operations (14,500 – 24,500)	10,000		
	20,000		20,000

Illustration: 7

From the following Balance sheet of RR & Co. Ltd., you are required to prepare (a) Schedule of Changes in Working Capital (b) Fund Flow Statement and (c) Fund From Operations.

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Equity Capital	1,00,000	1,00,000	Good Will	6,000	6,000
General Reserve	14,000	18,000	Patents	6,000	6,000
Profit & Loss A/c	16,000	13,000	Building	50,000	46,000
Bank Overdraft	3,000	2,000	Machinery	27,000	26,000
Sundry Creditors	5,000	3,400	Investments	10,000	11,000
Bills Payable	1,200	800	Stock	20,000	13,400
Provision for Taxation	10,000	11,000	Bills Receivable	12,000	13,200
Proposed Dividend	6,000	7,000	Debtors	18,000	19,000
Provision for Doubtful Debts	400	600	Cash at Bank	6,600	15,200
	1,55,600	1,55,800		1,55,600	1,55,800

Additional Information

- (1) Depreciation Charged on Machinery Rs. 4,000 and on Building Rs. 4,000.
- (2) Provision for Taxation of Rs. 19,000 was made during the year 2003.
- (3) Interim Dividend of Rs. 8,000 was Paid during the year 2003.

Solution:**Calculation of Fund from Operations**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Profit and Loss A/c (Closing Balance of 2003)		13,000
Add : Non-Fund or Non-Trading items already Debited to P&L A/c :		
Depreciation on Machinery	4,000	
Depreciation on Building	4,000	
Interim Dividend Paid	8,000	
Transfer to General Reserve	4,000	

<i>Particulars</i>	<i>Amount</i>	<i>Amount</i>
Provision for Tax (See Note 1)	19,000	
Proposed Dividend	1,000	40,000
		53,000
<i>Less</i> : Non-Fund or Non-Trading items already Credited to P&L A/c :		
Profit and Loss A/c (Opening balance as per 2002)		16,000
Fund From Operations		37,000

Schedule of Changes in Working Capital

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash at Bank	6,600	15,200	8,600	—
Debtors	18,000	19,000	1,000	—
Stock	20,000	13,400	—	6,600
Bills Receivable	12,000	13,200	1,200	—
Total (A)	56,600	60,800		
Current Liabilities :				
Bank Overdraft	3,000	2,000	1,000	—
Sundry Creditors	5,000	3,400	1,600	—
Provision for Doubtful Debts	400	600	—	200
Bills Payable	1,200	800	400	—
Total (B)	9,600	6,800		
Working Capital (Total A – B)	47,000	54,000		
Net Increase in Working Capital	7,000	—	—	7,000
	54,000	54,000	13,800	13,800

Fund Flow Statement

<i>Sources of Fund</i>	<i>Rs.</i>	<i>Application of Funds</i>	<i>Rs.</i>
Fund From Operations	37,000	Purchase of Machinery	3,000
		Tax Paid (see Note 3)	18,000
		Investment Purchased	1,000
		(10,000 – 11,000)]	
		Interim Dividend Paid	8,000
		Net Increase in Working	
		Capital]	7,000
	37,000		37,000

Machinery Account

To Balance b/d	27,000	By Depreciation	4,000
To Bank	3,000	By Balance c/d	26,000
(Purchase of Machinery balancing figure)			
	30,000		30,000

Building Account

To Balance b/d	50,000	By Depreciation	4,000
		By Balance c/d	46,000
	50,000		50,000

Provision for Taxation

To Bank	18,000	By Balance b/d	10,000
(Balancing figure)		By Provision for Taxation	19,000
To Balance c/d	11,000		
	29,000		29,000

Illustration: 8

From the following are the comparative Balance Sheet of Gupta & Co., you are required to prepare (a) Schedule of Changes in Working Capital (b) Fund Flow Statement and (c) Fund From Operations.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	90,000	1,00,000	Goodwill	12,000	10,000
General Reserve	14,000	18,000	Buildings	40,000	36,000
Profit & Loss A/c	19,500	12,000	Machinery	37,000	36,000
Provision for Taxation	16,000	17,000	Stock	30,000	25,400
Sundry Creditors	8,000	5,400	Sundry Debtors	20,000	22,200
Bills Payable	6,200	1,300	Cash at Bank	6,600	15,200
Provision for Doubtful Debts	1,900	2,100	Investments	10,000	11,000
	1,55,600	1,55,800		1,55,600	1,55,800

Additional Information

- (1) Depreciation charged on Machinery was Rs. 4000 and on building Rs. 4000.
- (2) Interim Dividend paid during 2003 was Rs. 7500.
- (3) Provision of Rs. 5000 was made for taxation during the 2003.

Solution :**Calculation of Fund From Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit (Closing Balance)		12,000
Add : Non-fund or Non-operating items Which already Debited to P & L A/c :		
Good Will Written off	2,000	
Depreciation on Machinery	4,000	
Depreciation on Building	4,000	
Interim Dividend Paid	7,500	

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Transfer to General Reserve	4,000	21,500
		33,500
<i>Less</i> : Non-Fund or Non Operating items already Credited to P & L A/c :		
Net Profit (Opening Balance)		19,500
Fund From Operations		14,000

Schedule of Changes in Working Capital

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Stock	30,000	25,400	—	4,600
Sundry Debtors				
(Less: Provision For Doubtful Debts)	18,100	20,100	2,000	
Cash Balances	6,600	15,200	8,600	—
Total (A)	54,700	60,700		
Current Liabilities :				
Sundry Creditors	8,000	5,400	2,600	—
Bills Payable	6,200	1,300	4,900	—
Provision for Tax	16,000	17,000	—	1,000
Total (B)	30,200	23,700		
Working Capital (Total A – B)	24,500	37,000		
Net Increase in Working Capital	12,500	—	—	12,500
	37,000	37,000	18,100	18,100

Fund Flow Statement

<i>Sources of Funds</i>	<i>Rs.</i>	<i>Application of Funds</i>	<i>Rs.</i>
Issue of Share Capital (90,000 – 1,00,000)]	10,000	Purchase of Machinery	3,000
Funds From Operations	14,000	Purchase of Investments	1,000
		Interim Dividend Paid	7,500
		Net Increase in Working Capital]	12,500
	24,000		24,000

Machinery Account

To Balance b/d	37,000	By Depreciation	4,000
To Bank	3,000	By Balance c/d	36,000
(Purchase of Machinery Balancing figure)	40,000		40,000

Building Account

To Balance b/d	40,000	By Depreciation	4,000
		By Balance c/d	36,000
	40,000		40,000

Illustration: 9

From the following Balance sheet of X Y Z Ltd., on 31st Dec. 2002 and 2003, you are required to prepare (a) Fund From Operations (b) Schedule of Changes in Working Capital and (c) Fund Flow Statement.

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Bills Payable	20,000	22,000	Cash Balances	10,000	7,000
Creditors	20,000	22,000	Debtors	20,000	20,000
Ramesh's Loan	25,000	—	Bills Payable	10,000	30,000
Loan from Kannan	40,000	50,000	Stock	35,000	25,000
Equity Share Capital	1,00,000	1,00,000	Machinery	80,000	55,000
Preference Share Capital	25,000	53,000	Land	40,000	50,000
			Building	35,000	60,000
	2,30,000	2,47,000		2,30,000	2,47,000

Additional Information

- (1) During the year machine costing Rs. 10,000 (accumulated depreciation Rs. 3,000) was sold for Rs. 5,000.
- (2) The provision for depreciation against machinery on 1st Jan. 2003 was Rs. 25,000 and on 31st December was Rs. 40,000.
- (3) Net profit for the year 2003 amounted to Rs. 45,000.

Solution:**Calculation of Fund From Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit (Closing Balance P & L A/c)		45,000
<i>Add : Non-Fund or Non-Operating items already debited to P & L A/c</i>		
Loss on Sale of Machinery (see note 1)	2,000	
Depreciation on Machinery	18,000	20,000
		65,000
<i>Less : Non-Fund or Non-Operating items already credited to P & L A/c</i>		
Fund From Operations	—	65,000

Schedule of Changes in Working Capital

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash Balances	10,000	7,000	—	3,000
Bills Payable	10,000	30,000	20,000	—
Stock	35,000	25,000	—	10,000
Total (A)	55,000	62,000		
Current Liabilities :				
Bills Payable	20,000	22,000	—	2,000
Creditors	20,000	22,000	—	2,000
Total (B)	40,000	44,000		
Working Capital (Total A – B)	15,000	18,000		
Net Increase in Working Capital	3,000	—		3,000
	18,000	18,000	20,000	20,000

Fund Flow Statement

<i>Sources of Funds</i>	<i>Rs.</i>	<i>Application of Funds</i>	<i>Rs.</i>
Fund from Operations	65,000	Ramesh Loan Repaid	25,000
Loan From Kannan	10,000	Drawings	17,000
Sale of Machinery (See Note)	5,000	Purchase of Land	10,000
		Purchase of Building	25,000
		Net Increase in Working Capital }]	3,000
	80,000		80,000

Machinery Account

To Balance b/d	1,05,000	By Provision for depreciation on machinery sold }]	3,000
		By Bank	5,000
		By Loss on sale of machinery	2,000
		By Balance c/d	95,000
	1,05,000		1,05,000

Provision for Depreciation on Machinery

To Machinery A/c	3,000	By Balance b/d	25,000
To Balance c/d	40,000	By P & L (depreciation Provided during the year – balancing figure) }]	18,000
	43,000		43,000

Capital Account :

	Rs.
Opening balance of Equity Share Capital	1,00,000
Opening balance of preference Share Capital	25,000
Net Profit during the year 2003	45,000
	1,70,000
<i>Less</i> : Closing balance of Equity and Preference Share Capital] (Rs. 1,00,000 to Rs. 53,000)	1,53,000
Drawing	17,000

Illustration: 10

From the following Balance sheet of Mohan & Co. Ltd. as on 31st December 2002 and 2003, you are required to prepare: (a) Fund From Operations (b) A Schedule of Changes in Working Capital and (c) A Fund Flow Statement:

Balance Sheet

<i>Liabilities</i>			<i>Assets</i>		
	2002 Rs.	2003 Rs.		2002 Rs.	2003 Rs.
Sundry Creditors	50,000	48,000	Cash in hand	25,000	22,000
Bills Payable	40,000	39,000	Cash at Bank	25,000	18,000
Bank Overdraft	13,000	90,000	Sundry Debtors	30,000	28,000
Outstanding Expenses	13,000	22,000	Bills Receivable	47,000	45,000
15% Debentures	90,000	70,000	Short-Term Investments	1,10,000	84,000
Depreciation Fund	40,000	44,000	Prepaid Expenses	1,000	2,000
General Reserve	60,000	50,000	Inventories	92,000	1,06,000
Profit and Loss A/c	16,000	23,000	Land & Buildings	50,000	50,000
Equity Share Capital	1,00,000	1,00,000	Furniture	50,000	50,000
Preference Share Capital	80,000	80,000	Plant & Machinery	72,000	8,000
	5,02,000	4,85,000		5,02,000	4,85,000

Additional Information

- (1) Dividend was paid in cash was Rs. 18,000
- (2) New machinery for Rs. 20,000 was purchased but old machinery costing Rs. 12,000 was sold for Rs. 4,000, accumulated depreciation was Rs. 6,000
- (3) Rs. 20,000, 15% debentures were redeemed by purchase from open market @ Rs. 96
- (4) Rs. 10,000 was debited to General reserve for settlement of previous tax liability
- (5) Rs. 26,000 investments were sold at book value.

Solution:**(1) Statement of Changes in Working Capital**

Particulars	2002 Rs.	2003 Rs.	Change in Working Capital	
			Increase	Decrease
Current Assets :				
Cash in hand	25,000	22,000	-	3,000
Cash at Bank	25,000	18,000	-	7,000
Sundry Debtors	30,000	28,000	-	2,000
Bills Receivable	47,000	45,000	-	2,000
Short-Term Investment	1,10,000	84,000	-	26,000
Prepaid Expenses	1,000	2,000	1,000	-
Inventories	92,000	1,06,000	14,000	-
Total Current Assets (A)	3,30,000	3,05,000		
Current Liabilities :				
Sundry Creditors	50,000	48,000	2,000	-
Bills Payable	40,000	39,000	1,000	-
Bank Overdraft	13,000	9,000	4,000	-
Outstanding Expenses	13,000	22,000	-	9,000
Total Current Liabilities (B)	1,16,000	1,18,000		
Working Capital (A – B)	2,14,000	1,87,000		-
Net Decrease in Working Capital		27,000	27,000	-
	2,14,000	2,14,000	49,000	49,000

(2) Calculation of Fund From Operations

Particulars	Amount Rs.	Amount Rs.
Profit & Loss A/c (Closing Balance)		
<i>Add</i> : Non-Fund or Non-Operating items already been debited to P & L A/c		23,000
Depreciation on Machinery	10,000	
Loss on Sale of Machinery	2,000	
Dividend Paid	18,000	30,000
		53,000
<i>Less</i> : Non-Fund and Non-Operating items already been credited to P & L A/c		
Profit on redemption of debentures	800	
Profit and Loss A/c (Opening balance)	16,000	16,800
Fund From Operations		36,200

Dr.**(3) Fund Flow Statement****Cr.**

Sources of Fund	Amount Rs.	Application of Funds	Amount Rs.
Sale of Machinery	4,000	Dividends Paid	18,000
Fund From Operations	36,200	Purchase of Machinery	20,000
Net Decrease in Working Capital	27,000	Tax Paid	10,000
		Debenture Redeemed	19,200
	67,200		67,200

Dr.		(4) Machinery Account		Cr.	
Particulars	Amount Rs.	Particulars	Amount Rs.		
To Balance b/d	72,000	By Bank (Sold)	4,000		
To Bank (New Machinery)	20,000	By Depreciation Fund (A/c)	6,000		
		By Profit & Loss A/c (Loss) (6,000 + 4,000 - 12,000)	2,000		
		By Balance c/d	80,000		
	92,000		92,000		

Dr.		(5) Depreciation Fund Account		Cr.	
Particulars	Amount Rs.	Particulars	Amount Rs.		
To Machinery A/c	6,000	By Balance b/d	40,000		
To Balance c/d	44,000	By Profit & Loss A/c (Depreciation)	10,000		
	50,000		50,000		

Illustration: 11

From the following Balance sheet of Hari & Co. Ltd. as on 31st December 2002 and 2003, you are required to prepare: (a) Fund From operations (b) A Schedule of Changes in Working Capital and (c) A Fund Flow Statement :

Balance Sheet

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Equity Share Capital	2,00,000	2,00,000	Fixed Assets at Cost	10,00,000	10,00,000
7% Preference Share Capital	2,00,000	3,00,000	Less : Depreciation	2,60,000	3,10,000
				7,10,000	6,90,000
Capital Reserve		20,000	Trade Investments	1,10,000	90,000
General Reserve	1,80,000	2,10,000	Sundry Debtors	1,50,000	2,00,000
Debenture	3,00,000	2,00,000	Bills Receivable	1,70,000	2,50,000
Profit and Loss A/c	70,000	90,000	Preliminary Expenses	30,000	20,000
Sundry Creditors	50,000	50,000			
Bills Payable	30,000	20,000			
Bank Overdraft	50,000	50,000			
Provision for Income Tax	80,000	60,000			
Proposed Dividend	40,000	50,000			
	12,00,000	12,50,000		12,00,000	12,50,000

Additional Information

- (1) During the year 2003 depreciation provided for Rs. 1,00,000
- (2) Redeemed the debentures at Rs. 105
- (3) Sold one machine for Rs. 4,00,000 the cost of the machine was Rs. 80,000 and the depreciation provided for it amounted to Rs. 30,000

- (4) Sold some trade investments at profit which was credited to capital reserve
- (5) Decided to value the stock at cost whereas previously the practice was value stock at cost less 10%. The opening stock according to books was Rs. 63,000. The stock on 31st December 2003 was correctly valued at cost.

Solution:

(1) Schedule of Changes in Working Capital

Particulars	2002 Rs.	2003 Rs.	Changes in Working Capital	
			Increase	Decrease
Current Assets :				
Sundry Debtors	1,50,000	2,00,000	50,000	-
Bills Receivable	1,70,000	2,50,000	80,000	-
Inventory	7,000	-	-	7,000
Total Current Assets (A)	3,27,000	4,50,000		
Current Liabilities :				
Sundry Creditors	50,000	50,000	-	-
Bills Payable	30,000	20,000	10,000	-
Bank Overdraft	50,000	50,000	-	-
Total Current Liabilities (B)	1,30,000	1,20,000		
Working Capital (A – B)	1,97,000	3,30,000		
Net Increase in Working Capital	1,33,000	-	-	1,33,000
Total	3,30,000	3,30,000	1,40,000	1,40,000

(2) Calculation of Fund From Operations

Particulars	Rs.	Rs.
Net Profit (Closing Balance)		90,000
Add : Non-Fund and Non-operating items which already been debited to profit and loss A/c :		
Loss on sale of machinery	10,000	
Loss on redemption of debenture	5,000	
Depreciation provided	1,00,000	
Preliminary expenses (Rs. 30,000 – Rs. 20,000)	10,000	
Proposed dividend	50,000	
Transfer to General Reserve (Rs. 2,10,000 – Rs. 1,80,000)	30,000	
Provision for income tax	60,000	2,65,000
		3,55,000
Less : Non-Fund and Non-Operating items which already credited to Profit and Loss A/c :		
Opening Stock Written off	70,000	
Net Profit (Opening balance)	70,000	77,000
Fund From Operations		2,78,000

Fund Flow Statement

<i>Sources of Funds</i>	<i>Rs.</i>	<i>Application of Funds</i>	<i>Rs.</i>
Equity Share Capital	-	Purchase of Fixed Assets	1,00,000
7% Preference Share Capital (2,00,000 – 3,00,000)	1,00,000	Redemption of Debenture	1,05,000
		Proposed Dividend for 2002 (Assumed to be paid)	40,000
Sale of Trade Investments (Rs. 1,10,000 + 20,000 – 90,000)	40,000	Provision for Taxation for (2002 assumed to be paid)	80,000
Sale of Machine	40,000	Net Increase in Working Capital	1,33,000
Fund From Operations	2,78,000		
	4,58,000		4,58,000

Dr. Fixed Assets Account Cr.

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Balance b/d	10,00,000	By Cash (Sale)	40,000
To Cash (Purchase)		By Accumulated depreciation	30,000
Balancing figure	1,00,000	By Adjusted P & L (Loss on Sale)	10,000
		By Accumulated depreciation (Fixed Asset Written off)	20,000
		By Balance c/d	10,00,000
	11,00,000		11,00,000

Dr. Debenture Account Cr.

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Bank	1,05,000	By Balance b/d	3,00,000
To Balance c/d	2,00,000	By Adjusted P & L A/c (Loss on redeemed)	5,000
	3,05,000		3,05,000

Dr. Accumulated Depreciation Account Cr.

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Fixed Assets (Depreciation on Machinery Sold)	30,000	By Balance b/d	2,60,000
To Fixed Assets Written off (Rs. 7,10,000 – Rs. 6,90,000)	20,000	By Adjusted P & L A/c (Depreciation during the year)	1,00,000
To Balance c/d	3,10,000		
	3,60,000		3,60,000

Illustration: 12

The following summarized balance sheets are given to you by Pilh & Co. Ltd. :

Balance Sheet

<i>Liabilities</i>	2002	2003	<i>Assets</i>	2002	2003
	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>	<i>Rs.</i>
Share Capital	10,00,000	11,00,000	Fixed Assets		
Reserves	3,50,000	3,00,000	Less : Depreciation	11,70,000	16,90,000
Profit & Loss A/c	80,000	70,000	Investments	2,00,000	1,50,000
Loans @ 10%	6,00,000	8,00,000	Sundry Debtors	5,00,000	4,50,000
Provision for tax	2,10,000	2,40,000	Stock in Trade	4,50,000	3,90,000
Provision for Doubtful debts	30,000	20,000	Cash at Bank	90,000	60,000
Sundry Creditors	3,10,000	2,90,000	Goodwill	2,70,000	2,00,000
Proposed Dividend	1,00,000	1,20,000			
	12,00,000	29,40,000		26,80,000	29,40,000

Additional Information

- (1) Investments were sold during 2003 at a loss of 20% on the cost
- (2) An item of fixed assets, cost Rs.70,000, depreciation provided for Rs.66,000 had to be discarded in 2003 without any scrap value
- (3) Depreciation provided during 2003 came to Rs.1,80,000
- (4) The increase in share capital was because of issue of bonus shared out of reserves. Prepare the fund flow statement for the year ended 31st December 2003.

Solution:**Statement of Changes in Working Capital**

<i>Particulars</i>	2002	2003	<i>Effect on Working Capital</i>	
	<i>Rs.</i>	<i>Rs.</i>	<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Sundry Debtors	5,00,000	4,50,000	-	50,000
Stock in Trade	4,50,000	3,90,000	-	60,000
Cash at Bank	90,000	60,000	-	30,000
Total Current Assets (A)	10,40,000	9,00,000		
Current Liabilities :				
Sundry Creditors	3,10,000	2,90,000	20,000	-
Provision for Tax	2,10,000	2,40,000	-	30,000
Provision for doubtful debts	30,000	20,000	10,000	-
Total Current Liabilities (B)	5,50,000	5,50,000	5,50,000	
Working Capital (A – B)	4,90,000	4,90,000	3,50,000	
Net Decrease in Working Capital	-	1,40,000	14,000	-
	4,90,000	4,90,000	1,70,000	1,70,000

Fund Flow Statements

<i>Sources of Fund</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
New Loans raised (8,00,000 – 6,00,000)	2,00,000	Fixed Assets acquired	7,04,000
Sale of Investments	40,000	Dividend Paid	1,00,000
Net Decrease in Working Capital	1,40,000		
Fund From Operations	4,24,000		
	8,04,000		8,04,000

Calculation of Funds From Operations

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Profit & Loss A/c (Closing Balance)		70,000
<i>Add</i> : Non-fund and Non-operating items which have already been debited to P & L A/c:		
Proposed dividend for 2003	1,20,000	
Loss on investment 20% of Rs.50,000	10,000	
Loss on fixed assets scrapped	4,000	
Depreciation provided	1,80,000	
Goodwill Written off	70,000	
Transfer to reserves	50,000	4,34,000
		5,04,000
<i>Less</i> : Non-fund and Non-operating items which have already been credited to P & L A/c:		
Profit & Loss A/c (opening balance)	80,000	80,000
Fund From Operations		4,24,000

Fixed Assets Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Balance b/d	11,70,000	By Book Value of item Scrapped	4,000
To Bank A/c (Purchase of new assets)	7,04,000	By Depreciation	1,80,000
		By Balance c/d	16,90,000
	18,74,000		18,74,000

Movement of Reserves : Rs.

Opening Balance of Reserves	3,50,000
<i>Less</i> : Utilised for bonus shares	1,00,000
	<u>2,50,000</u>
Closing Balance of Reserves	<u>3,00,000</u>
Addition during the year	<u>50,000</u>

QUESTIONS

1. What is mean by Fund Flow Statement?
2. Explain the Changes of Financial Position.
3. Briefly explain the Flow of Funds and No Flow of Funds. Illustrate with numerical examples.
4. What are the components of Flow of Fund?
5. What do you understand by Fund Flow Statement? How is it Prepared?
6. Explain the importance of Fund Flow Statement.
7. Distinguish between
 - (a) Fund Flow Statement and Income Statement
 - (b) Fund Flow Statement and Balance Sheet
8. Explain the limitations of Fund Flow Statement.
9. Explain the procedure for preparation of Fund Flow Statement.
10. What do you understand by Fund From Operations?
11. What is meant by Schedule of Changes in Working Capital How is it prepared?

PRACTICAL PROBLEMS

(1) From the following Balance sheet of X Y & Co. as on 31st Dec. 2002 and 2003, you are required to prepare Statement of Changes in Working Capital.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Equity Share Capital	1,00,000	1,25,000	Cash Balances	30,000	47,000
Preference Share Capital	1,00,000	1,25,000	Debtors	60,000	60,000
Creditors	40,000	20,000	Bills Payable	60,000	55,000
Bills Payable	30,000	25,000	Stock	40,000	45,000
Retained Earnings	10,000	23,000	Short-Term Loan	40,000	45,000
			Building	50,000	66,000
	2,80,000	3,18,000		2,80,000	3,18,000

[Ans : Net Increase in working capital Rs. 47,000].

(2) From the following information, you are required to prepare: (a) Fund From Operations (b) Statement of Changes in Working Capital and (c) Fund Flow Statement:

Comparative Balance Sheet

<i>Particulars</i>	2002 Rs.	2003 Rs.
<i>Liabilities and Capital :</i>		
Share Capital 50,000	40,000	
Reserve and Surplus	15,000	5,000
Secured Loans	35,000	40,000
Current Liabilities	50,000	60,000
Total Liabilities and Capital	1,50,000	1,45,000
<i>Assets :</i>		
Fixed Assets	31,000	30,000
Investments	1,500	—
Cash Balances	2,500	1,250
Stock	75,000	78,750
Sundry Debtors	40,000	35,000
Total Assets	1,50,000	1,45,000

Additional Information

- (a) The net profit for the year after adjustments Rs. 1,00,000.
- (b) Additional fixed assets during the year Rs. 4,000 and depreciation for the year Rs. 3,000.

[Ans : (a) Fund From Operations Rs.1,30,000;
 (b) Statement of changes in working capital Rs. 12,500 (Net Increase in Working Capital);
 (c) Fund Flow Statement Rs. 23,000].

- (3) From the following particulars, you are required to prepare Schedule of Changes:

Working Capital

Particulars	2002 Rs.	2003 Rs.
<i>Capital and Liabilities :</i>		
Share Capital	15,000	
Trade Creditors	5,300	3,500
Profit and Loss A/c	700	1,550
Total Liabilities	21,000	23,800
<i>Assets :</i>		
Plant and Machinery	3,500	5,000
Bills Payable	6,050	
Trade Debtors	9,050	8,500
Cash Balances	2,400	3,500
Total Assets	21,000	23,800

[Ans : Increase in Working Capital Rs. 31,000].

- (4) Calculate funds from operations from the following Particulars:

	Rs.
Transfer to General Reserve	5,000
Loss on Sale of Investments	5,000
Depreciation on Machinery	10,000
Depreciation on Building	4,000
Discount on Issue of Debenture	15,000
Provision for Taxation	10,000
Proposed Dividend	20,000
Closing Balance of P & L A/c	30,600
Opening Balance of P & L A/c	30,500

[Ans : Funds From Operations Rs. 69,100].

- (5) The following Balance Sheets of X and Y Ltd. for the year 2002 and 2003, you are required to prepare (a) Funds from Operations (b) Statement of Changes in Working Capital and (c) Funds Flow Statement:

Balance Sheet

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Share Capital	50,000	50,000	Good will	6,000	6,000
General Reserve	7,000	9,000	Buildings	20,000	18,000
Profit & Loss A/c	8,000	6,500	Machinery	18,500	18,000
Trade Creditors	4,000	2,700	Investments	5,000	5,500
Bills Payable	600	400	Stock	15,000	11,700
Provision for Taxation	8,000	9,000	Bills Receivable	1,000	1,600
Provision for Doubtful Debts	200	300	Trade Debtors	9,000	9,500
			Cash Balance	3,300	7,600
	77,800	77,900		77,800	77,900

Additional Information

- Depreciation charged on machinery was Rs. 2000 and on Building was Rs. 2000.
- Provision for taxation of Rs. 9,500 was made during the year 2003.
- Interim dividend of Rs. 4,000 was paid during the year 2003.

[Ans : Funds From Operations Rs. 18,000; Statement of Changes in Working Capital Rs. 3,500; Fund Flow Statements Rs. 18,000].

(6) Following are the summarized Balance sheet of ABC Ltd. as on 31st December 2002 and 2003

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	2,00,000	2,50,000	Land & Buildings	2,00,000	1,90,000
General Reserves	50,000	60,000	Machinery & Plant	1,50,000	1,69,000
Profit & Loss A/c	30,500	30,600	Stock	1,00,000	74,000
Bank Loan	70,000	-	Sundry Debtors	80,000	64,200
Sundry Creditors	1,50,000	1,35,200	Cash	500	600
Provision for taxation	30,000	35,000	Bank	-	8,000
			Goodwill	-	5,000
	5,30,500	5,10,000		5,30,500	5,10,000

Additional Information

(1) During the year ended 31st December 2003

(a) Dividend was paid Rs. 23,000

(b) Assets of another company were purchased for a consideration of Rs. 50,000 payable in shares. The following assets were purchased : stock Rs. 20,000; machinery Rs. 25,000

(c) Machinery was purchased for Rs. 8,000

(d) Depreciation written off : Building Rs. 10,000 ; Machinery Rs. 14,000

(e) Income Tax paid during the year Rs. 28,000 ; provision of Rs. 33,000 was charged to profit and loss A/c

Prepare a statement of sources and application of funds for the year ended 31st December 2003.

[Ans : Fund From Operations Rs. 90,100;

Decrease in Working Capital Rs. 18,900;

Sources and Applications of fund Rs. 1,29,000]

(7) The Balance sheet of Jai & Co. Ltd. as at 31st December 2002 and 2003 are given below :

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	1,00,000	1,50,000	Freehold Land	1,00,000	1,00,000
Share Premium	-	50,000	Plant at Cost	1,04,000	1,00,000
General Reserve	50,000	60,600	Furniture at Cost	7,000	9,000
Profit & Loss A/c	10,000	17,000	Investment at Cost	60,000	80,000
6% Debentures	70,000	50,000	Sundry Debtors	30,000	70,000
Provision for			Stock	60,000	65,000
Depreciation on Plant	50,000	56,000	Cash at Bank	30,000	45,000
Provision for					
Depreciation	70,000	6,000			
on furniture					
Provision for taxation	20,000	30,000			
Sundry Creditors	86,000	95,000			
	3,91,000	4,69,000		3,91,000	4,69,000

A plant purchased for Rs.40,000 (Depreciation Rs.2,000) was sold for cash Rs.800 on 30th September 2003. On 30th June 2003 an item of furniture was purchased for Rs.2,000. These were the only transactions concerning fixed assets during 2003.

Depreciation was provided on plant at 8% on cost (the sold out item is not taken in to consideration) and on furniture at 12 ½ % on average cost. A dividend of 22 ½ % on original shares was paid.

Prepare a schedule of changes in working capital and also a statement of sources and application of funds during 2003.

[Ans : Net increase in Working Capital Rs. 41,000

Fund From Operations Rs. 49,700

Sources and Application of fund Rs. 1,05,500]

(8) From the following Balance sheet of XY & Co. Ltd. as on 31st December 2002 and 2003, you are required to prepare a funds flow statement showing change in working capital.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Equity Share Capital	3,00,000	4,00,000	Buildings	2,50,000	3,00,000
Preference Share Capital	2,00,000	-	Machinery	3,00,000	3,20,000
Capital Redemption Reserve	-	1,00,000	Furniture	20,000	18,000
General Reserve	2,00,000	1,20,000	Investments	1,00,000	1,50,000
Share Premium	30,000	30,000	Stock	3,00,000	2,50,000
Profit and Loss A/c	1,20,000	1,80,000	Debtors	1,40,000	2,00,000
10% Debenture	2,00,000	3,00,000	Cash at Bank	20,000	32,000
Creditors	80,000	1,40,000			
	11,30,000	12,70,000		11,30,000	12,70,000

Additional Information

- (1) Preference share were redeemed at 10% premium
- (2) Rs.20,000 was transferred to reserve fund from profit and loss account
- (3) Investment (book value Rs. 40,000) were sold for Rs. 70,000
- (4) Depreciation provided on building, machinery and furniture Rs. 20,000, Rs. 30,000 and Rs. 2,000 respectively.
- (5) Depreciation paid Rs. 50,000 and income tax paid Rs. 45,000

[Ans : Net Decrease in Working Capital Rs. 38,000
Fund From Operations Rs. 2,17,000
Sources and Application Funds Rs. 5,25,000]

(9) From the following Balance Sheet of Saxena & Co. Ltd. as on 31st December 2002 and 2003, you are required to prepare the Fund Flow Statement.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	10,00,000	10,00,000	Land & Building at Cost	6,00,000	6,00,000
Capital Reserve	50,000	50,000	Plant & Machinery at Cost	3,30,000	4,50,000
Long-Term Loans	5,00,000	6,50,000	Furniture at Cost	3,00,000	3,00,000
Sundry Creditors	6,00,000	7,85,000	Stock in Trade	4,10,000	5,60,000
			Sundry Debtors	3,40,000	2,10,000
			Cash at Bank	20,000	5,000
			Profit & Loss A/c	1,50,000	3,60,000
	21,50,000	24,85,000		21,50,000	24,85,000

Additional Information

During the year 2003 Depreciation provided on Land and Building was Rs. 50,000; Plant and Machinery was Rs. 50,000 and Furniture was Rs. 15,000.

(10) The following are the summarized Balance sheet of Gupta & Co. Ltd. as at 31st December 2002 and 2003, you are required to prepare a statement showing the sources and application of funds for the year 2003 and a schedule setting out changes in working capital

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	2,00,000	2,60,000	Goodwill	-	20,000
Profit & Loss A/c	39,690	41,220	Plant & Machinery	1,12,950	1,16,200
General Reserve	50,000	50,000	Buildings	1,48,500	1,44,250
Tax Provision	40,000	50,000	Stock	1,11,040	97,370
Bank Overdraft	59,510	-	Sundry Debtors	87,490	73,360

Bills Payable	33,780	11,525	Cash at Bank	2,500	2,700
Sundry Creditors	39,550	41,135			
	4,62,480	3,53,880		4,62,480	3,53,880

Additional Information

- (1) During the year 2003 an interim dividend of Rs. 26,000 was paid
- (2) The assets of another company were purchased for Rs. 60,000 payable in fully paid share of Gupta & Co. Ltd. These assets include stock Rs. 22,000 and machinery Rs.18,000 p.a. In addition sundry machinery amounted to Rs. 5,600.
- (3) Income tax paid during the year for Rs. 25,000
- (4) Net profit for the year before tax was Rs. 62,530

[Ans : Increase in Working Capital Rs. 42,530
Fund From Operations Rs. 77,130
Total Fund Flow Statement Rs. 1,37,130]

(11) The summarized balance sheet of Karunya & Co. Ltd. as at 31st December 2002 and 2003, you are required to prepare a statement of sources and application of funds.

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	4,50,000	4,50,000	Land & Building	2,00,000	1,00,000
General Reserve	3,00,000	3,10,000	Plant & Machinery	2,00,000	1,20,000
Profit & Loss A/c	56,000	68,000	Investments	50,000	60,000
Sundry Creditors	1,68,000	1,34,000	Stock	2,40,000	2,10,000
Provision for Taxation	75,000	10,000	Sundry Debtors	2,10,000	4,55,000
Mortgage Loan	-	2,70,000	Bank Balances	1,49,000	1,97,000
	10,49,000	12,42,000		10,49,000	12,42,000

Additional Information

- (1) Investment costing Rs. 8,000 were sold during the year 2003 for Rs. 8,500
- (2) Provision for tax made during the year was Rs. 9,000
- (3) During the year part of the land and buildings costing Rs. 10,000 were sold for Rs. 12,000 and the profit was included in profit and loss account and
- (4) Dividend paid during the year announced to Rs. 40,000

[Ans : Fund From Operations Rs. 1,38,500
Total Sources Rs. 4,29,000
Applications Rs. 1,32,000]

(12) Prepare a fund flow statement of Kumar & Co. Ltd. for the year 2003 from the following information :

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Bills Payable	15,000	12,000	Cash at Bank	40,000	44,400
Capital	35,000	43,500	Bills Receivable	10,000	20,700
Bonds Payable	22,000	22,000	Stock	15,000	15,000
Bonds Payable Discount	(2,000)	(1,800)	Land & Building	20,000	16,000
Retained Earnings	15,000	19,500	Plant & Machinery	15,000	17,000
Sundry Creditors	15,000	15,000	Accumulated Depreciation	5,000	2,800
			Patents and Trade Marks	1,000	900
	1,00,000	1,15,200		1,00,000	1,15,200

Additional Information

- (1) Income for the period Rs. 10,000
- (2) The building that costs Rs. 4,000 and which had a book value of Rs. 1,000 was sold for Rs. 1,400
- (3) The depreciation charged for the period was Rs. 800
- (4) There was an issue of capital stock Rs. 5,000

(5) Cash dividends Rs. 2,000 and stock dividend of Rs. 3,500 were declared.

[Ans : Net Increase in Working Capital Rs. 13,100
Fund From Operational Rs. 10,700
Total of Fund Flow Statement Rs. 17,100]

(13) From the following Balance sheet of Ramasamy & Co. Ltd. as on 31st December 2003 you are required to prepare a Fund Flow Statement:

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Equity Share Capital	3,00,000	3,50,000	Fixed Assets	5,10,000	6,20,000
Preference Share Capital	2,00,000	1,00,000	Investments	30,000	80,000
10% Debenture	1,00,000	2,00,000	Sundry Creditors	40,000	75,000
Reserves	1,10,000	2,70,000	Stock	1,00,000	2,00,000
Provision for Doubtful Debts	10,000	15,000	Bills Receivable	1,00,000	1,00,000
Sundry Creditors	35,000	45,000	Discount on Debenture	10,000	5,000
Bills Payable	35,000	1,00,000			
	7,90,000	10,80,000		7,90,000	10,80,000

Additional Information

- (1) Provision for depreciation stood at Rs.1,50,000 on 31st December 2002 and at Rs.1,90,000 on 31st December 2003.
- (2) During the year 2003, a machine costing Rs.70,000 (book value Rs. 40,000) was disposed off for Rs. 25,000
- (3) Preference share redemption was carried out at a premium of 5% on 1st January 2003 and
- (4) Dividend @ 15% was paid on equity shares for the year 2002.

[Ans : Fund From Operations Rs. 2,34,000
Net Increase in Working Capital Rs. 55,000
Total Flow of Funds Rs. 4,84,000]

CHAPTER 8

Cash Flow Statement

Introduction

Cash Flow is the life blood of a business which plays a vital role in an entire economic life. As discussed in the previous chapter, the word 'fund' is used in a narrower sense refers to 'cash'. When cash is used as 'fund' the analysis relates to movement of cash. Cash flows refer to the actual movement of cash into and out of an organization. In other words, the movement of cash inclusive of inflow of cash and outflow of cash. When the cash flows into the organization, it represents 'Inflow of Cash.' Similarly when the cash flows out of the business concern, it called as "Cash Outflow."

In order to ensure cash flows are adequate to meet current liabilities such as tax payments, wages, amounts due to trade creditors, it is essential to prepare a statement of changes in the financial position of a firm on cash basis is called as "Cash Flow Statement." This statement depicting movement of cash position from one period to another.

Uses of Cash Flow Statement

Cash Flow Statement is a useful tool to the management for taking important financial decision making. The following are the uses of this statement :

- (1) This Statement is the most useful to the management to prepare dividend and retention policies.
- (2) It guides the management to evaluate the changes in cash position.
- (3) It presents in brief to the management about the performance of operational, financial and investment rativities for effective decision.
- (4) It helps to know how the movement of cash took place and the factors which caused the changes in cash flows.
- (5) It guides the management in order to take decisions about short-term obligations.
- (6) It also presents the details about the sources of cash and applications of cash during the particular period.

Difference between Fund Flow Statement and Cash Flow Statement

Fund Flow Statement and Cash Flow Statement are the two useful tools of financial analysis and interpretations of financial statements. But at the same time both the statements differ from each other in the following manner:

- (1) Fund Flow Statement helps to measure the causes of changes in working capital whereas cash flow statement focuses on the causes for the movement of cash during a particular period.
- (2) Fund flow statement is prepared on the basis of Fund or all financial resources while cash flow statement is based on cash basis of accounting.
- (3) Cash Flow Statement guides to the management for short-term financial planning while Fund flow analysis helps to the management for intermediate and long-term financial planning.
- (4) Statement of changes in working capital is required for the preparation of Fund flow statement while for cash flow statement no such statement is required.

Limitations of Cash Flow Statement

- (1) Cash Flow Statement has limited scope as it compares with Fund flow statement. Because it discloses inflows and outflows of cash alone. It does not reveal the overall financial position of the concern.
- (2) Cash Flow Statement cannot provide a comprehensive picture of a financial position because non-cash items of expenses and incomes are excluded.
- (3) The balances as disclosed by the cash flow statement may not be treated as actual liquid position of a concern since it cannot be easily influenced by postponing purchases and other payments.

Preparation of Cash Flow Statement

Cash Flow Statement is prepared like Fund Flow Statement. Preparation of this statement is based on the movement of cash, may be an actual inflow of cash or outflow of cash, Profit and Loss Account and other relevant informations. While preparing a cash flow statement, it starts with an opening balance of cash in hand and cash at bank, all the sources of cash are added to an opening balance minus applications of cash is reconciled with the closing balance of cash. The balance represents cash and bank balances at the end of accounting period.

SOURCES AND APPLICATIONS OF CASH

Sources of Cash (Inflow of Cash)

The following are the main sources of cash such as:

- (1) Cash From Operations or Trading Profit.
- (2) Sale of Fixed Assets for Cash.
- (3) Sale of Investments for Cash.
- (4) Raising Long-Term Loans from Banks and Financial Institutions.
- (5) Issue of Shares and Debentures for Cash.

Application of Cash (Outflow of Cash)

Application of cash can be involved in the following forms :

- (1) Cash Lost in Operations or Trading Losses.
- (2) Redemption of Shares and Debentures by Cash.
- (3) Purchase of Fixed Assets.
- (4) Repayment of Long-Term Loans.

Computation of Cash Flow Statement

A comprehensive Cash Flow Statement is ascertained in two stages:

- (I) Cash From Operations, i.e., internal sources of cash calculated by preparing combined statements of adjusted profit and loss account.
- (II) External Sources and Applications of Cash, i.e., Flow of Cash involves in non-current items ascertained by the Statement of Sources and Applications of Cash.

Diagram of Sources and Applications of Cash

The summary of sources and applications of cash is presented in the chart given below :

<i>Sources of Cash (Inflow of Cash)</i>	<i>Applications of Cash (Outflow of Cash)</i>
Cash From Operations Sale of Fixed Assets Sale of Investments Issue of Shares Issue of Debentures Raising Long-Term Loans Increase in any Liabilities Decrease in any Assets	Cash Lost in Operations Purchase of Fixed Assets Purchase of Investment Redemption of Preference Shares Redemption of Debentures Decrease in any Liability Decrease in any Assets

I. CASH FROM OPERATIONS

Cash from operations is the main source of inflow of cash. The Net Profit or Net Loss is the net effect of business transactions shown by the profit and loss account. In order to find out the actual movement of cash from trading operations, it is essential to ascertaining cash from operations. It can be calculated under the following situations:

- (a) When all Transactions are Cash Transactions.
- (b) When all Transactions are not Cash Transactions.

(a) When all Transactions are Cash Transactions: It assumes that where all the expenses and losses, incomes and gains are paid or received in cash during the particular period. The Net Profit or Net Loss shown by the profit and loss account is taken as the amount of cash from operations. Thus, Net Profit or Net Loss is equal to cash from operations. When Net Profit made by a firm represents Cash Inflow or Cash Profit From Operations. Similarly, the Net Loss shown by the profit and loss account refers to Cash Outflow From Operations.

(b) When all Transactions are not Cash Transactions: In actual practice, in business transactions are made either on cash basis or credit basis. For example, goods purchased or sold on cash as well as on credit. Certain expenses are always outstanding and some of the incomes are not immediately realized

under such circumstances, the net profit made by a firm cannot generate equivalent amount of cash. Therefore, the charging of non-fund or non-cash items such as outstanding expenses, incomes received in advances, prepaid expenses and outstanding incomes etc. to profit and loss account should be readjusted. In such circumstances the actual cash from operations can be calculated by preparing adjusted profit and loss account.

Calculation of Cash from Operations

Cash From Operations can be calculated by either of the following methods:

- (A) Cash From Operations calculated with the help of Adjusted Profit and Loss Account. Under this method, all non-fund or non-operations items should be readjusted to cash profit from operations. The specimen form of cash from operations is given below :

Cash from Operations (Adjusted Profit and Loss Account)

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Depreciation on Fixed Assets		By Balance b/d	
To Transfer to General Reserve		(Opening Balance of P & L A/c)	
To Loss on Sale of Fixed Assets		By Profit on Sale of Fixed Assets	
To Increase in Outstanding Expenses		By Profit on Sale of Investments	
To Decrease in Prepaid Expenses		By Decrease in Outstanding Expenses	
To Preliminary Expenses written off		By Increase in Prepaid Expenses	
To Balance c/d		By Cash From Operations	
(Closing Balance of P & L A/c)		(Balancing figure)	

- (B) Cash From Operations can also be calculated on the basis of current assets and current liabilities. Under this method, the amount of changes in the various items of current assets and current liabilities other than cash and bank balances should be adjusted with the help of Adjusted Profit and Loss Account. It may be noted that, as compared to above this method may increase or decrease in items of creditors, stocks, debtors, bills receivable and bills payable are not adjusted while calculating cash profit from operations and they may be directly taken as Sources (inflow) of Cash or Application (outflow) of Cash. This method is generally adopted in practice.

While applying this method, the following general principles may be taken for measuring cash from operations :

Increase in Current Assets	—————>	Decrease in Cash
Decrease in Current Assets	—————>	Increase in Cash
Increase in Current Liability	—————>	Increase in Cash
Decrease in Current Liability	—————>	Decrease in Cash

Specimen Form

The specimen form for computation of cash from operations is given below :

Calculation of Cash from Operations :

(Combining Current Assets & Current Liabilities & Non-Cash & Non-Operating Items)

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit (Closing Balance of Profit & Loss A/c)		* * *
<i>Add:</i>		
Depreciation on Fixed Assets	* * *	
Transfer to General Reserve		
Loss on Sale of Fixed Assets		
Loss on Sale of Investments		
Goodwill Written off		
Increase in Outstanding Expenses		
Decrease in Prepaid Expenses		
Decrease in Current Assets (Other than Cash and Bank)		
Increase in Current Liabilities		
Preliminary Expenses Written off	* * *	* * *
<i>Less :</i>	* * *	
Profit on Sale of Fixed Assets		
Profit on Sale of Investments		
Decrease in Outstanding Expenses		
Increase in Prepaid Expenses		
Increase in Current Assets (Other than Cash and Bank)		
Increase in Current Liabilities		
Opening Balance of Profit & Loss A/c		* * *
Cash From Operations		* * *

Illustration: 1

From the following Balance Sheet of ABC Ltd., you are required to calculate Cash From Operations:

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Capital and Liabilities :		
Share Capital	20,000	20,000
Profit made during the year	14,100	17,300
Provision for Depreciation	1,000	1,400
Long-Term Loans	2,000	3,000
Trade Creditors	6,450	5,300
Outstanding Expenses	850	150
	44,400	47,150
Assets :		
Plant and Machinery	28,500	30,000
Stocks	9,800	11,300
Trade Debtors	3,950	2,850
Cash Balances	2,150	3,000
	44,400	47,150

Solution :**Calculation of Cash from Operations**

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Profit made during the year (Closing Balance of P & L A/c)		17,300
Add :		
Provision for Depreciation	400	
Decrease in Debtors	1,100	1,500
		18,800
Less :		
Decrease in Creditors	1,150	
Decrease in Outstanding Expenses	700	
Increase in Stock	1,500	
Net Profit (Opening Balance of P & L A/c)	14,100	17,450
Cash From Operations		1,350

Illustration: 2

From the following balance you are required to calculate cash from operations

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Trade Debtors	1,00,000	94,000
Bills Receivable	20,000	25,000
Trade Creditors	40,000	50,000
Bills Payable	16,000	12,000
Outstanding Expenses	2,000	2,400
Prepaid Expenses	1,600	1,400
Accrued Income	1,200	1,500
Income Received in Advance	600	500
Profit made during the year	—	2,60,000

Solution:**Calculation of Cash from Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit (Closing Balance)		2,60,000
Add :		
Decrease in Debtors	6,000	
Increase in Creditors	10,000	
Increase in Outstanding Expenses	400	
Decrease in Prepaid Expenses	200	16,600
		2,76,600
Less :		
Increase in Bills Receivable	5,000	
Decrease in Bills Payable	4,000	
Increase in Accrued Income	300	
Decrease in Income Received in Advance	100	9,400
Cash From Operations		2,67,200

Illustration: 3

From the following information given by RR Ltd., you are required to prepare Cash From Operations:

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>
Bills Payable	10,000	16,000
Trade Creditors	24,000	32,000
Outstanding Expenses	4,000	2,000
Bills Receivable	40,000	36,000
Trade Debtors	80,000	1,20,000
Prepaid Expenses	4,000	6,000
Accrued Incomes	10,000	16,000
Incomes Received in Advance	4,000	2,000

Additional Information

RR Ltd., earned profit of Rs. 4,00,000 after charging or crediting the following items to its profit and loss account during the year 2003:

- (1) Profit on Sale of Investments Rs. 8,000
- (2) Loss on Sale of Building Rs. 18,000
- (3) Depreciation on Fixed Assets Rs. 14,000
- (4) Good Will Written off Rs. 4,000

Solution:**Calculation of Cash from Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit during the year		4,00,000
Add :		
Loss on Sale of Building	18,000	
Depreciation on Fixed Assets	14,000	
Good will Written off	4,000	
Increase in Bills Payable	6,000	
Increase in Trade Creditors	8,000	
Decrease in Bills Receivable	4,000	54,000
		4,54,000
Less :		
Profit on Sale of Investments	8,000	
Decrease in Outstanding Expenses	2,000	
Decrease in Income Received in Advance	2,000	
Increase in Trade Debtors	40,000	
Increase in Prepaid Expenses	2,000	
Increase in Accrued Income	6,000	60,000
Cash From Operations		3,94,000

II. EXTERNAL SOURCES AND APPLICATIONS OF CASH

External Sources of Cash

The following are the external sources of cash such as:

(1) **Fresh Issue of Shares:** Cash is received by issue of fresh shares to the public, after deducting necessary expenses and discount on issue of shares will be treated as sources of cash.

(2) **Issue of Debentures:** The Net Cash is received by the issue of debentures is source of cash.

(3) **Raising Long-Term Borrowings:** Long-term loans received from banks and financial institutions refer to inflow of cash.

(4) **Sale of Fixed Assets and Investments:** Net cash received from the sale of permanent assets and investments are treated as sources of cash.

Applications of Cash

Applications of cash or cash outflows or uses of cash may take any of the following forms:

(1) **Redemption of Shares and Debentures:** When redeemable preference shares and debentures are redeemed by paid in cash. It refers to as application or outflow of cash.

(2) **Purchase of Fixed Assets:** Cash used for purchase of plant and machinery, land and building, furniture and fixtures etc., or renewals and replacement of fixed assets are to be treated as outflow of cash.

(3) **Payment of Long-Term Loans:** The repayment or discharge of long-term loans received from banks and financial institutions results in outflow of cash.

Specimen Form of Cash Flow of Statement

Cash Flow Statement is prepared in any one of the following two ways :

- (1) Account Form.
- (2) Report Form.

(1) Account Form:

Cash Flow Statement

<i>Sources or Inflow of Cash</i>	<i>Rs.</i>	<i>Applications or Outflow of Cash</i>	<i>Rs.</i>
Opening Balances :		Cash Lost in Operations	
Cash		Redemption of Preference Shares	
Bank		Redemption of Debentures	
Fresh Issue of Shares		Repayment of Long-Term Loans	
Issue of Debentures		Purchase of Fixed Assets	
Raising Long-Term Loans		Purchase of Investments	
Sale of Fixed Assets		Tax Paid	
Sale of Investments		Dividend Paid	
Dividends Received		Closing Balance :	
Cash From Operations		Cash	
		Bank	
	***		***

(2) Report Form:**Cash Flow Statement**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Opening Balances :		
Cash		* * *
Bank		* * *
Add : Sources of Cash :		
Fresh Issue of Shares		
Issue of Debentures		
Long-Term Loans from Bank and Financial Institutions		
Sale of Fixed Assets		
Sale of Investments		
Dividends Received	* * *	
Cash From Operations		* * *
Total Inflow of Cash (A)		* * *
Less : Applications of Cash :		
Redemption of Preference Shares		
Redemption of Debentures		
Repayment of Long-Term Loans		
Purchase of Fixed Assets		
Payment of Dividends		
Payment of Tax		
Cash Lost of in Operations	* * *	* * *
Total Outflow of Cash (B)		* * *
Closing Balance of Cash and Bank		* * *

Illustration: 4

From the following Balance sheets of ABC Ltd., you are required to prepare a Cash Flow Statement:

Balance Sheet

<i>Liabilities</i>	2002	2003	<i>Assets</i>	2002	2003
	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>	<i>Rs.</i>
Share Capital	20,000	30,000	Fixed Assets	20,000	30,000
Profit & Loss A/c	10,000	16,000	Good Will	10,000	8,000
General Reserve	6,000	8,000	Stock	10,000	16,000
Debenture	10,000	12,000	Trade Debtors	10,000	16,000
Trade Creditors	6,000	8,000	Bills Receivable	2,000	4,000
Outstanding Expenses	2,000	3,000	Bank Balance	2,000	3,000
	54,000	77,000		54,000	77,000

Solution:**Calculation of Cash from Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit during the year (Closing Balance of Profit & Loss A/c)		16,000
<i>Add :</i>		
General Reserve (6000 – 8000)	2,000	
Good Will Written off (10,000 – 8000)	2,000	
Increase in Outstanding Expenses	1,000	
Increase in Trade Creditors	2,000	7,000
		23,000
<i>Less :</i>		
Increase in Stock (10000 – 16000)	6,000	
Increase in Debtors (10000 – 16000)	6,000	
Increase in Bills Receivable	2,000	
Opening Balance of P & L A/c	10,000	24,000
Cash Lost in Operations		1,000

Cash Flow Statement

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Opening Balances :		Purchase of Fixed Assets	10,000
Cash at Bank	2,000	Cash lost in Operations	1,000
<i>Add :</i>		Closing Balance :	
Issue of Shares	10,000	Cash at Bank	3,000
Issue of Debenture	2,000		
	14,000		14,000

Illustration: 5

From the following informations, Prepare Cash From Operations and Cash Flow Statement :

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Assets :		
Cash Balances	5,000	3,500
Trade Debtors	15,000	25,000
Stock	17,500	12,500
Machinery	40,000	27,500
Land	20,000	25,000
Building	17,500	30,000
	1,15,000	1,23,500
Capital and Liabilities :		
Capital	62,500	76,500
Long-Term Loans	20,000	25,000
Mortgage Loans	12,500	—
Trade Creditors	20,000	22,000
	1,15,000	1,23,500

Additional Information

- (1) During the year a machine costing Rs. 5,000 (accumulated depreciation Rs. 1,500) was sold for Rs. 2,500.
- (2) The provision for depreciation against machinery during the year 2002 was Rs. 12,500 and Rs. 20,000 in 2003.
- (3) Net Profit earned during the year 2003 was Rs. 22,500.

Solution:**Cash Flow Statement**

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Opening Balances :		Purchase of Land	5,000
Cash at Bank	5,000	Purchase of Building	12,500
<i>Add :</i>		Mortgage Loan repaid	12,500
Long-Term Loans	5,000	Drawings	8,500
Sale of Machinery	2,500	Closing Balances :	
Cash From Operations	29,500	Cash at Bank	3,500
	42,000		42,000

Working Note:**(1) Calculation of Cash from Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit during the year		22,500
<i>Add :</i>		
Depreciation on Machinery	9,000	
Loss on Sale of Machinery	1,000	
Decrease in Stock	5,000	
Increase in Creditors	2,000	17,000
		39,500
<i>Less :</i>		
Decrease in Creditors	10,000	10,000
Cash From Operations		29,500

(2) Machinery Account

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Balance b/d	52,500	By Bank	2,500
		By Loss on Sale of Machinery	1,000
		By Provision for Depreciation	1,500
		By Balance c/d	
		(40,000 + 5000 + 2500)	47,500
	52,500		52,500

(3) Provision for Depreciation

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Machinery A/c	1,500	By Balance b/d	12,500
To Balance c/d	20,000	By P & L A/c (Depreciation Charged – Balancing Figure)	9,000
	21,500		21,500

(4) Capital Account

<i>Particulars</i>	<i>Rs.</i>
Opening Balance of Capital	62,500
Add : Profit	22,500
	85,000
Less : Closing Balance of Capital	76,500
Drawings	8,500

Illustration: 6

The summarized balance sheet of William & Co. Ltd., you are required to prepare a Cash Flow Statement.

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Share Capital	90,000	90,000	Fixed Assets	80,000	64,000
General Reserve	60,000	62,000	Investments	10,000	12,000
Profit & Loss A/c	11,200	13,600	Stock	48,000	42,000
Creditors	33,600	26,800	Debtors	42,000	91,000
Provision for Tax	15,000	2,000	Bank	29,800	39,400
Mortgage Loan	—	54,000			
	2,09,800	2,48,400		2,09,800	2,48,400

Additional Information

- (1) Investments costing Rs. 1,600 were sold during the year 2003 for Rs. 1,700.
- (2) Provision for tax made during the year was Rs. 1,800.
- (3) During the year part of the fixed assets costing Rs. 2,000 was sold for Rs. 2,400 and the profit was included in profit and loss account.
- (4) Dividend paid during the year amounted to Rs. 800.

Solution:**Calculation of Cash from Operations**

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Net Profit during the year (13600 – 11200)		2,400
<i>Add :</i>		
Transfer to General Reserve	2,000	
Provision for Tax	1,800	
Dividend	8,000	
Depreciation	14,000	
Decrease in Stock	6,000	31,800
		34,200
<i>Less :</i>		
Profit on Sale of Investments	100	
Profit on Sale of Fixed Assets	400	
Increase in Debtors	49,000	
Decrease in Creditors	6,800	56,300
Fund Lost in Operations		22,100

Solution:**Cash Flow Statement**

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Opening Balances :		Cash Lost in Operations	22,100
Cash at Bank	29,800	Payment of Tax	14,800
<i>Add :</i>		Payment of Dividend	8,000
Sale of Investments	1,700	Purchase of Investment	3,600
Sale of Fixed Assets	2,400	Closing Balances :	
Mortgage Loan	54,000	Cash at Bank	39,400
	87,900		87,900

Working Notes:**Provision for Tax Account**

To Bank (Balancing Figure)	14,800	By Balance b/d (Opening Balance)	15,000
To Balance c/d (Closing Balance)	2,000	By P & L A/c (Provision for 2003)	1,800
	16,800		16,800

Investment Account

To Balance b/d	10,000	By Cash A/c (Sold during the year)	1,600
To Bank (Purchased of Investments — Balancing Figure)	3,600	By Balance c/d	12,000
	13,600		13,600

Illustration: 7

From the following information, prepare

- (a) Cash From Operations
 (b) Cash Flow Statement
 (c) Statement of Changes in Working Capital and
 (d) Fund Flow Statement

Balance Sheet

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>
Assets :		
Furniture and Fittings	1,17,000	1,30,000
Motor Vans	1,54,000	80,000
Long-Term Investments	3,00,000	2,60,000
Stock	8,29,000	8,00,000
Trade Debtors	90,000	1,09,000
Cash at Bank	1,43,000	1,40,000
Preliminary Expenses	10,000	15,000
	16,43,000	15,34,000
Capital and Liabilities :		
Equity Share Capital	9,00,000	6,00,000
Preference Share Capital	—	2,00,000
Profit & Loss Account	1,10,000	75,000
Debentures	2,50,000	3,00,000
Bank Loan	75,000	1,00,000
Bills Payable	45,000	40,000
Trade Creditors	1,50,000	1,15,000
Outstanding Expenses	18,000	19,000
Provision for Taxation	95,000	85,000
	16,43,000	15,34,000

Solution:**Cash Flow Statement**

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Opening Balances :		Redemption of Preference Shares	2,00,000
Cash at Bank	1,40,000	Redemption of Debenture	50,000
Add :		Repayment of Bank Loan	25,000
Cash From Operations	35,000	Purchase of Motor Vans	74,000
Depreciation on Furniture	13,000	Purchase of Long-Term Investments }	40,000
Preliminary Expenses written off }	5,000	Increase in Stock	29,000
Issue of Share Capital	3,00,000	Decrease in Outstanding Expenses	1,000
Decrease in Debtors	19,000	Closing Balances :	
Increase in Bills Payable	5,000	Cash at Bank	1,43,000
Increase in Trade Creditors	35,000		
Increase in Provision Tax	10,000		
	5,62,000		5,62,000

Cash Flow Statement

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Fund From Operations	53,000	Redemption of preference shares	2,00,000
Issue of Equity Shares	3,00,000	Redemption of Shares	50,000
Decrease in Working Capital }]	36,000	Repayment of Bank Loan	25,000
		Purchase of Motor Vans	74,000
		Purchase of Long-Term Investments }]	40,000
	3,89,000		3,89,000

Note : While preparing Cash Flow Statement, increase or decrease in the various items of current assets and current liabilities are taken as Sources of Cash or Applications of Cash. Here they are not adjusted while computing Cash from Operations.

Calculation of Cash from Operations**(Adjusted Profit and Loss Account)**

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Depreciation on Furniture & Fixtures }]	13,000	By Opening Balance of Profit & Loss A/c }]	75,000
To Preliminary Expenses Written off }]	5,000	By Cash From Operations (Balancing figure) }]	53,000
To Closing Balance of Profit and Loss A/c }]	1,10,000		
	1,28,000		1,28,000

Statement of Changes in Working Capital

<i>Particulars</i>	2002 <i>Rs.</i>	2003 <i>Rs.</i>	<i>Changes in Working Capital</i>	
			<i>Increase</i>	<i>Decrease</i>
Current Assets :				
Cash at Bank	1,40,000	1,43,000	3,000	—
Trade Debtors	1,09,000	90,000	—	19,000
Stock	8,00,000	8,29,000	29,000	—
Total Current Assets (A)	10,49,000	10,62,000		
Current Liabilities :				
Bills Payable	40,000	45,000	—	5,000
Trade Creditors	1,15,000	1,50,000	—	35,000
Outstanding Expenses	19,000	18,000	1,000	—
Provision for Taxation	85,000	95,000	—	10,000
Total Current Liabilities (B)	2,59,000	3,08,000		
Working Capital (Total A – B)	7,90,000	7,54,000		
Net Decrease in Working Capital	—	36,000	36,000	—
	7,90,000	7,90,000	69,000	69,000

Illustration: 8

From the following Balance sheet of Brard Well & Co. Ltd., make out the statement of Cash Flow:

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Assets :		
Good Will	5,750	4,500
Land & Buildings	10,000	8,500
Machinery	4,000	10,000
Trade Debtors	8,000	10,000
Stock	3,850	5,450
Bills Receivable	1,000	1,500
Cash in Hand	750	500
Cash at Bank	500	400
	33,850	40,850
Capital & Liabilities :		
Equity Share Capital	15,000	20,000
Preference Share Capital	7,500	5,000
General Reserve	2,000	3,500
Profit and Loss A/c	1,500	2,400
Proposed Dividend	2,100	2,500
Trade Creditors	2,750	4,150
Bills Payable	1,000	800
Provision for Taxations	2,000	2,500
	33,850	40,850

Additional Information

- (1) Depreciation on Machinery of Rs. 500 during the year 2003.
- (2) Depreciation on Land and Building of Rs. 1,000 during the year 2003.
- (3) An interim dividend of Rs. 1,000 was paid during the year 2003.
- (4) Income Tax Rs. 1,750 was paid during the year 2003.

Solution:**Cash Flow Statement**

<i>Sources of Cash</i>	<i>Rs.</i>	<i>Applications of Cash</i>	<i>Rs.</i>
Opening Balances :		Redemption of Preference Shares	2,500
Cash in Hand	750	Machinery Purchased	6,500
Cash at Bank	500	Interim Dividend Paid	1,000
<i>Add:</i>		Proposed Dividend of 2002 paid	2,100
Cash From Operations	8,000	Tax Paid	1,750
Issue of Equity Shares	5,000	Closing Balances :	
Sale of Buildings	500	Cash in Hand	500
		Cash at Bank	400
	14,750		14,750

Calculation of Cash from Operations

Particulars	Rs.	Rs.
Net Profit during the year (Rs. 2,400 – Rs. 1,500)		900
<i>Add :</i>		
Depreciation on Machinery	500	
Depreciation on Land & Buildings	1,000	
Transfer to General Reserve	1,500	
Interim Dividend	1,000	
Proposed Dividend	2,500	
Provision for Tax	2,250	
Good Will Written off	1,250	
Increase in Creditors	1,400	11,400
		12,300
<i>Less :</i>		
Increase in Debtors	2,000	
Decrease in Bills Payable	200	
Increase in Stock	1,600	
Increase in Bills Receivable	500	4,300
Cash From Operations		8,000

Note : Provision for Tax and Dividend are treated as Non-current items.

Provision for Taxation Account

To Bank (Tax Paid)	1,750	By Balance b/d	2,000
To Balance c/d	2,500	(Opening Balance)	
(Closing Balance)		By Profit & Loss A/c	2,250
	4,250		4,250

Machinery Account

To Balance b/d	4,000	By Depreciation	500
To Bank (Purchases)	6,500	By Balance c/d	10,000
(Balancing Figure)		(Provision for 2003)	
	10,500		10,500

Land and Buildings Account

To Balance b/d	10,000	By Depreciation	1,000
(Opening Balance)		By Bank (Sale)	
		(Balancing Figure)	500
		By Balance c/d	
		(Closing Balance)	8,500
	10,000		10,000

Note : Balancing figure in Land and Buildings is treated as sale of building because closing balance of depreciation on Land and Buildings already given in the problem (Rs. 10,000 – Rs. 8,500 = Rs. 1,500).

QUESTIONS

1. What is meant by Cash Flow Statement?
2. Explain briefly the uses of Cash Flow Statement.
3. What are the differences between Cash Flow Statement and Fund Flow Statement?
4. What are the limitations of Cash Flow Statement?
5. Explain the procedure for preparing a Cash Flow Statement.
6. What are the components of Sources and Applications of Cash?

PARTICULAR PROBLEMS

(1) From the following Balance sheet of Gupta & Co. Ltd., as on 31st Dec. 2002 and 2003, you are required to prepare Cash Flow Statement:

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Capital and Liabilities :		
Equity Share Capital	2,30,000	2,30,000
General Reserve	60,000	60,000
Profit and Loss Account	16,000	23,000
Debenture	90,000	70,000
Bills Payable	1,03,000	96,000
Outstanding Salary	13,000	12,000
Depreciation Fund	40,000	44,000
	5,52,000	5,35,000
Assets :		
Cash Balances	90,000	90,000
Trade Debtors	67,000	43,000
Bills Receivable	1,10,000	74,000
Stock	82,000	1,06,000
Prepaid Expenses	1,000	2,000
Land & Building	1,50,000	1,50,000
Machinery	52,000	70,000
	5,52,000	5,35,000

Additional Information

- (1) Now machinery for Rs. 30,000 was purchased but old machinery costing Rs. 6,000 was sold for Rs. 4,000; accumulated depreciation was Rs. 6,000.
- (2) Rs. 20,000 8% Debenture were redeemed by purchase from open market @ Rs. 96 for a debenture of Rs. 100.
- (3) Rs. 36,000 investments were sold at book value.
- (4) 10% dividend was paid in cash.

[Ans : Cash From Operations Rs. 54,200; Cash Flow Statement Rs. 2,08,200]

(2) The summarized Balance sheet of X Y Ltd. as on 31st December 2002 & 2003 you are required to prepare (a) Cash From Operations and (b) Cash Flow Statements.

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Assets :		
Plant and Machinery	1,00,000	1,00,000
Land and Buildings	2,00,000	1,50,000
Furniture and Fixtures	1,00,000	1,30,000
Investments	50,000	60,000
Stock	2,00,000	2,00,000
Bills Receivable	1,40,000	1,10,000
Trade Debtors	1,10,000	2,95,000
Bank Balances	1,49,000	1,97,000
	10,49,000	12,42,000

<i>Particulars</i>	2002 Rs.	2003 Rs.
Capital and Liabilities :		
Equity Share Capital	2,00,000	2,00,000
Preference Share Capital	2,50,000	4,50,000
General Reserve	3,00,000	3,10,000
Profit and Loss A/c	56,000	68,000
Bills Payable	1,20,000	1,10,000
Trade Creditors	48,000	24,000
Tax Provisions	75,000	10,000
Long-Term Loans	—	70,000
	10,49,000	12,42,000

Additional Information

- (1) Tax Provision made during the year was Rs. 9,000.
- (2) Investment costing Rs. 8,000 was sold for Rs. 8,500.
- (3) A part of the land and building costing Rs. 10,000 was sold for Rs. 12,000 and the profit was included in profit and loss A/c.

[Ans : Cash lost in operations Rs. 1,50,500; Cash flow statements Rs. 4,39,500].

- (3) The financial position of RX Ltd. as on 31st December 2002 and 2003, you are required to prepare the Cash Flow Statement :

<i>Particulars</i>	2002 Rs.	2003 Rs.
Assets :		
Cash in Hand	1,000	1,500
Cast at Bank	3,000	2,100
Trade Debtors	35,000	38,400
Bills Receivable	15,000	13,000
Stock	10,000	9,000
Land	20,000	30,000
Buildings	50,000	55,000
Machinery	80,000	86,000
	2,14,000	2,35,000
Capital and Liabilities :		
Trade Creditors	28,000	30,000
Bills Receivable	8,000	11,000
Long-Term Loans	—	20,000
Short-Term Loans	30,000	25,000
Capital and Reserves	1,48,000	1,49,000
	2,14,000	2,35,000

Additional Information

- (1) Dividend of Rs. 26,000 was paid during the year.
- (2) The provision for depreciation against machinery of Rs. 27,000 was made during the year 2002 and Rs. 36,000 was during the year 2003.

[Ans : (a) Cash From Operations Rs. 36,000; (b) Cash Flow Statement Rs. 68,000; (Total Figure).]

- (4) The following are the summarized Balance sheet of PH & Co. Ltd., you are required to prepare the Cash Flow Statement :

<i>Particulars</i>	2002 Rs.	2003 Rs.
Assets :		
Land and Buildings	1,00,000	95,000
Machinery	75,000	84,500
Stock	50,000	37,000

Sundry Debtors	40,000	32,100
Cash Balances	250	300
Bank Balances	—	4,000
Good will	—	2,500
	2,65,250	2,55,400
Capital & Liabilities :		
Share Capital	1,00,000	1,25,000
General Reserve	25,000	30,000
Profit and Loss A/c	15,250	15,300
Long-Term Loan	35,000	—
Trade Creditors	75,000	67,500
Provision for Taxation	15,000	17,500
	2,65,250	2,55,400

Additional Information

During the year ended 31st December 2003 :

- (1) Dividend of Rs. 11,500 was paid.
- (2) Assets of another company are purchased for a consideration of Rs. 25,000 payable in shares.
- (3) Purchase of Stock Rs. 10,000.
- (4) Purchase of Machinery Rs. 12,500 on shares.
- (5) Machinery was further purchased for Rs. 4,000 for cash.
- (6) Depreciation written off of machinery Rs. 6,000.
- (7) Income tax provided during the year Rs. 16,500.
- (8) Loss on sale of machinery Rs. 100 was written off to General Reserve.

[Ans : Cash From Operations Rs. 44,150; Cash Flow Statement Rs.68,800].

- (5) From the following Balance Sheet of Ram & Co. Ltd., you are required to prepare Cash Flow Statement:

<i>Particulars</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Assets :		
Goodwill	20,000	10,000
Land & Buildings	40,000	81,200
Stock	98,400	85,400
Trade Debtors	29,800	35,400
Bank Balances	18,000	—
	2,06,200	2,12,000
Capital and Liabilities :		
Share Capital	1,40,000	1,48,000
Debentures	24,000	12,000
Trade Creditors	20,720	23,680
Profit and Loss A/c	20,080	21,120
Provision for Doubtful Debts	1,400	1,600
Bank Overdraft	—	5,600
	2,06,200	2,12,000

Additional Information

- (1) During the year a building costing of Rs. 41,200 was purchased.
- (2) Goodwill written off Rs. 10,000.
- (3) Dividend of Rs. 7,000 has been paid during the year 2003.
- (4) Debenture loan of Rs. 1,200 was repaid during the year 2003.
- (5) An overdraft of Rs. 5,600 availed during the year 2003.

[Ans : Cash From Operations Rs. 18,240; Cash Flow Statement Rs. 65,800].

(6) The Balance Sheet of Nair & Co. Ltd., as on 31st Dec. 2002 and 2003, you are required to prepare a Cash Flow Statement:

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Share Capital	2,00,000	3,20,000	Fixed Assets	3,04,000	4,00,000
Profit & Loss A/c	1,40,500	1,70,600	Stock	1,86,800	1,78,400
Accumulated			Trade Debtors	61,600	42,200
Depreciation	1,20,000	80,000	Prepaid Expenses	7,900	6,000
Debenture	1,00,000	—	Bank Balances	56,200	40,000
Trade Debtors	56,000	96,000			
	6,16,500	6,66,600		6,16,500	6,66,600

Additional Information

- (1) Profit earned during the year was Rs. 54,100.
- (2) Depreciation charge Rs. 20,000.
- (3) Cash dividend declared during the year Rs. 24,000.
- (4) An addition to the building was made during the year at cost of Rs. 1,56,000 and fully depreciated equipment costing Rs. 60,000 was discarded as no salvage being realized.

[Ans : (1) Cash From Operations Rs. 82,000; (2) Closing Balance of Cash Rs. 40,000]

(7) From the following Balance sheet of Ratha & Co. Ltd., as on 31st December 2003, you are required to prepare a Cash Flow Statement.

Balance sheet

<i>Particulars</i>	2002 Rs.	2003 Rs.
Assets :		
Land and Buildings	3,20,000	3,82,000
Plant and Machinery	1,80,000	2,76,000
Stock	60,000	80,000
Trade Debtors	1,20,000	1,60,000
Bills Receivable	20,000	28,000
Cash Balances	40,000	60,000
	7,40,000	9,86,000
Capital and Liabilities :		
Share Capital	4,00,000	5,60,000
Bank Overdraft	2,40,000	3,20,000
Bills Payable	28,000	32,000
Sundry Creditors	68,000	68,000
Outstanding Wages	4,000	6,000
	7,40,000	9,86,000

Additional Information

- (1) Profit earned during the year was Rs.1,60,000.
- (2) A machine costing Rs.40,000 included in the plant and machinery was sold at Rs.30,000.
- (3) The depreciation so charged on it up to the date of sale was Rs. 6,000.
- (4) Accumulated Balance of depreciation on Plant and Machinery during the year 2002 was Rs. 60,000 and Rs. 80,000 was in 2003.

(8) From the following Balance sheet as at 31st December 2002 and 31st December 2003, you are required to prepare a Cash Flow Statement :

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Share Capital	1,00,000	1,50,000	Fixed Assets	1,00,000	1,50,000
Profit & Loss A/c	50,000	80,000	Goodwill	50,000	40,000
General Reserve	30,000	40,000	Inventories	50,000	80,000
12% Bonds	50,000	60,000	Debtors	50,000	80,000
Sundry Creditors	30,000	40,000	Bills Receivable	10,000	20,000
Outstanding Expenses	10,000	15,000	Bank Balance	10,000	15,000
	2,70,000	3,85,000		2,70,000	3,85,000

[Ans : Cash from Operations Rs. 5,000; Total Cash Flow Statements Rs. 60,000]

(9) From the following Balance sheet of Gupta & Co. Ltd., you are required to prepare a Cash Flow Statement :

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Equity Share Capital	2,00,000	2,50,000	Cash in Hand	30,000	50,000
Preference Share Capital	2,00,000	2,50,000	Cash at Bank	30,000	44,000
Bills Payable	40,000	50,000	Sundry Debtors	2,00,000	1,90,000
Sundry Creditors	1,00,000	40,000	Bills Receivable	40,000	40,000
Profit and Loss A/c	20,000	46,000	Inventories	1,60,000	1,80,000
			Land Buildings	50,000	60,000
			Plant & Machinery	50,000	72,000
	5,60,000	6,36,000		5,60,000	6,36,000

[Ans : Cash From Operations Rs. 34,000; Total of Cash Flow Statements Rs. 16,000]

(10) Prepare Cash Flow Statement of Rajan & Co. Ltd. from the following information :

Balance Sheet

<i>Liabilities</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>	<i>Assets</i>	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Share Capital	1,00,000	4,00,000	Goodwill	-	20,000
8% Debentures	-	2,00,000	Machinery	1,25,000	4,75,000
Retained Earnings	60,000	90,000	Stock	20,000	80,000
Sundry Creditors	40,000	1,00,000	Sundry Debtors	30,000	1,00,000
Bills Payable	20,000	40,000	Cash at Bank	50,000	1,50,000
Provision for Tax	30,000	40,000	Cash in hand	25,000	45,000
	2,50,000	8,70,000		2,50,000	8,70,000

Additional Information

- (1) Depreciation charge on Machinery was Rs. 30,000
- (2) The debenture were issued at a premium of 5% which is included in the retained earnings
- (3) Provision for tax charged in 2003 was Rs. 35,000
- (4) During 2003, the business of a firm was purchased by issuing shares for Rs. 2,00,000. The assets acquired from the firm were ; Goodwill Rs. 20,000 ; Machinery Rs. 1,00,000; Stock Rs. 50,000 and Debtors Rs. 30,000

[Ans : Cash From Operations Rs. 1,15,000 ; Total of Cash Flow Statements Rs. 5,00,000]

(11) From the following Balance sheet of Patil & Co. Ltd. on 31st December 2002 and 2003, you are required to prepare a Cash Flow Statements :

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Equity Share (Rs. 100 each)	10,00,000	15,00,000	Plant & Machinery (at Cost)	15,00,000	18,00,000
Redeemable Preference Shares (Rs. 100 each Rs. 50 Paid)	5,00,000	-	Inventory	6,00,000	3,00,000
Share Premium	25,000	-	Sundry Debtors	15,00,000	10,00,000
Capital Redemption Reserve	-	5,00,000	Cash at Bank	2,00,000	5,00,000
General Reserve	10,00,000	7,00,000			
Profit & Loss A/c	2,75,000	3,00,000			
Current Liabilities	10,00,000	6,00,000			
	38,00,000	36,00,000		38,00,000	36,00,000

Additional Information

- (1) During the year the company paid Rs. 2,00,000 as equity dividend and Rs. 56,250 as preference dividend
- (2) The company redeemed the preference shares at a premium of 5% after making a call of Rs. 50 per share to make the shares fully paid
- (3) During the year one plant, the book value of which was Rs. 1,00,000, was sold at Rs. 25,000 and the company purchased plant for Rs. 6,00,000

[Ans : Cash From Operation Rs. 7,56,250; Total of Cash Flow Statement Rs. 27,81,000]

(12) Mohan & Co. Ltd. gives you the following balance sheet as at 31st December 2002 and 2003

Balance Sheet

<i>Liabilities</i>	2002 Rs.	2003 Rs.	<i>Assets</i>	2002 Rs.	2003 Rs.
Equity Share Capital	50,000	60,000	Fixed Assets	85,000	1,04,000
8% Redeemable Preference Shares]	20,000	-	Investments	10,000	8,000
Capital Redemption reserve	-	10,000	Preliminary Expenses	4,000	3,000
Share Premium	5,000	5,000	Stock	20,000	28,000
Profit and Loss A/c	14,000	27,000	Sundry Debtors	18,000	17,000
General Reserve	10,000	13,000	Cash balances	6,000	11,000
Taxation Reserve	7,000	9,000			
Proposed Dividend	5,000	6,000			
Sundry Creditors	14,000	18,000			
Provision for Depreciation	18,000	23,000			
	1,43,000	1,71,000		1,43,000	1,71,000

Additional Information

- (1) During 2003 the proposed dividend was paid in addition to the preference dividend up to 30th June, 2003 on which date the preference shares were reduced at a per cent of 5. The premium had been provided out of share premium account.
- (2) Tax liability in respect of 2002 came to Rs. 5,500, the balance in the Taxation reserve as on 31st December 2002 was transferred to general reserve.
- (3) During the year a fixed costing Rs. 3,000 (depreciation provided for Rs. 1,600) was sold for Rs. 1,000.
- (4) Investment costing Rs. 2,000 were realized for Rs. 1,600. These matters have been adjusted in the profit and loss account. Prepare a statement showing the source and application of cash during 2003.

[Ans: Cash from operations Rs. 48,700; Total of cash flow statement Rs. 73,300]

CHAPTER 9

Ratio Analysis

Introduction

The analysis of the financial statements and interpretations of financial results of a particular period of operations with the help of 'ratio' is termed as "ratio analysis." Ratio analysis used to determine the financial soundness of a business concern. Alexander Wall designed a system of ratio analysis and presented it in useful form in the year 1909.

Meaning and Definition

The term 'ratio' refers to the mathematical relationship between any two inter-related variables. In other words, it establishes relationship between two items expressed in quantitative form.

According J. Batty, Ratio can be defined as "the term accounting ratio is used to describe significant relationships which exist between figures shown in a balance sheet and profit and loss account in a budgetary control system or any other part of the accounting management."

Ratio can be used in the form of (1) percentage (20%) (2) Quotient (say 10) and (3) Rates. In other words, it can be expressed as a to b ; $a : b$ (a is to b) or as a simple fraction, integer and decimal. A ratio is calculated by dividing one item or figure by another item or figure.

Analysis or Interpretations of Ratios

The analysis or interpretations in question may be of various types. The following approaches are usually found to exist:

- (a) Interpretation or Analysis of an Individual (or) Single ratio.
- (b) Interpretation or Analysis by referring to a group of ratios.
- (c) Interpretation or Analysis of ratios by trend.
- (d) Interpretations or Analysis by inter-firm comparison.

Principles of Ratio Selection

The following principles should be considered before selecting the ratio:

- (1) Ratio should be logically inter-related.
- (2) Pseudo ratios should be avoided.
- (3) Ratio must measure a material factor of business.
- (4) Cost of obtaining information should be borne in mind.
- (5) Ratio should be in minimum numbers.
- (6) Ratio should be facilities comparable.

Advantages of Ratio Analysis

Ratio analysis is necessary to establish the relationship between two accounting figures to highlight the significant information to the management or users who can analyse the business situation and to monitor their performance in a meaningful way. The following are the advantages of ratio analysis:

- (1) It facilitates the accounting information to be summarized and simplified in a required form.
- (2) It highlights the inter-relationship between the facts and figures of various segments of business.
- (3) Ratio analysis helps to remove all type of wastages and inefficiencies.
- (4) It provides necessary information to the management to take prompt decision relating to business.
- (5) It helps to the management for effectively discharge its functions such as planning, organizing, controlling, directing and forecasting.
- (6) Ratio analysis reveals profitable and unprofitable activities. Thus, the management is able to concentrate on unprofitable activities and consider to improve the efficiency.
- (7) Ratio analysis is used as a measuring rod for effective control of performance of business activities.
- (8) Ratios are an effective means of communication and informing about financial soundness made by the business concern to the proprietors, investors, creditors and other parties.
- (9) Ratio analysis is an effective tool which is used for measuring the operating results of the enterprises.
- (10) It facilitates control over the operation as well as resources of the business.
- (11) Effective co-operation can be achieved through ratio analysis.
- (12) Ratio analysis provides all assistance to the management to fix responsibilities.
- (13) Ratio analysis helps to determine the performance of liquidity, profitability and solvency position of the business concern.

Limitations of Ratio Analysis

Ratio analysis is one of the important techniques of determining the performance of financial strength and weakness of a firm. Though ratio analysis is relevant and useful technique for the business concern, the analysis is based on the information available in the financial statements. There are some situations, where ratios are misused, it may lead the management to wrong direction. The ratio analysis suffers from the following limitations:

- (1) Ratio analysis is used on the basis of financial statements. Number of limitations of financial statements may affect the accuracy or quality of ratio analysis.
- (2) Ratio analysis heavily depends on quantitative facts and figures and it ignores qualitative data. Therefore this may limit accuracy.
- (3) Ratio analysis is a poor measure of a firm's performance due to lack of adequate standards laid for ideal ratios.
- (4) It is not a substitute for analysis of financial statements. It is merely used as a tool for measuring the performance of business activities.
- (5) Ratio analysis clearly has some latitude for window dressing.
- (6) It makes comparison of ratios between companies which is questionable due to differences in methods of accounting operation and financing.
- (7) Ratio analysis does not consider the change in price level, as such, these ratio will not help in drawing meaningful inferences.

CLASSIFICATION OF RATIOS

Accounting Ratios are classified on the basis of the different parties interested in making use of the ratios. A very large number of accounting ratios are used for the purpose of determining the financial position of a concern for different purposes. Ratios may be broadly classified in to:

- (1) Classification of Ratios on the basis of Balance Sheet.
- (2) Classification of Ratios on the basis of Profit and Loss Account.
- (3) Classification of Ratios on the basis of Mixed Statement (or) Balance Sheet and Profit and Loss Account.

This classification further grouped in to:

- I. Liquidity Ratios
- II. Profitability Ratios
- III. Turnover Ratios
- IV. Solvency Ratios
- V. Over all Profitability Ratios

These classifications are discussed hereunder :

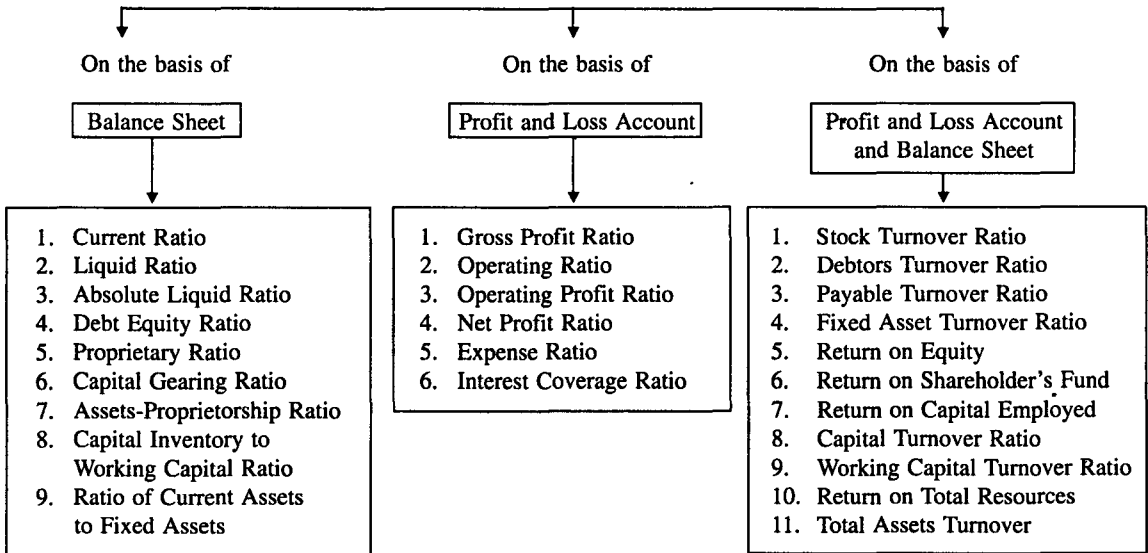
1. Classification of Ratios on the basis of Balance Sheet: Balance sheet ratios which establish the relationship between two balance sheet items. For example, Current Ratio, Fixed Asset Ratio, Capital Gearing Ratio and Liquidity Ratio etc.

2. Classification on the basis of Income Statements: These ratios deal with the relationship between two items or two group of items of the income statement or profit and loss account. For example, Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, and Net Profit Ratio etc.

3. Classification on the basis of Mixed Statements: These ratios also known as Composite or Mixed Ratios or Inter Statement Ratios. The inter statement ratios which deal with relationship between the item of profit and loss account and item of balance sheet. For example, Return on Investment Ratio, Net Profit to Total Asset Ratio, Creditor's Turnover Ratio, Earning Per Share Ratio and Price Earning Ratio etc.

A chart for classification of ratios by statement is given below showing clearly the types of ratios may be broadly classified on the basis of Income Statement and Balance Sheet.

Classification of Ratios by Statement



I. LIQUIDITY RATIOS

Liquidity Ratios are also termed as Short-Term Solvency Ratios. The term liquidity means the extent of quick convertibility of assets in to money for paying obligation of short-term nature. Accordingly, liquidity ratios are useful in obtaining an indication of a firm's ability to meet its current liabilities, but it does not reveal how effectively the cash resources can be managed. To measure the liquidity of a firm, the following ratios are commonly used:

- (1) Current Ratio.
- (2) Quick Ratio (or) Acid Test or Liquid Ratio.
- (3) Absolute Liquid Ratio (or) Cash Position Ratio.

(1) Current Ratio

Current Ratio establishes the relationship between current Assets and current Liabilities. It attempts to measure the ability of a firm to meet its current obligations. In order to compute this ratio, the following formula is used :

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The two basic components of this ratio are current assets and current liabilities. Current asset normally means assets which can be easily converted in to cash within a year's time. On the other hand, current liabilities represent those liabilities which are payable within a year. The following table represents the components of current assets and current liabilities in order to measure the current ratios :

Components of Current Assets and Current Liabilities

<i>Current Assets</i>	<i>Current Liabilities</i>
<ol style="list-style-type: none"> 1. Cash in Hand 2. Cash at Bank 3. Sundry Debtors 4. Bills Receivable 5. Marketable Securities (Short-Term) 6. Other Short-Term Investments 7. Inventories : <ol style="list-style-type: none"> (a) Stock of raw materials (b) Stock of work in progress (c) Stock of finished goods 	<ol style="list-style-type: none"> 1. Sundry Creditors (Accounts Payable) 2. Bills Payable 3. Outstanding and Accrued Expenses 4. Income Tax Payable 5. Short-Term Advances 6. Unpaid or Unclaimed Dividend 7. Bank Overdraft (Short-Term period)

Interpretation of Current Ratio: The ideal current ratio is 2:1. It indicates that current assets double the current liabilities is considered to be satisfactory. Higher value of current ratio indicates more liquid of the firm's ability to pay its current obligation in time. On the other hand, a low value of current ratio means that the firm may find it difficult to pay its current ratio as one which is generally recognized as the patriarch among ratios.

Advantages of Current Ratios:

- (1) Current ratio helps to measure the liquidity of a firm.
- (2) It represents general picture of the adequacy of the working capital position of a company.
- (3) It indicates liquidity of a company.
- (4) It represents a margin of safety, i.e., cushion of protection against current creditors.
- (5) It helps to measure the short-term financial position of a company or short-term solvency of a firm.

Disadvantages of Current Ratio:

- (1) Current ratios cannot be appropriate to all businesses it depends on many other factors.
- (2) Window dressing is another problem of current ratio, for example, overvaluation of closing stock.
- (3) It is a crude measure of a firm's liquidity only on the basis of quantity and not quality of current assets.

Calculation of Current Ratio:

Illustration: 1

The following information relates to Mishra & Co. for the year 2003, calculate current ratio:

Current Assets	Rs. 5,00,000
Current Liabilities	Rs. 2,00,000

Solution:

$$\begin{aligned} \text{Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\ &= \frac{5,00,000}{2,00,000} \\ &= 2.5 \text{ (or) } 2.5 : 1 \end{aligned}$$

The current ratio of 2.5 means that current assets are 2.5 times of current liabilities.

Illustration: 2**Calculate Current Ratio from the following Information**

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Sundry creditors	40,000	Inventories	1,20,000
Bills payable	30,000	Sundry debtors	1,40,000
Dividend payable	36,000	Cash at Bank	40,000
Accrued expenses	14,000	Bills Receivable	60,000
Short-term advances	50,000	Prepaid expenses	20,000
Share Capital	1,50,000	Machinery	2,00,000
Debenture	2,00,000	Patents	50,000
		Land & Building	1,50,000

Solution:

$$\begin{aligned} \text{Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\ \text{Current Assets} &= \text{Rs. } 1,20,000 + 1,40,000 + 40,000 + 60,000 + 20,000 \\ &= \text{Rs. } 3,80,000 \\ \text{Current Liabilities} &= \text{Rs. } 40,000 + 30,000 + 36,000 + 14,000 + 50,000 \\ &= \text{Rs. } 1,70,000 \\ \text{Current Ratio} &= \frac{3,80,000}{1,70,000} \\ &= 2.24 \text{ (or) } 2.24 : 1 \end{aligned}$$

(2) Quick Ratio (or) Acid Test or Liquid Ratio

Quick Ratio also termed as Acid Test or Liquid Ratio. It is supplementary to the current ratio. The acid test ratio is a more severe and stringent test of a firm's ability to pay its short-term obligations as and when they become due. Quick Ratio establishes the relationship between the quick assets and current liabilities. In order to compute this ratio, the below presented formula is used :

$$\text{Liquid Ratio} = \frac{\text{Liquid Assets} \text{ (Current Assets - Stock and Prepaid Expenses)}}{\text{Current Liabilities}}$$

Quick Ratio can be calculated by two basic components of quick assets and current liabilities.

$$\text{Quick Assets} = \text{Current Assets} - (\text{Inventories} + \text{Prepaid expenses})$$

Current liabilities represent those liabilities which are payable within a year.

The ideal Quick Ratio of 1:1 is considered to be satisfactory. High Acid Test Ratio is an indication that the firm has relatively better position to meet its current obligation in time. On the other hand, a low value of quick ratio exhibiting that the firm's liquidity position is not good.

Advantages

- (1) Quick Ratio helps to measure the liquidity position of a firm.
- (2) It is used as a supplementary to the current ratio.
- (3) It is used to remove inherent defects of current ratio.

Illustration: 3

Calculate Quick Ratio from the information given below :

	Rs.
Current Assets	4,00,000
Current Liabilities	2,00,000
Inventories (stock)	25,000
Prepaid Expenses	25,000
Land and Building	4,00,000
Share Capital	3,00,000
Good Will	2,00,000

Solution:

$$\begin{aligned}
 \text{Quick Ratio} &= \frac{\text{Quick Assets}}{\text{Current Liabilities}} \\
 &= \frac{\text{Current Assets} - (\text{Inventories} + \text{Prepaid Expenses})}{\text{Current Liabilities}} \\
 &= \frac{\text{Rs. } 4,00,000 - (25,000 + 25,000)}{\text{Rs. } 2,00,000} \\
 &= \frac{\text{Rs. } 4,00,000 - 50,000}{\text{Rs. } 2,00,000} \\
 &= \frac{\text{Rs. } 3,50,000}{2,00,000} \\
 &= 1.75 \text{ (or) } 1.75 : 1
 \end{aligned}$$

(3) Absolute Liquid Ratio

Absolute Liquid Ratio is also called as Cash Position Ratio (or) Over Due Liability Ratio. This ratio established the relationship between the absolute liquid assets and current liabilities. Absolute Liquid Assets include cash in hand, cash at bank, and marketable securities or temporary investments. The optimum value for this ratio should be one, i.e., 1 : 2. It indicates that 50% worth absolute liquid assets are considered adequate to pay the 100% worth current liabilities in time. If the ratio is relatively lower than one, it represents that the company's day-to-day cash management is poor. If the ratio is considerably more than one, the absolute liquid ratio represents enough funds in the form of cash to meet its short-term

obligations in time. The Absolute Liquid Ratio can be calculated by dividing the total of the Absolute Liquid Assets by Total Current Liabilities. Thus,

$$\text{Absolute Liquid Ratio} = \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$$

Illustration: 4

Calculate Absolute Liquid Ratio from the following Information

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Bills Payable	30,000	Goodwill	2,00,000
Sundry Creditors	20,000	Land and Building	2,00,000
Share Capital	1,00,000	Inventories	50,000
Debenture	2,00,000	Cash in Hand	30,000
Bank Overdraft	25,000	Cash at Bank	20,000
		Sundry Debtors	50,000
		Bills Payable	75,000
		Marketable Securities	10,000

Solution:

$$\begin{aligned} \text{Absolute Liquid Ratio} &= \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}} \\ \text{Absolute Liquid Assets} &= \text{Cash in Hand} + \text{Cash at Bank} + \\ &\quad \text{Marketable Securities} \\ &= \text{Rs. } 30,000 + 20,000 + 10,000 \\ &= \text{Rs. } 60,000 \\ \text{Current Liabilities} &= \text{Rs. } 30,000 + 20,000 + 25,000 \\ &= \text{Rs. } 75,000 \\ \text{Absolute Liquid Ratio} &= \frac{60,000}{75,000} \\ &= 0.8 \end{aligned}$$

The ratio of 0.8 is quite satisfactory because, it is much higher than the optimum value of 50%.

Illustration: 5

You are given the following information :

	<i>Rs.</i>
Cash in Hand	10,000
Cash at Bank	15,000
Sundry Debtors	75,000
Stock	60,000
Bills Payable	25,000
Bills Receivable	30,000
Sundry Creditors	40,000
Outstanding Expenses	20,000
Prepaid Expenses	10,000
Dividend Payable	15,000

Land and Building	2,00,000
Goodwill	1,00,000
Calculate: (a) Current Ratio (b) Liquid Ratio (c) Absolute Liquidity Ratio	

Solution:

$$(a) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current Assets :	<i>Rs.</i>
Cash in Hand	10,000
Cash at Bank	15,000
Sundry Debtors	75,000
Stock	60,000
Bills Receivable	30,000
Prepaid Expenses	10,000
Total Current Assets	<u>Rs. 2,00,000</u>

Current Liabilities :	<i>Rs.</i>
Bills Payable	25,000
Sundry Creditors	40,000
Outstanding Expenses	20,000
Dividend Payable	15,000
Total Current Liabilities	<u>1,00,000</u>

$$\begin{aligned} \text{Current Ratio} &= \frac{\text{Rs. 2,00,000}}{\text{Rs. 1,00,000}} \\ &= 2 \text{ times (or) } 2:1 \end{aligned}$$

$$(b) \text{ Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Liquid Assets} &= \text{Current Assets} - (\text{Stock and Prepaid Expenses}) \\ &= \text{Rs. 2,00,000} - (60,000 + 10,000) \\ &= \text{Rs. 2,00,000} - 70,000 \\ &= \text{Rs. 1,30,000} \end{aligned}$$

$$\text{Liquid Ratio} = \frac{1,30,000}{1,00,000} = 1.3 \text{ times (or) } 1:3:1$$

$$(c) \text{ Absolute Liquid Ratio} = \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Absolute Liquid Assets} &= \text{Cash in hand} + \text{Cash at Bank} \\ &\quad + \text{Marketable Securities} \\ &= \text{Rs. 10,000} + 15,000 + \text{Nil} \\ &= \text{Rs. 25,000} \end{aligned}$$

$$\begin{aligned} \text{Absolute Liquid Ratio} &= \frac{25,000}{1,00,000} \\ &= 0.25 \end{aligned}$$

Illustration: 6

Given :

$$\begin{aligned} \text{Current Ratio} &= 2.6 \\ \text{Liquid Ratio} &= 1.4 \\ \text{Working Capital} &= \text{Rs. } 1,10,000 \end{aligned}$$

Calculate : (1) Current Assets (2) Current Liabilities (3) Liquid Assets and (4) Stock.

Solution:

Calculation of current assets and current liabilities :

$$\begin{aligned} \text{Working Capital} &= \text{Current Assets} - \text{Current Liabilities} \\ \text{Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (\text{or}) \\ &= \frac{\text{Current Assets}}{\text{Current Liabilities}} = 2.6:1 \\ \text{Working Capital} &= \text{Current Assets} - \text{Current Liabilities} \\ \text{Working Capital} &= 2.6 - 1 \\ &= 1.6 \\ \text{Working Capital (Given)} &= 1,10,000 \\ \therefore 1.6 &= 1,10,000 \end{aligned}$$

$$(1) \text{ Current Assets} = 1,10,000 \times \frac{2.6}{1.6} = \text{Rs. } 1,78,750$$

$$(2) \text{ Current Liabilities} = 1,10,000 \times \frac{1}{1.6} = \text{Rs. } 68,750$$

(3) Calculation of Liquid Assets :

$$\begin{aligned} \text{Liquid Ratio (Given)} &= 1.4 \\ \text{Liquid Ratio} &= \frac{\text{Liquid Assets}}{\text{Current Liabilities}} \\ 1.4 &= \frac{\text{Liquid Assets}}{\text{Rs. } 68,750} \end{aligned}$$

$$\begin{aligned} \text{Liquid Assets} &= 68750 \times 1.4 \\ &= \text{Rs. } 96,250 \end{aligned}$$

(4) Calculation of Stock :

$$\begin{aligned} \text{Liquid Assets} &= \text{Current Assets} - (\text{Stock} + \text{Prepaid Expenses}) \\ \text{Stock} &= \text{Current Assets} - \text{Liquid Assets} \\ &= \text{Rs. } 1,78,750 - \text{Rs. } 96,250 \\ &= \text{Rs. } 82,500 \end{aligned}$$

II. PROFITABILITY RATIOS

The term profitability means the profit earning capacity of any business activity. Thus, profit earning may be judged on the volume of profit margin of any activity and is calculated by subtracting costs from the total revenue accruing to a firm during a particular period. Profitability Ratio is used to measure the overall efficiency or performance of a business. Generally, a large number of ratios can also be used for determining the profitability as the same is related to sales or investments.

The following important profitability ratios are discussed below :

1. Gross Profit Ratio.
2. Operating Ratio.
3. Operating Profit Ratio.
4. Net Profit Ratio.
5. Return on Investment Ratio.
6. Return on Capital Employed Ratio.
7. Earning Per Share Ratio.
8. Dividend Payout Ratio.
9. Dividend Yield Ratio.
10. Price Earning Ratio.
11. Net Profit to Net Worth Ratio.

(1) Gross Profit Ratio

Gross Profit Ratio established the relationship between gross profit and net sales. This ratio is calculated by dividing the Gross Profit by Sales. It is usually indicated as percentage.

$$\begin{aligned} \text{Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \\ \frac{\text{Gross Profit}}{\text{Net Sales}} &= \frac{\text{Sales} - \text{Cost of Goods Sold}}{\text{Gross Sales} - \text{Sales Return (or) Return Inwards}} \end{aligned}$$

Higher Gross Profit Ratio is an indication that the firm has higher profitability. It also reflects the effective standard of performance of firm's business. Higher Gross Profit Ratio will be result of the following factors.

- (1) Increase in selling price, i.e., sales higher than cost of goods sold.
- (2) Decrease in cost of goods sold with selling price remaining constant.
- (3) Increase in selling price without any corresponding proportionate increase in cost.
- (4) Increase in the sales mix.

A low gross profit ratio generally indicates the result of the following factors :

- (1) Increase in cost of goods sold.
- (2) Decrease in selling price.

- (3) Decrease in sales volume.
- (4) High competition.
- (5) Decrease in sales mix.

Advantages

- (1) It helps to measure the relationship between gross profit and net sales.
- (2) It reflects the efficiency with which a firm produces its product.
- (3) This ratio tells the management, that a low gross profit ratio may indicate unfavourable purchasing and mark-up policies.
- (4) A low gross profit ratio also indicates the inability of the management to increase sales.

Illustration: 7

Calculate Gross Profit Ratio from the following figures :

	Rs.
Sales	5,00,000
Sales Return	50,000
Closing Stock	35,000
Opening Stock	70,000
Purchases	3,50,000

Solution:

$$\begin{aligned}
 \text{Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \\
 \text{Net Sales} &= \text{Sales} - \text{Sales Return} \\
 &= \text{Rs. } 5,00,000 - 50,000 \\
 &= \text{Rs. } 4,50,000 \\
 \text{Gross Profit} &= \text{Sales} - \text{Cost of Goods Sold} \\
 \text{Cost of goods sold} &= \text{Opening Stock} + \text{Purchase} - \text{Closing Stock} \\
 &= \text{Rs. } 70,000 + 3,50,000 - 35,000 \\
 &= \text{Rs. } 4,20,000 - 35,000 = \text{Rs. } 3,85,000 \\
 \text{Gross Profit} &= \text{Rs. } 4,50,000 - 3,85,000 = \text{Rs. } 65,000 \\
 \text{Gross Profit Ratio} &= \frac{65,000}{4,50,000} \times 100 \\
 &= 14.44 \%
 \end{aligned}$$

(2) Operating Ratio

Operating Ratio is calculated to measure the relationship between total operating expenses and sales. The total operating expenses is the sum total of cost of goods sold, office and administrative expenses and selling and distribution expenses. In other words, this ratio indicates a firm's ability to cover total operating expenses. In order to compute this ratio, the following formula is used :

$$\begin{aligned}
 \text{Operating Ratio} &= \frac{\text{Operating Cost}}{\text{Net Sales}} \times 100 \\
 \text{Operating Cost} &= \text{Cost of goods sold} + \text{Administrative Expenses} \\
 &\quad + \text{Selling and Distribution Expenses} \\
 \text{Net Sales} &= \text{Sales} - \text{Sales Return (or) Return Inwards.}
 \end{aligned}$$

Illustration: 8

Find out Operating Ratio :

Cost of goods sold	Rs. 4,00,000
Office and Administrative Expenses	Rs. 30,000
Selling and Distribution Expenses	Rs. 20,000
Sales	Rs. 6,00,000
Sales Return	Rs. 20,000

Solution:

$$\begin{aligned} \text{Operating Ratio} &= \frac{\text{Operating Cost}}{\text{Net Sales}} \times 100 \\ \text{Operating Cost} &= \text{Cost of goods sold} + \text{Administrative Expenses} \\ &+ \text{Selling and Distribution Expenses} \\ &= \text{Rs. 4,00,000} + 30,000 + 20,000 \\ &= \text{Rs. 4,50,000} \\ &= \text{Rs. 6,00,000} - 20,000 \\ &= \text{Rs. 5,80,000} \\ \text{Operating Ratio} &= \frac{4,50,000}{5,80,000} \times 100 \\ &= 77.58\% \end{aligned}$$

This ratio indicated that 77.58% of the net sales have been consumed by cost of goods sold, administrative expenses and selling and distribution expenses. The remaining 23.42% indicates a firm's ability to cover the interest charges, income tax payable and dividend payable.

(3) Operating Profit Ratio

Operating Profit Ratio indicates the operational efficiency of the firm and is a measure of the firm's ability to cover the total operating expenses. Operating Profit Ratio can be calculated as :

$$\begin{aligned} \text{Operating Profit Ratio} &= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \\ \text{Operating Profit} &= \text{Net Sales} - \text{Operating Cost} \\ &(\text{or}) \\ &= \text{Net Sales} - (\text{Cost of Goods Sold} + \text{Office} \\ &\text{and Administrative Expenses} + \text{Selling} \\ &\text{and Distribution Expenses}) \\ &(\text{or}) \\ &= \text{Gross Profit} - \text{Operating Expenses} \\ &(\text{or}) \\ &= \text{Net Profit} + \text{Non-Operating Expenses} - \\ &\text{Non-Operating Income.} \\ \text{Net Sales} &= \text{Sales} - \text{Sales Return (or) Return Inwards} \end{aligned}$$

Illustration: 9

From the following information given below, you are required to calculate Operating Profit Ratio :

	Rs.
Gross Sales	6,50,000
Sales Return	50,000
Opening Stock	25,000
Closing Stock	30,000
Purchases	4,10,000
Office and Administrative Expenses	50,000
Selling and Distribution Expenses	40,000

Solution:

$$\begin{aligned}
 \text{Operating Profit Ratio} &= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \\
 \text{Operating Profit} &= \text{Net Sales} - \text{Total Operating Cost} \\
 \text{Net Sales} &= \text{Gross Sales} - \text{Sales Return} \\
 &= \text{Rs. } 6,50,000 - 50,000 \\
 &= \text{Rs. } 6,00,000 \\
 \text{Total Operating Cost} &= \text{Cost of Goods Sold} + \text{Office and Administrative Expenses} + \text{Selling and Distribution Expenses} \\
 \text{Cost of Goods sold} &= \text{Opening Stock} + \text{Purchase} - \text{Closing Stock} \\
 &= \text{Rs. } 25,000 + 4,10,000 - 30,000 \\
 &= \text{Rs. } 4,05,000 \\
 \text{Total Operating Expenses} &= \text{Rs. } 4,05,000 + 50,000 + 40,000 \\
 &= \text{Rs. } 4,95,000 \\
 \text{Operating Profit} &= \text{Net Sales} - \text{Total Operating Expenses} \\
 &= \text{Rs. } 6,00,000 - 4,95,000 \\
 &= \text{Rs. } 1,05,000 \\
 \text{Operating Profit Ratio} &= \frac{1,05,000}{6,00,000} \times 100 \\
 &= 17.5
 \end{aligned}$$

Illustration: 10

Calculate Operating Profit Ratio from the following figures :

Net Sales	=	Rs. 4,00,000
Cost of Goods Sold	=	Rs. 3,00,000
Office and Administrative Expenses	=	Rs. 20,000
Selling and Distribution Expenses	=	Rs. 15,000

Solution:

$$\begin{aligned}
 \text{Operating Profit Ratio} &= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \\
 \text{Operating Profit} &= \text{Sales} - \text{Total Operating Cost} \\
 \text{Total Operating Cost} &= \text{Cost of goods sold} + \text{Office and Administrative Expenses} + \text{Selling And Distribution Expenses}
 \end{aligned}$$

$$\begin{aligned}
 &= \text{Rs. } 3,00,000 + 20,000 + 15,000 \\
 &= \text{Rs. } 3,35,000 \\
 \text{Operating Profit} &= \text{Rs. } 4,00,000 - 3,35,000 \\
 &= \text{Rs. } 65,000 \\
 \text{Operating Profit Ratio} &= \frac{65,000}{4,00,000} \times 100 \\
 &= 16.25 \%
 \end{aligned}$$

(4) Net Profit Ratio

Net Profit Ratio is also termed as Sales Margin Ratio (or) Profit Margin Ratio (or) Net Profit to Sales Ratio. This ratio reveals the firm's overall efficiency in operating the business. Net profit Ratio is used to measure the relationship between net profit (either before or after taxes) and sales. This ratio can be calculated by the following formula :

$$\text{Net Profit Ratio} = \frac{\text{Net Profit After Tax}}{\text{Net Sales}} \times 100$$

Net profit includes non-operating incomes and profits. Non-Operating Incomes such as dividend received, interest on investment, profit on sales of fixed assets, commission received, discount received etc. Profit or Sales Margin indicates margin available after deduction cost of production, other operating expenses, and income tax from the sales revenue. Higher Net Profit Ratio indicates the standard performance of the business concern.

Advantages

- (1) This is the best measure of profitability and liquidity.
- (2) It helps to measure overall operational efficiency of the business concern.
- (3) It facilitates to make or buy decisions.
- (4) It helps to determine the managerial efficiency to use a firm's resources to generate income on its invested capital.
- (5) Net profit Ratio is very much useful as a tool of investment evaluation.

Illustration: 11

From the following Trading and Profit and Loss Account of Ramesh & Co. for the year 31st Dec. 2003 :

	Rs.		Rs.
To Opening Stock	60,000	By Sales	4,00,000
To Purchase	2,75,000	By Closing Stock	75,000
To Wages	25,000		
To Gross Profit c/d	1,15,000		
	4,75,000		4,75,000
To Administrative Expenses	45,000	By Gross Profit b/d	1,15,000
To Selling and Distribution Expenses	10,000	By Interest on Investment	10,000
To Office Expenses	5,000		
To Non Operating Expenses	15,000		
To Net Profit	50,000		
	1,25,000		1,25,000

You are required to calculate :

- (1) Gross Profit Ratio.
- (2) Operating Ratio.
- (3) Operating Profit Ratio.
- (4) Net Profit Ratio.

Solution:

(1) <i>Gross Profit Ratio</i>	=	$\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$
	=	$\frac{1,15,000}{4,00,000} \times 100$
	=	28.75 %
(2) <i>Operating Ratio</i>	=	$\frac{\text{Total Operating Cost}}{\text{Net Sales}} \times 100$
Total Operating Cost	=	Cost of Goods Sold + Operating Expenses
Cost of goods sold	=	Opening Stock + Purchases – Closing Stock
	=	Rs. 60,000 + 2,75,000 – 75,000
	=	Rs. 2,60,000
Operating Expenses	=	Office Expenses + Administrative Expenses + Selling and Distribution Expenses
	=	Rs. 5000 + 45,000 + 10,000
	=	Rs. 60,000
Total Operating Cost	=	Rs. 2,60,000 + 60,000
	=	Rs. 3,20,000
Operating Ratio	=	$\frac{3,20,000}{4,00,000} \times 100$
	=	80%
(3) <i>Operating Profit Ratio</i>	=	$\frac{\text{Net Operating Profit}}{\text{Net Sales}} \times 100$
Net Operating Profit	=	Net Sales – Total Operating Cost
	=	Rs. 4,00,000 – 3,20,000
	=	Rs. 80,000
Operating Profit Ratio	=	$\frac{80,000}{4,00,000} \times 100$
	=	20%
(4) <i>Net Profit Ratio</i>	=	$\frac{\text{Net Profit (after tax)}}{\text{Net Sales}} \times 100$
	=	$\frac{50,000}{4,00,000} \times 100$
	=	12.5 %

Answers

(1) Gross Profit Ratio	=	28.75%
(2) Operating Ratio	=	80%
(3) Operating Profit Ratio	=	20%
(4) Net Profit Ratio	=	12.5 %

Illustration: 12

The following are the summarized profit and loss account of Sun India Ltd. for the year ending 31st Dec. 2003 and the Balance sheet as on that date:

Dr.		Profit and Loss Account			Cr.
Particulars	Rs.	Particulars	Rs.	Rs.	
To Opening Stock	10,000	By Sales	1,20,000		
To Purchases	60,000	Less : Sales Return	10,000	1,10,000	
To Freight Expenses	5,000	By Closing Stock		15,000	
To Gross Profit c/d	50,000				
	1,25,000			1,25,000	
<i>To Operating Expenses :</i>		By Gross Profit b/d		50,000	
Office Expenses	5,000	By Non-Trading Income :			
Administrative Expenses	15,000	Interest on Investment		5,000	
Selling and Distribution Expenses	5,000	Profit on sale of fixed Assets		1,000	
<i>To Non-Operating Expenses:</i>		Dividend Received		4,000	
Loss on Sale of Fixed Assets	1,000				
To Net Profit	34,000				
	60,000			60,000	

Balance Sheet for the year ending 31st Dec. 2001

Liabilities	Rs.	Assets	Rs.
Share Capital	15,000	Cash in Hand	2,000
Reserves	3,000	Cash at Bank	3,000
Debenture	12,000	Marketable Securities	5,000
Current Liabilities	20,000	Inventories	15,000
Profit and Loss A/c	5,000	Sundry Debtors	6,000
		Prepaid Expense	4,000
		Land and Building	20,000
	55,000		55,000

You are required to calculate :

- (a) Current Ratio
- (b) Liquid Ratio
- (c) Gross Profit Ratio
- (d) Operating Ratio
- (e) Operating Profit Ratio
- (f) Net Profit Ratio

Solution:

	=	<u>Current Assets</u>	
(a) <i>Current Ratio</i>	=	Current Liabilities	
Current Assets	=	Rs. 2,000 + 3,000 + 5,000 + 15,000 + 6,000 + 4,000	
	=	Rs. 35,000	
Current Ratio	=	<u>35,000</u>	
	=	20,000	
	=	1.75 (or) 1.75 :1	
	=	<u>Liquid Assets</u>	
(b) <i>Liquid Ratio</i>	=	Current Liabilities	
Liquid Assets	=	Current Assets – (Stock and Prepaid Expenses)	
	=	Rs. 35,000 – (15,000 + 4,000)	
	=	Rs. 16,000	
Liquid Ratio	=	<u>16,000</u>	
	=	20,000	
	=	0.8 (or) 0.8:1	
	=	<u>Gross Profit</u>	x 100
(c) <i>Gross Profit Ratio</i>	=	Net Sales	
	=	<u>50,000</u>	x 100
	=	1,10,000	
	=	45.45 %	
	=	<u>Total Operating Cost</u>	x 100
(d) <i>Operating Ratio</i>	=	Net Sales	
Total Operating Cost	=	Cost of Goods Sold + Operating Expenses	
Cost of Goods Sold	=	Opening Stock + Purchases – Closing Stock	
	=	Rs. 10,000 + 60,000 – 15,000	
	=	Rs. 55,000	
Operating Expenses	=	Office Expenses + Administrative Expenses + Selling and Distribution Expenses	
	=	Rs. 5,000 + 15,000 + 5,000	
	=	Rs. 25,000	
Total operating cost	=	Rs. 55,000 + 25,000 = Rs. 80,000	
Operating Ratio	=	<u>80,000</u>	x 100 = 72.72%
	=	1,10,000	
	=	<u>Net Operating Profit</u>	x 100
(e) <i>Operating Profit Ratio</i>	=	Net Sales	
Net Operating Profit	=	Net Sales – Total Operating Cost	
	=	Rs. 1,10,000 – 80,000 = Rs. 30,000	
Operating Profit Ratio	=	<u>30,000</u>	x 100 = 27.27%
	=	1,10,000	

Alternatively

$$\begin{aligned}
 \text{Net Operating Profit} &= \text{Net Profit} + \text{Non-Operating Expenses} \\
 &\quad - \text{Non-Operating Income} \\
 \text{Net Operating Profit} &= \text{Rs. } 34,000 + 1,000 - (5,000 + 1,000 + 4,000) \\
 &= \text{Rs. } 35,000 - 10,000 = \text{Rs. } 25,000 \\
 \text{Operating Profit Ratio} &= \frac{25,000}{1,10,000} \times 100 \\
 &= 22.72\% \\
 (f) \text{ Net Profit Ratio} &= \frac{\text{Net Profit (after tax)}}{\text{Net Sales}} \times 100 \\
 &= \frac{34,000}{1,10,000} \times 100 \\
 &= 30.90\%
 \end{aligned}$$

Answers

$$\begin{aligned}
 (a) \text{ Current Ratio} &= 1.75 \text{ (or) } 1.75 : 1 \\
 (b) \text{ Liquid Ratio} &= 0.8 \text{ (or) } 0.8 : 1 \\
 (c) \text{ Gross Profit Ratio} &= 45.45\% \\
 (d) \text{ Operating Ratio} &= 72.72\% \\
 (e) \text{ Operating Profit Ratio} &= 27.27\% \text{ or } 22.72\% \\
 (f) \text{ Net Profit Ratio} &= 30.90\%
 \end{aligned}$$

(5) Return on Investment Ratio

This ratio is also called as ROI. This ratio measures a return on the owner's or shareholders' investment. This ratio establishes the relationship between net profit after interest and taxes and the owner's investment. Usually this is calculated in percentage. This ratio, thus, can be calculated as :

$$\begin{aligned}
 \text{Return on Investment Ratio} &= \frac{\text{Net Profit (after interest and tax)}}{\text{Shareholders' Fund (or) Investments}} \times 100 \\
 \text{Shareholder's Investments} &= \text{Equity Share Capital} + \text{Preference} \\
 &\quad \text{Share Capital} + \text{Reserves and Surplus} \\
 &\quad - \text{Accumulated Losses} \\
 \text{Net Profit} &= \text{Net Profit} - \text{Interest and Taxes}
 \end{aligned}$$

Advantages

- (1) This ratio highlights the success of the business from the owner's point of view.
- (2) It helps to measure an income on the shareholders' or proprietor's investments.
- (3) This ratio helps to the management for important decisions making.
- (4) It facilitates in determining efficiently handling of owner's investment.

Illustration: 13

Calculate Return on Investment Ratio from the following information :

	<i>Rs.</i>
1000 Equity shares @ of Rs.10 each	10,000
2000, 5% preference share @ of Rs. 10 each	20,000
Reverses	5,000
Net profit before interest and Tax	10,000
Interest	2,000
Taxes	3,000

Solution:

$$\begin{aligned}
 \text{Return on Investment Ratio} &= \frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Investment}} \times 100 \\
 \text{Shareholders' Investment} &= \text{Equity Share Capital + Preference Share Capital + Reserves and Surplus} \\
 &\quad - \text{Accumulated Losses} \\
 \text{Shareholders' Investment} &= \text{Rs.10,000+ 20,000 + 5,000 – Nil} \\
 &= \text{Rs. 35,000} \\
 \text{Net Profit after Interest and Taxes} &= \text{Rs. 10,000 – (2,000 + 3,000)} \\
 &= \text{Rs.10,000 – 5,000 = 5,000} \\
 \text{Return on Investment Ratio} &= \frac{5,000}{35,000} \times 100 \\
 &= 14.28 \%
 \end{aligned}$$

(6) Return on Capital Employed Ratio

Return on Capital Employed Ratio measures a relationship between profit and capital employed. This ratio is also called as Return on Investment Ratio. The term return means Profits or Net Profits. The term Capital Employed refers to total investments made in the business. The concept of capital employed can be considered further into the following ways :

$$\begin{aligned}
 &\text{(a) Gross Capital Employed} \\
 &\text{(b) Net Capital Employed} \\
 &\text{(c) Average Capital Employed} \\
 &\text{(d) Proprietor's Net Capital Employed} \\
 \text{(a) Gross Capital Employed} &= \text{Fixed Assets + Current Assets} \\
 \text{(b) Net Capital Employed} &= \text{Total Assets – Current Liabilities} \\
 &\quad \text{Opening Capital Employed + Closing} \\
 &\quad \text{Capital Employed} \\
 \text{(c) Average Capital Employed} &= \frac{\quad}{2} \\
 &\quad \text{(or)} \\
 \text{Average Capital Employed} &= \text{Net Capital Employed + } \frac{1}{2} \text{ of Profit After Tax} \\
 \text{(d) Proprietor's Net Capital Employed} &= \text{Fixed Assets + Current Assets} \\
 &\quad - \text{Outside Liabilities} \\
 &\quad \text{(both long-term and short-term)}
 \end{aligned}$$

In order to compute this ratio, the below presented formulas are used:

$$(1) \text{ Return on Capital Employed} = \frac{\text{Net Profit After Taxes}}{\text{Gross Capital Employed}} \times 100$$

(or)

$$(2) \text{ Return on Capital Employed} = \frac{\text{Net Profit After Taxes Before Interest}}{\text{Gross Capital Employed}} \times 100$$

(or)

$$(3) \text{ Return on Capital Employed} = \frac{\text{Net Profit After Taxes Before Interest}}{\text{Average Capital Employed or Net Capital Employed}} \times 100$$

Illustration: 14

The following is the Balance sheet of M/s Sharma Ltd. for the year ending Dec. 31st 2003.

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital	4,00,000	Good Will	1,50,000
Reserves	40,000	Building	2,00,000
Profit and Loss A/c	80,000	Machinery	2,50,000
Debenture	1,00,000	Stock	80,000
Secured Loans	1,00,000	Sundry Debtors	60,000
Creditors	80,000	Bills Receivable	40,000
Provision for Tax	50,000	Cash at Bank	50,000
Bills Payable	40,000	Preliminary Expenses	60,000
	8,90,000		8,90,000

You are required to calculate :

- (a) Current Ratio
- (b) Liquid Ratio
- (c) Gross Capital Employed
- (d) Net Capital Employed
- (e) Average Capital Employed
- (f) Return on Capital Employed Ratio

Solution:

$$(a) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Current Assets} = \text{Stock} + \text{Sundry Debtors} + \text{Bills Receivable} + \text{Cash at Bank} + \text{Preliminary Expenses}$$

$$= \text{Rs. } 80,000 + 60,000 + 50,000 + 60,000$$

$$= \text{Rs. } 2,50,000$$

$$\text{Current Liabilities} = \text{Creditors} + \text{Provision for Tax} + \text{Bills Payable}$$

$$= \text{Rs. } 80,000 + 50,000 + 40,000$$

$$= \text{Rs. } 1,70,000$$

$$\text{Current Ratio} = \frac{2,50,000}{1,70,000} = 1.47 \text{ (or) } 1.47 : 1$$

(b) <i>Liquid Assets</i>	=	Liquid Assets – (Stock and Preliminary Expenses)
	=	Rs. 2,50,000 – (80,000 + 60,000)
	=	Rs. 1,10,000
		$\frac{1,10,000}{1,70,000} = 0.64$ (or) 0.64 :1
<i>Liquid Ratio</i>	=	
(c) <i>Gross Capital Employed</i>	=	Fixed Assets + Current Assets
<i>Fixed Assets</i>	=	Goodwill + Building + Machinery
	=	1,50,000 + 2,00,000 + 2,50,000
	=	Rs. 6,00,000
<i>Current Assets</i>	=	Rs. 2,50,000
<i>Gross Capital Employed</i>	=	Rs. 6,00,000 + 2,50,000
	=	Rs. 8,50,000
(d) <i>Net Capital Employed</i>	=	Total Assets – Current Liabilities
<i>Total Assets</i>	=	Rs. 8,50,000
<i>Current Liabilities</i>	=	Rs. 1,70,000
<i>Net Capital Employed</i>	=	Rs. 8,50,000 – 1,70,000
	=	Rs. 6,80,000
(e) <i>Average Capital Employed</i>	=	Net Capital Employed + $\frac{1}{2}$ of Profit After Tax
<i>$\frac{1}{2}$ of profit after tax</i>	=	$\frac{1}{2}$ (80,000 – 50,000)
	=	Rs. 15,000
<i>Average Capital Employed</i>	=	Rs. 7,20,000 + 15,000
	=	Rs. 7,35,000
(f) <i>Return on Capital Employed</i>	=	$\frac{\text{Net Profit After Tax}}{\text{Gross Capital Employed}} \times 100$
	=	$\frac{80,000 - 50,000}{8,50,000} \times 100$
	=	$\frac{30,000}{8,50,000} \times 100$
	=	3.52%

Alternatively

<i>Return on Capital Employed</i>	=	$\frac{\text{Net Profit After Tax}}{\text{Net Capital Employed}} \times 100$
	=	$\frac{30,000}{7,20,000} \times 100$
	=	4.16 %

Answers

(a) <i>Current Ratio</i>	=	1.47 (or) 1.47 :1
(b) <i>Liquid Ratio</i>	=	0.64 (or) 0.64 :1
(c) <i>Gross Capital Employed</i>	=	Rs. 8,50,000
(d) <i>Net Capital Employed</i>	=	Rs. 7,20,000
(e) <i>Average Capital Employed</i>	=	Rs. 7,35,000
(f) <i>Return on Capital Employed</i>	=	3.52 % (or) 4.16 %

(7) Earning Per Share Ratio

Earning Per Share Ratio (EPS) measures the earning capacity of the concern from the owner's point of view and it is helpful in determining the price of the equity share in the market place. Earning Per Share Ratio can be calculated as :

$$\text{Earning Per Share Ratio} = \frac{\text{Net Profit After Tax and Preference Dividend}}{\text{No. of Equity Shares}}$$

Advantages

- (1) This ratio helps to measure the price of stock in the market place.
- (2) This ratio highlights the capacity of the concern to pay dividend to its shareholders.
- (3) This ratio used as a yardstick to measure the overall performance of the concern.

Illustration: 15

Calculate the Earning Per Share from the following data :

Net Profit before tax Rs. 2,00,000.

Taxation at 50% of Net Profit.

10 % Preference share capital (Rs. 10 each) Rs. 2,00,000, Equity share capital (Rs. 10 each) Rs. 2,00,000.

Solution:

	=	<u>Net Profit After Tax and Preference Dividend</u>
Earning Per Equity Share	=	No. of Equity Shares
Net Profit before Tax	=	Rs. 2,00,000
Taxation at 50 % of Net Profit	=	2,00,000 x $\frac{50}{100}$
	=	Rs. 1,00,000
Net Profit after Tax	=	Rs. 2,00,000 – 1,00,000
	=	Rs. 1,00,000
10 % of Preference Dividend	=	2,00,000 x $\frac{10}{100}$
	=	Rs. 20,000
Net Profit after Tax and Preference Dividend	=	Rs. 1,00,000 – 20,000
	=	Rs. 80,000
No. of Equity Shares	=	<u>2,00,000</u>
	=	10
	=	20,000 Shares
Earning Per Equity Share	=	<u>80,000</u>
	=	20,000
	=	Rs. 4 Per Share

(8) Dividend Payout Ratio

This ratio highlights the relationship between payment of dividend on equity share capital and the profits available after meeting tax and preference dividend. This ratio indicates the dividend policy adopted by the top management about utilization of divisible profit to pay dividend or to retain or both. The ratio, thus, can be calculated as :

$$\begin{aligned} \text{Dividend Payout Ratio} &= \frac{\text{Equity Dividend}}{\text{Net Profit After Tax and Preference Dividend}} \times 100 \\ & \text{(or)} \\ &= \frac{\text{Dividend Per Equity Share}}{\text{Earning Per Equity Share}} \times 100 \end{aligned}$$

Illustration: 16

Compute Dividend Payout Ratio from the following data :

Net Profit	Rs. 60,000
Provision for tax	Rs. 15,000
Preference dividend	Rs. 15,000
No. of Equity Shares	Rs. 6,000
Dividend Per Equity Share = 0.30	

Solution :

$$\begin{aligned} \text{Dividend Payout Ratio} &= \frac{\text{Equity Dividend}}{\text{Net Profit After Tax and Preference Dividend}} \times 100 \\ \text{Equity Dividend} &= \text{No. of Equity Shares} \times \text{Dividend Per Equity Share} \\ &= 6,000 \times 0.30 \\ &= \text{Rs. 1,800} \\ \text{Net Profit After Tax} &= \text{Rs. 60,000} - (15,000 + 15,000) \\ \text{Preference Dividend} &= \text{Rs. 60,000} - 30,000 \\ &= \text{Rs. 30,000} \end{aligned}$$

Alternatively

$$\begin{aligned} \text{Dividend Payout Ratio} &= \frac{\text{Dividend Per Equity Share}}{\text{Earning Per Equity Share}} \times 100 \\ \text{Dividend Per Equity Share} &= 0.30 \\ \text{Earning Per Equity Share} &= \frac{\text{Net Profit After tax and Preference Dividend}}{\text{No. of Equity Shares}} \\ &= \frac{30,000}{6,000} = \text{Rs. 5 Per Share} \\ \text{Dividend Payout Ratio} &= \frac{0.30}{5} \times 100 \\ &= 6\% \end{aligned}$$

(9) Dividend Yield Ratio:

Dividend Yield Ratio indicates the relationship is established between dividend per share and market value per share. This ratio is a major factor that determines the dividend income from the investors' point of view. It can be calculated by the following formula :

$$\text{Dividend Yield Ratio} = \frac{\text{Dividend Per Share}}{\text{Market Value Per Share}} \times 100$$

Illustration: 17

The following details have been given to you for M/s I.M. Pandey Ltd., you are required to find out (1) Dividend Yield Ratio (2) Dividend Payout Ratio and (3) Earning Per Share Ratio.

10 % Preference Shares of Rs. 10 each	Rs.	5,00,000
60,000 Equity Shares of Rs. 10 each	Rs.	6,00,000
	Rs.	11,00,000

Additional Information	
Profit after tax at	50 %
Equity Dividend Paid	20 %
Market Price of Equity Share Rs. 30	

Solution:

Profit after Tax	=	Rs.	1,50,000
Less : Preference dividend (10% of 5,00,000)	=		50,000
Equity Earnings	=		<u>1,00,000</u>

Profit after tax and preference dividend	=	Rs. 1,00,000	
No. of Equity Shares	=	60,000 Shares	
(1) Dividend Yield Ratio	=	$\frac{\text{Dividend Per Share}}{\text{Market Value Per Share}} \times 100$	
	=	$\frac{20 \% \text{ of Rs. } 10}{\text{Rs. } 30} \times 100$	
	=	$\frac{2}{30} \times 100 = 6.66\%$	
(2) Earning Per Equity Share	=	$\frac{\text{Net Profit after tax preference dividend}}{\text{No. of Equity Shares}} \times 100$	
	=	$\frac{1,00,000}{60,000} = \text{Rs. } 1.67 \text{ Per Share}$	
(3) Dividend Payout Ratio	=	$\frac{\text{Dividend Per Equity Share}}{\text{Earning Per Equity Share}} \times 100$	
	=	$\frac{2}{1.67} \times 100$	
	=	119.76%	

Alternatively

$$\begin{aligned}
 \text{Dividend Payout Ratio} &= \frac{\text{Equity Dividend}}{\text{Net Profit After Tax and Preference Dividend}} \times 100 \\
 \text{Equity Dividend} &= 20\% \text{ of Rs. } 10 = \text{Rs. } 2 \\
 \therefore \text{Equity Dividend for 60,000 Shares} &= 60,000 \times 2 = \text{Rs. } 1,20,000 \\
 \text{Dividend Payout Ratio} &= \frac{1,20,000}{1,00,000} \times 100 \\
 &= 120\%
 \end{aligned}$$

Illustration: 18

Compute: (1) Earning Per Share (2) Dividend Yield Ratio from the following information :

Net Profit	= Rs. 3,00,000
Market Price Per Equity Share	= Rs. 40
No. of Equity Shares	= 30,000
Provision for Tax	= Rs. 50,000
Preference Dividend	= Rs. 30,000

Solution:

$$\begin{aligned}
 (1) \text{ Earning Per Share} &= \frac{\text{Net Profit After Tax and Preference Dividend}}{\text{No. of Equity Shares}} \times 100 \\
 \left. \begin{array}{l} \text{Net Profit After Tax and} \\ \text{Preference Dividend} \end{array} \right\} &= \text{Rs. } 3,00,000 - (50,000 + 30,000) \\
 &= \text{Rs. } 3,00,000 - 80,000 = \text{Rs. } 2,20,000 \\
 (2) \text{ Earning Per Share} &= \frac{2,20,000}{30,000} \\
 &= \text{Rs. } 7.33 \\
 \text{Dividend Yield Ratio} &= \frac{\text{Earning Per Share}}{\text{Market Value Per Share}} \times 100 \\
 &= \frac{7.33}{40} \times 100 \\
 &= 18.33\%
 \end{aligned}$$

(10) Price Earning Ratio

This ratio highlights the earning per share reflected by market share. Price Earning Ratio establishes the relationship between the market price of an equity share and the earning per equity share. This ratio helps to find out whether the equity shares of a company are undervalued or not. This ratio is also useful in financial forecasting. This ratio is calculated as :

$$\text{Price Earning Ratio} = \frac{\text{Market Price Per Equity Share}}{\text{Earning Per Share}}$$

Illustration: 19

Calculate (1) Earning Per Share (2) Dividend Yield Ratio and (3) Price Earning Ratio from the following figures:

Net Profit	=	Rs. 6,00,000
Market price Per Equity Shares	=	Rs. 60
No. of Equity Shares	=	40,000
Provision for Tax	=	Rs. 1,60,000
Preference Dividend	=	Rs. 50,000
Depreciation	=	Rs. 70,000
Bank Overdraft	=	Rs. 50,000

Solution:

$$\begin{aligned}
 (1) \text{ Earning Per Share} &= \frac{\text{Net Profit After Tax and Preference Dividend}}{\text{No. of Equity Shares}} \\
 \text{Net Profit After Tax and Preference Dividend} &= \text{Rs. 6,00,000} - (1,60,000 + 50,000) \\
 &= \text{Rs. 6,00,000} - 2,10,000 = \text{Rs. 3,90,000} \\
 \text{Earning Per Share} &= \frac{3,90,000}{40,000} \\
 &= \text{Rs. 9.75} \\
 (2) \text{ Dividend Yield Ratio} &= \frac{\text{Earning Per Share}}{\text{Market Value Per Share}} \times 100 \\
 &= \frac{9.75}{60} \times 100 \\
 &= 16.25\% \\
 (3) \text{ Price Earning Ratio} &= \frac{\text{Market Price Per Equity Share}}{\text{Earning Per Share}} \\
 &= \frac{60}{9.75} \\
 &= 6.15
 \end{aligned}$$

Interpretations: The market price of a share is Rs. 60 and earning per share is Rs. 9.75, the price earning ratio would be 6.15. It means that the market value of every one rupee of earning is 6.15 times or Rs. 6.15.

(11) Net Profit to Net Worth Ratio

This ratio measures the profit return on investment. This ratio indicates the established relationship between net profit and shareholders' net worth. It is a reward for the assumption of ownership risk. This ratio is calculated as :

$$\begin{aligned}
 \text{Net Profit to Net Worth} &= \frac{\text{Net Profit After Taxes}}{\text{Shareholders' Net Worth}} \times 100 \\
 \text{Shareholder Net Worth} &= \text{Total Tangible Net Worth} \\
 \text{Total Tangible Net Worth} &= \text{Company's Net Assets} - \text{Long-Term Liabilities} \\
 & \text{(or)} \\
 &= \text{Shareholders' Funds} + \text{Profits Retained in business}
 \end{aligned}$$

Advantages

- (1) This ratio determines the incentive to owners.
- (2) This ratio helps to measure the profit as well as net worth.
- (3) This ratio indicates the overall performance and effectiveness of the firm.
- (4) This ratio measures the efficiency with which the resources of a firm have been employed.

Illustration: 20

Compute Net Profit to Net Worth Ratio from the following data :

	Rs.
Net Profit	80,000
Provision for Tax	15,000
Shareholders' Fund	8,00,000
Dividend to Equity Shares	20,000
Dividend to Preference Shares @ 10 %	10,000

Solution:

Net Profit to Net Worth	=	$\frac{\text{Net Profit After Taxes}}{\text{Total Tangible Net Worth}}$	x 100
Net Profit after Taxes	=	Rs. 80,000 – 15,000 = Rs.65, 000	
Total Tangible Net Worth	=	Shareholders' fund + Profit retained in business	
Profit Retained in Business	=	Profit – (Taxes + Preference dividend + Equity dividend)	
	=	Rs. 80,000 – (15,000 + 20,000 + 10,000)	
	=	Rs. 80,000 – 45,000	
	=	Rs. 35,000	
Total Tangible Net Worth	=	Rs. 8,00,000 + 35,000	
	=	Rs. 9,15,000	
Net Profit Net Worth	=	$\frac{65,000}{9,15,000}$	x 100 = 7.10%
Net Profit to Net Worth Ratio	=	7.10 %	

III. TURNOVER RATIOS

Turnover Ratios may be also termed as Efficiency Ratios or Performance Ratios or Activity Ratios. Turnover Ratios highlight the different aspect of financial statement to satisfy the requirements of different parties interested in the business. It also indicates the effectiveness with which different assets are vitalized in a business. Turnover means the number of times assets are converted or turned over into sales. The activity ratios indicate the rate at which different assets are turned over.

Depending upon the purpose, the following activities or turnover ratios can be calculated :

1. Inventory Ratio or Stock Turnover Ratio (Stock Velocity)
2. Debtor's Turnover Ratio or Receivable Turnover Ratio (Debtor's Velocity)
- 2 A. Debtor's Collection Period Ratio
3. Creditor's Turnover Ratio or Payable Turnover Ratio (Creditor's Velocity)
- 3 A. Debt Payment Period Ratio

4. Working Capital Turnover Ratio
5. Fixed Assets Turnover Ratio
6. Capital Turnover Ratio.

(1) Stock Turnover Ratio

This ratio is also called as Inventory Ratio or Stock Velocity Ratio.

Inventory means stock of raw materials, working in progress and finished goods. This ratio is used to measure whether the investment in stock in trade is effectively utilized or not. It reveals the relationship between sales and cost of goods sold or average inventory at cost price or average inventory at selling price. Stock Turnover Ratio indicates the number of times the stock has been turned over in business during a particular period. While using this ratio, care must be taken regarding season and condition, price trend, supply condition etc. In order to compute this ratio, the following formulae are used :

$$\begin{aligned}
 (1) \text{ Stock Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory at Cost}} \\
 \text{Cost of Goods Sold} &= \text{Opening Stock} + \text{Purchases} + \text{Direct Expenses} - \text{Closing Stock} \\
 &(\text{or}) \\
 &= \text{Total Cost of Production} + \text{Opening Stock of Finished Goods} - \text{Closing Stock of Finished Goods} \\
 \text{Total Cost of Production} &= \text{Cost of Raw Material Consumed} + \text{Wages} + \text{Factory Cost} \\
 &(\text{or}) \\
 &= \text{Sales} - \text{Gross Profit} \\
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 (2) \text{ Stock Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Average Inventory at Cost}} \\
 (3) \text{ Stock Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Average Inventory at Selling Price}} \\
 (4) \text{ Stock Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Inventory}}
 \end{aligned}$$

The above said formulas can be used on the basis of the information given in the illustration.

Advantages

- (1) This ratio indicates whether investment in stock in trade is efficiently used or not.
- (2) This ratio is widely used as a measure of investment in stock is within proper limit or not.
- (3) This ratio highlights the operational efficiency of the business concern.
- (4) This ratio is helpful in evaluating the stock utilization.

- (5) It measures the relationship between the sales and the stock in trade.
- (6) This ratio indicates the number of times the inventories have been turned over in business during a particular period.

Illustration: 21

From the following information calculate stock turnover ratio :

Gross Sales	:	Rs.	5,00,000
Sales Return	:	Rs.	25,000
Opening Stock	:	Rs.	70,000
Closing Stock at Cost	:	Rs.	85,000
Purchase	:	Rs.	3,00,000
Direct Expenses	:	Rs.	1,00,000

Solution:

$$\begin{aligned}
 \text{Inventory Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory at Cost}} \\
 \text{Cost of Goods Sold} &= \text{Opening Stock} + \text{Purchases} + \text{Direct Expenses} \\
 &\quad - \text{Closing Stock} \\
 &= \text{Rs. } 70,000 + 3,00,000 + 1,00,000 - 85,000 \\
 &= \text{Rs. } 3,85,000 \\
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 &= \frac{70,000 + 85,000}{2} = \text{Rs. } 77,500 \\
 \text{Inventory Turnover Ratio} &= \frac{3,85,000}{77,500} = 4.97 \text{ times}
 \end{aligned}$$

Illustration: 22

The following figures are extract from the Trading Account of X A/c, you are required to calculate stock Turnover Ratio :

Opening Stock	Rs.	30,000
Purchases	Rs.	1,10,000
Direct Expenses	Rs.	10,000
Gross Profit	Rs.	75,000
Gross Sales	Rs.	2,20,000
Sales Return	Rs.	10,000
Closing Stock at Cost	Rs.	15,000

Solution:

$$\begin{aligned}
 \text{Stock Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory at Cost}} \\
 \text{Cost of Goods Sold} &= \text{Opening Stock} + \text{Purchases} \\
 &\quad + \text{Direct Expenses} - \text{Closing Stock} \\
 &= \text{Rs. } 30,000 + 1,10,000 + 10,000 - 15,000 \\
 &= \text{Rs. } 1,35,000
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\
 \text{Net Sales} &= \text{Sales} - \text{Sales Return} \\
 &= \text{Rs. } 2,20,000 - 10,000 = \text{Rs. } 2,10,000 \\
 \text{Cost of Goods Sold} &= \text{Rs. } 2,10,000 - 75,000 = \text{Rs. } 1,35,000 \\
 \text{Average Inventory} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 &= \frac{30,000 + 15,000}{2} = \frac{45,000}{2} \\
 &= \text{Rs. } 22,500 \\
 \text{Stock Turnover Ratio} &= \frac{1,35,000}{22,500} = 6 \text{ times}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Stock Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Average Inventory at Cost}} \\
 &= \frac{2,10,000}{22,500} \\
 &= 9.33 \text{ times}
 \end{aligned}$$

(2) Debtor's Turnover Ratio

Debtor's Turnover Ratio is also termed as Receivable Turnover Ratio or Debtor's Velocity. Receivables and Debtors represent the uncollected portion of credit sales. Debtor's Velocity indicates the number of times the receivables are turned over in business during a particular period. In other words, it represents how quickly the debtors are converted into cash. It is used to measure the liquidity position of a concern. This ratio establishes the relationship between receivables and sales. Two kinds of ratios can be used to judge a firm's liquidity position on the basis of efficiency of credit collection and credit policy. They are (A) Debtor's Turnover Ratio and (B) Debt Collection Period. These ratios may be computed as :

$$\begin{aligned}
 (1) \text{ Debtor's Turnover Ratio} &= \frac{\text{Net Credit Sales}}{\text{Average Receivables}} \\
 &\quad \text{or} \\
 &\quad \text{Average Accounts Receivable} \\
 \text{Net Credit Sales} &= \text{Total Sales} - (\text{Cash Sales} + \text{Sales Return}) \\
 \text{Accounts Receivable} &= \text{Sundry Debtors or Trade Debtors} \\
 &\quad + \text{Bills Receivable} \\
 \text{Average Accounts Receivable} &= \frac{\text{Opening Receivable} + \text{Closing Receivable}}{2}
 \end{aligned}$$

It is to be noted that opening and closing receivable and credit sales are not available, the ratio may be calculated as

$$\text{Debtor's Turnover Ratio} = \frac{\text{Total Sales}}{\text{Accounts Receivable}}$$

Illustration: 23

Calculate Debtor's Turnover Ratio, from the following data :

		Rs.
Sundry Debtors as on	1.1.2003	70,000
Sundry Debtors as on	31.12.2003	90,000
Bills Receivable as on	1.1.2003	20,000
Bills Receivable as on	31.12.2003	30,000
Total Sales for the year 2003		7,00,000
Sales Return		20,000
Cash sales for the year 2003		1,00,000

Solution:

$$\begin{aligned}
 \text{Debtor's Turnover Ratio} &= \frac{\text{Net Credit Sales}}{\text{Average Account Receivable}} \\
 \text{Net Credit Sales} &= \text{Total Sales} - (\text{Cash Sales} + \text{Sales Return}) \\
 &= \text{Rs. } 7,00,000 - (1,00,000 + 20,000) \\
 &= \text{Rs. } 5,80,000 \\
 \text{Average Accounts Receivable} &= \frac{\text{Opening Receivable} + \text{Closing Receivable}}{2} \\
 &= \frac{(70,000 + 20,000) + (90,000 + 30,000)}{2} \\
 &= \frac{90,000 + 1,20,000}{2} = \frac{2,10,000}{2} \\
 &= \text{Rs. } 1,05,000 \\
 \text{Debtors Turnover Ratio} &= \frac{5,80,000}{1,05,000} \\
 &= 5.52 \text{ times}
 \end{aligned}$$

2 (A) Debt Collection Period Ratio

This ratio indicates the efficiency of the debt collection period and the extent to which the debt have been converted into cash. This ratio is complementary to the Debtor Turnover Ratio. It is very helpful to the management because it represents the average debt collection period. The ratio can be calculated as follows:

$$\begin{aligned}
 \text{(a) Debt Collection Period Ratio} &= \frac{\text{Months (or) Days in a year}}{\text{Debtor's Turnover}} \\
 &\quad \text{(or)} \\
 &\quad \frac{\text{Average Accounts Receivable} \times \text{Months (or) Days in a year}}{\text{Net Credit Sales for the year}} \\
 \text{(b) Debt Collection Period Ratio} &= \frac{\text{Average Accounts Receivable} \times \text{Months (or) Days in a year}}{\text{Net Credit Sales for the year}}
 \end{aligned}$$

Advantages of Debtor's Turnover Ratio

- (1) This ratio indicates the efficiency of firm's credit collection and efficiency of credit policy.
- (2) This ratio measures the quality of receivable, i.e., debtors.

- (3) It enables a firm to judge the adequacy of the liquidity position of a concern.
- (4) This ratio highlights the probability of bad debts lurking in the trade debtors.
- (5) This ratio measures the number of times the receivables are turned over in business during a particular period.
- (6) It points out the liquidity of trade debtors, i.e., higher turnover ratio and shorter debt collection period indicate prompt payment by debtors. Similarly, low turnover ratio and higher collection period implies that payment by trade debtors are delayed :

Illustration: 24

From the following information calculate:

<p>(a) <i>Debtor's Turnover Ratio and</i></p> <p>Total Sales</p> <p>Cash Sales</p> <p>Sales Return</p> <p>Opening Accounts Receivable</p> <p>Closing Accounts Receivable</p>	<p>(b) <i>Debt Collection Period Ratio.</i></p> <p>Rs. 1,00,000</p> <p>Rs. 25,000</p> <p>Rs. 5,000</p> <p>Rs. 10,000</p> <p>Rs. 15,000</p>
--	--

Solution:

$$\begin{aligned}
 \text{(a) Debtor's Turnover Ratio} &= \frac{\text{Net Credit Sales}}{\text{Average Receivables}} \\
 \text{Net Credit Sales} &= \text{Total Sales} - (\text{Cash Sales} + \text{Sales Return}) \\
 &= \text{Rs. } 1,00,000 - (25,000 + 5,000) \\
 &= \text{Rs. } 70,000 \\
 \text{Average Receivables} &= \frac{\text{Opening Receivables} + \text{Closing Receivables}}{2} \\
 &= \frac{10,000 + 15,000}{2} = \frac{25,000}{2} = \text{Rs. } 12,500 \\
 \text{Debtor's Turnover Ratio} &= \frac{70,000}{12,500} = 5.6 \text{ times} \\
 \text{(b) Debt Collection Period Ratio} &= \frac{\text{Month (or) Days in a year}}{\text{Debtor's Turnover}} \\
 &= \frac{12}{5.6} \\
 &= 2.14 \text{ months}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Debt Collection Period Ratio} &= \frac{\text{Average Accounts Receivable} \times \text{Months in a year}}{\text{Net Credit Sales for the year}} \\
 &= \frac{12,500 \times 12}{70,000} \\
 &= 2.14 \text{ months}
 \end{aligned}$$

Illustration: 25

From the following profit and loss Account and balance sheet relating to Ramesh Company presented as on 31st March, 2003 :

Dr.		Profit and Loss Account		Cr.
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
To Opening Stock	3,000	By Gross Sales	Rs. 2,00,000	
To Purchase	1,20,000	Less: Sales Return	Rs. 5,000	1,95,000
To Wages (Direct)	7,000	By Closing Stock		5,000
To Gross Profit c/d	70,000			
	2,00,000			2,00,000
To Administrative Expn.	15,000	By Gross Profit b/d		70,000
To Selling and Distribution expenses]	20,000	By Dividend Received		10,000
To Loss on sale of Fixed Assets]	5,000			
To Net Profit	40,000			
	80,000			80,000

Balance Sheet as on 31st March 2002

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital (5000 Equity Shares of 100 each)	5,00,000	Land	1,50,000
General Reserve	50,000	Building	2,00,000
Profit and Loss A/c	70,000	Plant & Machinery	2,00,000
Sundry Creditors	80,000	Stock	80,000
		Debtors	50,000
		Bank Balance	20,000
	7,00,000		7,00,000

From the above information you are required to calculate :

- (1) Gross Profit Ratio.
- (2) Operating Ratio.
- (3) Operating Profit Ratio.
- (4) Net Profit to Capital Employed Ratio.
- (5) Current Ratio.
- (6) Liquid Ratio.
- (7) Stock Turnover Ratio.
- (8) Debtor's Turnover Ratio.
- (9) Debt Collection Period Ratio.

Solution:

$$\begin{aligned}
 (1) \text{ Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \\
 &= \frac{70,000}{1,95,000} \times 100 \\
 &= 35.89\%
 \end{aligned}$$

$$\begin{aligned}
 (2) \text{ Operating Ratio} &= \frac{\text{Operating Cost}}{\text{Net Sales}} \times 100 \\
 \text{Operating Cost} &= \text{Cost of goods sold} + \text{Administrative Expenses} + \text{Selling and distribution Expenses} \\
 \text{Cost of Goods Sold} &= \text{Opening Stock} + \text{Purchases} + \text{Direct Wages} - \text{Closing Stock} \\
 &= \text{Rs. } 3,000 + 1,20,000 + 7,000 - 5,000 \\
 &= \text{Rs. } 1,30,000 - 5,000 = \text{Rs. } 1,25,000 \\
 \text{Operating Cost} &= \text{Rs. } 1,25,000 + 15,000 + 20,000 \\
 &= \text{Rs. } 1,60,000 \\
 \text{Operating Ratio} &= \frac{1,60,000}{1,95,000} \times 100 = 82.05\%
 \end{aligned}$$

$$\begin{aligned}
 (3) \text{ Operating Profit Ratio} &= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \\
 \text{Operating Profit} &= \text{Net Sales} - \text{Total Operating Cost} \\
 &= \text{Rs. } 1,95,000 - 1,60,000 = \text{Rs. } 35,000 \\
 \text{Operating Profit Ratio} &= \frac{35,000}{1,95,000} \times 100 \\
 &= 17.94\%
 \end{aligned}$$

$$\begin{aligned}
 (4) \text{ Net Profit to Capital Employed Ratio} &= \frac{\text{Net Profit}}{\text{Capital Employed}} \times 100 \\
 \text{Capital Employed} &= \text{Share Capital} + \text{General Reserve} + \text{Profit and Loss A/c} \\
 &= \text{Rs. } 5,00,000 + 50,000 + 70,000 \\
 &= \text{Rs. } 6,20,000 \\
 \text{Net Profit to Capital Employed Ratio} &= \frac{40,000}{6,20,000} \times 100 \\
 &= 6.45\%
 \end{aligned}$$

$$\begin{aligned}
 (5) \text{ Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 \text{Current Assets} &= \text{Stock} + \text{Debtors} + \text{Bank Balances} \\
 &= \text{Rs. } 80,000 + 50,000 + 20,000 \\
 &= \text{Rs. } 1,50,000 \\
 \text{Current Ratio} &= \frac{1,50,000}{80,000} = 1.88 \text{ (or) } 1.88 : 1
 \end{aligned}$$

$$\begin{aligned}
 (6) \text{ Liquid Ratio} &= \frac{\text{Liquid Assets}}{\text{Current Liabilities}} \\
 \text{Liquid Assets} &= \text{Current Assets} - \text{Stock and Prepaid Expenses} \\
 &= \text{Rs. } 1,50,000 - 80,000 \\
 &= \text{Rs. } 70,000 \\
 \text{Liquid Ratio} &= \frac{70,000}{80,000} \\
 &= 87.5 \text{ (or) } 87.5 : 1
 \end{aligned}$$

$$\begin{aligned}
 (7) \text{ Stock Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \\
 \text{Average Inventory} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 &= \frac{3,000 + 5,000}{2} \\
 &= \text{Rs. 4,000} \\
 \text{Stock Turnover Inventory} &= \frac{1,25,000}{4,000} \\
 &= 31.25 \text{ times}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Stock Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Average Inventory}} \\
 &= \frac{1,95,000}{4,000} = 48.75 \text{ times} \\
 (8) \text{ Debtor's Turnover Ratio} &= \frac{\text{Net Credit Sales}}{\text{Average Receivables}}
 \end{aligned}$$

It is to be noted that credit sales, opening and closing receivables are not given in the problem, the ratio may be calculated as :

$$\begin{aligned}
 \text{Debtor's Turnover Ratio} &= \frac{\text{Total Sales}}{\text{Accounts Receivable}} \\
 &= \frac{1,95,000}{50,000} \\
 &= 3.9 \text{ times} \\
 (9) \text{ Debt Collection Period Ratio} &= \frac{\text{Month or Days in a year}}{\text{Debtor's Turnover}} \\
 &= \frac{365 \text{ days}}{3.9} = 93.58 \text{ days} \\
 &(\text{or}) \\
 &= \frac{12 \text{ months}}{3.9} \\
 &= 3.07 \text{ months}
 \end{aligned}$$

(3) Creditor's Turnover Ratio

Creditor's Turnover Ratio is also called as Payable Turnover Ratio or Creditor's Velocity. The credit purchases are recorded in the accounts of the buying companies as Creditors to Accounts Payable. The Term Accounts Payable or Trade Creditors include sundry creditors and bills payable. This ratio establishes the relationship between the net credit purchases and the average trade creditors. Creditor's velocity ratio indicates the number of times with which the payment is made to the supplier in respect of

credit purchases. Two kinds of ratios can be used for measuring the efficiency of payable of a business concern relating to credit purchases. They are: (1) Creditor's Turnover Ratio (2) Creditor's Payment Period or Average Payment Period. The ratios can be calculated by the following formulas :

$$\begin{aligned}
 (1) \text{ Creditor's Turnover Ratio} &= \frac{\text{Net Credit Purchases}}{\text{Average Accounts Payable}} \\
 \text{Net Credit Purchases} &= \text{Total Purchases} - \text{Cash Purchases} \\
 \text{Average Accounts Payable} &= \frac{\text{Opening Payable} + \text{Closing Payable}}{2} \\
 \\
 (2) \text{ Average Payment Period} &= \frac{\text{Month (or) Days in a year}}{\text{Creditors Turnover Ratio}} \\
 & \text{(or)} \\
 &= \frac{\text{Average Trade Creditors}}{\text{Net Credit Purchases}} \times 365
 \end{aligned}$$

Significance : A high Creditor's Turnover Ratio signifies that the creditors are being paid promptly. A lower ratio indicates that the payment of creditors are not paid in time. Also, high average payment period highlight the unusual delay in payment and it affect the creditworthiness of the firm. A low average payment period indicates enhancing the creditworthiness of the company.

Illustration: 26

From the following information calculate (1) Creditor's Turnover Ratio and (2) Average Payment Period

	Rs.
Total Purchase	3,00,000
Cash Purchases	1,75,000
Purchase Return	25,000
Sundry Creditors 1.1.2003	30,000
Sundry Creditors 31.12.2003	15,000
Bills Payable 1.1.2003	7,000
Bills Payable 31.12.2003	8,000

Solution:

$$\begin{aligned}
 (1) \text{ Creditor's Turnover Ratio} &= \frac{\text{Net Credit Purchases}}{\text{Average Accounts Payables}} \\
 \text{Net Credit Purchases} &= \text{Total Purchases} - (\text{Cash Purchases} + \text{Purchase Return}) \\
 &= \text{Rs. } 3,00,000 - (1,75,000 + 25,000) \\
 &= \text{Rs. } 1,00,000 \\
 \\
 \text{Average Accounts Payable} &= \frac{\text{Opening payable} + \text{Closing payable}}{2} \\
 &= \frac{(30,000 + 7,000) + (15,000 + 8000)}{2}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{60,000}{2} = \text{Rs. } 30,000 \\
 \text{Creditor's Turnover Ratio} &= \frac{1,00,000}{30,000} = 3.33 \text{ times} \\
 (2) \text{ Average Payment Period} &= \frac{\text{Month or Days in a year}}{\text{Creditor's Turnover Ratio}} \\
 &= \frac{12 \text{ months}}{3.33} = 3.60 \text{ months} \\
 &\quad (\text{or}) \\
 &= \frac{365 \text{ days}}{3.33} = 109.61 \text{ days}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Average Payment Period} &= \frac{\text{Average Trade Creditors}}{\text{Net Credit Purchases}} \times 365 \\
 &= \frac{30,000}{1,00,000} \times 365 \\
 &= 109.5 \text{ days}
 \end{aligned}$$

(4) Working Capital Turnover Ratio

This ratio highlights the effective utilization of working capital with regard to sales. This ratio represent the firm's liquidity position. It establishes relationship between cost of sales and networking capital. This ratio is calculated as follows :

$$\begin{aligned}
 \text{Working Capital Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Working Capital}} \\
 \text{Net Sales} &= \text{Gross Sales} - \text{Sales Return} \\
 \text{Work Capital} &= \text{Current Assets} - \text{Current Liabilities}
 \end{aligned}$$

Significance : It is an index to know whether the working capital has been effectively utilized or not in making sales. A higher working capital turnover ratio indicates efficient utilization of working capital, i.e., a firm can repay its fixed liabilities out of its working capital. Also, a lower working capital turnover ratio shows that the firm has to face the shortage of working capital to meet its day-to-day business activities unsatisfactorily.

Illustration: 27

Calculate Working Capital Turnover Ratio :

Current Assets	Rs.	3,20,000
Current Liabilities	Rs.	1,10,000
Gross Sales	Rs.	4,00,000
Sales Return	Rs.	20,000

Solution:

	=	<u>Net Sales</u>
Working Capital Turnover Ratio	=	Working Capital
Net Sales	=	Gross Sales – Sales Return
Working Capital	=	Rs. 4,00,000 – 20,000
		Rs. 3,80,000
Working Capital	=	Current Assets – Current Liabilities
	=	Rs. 3,20,000 – 1,10,000
	=	Rs. 2,10,000
		<u>3,80,000</u>
Working Capital Turnover Ratio	=	2,10,000
	=	1.80 times

Illustration: 28

The following information is given about M/s Gowda Ltd. for the year ending Dec. 31st 2003 :

(a) Share Capital	Rs. 8,40,000
(b) Bank Overdraft	Rs. 50,000
(c) Working Capital	Rs. 2,52,000
(d) Current Ratio	= 2.5 :1
(e) Quick Ratio	= 1.5 :1
(f) Gross Profit Ratio	= 20 % on sales
(g) Stock Turnover Ratio	= 5 times
(h) Sales for 2003	Rs. 5,00,000
(i) Trade Debtors	Rs. 70,000
(j) Opening Creditors	Rs. 40,000
(k) Closing Creditors	Rs. 30,000
(l) Closing Stock is Rs. 20,000 higher than the opening stock	

Find Out

- (a) Current Assets and Current Liabilities.
- (b) Cost of goods sold, Average stock and Purchases.
- (c) Creditor's Turnover Ratio.
- (d) Creditor's Payment Period.
- (e) Debtor's Turnover Period.
- (f) Debtor's Collection Period.
- (g) Working Capital Turnover Ratio.

Solution:**(a) Current Assets and Current Liabilities :**

Working Capital	=	Current Assets – Current Liabilities
∴ Rs. 2,52,000	=	2.5 – 1
1.5	=	Rs. 2,52,000
		<u>2,52,000</u>
1	=	1.5
	=	Rs. 1,68,000

Therefore

Current Assets	=	Rs. 1,68,000 x 2.5 = Rs. 4,20,000
Current Liabilities	=	Rs. 1,68,000 x 1 = Rs. 1,68,000

(b) Cost of goods sold, Average Stock and Purchases :

$$\begin{aligned}
 \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\
 &= \text{Rs. } 5,00,000 - 20\% \text{ on sales} \\
 &= \text{Rs. } 5,00,000 - 1,00,000 \\
 &= \text{Rs. } 4,00,000
 \end{aligned}$$

Average Stock

$$\begin{aligned}
 \text{Stock Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} \\
 5 \text{ times} &= \frac{4,00,000}{\text{Average Stock}} \\
 \text{Average Stock} &= \frac{4,00,000}{5} \\
 &= \text{Rs. } 80,000
 \end{aligned}$$

Purchases

$$\begin{aligned}
 \text{Cost of Goods Sold} &= \text{Opening Stock} + \text{Purchases} - \text{Closing Stock} \\
 \text{Purchases} &= \text{Cost of Goods Sold} + \text{Closing Stock} \\
 &\quad - \text{Opening Stock} \\
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2}
 \end{aligned}$$

Since closing stock is Rs. 20,000 higher than the opening stock

$$\begin{aligned}
 \text{Rs. } 80,000 &= \frac{\text{Opening Stock} + (\text{Rs. } 20,000 + \text{Opening Stock})}{2} \\
 \text{Rs. } 1,60,000 &= 2 \text{ Opening Stock} + \text{Rs. } 20,000 \\
 \text{Opening Stock} &= \frac{1,60,000 - 20,000}{2} = \frac{1,40,000}{2} \\
 &= \text{Rs. } 70,000 \\
 \text{Closing Stock} &= \text{Rs. } 70,000 + \text{Rs. } 20,000 = \text{Rs. } 90,000 \\
 \text{Purchases} &= \text{Rs. } 4,00,000 + 90,000 - 70,000 = \text{Rs. } 4,20,000
 \end{aligned}$$

(c) Creditor's Turnover Ratio

$$\begin{aligned}
 \text{Creditor's Turnover Ratio} &= \frac{\text{Net Credit Purchases}}{\text{Average Trade Creditors}} \\
 \text{All Purchases taken as credit purchases} & \\
 \text{Average Trade Creditors} &= \frac{\text{Opening Creditors} + \text{Closing Creditors}}{2} \\
 \text{Average Trade Creditors} &= \frac{\text{Rs. } 40,000 + \text{Rs. } 30,000}{2} \\
 &= \frac{\text{Rs. } 70,000}{2} \\
 &= \text{Rs. } 35,000
 \end{aligned}$$

(d) Creditor's Payment Period

$$\begin{aligned}
 \text{Creditor's Payment Period} &= \frac{\text{Month or Days in a year}}{\text{Creditor's Turnover Ratio}} \\
 &= \frac{12 \text{ months}}{12} \\
 &= 1 \text{ month}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Creditor's Payment Period} &= \frac{\text{Average Trade Creditor's x No. of Working Days}}{\text{Net Credit Purchases}} \\
 &= \frac{35,000 \times 365}{4,20,000} \\
 &= 30.41 \text{ days}
 \end{aligned}$$

(e) Debtor's Turnover Ratio

$$\text{Debtor's Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Trade Debtor's}}$$

It is to be noted that credit sales, opening and closing receivables are not given in the problem, so the ratio may be calculated as :

$$\begin{aligned}
 \text{Debtor's Turnover Ratio} &= \frac{\text{Total Sales}}{\text{Accounts Receivable or Trade Debtor's}} \\
 &= \frac{\text{Rs. 5,00,000}}{\text{Rs. 70,000}} \\
 &= 7.14 \text{ times}
 \end{aligned}$$

(f) Debtors Collection Period

$$\begin{aligned}
 \text{Debtor's Collection Period} &= \frac{\text{Month or Days in a year}}{\text{Debtor's Turnover Ratio}} \\
 &= \frac{12 \text{ months}}{7.14} \\
 &= 1.68 \text{ months}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Debtor's Collection Period} &= \frac{\text{Average Trade Debtors x No. of Working Days}}{\text{Net Annual Sales}} \\
 &= \frac{70,000 \times 365}{5,00,000} \\
 &= 51.1 \text{ days}
 \end{aligned}$$

(g) Working Capital Turnover Ratio

$$\begin{aligned}
 \text{Working Capital Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Net Working Capital}} \\
 &= \frac{\text{Rs. 4,00,000}}{\text{Rs. 2,50,000}} \\
 &= 1.6 \text{ times}
 \end{aligned}$$

(5) Fixed Assets Turnover Ratio

This ratio indicates the efficiency of assets management. Fixed Assets Turnover Ratio is used to measure the utilization of fixed assets. This ratio establishes the relationship between cost of goods sold and total fixed assets. Higher the ratio highlights a firm has successfully utilized the fixed assets. If the ratio is depressed, it indicates the under utilization of fixed assets. The ratio may also be calculated as:

$$\begin{aligned}
 \text{Fixed Assets Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Total Fixed Assets}} \\
 &\quad \text{(or)} \\
 &= \frac{\text{Sales}}{\text{Net Fixed Assets}}
 \end{aligned}$$

Components of Fixed Assets (or) Non-Current Assets

- (1) Goodwill
- (2) Land and Building
- (3) Plant and Machinery
- (4) Furniture and Fittings
- (5) Trade Mark
- (6) Patent Rights and Livestock
- (7) Long-Term Investment
- (8) Debt Balance of Profit and Loss Account
- (9) Discount on Issue of Shares
- (10) Discount on Issue of Debenture
- (11) Preliminary Expenses
- (12) Other Deferred Expenses
- (14) Government or Trust Securities
- (15) Any other immovable Prosperities

Illustration: 29

Find out Fixed Assets Turnover Ratio from the following information :

Total Fixed Assets	=	Rs. 6,00,000
Gross Profit	=	20 % on sales
Net Sales	=	Rs. 8,00,000
Debenture	=	Rs. 2,00,000
Share Capital	=	Rs. 3,00,000

Solution :

Fixed Asset Turnover Ratio	=	$\frac{\text{Cost of Goods Sold}}{\text{Total Fixed Assets}}$
Cost of Goods Sold	=	Sales – Gross Profit
	=	Rs. 8,00,000 – 20 % on sales
	=	Rs. 8,00,000 – 1,60,000 = Rs. 6,40,000
Fixed Assets Turnover Ratio	=	$\frac{\text{Rs. 6,40,000}}{\text{Rs. 6,00,000}}$
	=	1.06 times

Alternatively

Fixed Assets Turnover Ratio	=	$\frac{\text{Sales}}{\text{Net Fixed Assets}}$
	=	$\frac{\text{Rs. 8,00,000}}{\text{Rs. 6,00,000}}$
	=	1.33 times

Illustration: 30

From the following information find out Fixed Assets Turnover Ratio :

Opening Stock	Rs.	40,000
Purchases	Rs.	3,00,000
Closing Stock	Rs.	60,000
Sales	Rs.	5,00,000
Total Fixed Assets	Rs.	6,25,000
Depreciation	Rs.	25,000

Solution:

Fixed Assets Turnover Ratio	=	$\frac{\text{Cost of Goods Sold}}{\text{Total Fixed Assets}}$
Cost of goods sold	=	Opening Stock + Purchases – Closing Stock
	=	Rs. 40,000 + 3,00,000 – 60,000
	=	Rs. 2,80,000
Fixed Assets Turnover Ratio	=	$\frac{2,80,000}{6,25,000}$
	=	0.448 times

Alternatively

$$\begin{aligned}
 \text{Fixed Assets Turnover Ratio} &= \frac{\text{Sales}}{\text{Net Fixed Assets}} \\
 \text{Net Fixed Assets} &= \text{Total Fixed Assets} - \text{Depreciation} \\
 &= \text{Rs. } 6,25,000 - 25,000 = \text{Rs. } 6,00,000 \\
 \text{Fixed Assets Turnover Ratio} &= \frac{5,00,000}{6,00,000} \\
 &= 0.83 \text{ times}
 \end{aligned}$$

Illustration: 31

Find out Fixed Assets Gross Profit and Cost of Sales from the following information :

Sales Rs. 5,00,000
 Gross Profit Ratio 20 %
 Fixed Assets Turnover Ratio (on cost of sales) 4 times

Solution:

$$\begin{aligned}
 \text{Gross Profit} &= \text{Sales} \times \text{Gross Profit Ratio} \\
 &= \text{Rs. } 5,00,000 \times 20 \% \\
 &= 5,00,000 \times \frac{20}{100} \\
 &= \text{Rs. } 1,00,000 \\
 \text{Cost of Sales} &= \text{Sales} - \text{Gross Profit} \\
 &= \text{Rs. } 5,00,000 - 1,00,000 = \text{Rs. } 4,00,000 \\
 \text{Fixed Assets Turnover} &= \frac{\text{Cost of Sales}}{\text{Fixed Assets}} \\
 4 &= \frac{\text{Rs. } 4,00,000}{\text{Fixed Assets}} \\
 \text{Fixed Assets} &= \frac{4,00,000}{4} = \text{Rs. } 1,00,000
 \end{aligned}$$

(6) Capital Turnover Ratio

This ratio measures the efficiency of capital utilization in the business. This ratio establishes the relationship between cost of sales or sales and capital employed or shareholders' fund. This ratio may also be calculated as :

$$\begin{aligned}
 (1) \text{ Capital Turnover Ratio} &= \frac{\text{Cost of Sales}}{\text{Capital Employed}} \quad (\text{or}) \quad \frac{\text{Sales}}{\text{Capital Employed}} \\
 \text{Capital Employed} &= \text{Shareholders' Funds} + \text{Long-Term Loans} \\
 & \quad (\text{or}) \\
 &= \text{Total Assets} - \text{Current Liabilities} \\
 (2) \text{ Capital Turnover Ratio} &= \frac{\text{Cost of Sales}}{\text{Shareholders' Fund}} \quad (\text{or}) \quad \frac{\text{Sales}}{\text{Shareholders' Fund}}
 \end{aligned}$$

Components of Capital Employed (Shareholders' Fund + Long-Term Loans)

- (1) Equity Share Capital
- (2) Preference Share Capital
- (3) Debentures
- (4) Long-Term Loans
- (5) Share Premium
- (6) Credit Balance of Profit and Loss Account
- (7) Capital Reserve
- (8) General Reserve
- (9) Provisions
- (10) Appropriation of Profits

Illustration: 32

From the following information find out (a) Cost of Sales (b) Capital Employed and (c) Capital Turnover Ratio.

	<i>Rs.</i>
Total Assets	10,00,000
Bills Payable	1,50,000
Sundry Creditors	75,000
Opening Stock	50,000
Purchases	3,00,000
Closing Stock	60,000

Solution:

$$\begin{aligned}
 (a) \text{ Cost of Sales} &= \text{Opening Stock} + \text{Purchases} - \text{Closing Stock} \\
 &= \text{Rs. } 5,00,000 + 4,00,000 - 60,000 \\
 &= \text{Rs. } 3,90,000 \\
 (b) \text{ Capital Employed} &= \text{Total Assets} - \text{Current Liabilities} \\
 &= \text{Rs. } 10,00,000 - 2,25,000 = \text{Rs. } 7,75,000 \\
 (3) \text{ Capital Turnover Ratio} &= \frac{\text{Cost of Sales}}{\text{Capital Employed}} \\
 &= \frac{3,90,000}{7,75,000} \\
 &= 0.50 \text{ times}
 \end{aligned}$$

Illustration: 33

Equity Share Capital	Rs. 3,00,000
General Reserve	Rs. 50,000
Preference Share Capital	Rs. 2,00,000
Long-Term Loans	Rs. 1,50,000
Profit and Loss Account (Credit Balance)	Rs. 70,000
Total Sales	Rs. 10,00,000
Gross Profit	Rs. 80,000

From the above information find out Capital Turnover Ratio

Solution:

$$\begin{aligned}
 \text{Capital Turnover Ratio} &= \frac{\text{Sales}}{\text{Capital Employed}} \\
 \text{Capital Employed} &= \text{Shareholder fund} + \text{Long-Term Loans} \\
 &= \text{Equity Share Capital} + \text{General Reserve} \\
 &\quad + \text{Preference Share Capital} + \text{Long-Term Loans} \\
 &\quad + \text{Credit Balance of P \& L A/c} \\
 &= \text{Rs. } 3,00,000 + 50,000 + 2,00,000 + 1,50,000 + 70,000 \\
 &= \text{Rs. } 7,70,000 \\
 \text{Capital Turnover Ratio} &= \frac{10,00,000}{7,70,000} \\
 &= 1.29 \text{ times}
 \end{aligned}$$

Alternatively

$$\begin{aligned}
 \text{Capital Turnover Ratio} &= \frac{\text{Cost of Sales}}{\text{Capital Employed}} \\
 \text{Cost of Sales} &= \text{Sales} - \text{Gross Profit} \\
 &= \text{Rs. } 10,00,000 - \text{Rs. } 80,000 \\
 &= \text{Rs. } 9,20,000 \\
 \text{Capital Turnover Ratio} &= \frac{9,20,000}{7,70,000} \\
 &= 1.19 \text{ times}
 \end{aligned}$$

IV. SOLVENCY RATIOS

The term 'Solvency' generally refers to the capacity of the business to meet its short-term and long-term obligations. Short-term obligations include creditors, bank loans and bills payable etc. Long-term obligations consists of debenture, long-term loans and long-term creditors etc. Solvency Ratio indicates the sound financial position of a concern to carry on its business smoothly and meet its all obligations. Liquidity Ratios and Turnover Ratios concentrate on evaluating the short-term solvency of the concern have already been explained. Now under this part of the chapter only the long-term solvency ratios are dealt with. Some of the important ratios which are given below in order to determine the solvency of the concern :

- (1) Debt – Equity Ratio
- (2) Proprietary Ratio
- (3) Capital Gearing Ratio
- (4) Debt Service Ratio or Interest Coverage Ratio

(1) Debt Equity Ratio

This ratio also termed as External – Internal Equity Ratio. This ratio is calculated to ascertain the firm's obligations to creditors in relation to funds invested by the owners. The ideal Debt Equity Ratio is 1:1. This ratio also indicates all external liabilities to owner recorded claims. It may be calculated as

$$(a) \text{ Debt – Equity Ratio} = \frac{\text{External Equities}}{\text{Internal Equities}}$$

(or)

$$(b) \text{ Debt – Equity Ratio} = \frac{\text{Outsider's Funds}}{\text{Shareholders' Funds}}$$

The term External Equities refers to total outside liabilities and the term Internal Equities refers to all claims of preference shareholders and equity shareholders' and reserve and surpluses.

$$(c) \text{ Debt – Equity Ratio} = \frac{\text{Total Long-Term Debt}}{\text{Total Long-Term Funds}}$$

(or)

$$(d) \text{ Debt – Equity Ratio} = \frac{\text{Total Long-Term Debt}}{\text{Shareholders' Funds}}$$

The term Total Long-Term Debt refers to outside debt including debenture and long-term loans raised from banks.

Illustration: 34

From the following figures calculate Debt Equity Ratio :

	Rs.
Preference Share Capital	1,50,000
Equity Share Capital	5,50,000
Capital Reserve	2,00,000
Profit and Loss Account	1,00,000
6 % Debenture	2,50,000
Sundry Creditors	1,20,000
Bills Payable	60,000
Provision for taxation	90,000
Outstanding Creditors	80,000

Solution:

$$(a) \text{ Debt Equity Ratio} = \frac{\text{External Equities}}{\text{Internal Equities}}$$

$$\text{External Equities} = \text{Debenture} + \text{Sundry Creditors}$$

$$+ \text{Bills Payable} + \text{Provision for taxation}$$

$$+ \text{Outstanding Creditors}$$

$$= \text{Rs. } 2,50,000 + 1,20,000 + 60,000 + 90,000 + 80,000$$

$$= \text{Rs. } 6,00,000$$

$$\text{Internal Equities} = \text{Preference Share Capital} + \text{Equity Share Capital}$$

$$+ \text{Capital Reserve} + \text{Profit and Loss A/c}$$

$$= \text{Rs. } 1,50,000 + 5,50,000 + 2,00,000 + 1,00,000$$

$$= \text{Rs. } 10,00,000$$

	=	$\frac{6,00,000}{10,00,000}$	= 0.6 (or) 3 : 5
(b) Debt Equity Ratio	=	$\frac{\text{Total Long-Term Debt}}{\text{Shareholders' Funds}}$	
Total Long-Term Debt	=	Rs. 2,50,000	
Shareholders' Fund	=	Rs. 10,00,000	
Debt-Equity Ratio	=	$\frac{\text{Rs. 2,50,000}}{\text{Rs. 10,00,000}}$	
	=	0.25	
(c) Debt Equity Ratio	=	$\frac{\text{Total Long-term Debt}}{\text{Total Long-term Funds}}$	
	=	$\frac{2,50,000}{12,50,000}$	
	=	0.2	
(d) Debt Equity Ratio	=	$\frac{\text{Outsider's Fund}}{\text{Shareholders' Fund}}$	
Outsider's Fund	=	Total Outside Liabilities	
	=	Rs. 6,00,000	
Debt Equity Ratio	=	$\frac{6,00,000}{10,00,000}$	
	=	0.6 (or) 3 : 5	

Significance : This ratio indicates the proportion of owner's stake in the business. Excessive liabilities tend to cause insolvency. This ratio also tell the extent to which the firm depends upon outsiders for its existence.

(2) Proprietary Ratio

Proprietary Ratio is also known as Capital Ratio or Net Worth to Total Asset Ratio. This is one of the variant of Debt-Equity Ratio. The term proprietary fund is called Net Worth. This ratio shows the relationship between shareholders' fund and total assets. It may be calculated as :

	=	$\frac{\text{Shareholders' Fund}}{\text{Total Assets}}$	
Shareholders' Fund	=	Preference Share Capital + Equity Share Capital + All Reserves and Surplus	
Total Assets	=	Tangible Assets + Non-Tangible Assets + Current Assets (or) All Assets including Goodwill	

Significance : This ratio used to determine the financial stability of the concern in general. Proprietary Ratio indicates the share of owners in the total assets of the company. It serves as an indicator to the creditors who can find out the proportion of shareholders' funds in the total assets employed in the business. A higher proprietary ratio indicates relatively little secure position in the event of solvency of a concern. A lower ratio indicates greater risk to the creditors. A ratio below 0.5 is alarming for the creditors.

Illustration: 35

From the following informations calculate the Proprietary Ratio :

	<i>Rs.</i>
Preference Share Capital	2,00,000
Equity Share Capital	4,00,000
Capital Reserve	50,000
Profit and Loss Account	50,000
9% Debenture	2,00,000
Sundry Creditors	50,000
Bills Payable	50,000
Land and Building	2,00,000
Plant and Machinery	2,00,000
Goodwill	1,00,000
Investments	3,00,000

Solution:

$$\begin{aligned}
 \text{Proprietary Ratio} &= \frac{\text{Shareholders' Fund}}{\text{Total Assets}} \\
 \text{Shareholders' Fund} &= \text{Preference Share Capital} + \text{Equity Share Capital} \\
 &+ \text{Capital Reserve} + \text{Profit and Loss Account} \\
 &= \text{Rs. } 2,00,000 + 4,00,000 + 50,000 + 50,000 \\
 &= \text{Rs. } 7,00,000 \\
 \text{Total Assets} &= \text{Land and Building} + \text{Plant and Machinery} \\
 &+ \text{Goodwill} + \text{Investments} \\
 &= \text{Rs. } 2,00,000 + 2,00,000 + 1,00,000 + 3,00,000 \\
 &= \text{Rs. } 8,00,000 \\
 \text{Proprietary Ratio} &= \frac{7,00,000}{8,00,000} \\
 &= 87.5\% \text{ (or) } 0.87
 \end{aligned}$$

(3) Capital Gearing Ratio

This ratio also called as Capitalization or Leverage Ratio. This is one of the Solvency Ratios. The term capital gearing refers to describe the relationship between fixed interest and/or fixed dividend bearing securities and the equity shareholders' fund. It can be calculated as shown below :

$$\begin{aligned}
 \text{Capital Gearing Ratio} &= \frac{\text{Equity Share Capital}}{\text{Fixed Interest Bearing Funds}} \\
 \text{Equity Share Capital} &= \text{Equity Share Capital} + \text{Reserves and Surplus} \\
 \text{Fixed Interest Bearing Funds} &= \text{Debentures} + \text{Preference Share Capital} \\
 &+ \text{Other Long-Term Loans}
 \end{aligned}$$

A high capital gearing ratio indicates a company is having large funds bearing fixed interest and/or fixed dividend as compared to equity share capital. A low capital gearing ratio represents preference share capital and other fixed interest bearing loans are less than equity share capital.

Illustration: 36

From the following information, you are required to find out Capital Gearing Ratio

	Rs.
Preference Share Capital	5,00,000
Equity Share Capital	6,00,000
Capital Reserve	3,00,000
Profit and Loss Account	1,00,000
12% Debenture	3,00,000
Secured loan	1,00,000

Solution:

$$\begin{aligned}
 \text{Capital Gearing Ratio} &= \frac{\text{Equity Share Capital}}{\text{Fixed Interest Bearing Funds}} \\
 \text{Equity Share Capital} &= \text{Equity Share Capital} + \text{Capital Reserve} \\
 &+ \text{Profit and Loss Account} \\
 &= \text{Rs. } 6,00,000 + 3,00,000 + 1,00,000 \\
 &= \text{Rs. } 10,00,000 \\
 \text{Fixed Interest Bearing Funds} &= \text{Debenture} + \text{Preference Share Capital} \\
 &+ \text{Secured Loans} \\
 &= \text{Rs. } 3,00,000 + 5,00,000 + 1,00,000 \\
 &= \text{Rs. } 9,00,000 \\
 \text{Capital Gearing Ratio} &= \frac{10,00,000}{9,00,000} \\
 &= 10 : 9 \text{ (Low Gear)}
 \end{aligned}$$

(4) Debt Service Ratio

Debt Service Ratio is also termed as Interest Coverage Ratio or Fixed Charges Cover Ratio. This ratio establishes the relationship between the amount of net profit before deduction of interest and tax and the fixed interest charges. It is used as a yardstick for the lenders to know the business concern will be able to pay its interest periodically. Debt Service Ratio is calculated with the help of the following formula :

$$\text{Interest Coverage Ratio} = \frac{\text{Net Profit before Interest and Income Tax}}{\text{Fixed Interest Charges}} \times 100$$

Illustration: 37

Calculate Interest Coverage Ratio :	
Profit before Interest	= Rs. 7,00,000
Income Tax Paid	= Rs. 50,000
Interest On Debenture	= Rs. 3,00,000
Interest on Long-Term Loan	= Rs. 1,00,000

Solution:

$$\begin{aligned}
 \text{Interest Coverage Ratio} &= \frac{\text{Net Profit before Interest and Income Tax}}{\text{Fixed Interest Charges}} \times 100 \\
 \text{Net Profit before Interest and Taxes} &] = \text{Rs. } 7,00,000 + 50,000 \\
 &= \text{Rs. } 7,50,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Fixed Interest Charges} &= \text{Rs. } 3,00,000 + 1,00,000 \\
 &= \text{Rs. } 4,00,000 \\
 \text{Interest Coverage Ratio} &= \frac{7,50,000}{4,00,000} \times 100 \\
 &= 187.5 \% \text{ (or) } 1.87 : 1
 \end{aligned}$$

Significance : Higher the ratio the more secure the debentureholders and other lenders would be with respect to their periodical interest income. In other words, better is the position of long-term creditors and the company's risk is lesser. A lower ratio indicates that the company is not in a position to pay the interest but also to repay the principal loan on time.

V. OVERALL PROFITABILITY RATIO

This ratio used to measure the overall profitability of a firm on the extent of operating efficiency it enjoys. This ratio establishes the relationship between profitability on sales and the profitability on investment turnover. Overall all Profitability Ratio may be calculated in the following ways :

$$\text{Overall Profitability Ratio} = \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

DU Pont Control Chart (or) DU Pont Analysis

ROI indicates the efficiency of the concern which depends upon the working operations of the concern. Net Profit Ratio and Capital Turnover Ratio, as often called is usually computed on the basis of the chart represented by DU Pont. Thus it is known as "DU Pont Chart." This system of control was applied for the first time by DU Pont company of the United States of America. The DU Pont chart helps to the management to identify the areas of problems for the variations in the return on investment so that actions may initiated to improve the performance. The following chart can explain the ROI effect by a number of factors.

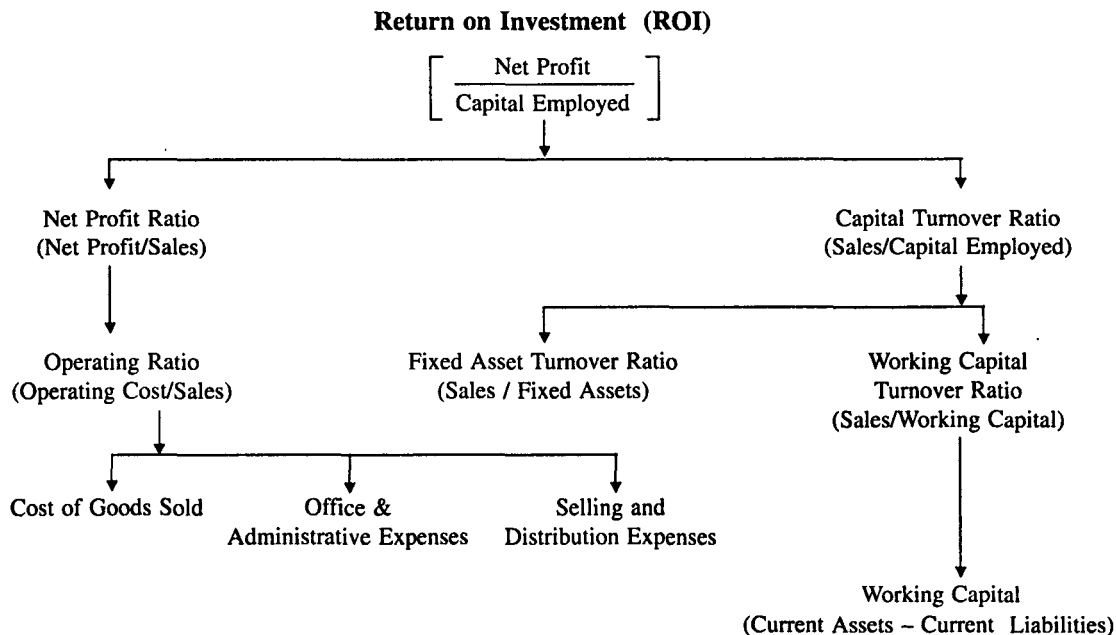


Illustration: 38

The following are the Profit and Loss Account and Balance Sheet of Mrs. Sharma Ltd. for the purpose of analysis and calculate (a) Liquidity Ratios (b) Profitability Ratios (c) Turnover Ratios (d) Solvency Ratios and (e) Overall Profitability Ratio.

Dr. Profit and Loss Account of Sharma Ltd. Cr.

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Opening Stock :		By Sales	5,00,000
Raw Materials	25,000	By Closing Stock :	
Finished goods	50,000	Raw Materials	75,000
To Purchases	1,50,000	Finished Goods	50,000
To Wages	1,00,000	By Profit on Sale of Investments	25,000
To Factory Expenses	50,000		
To Administrative Expenses	25,000		
To Selling & Distribution Expenses	25,000		
To Loss on Sale of Machinery	25,000		
To Interest on Debenture	5,000		
To Net Profit	1,95,000		
	6,50,000		6,50,000

Balance Sheet

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital @ Rs. 10 each	50,000	Plant & Machinery	50,000
10% Preference Share Capital	50,000	Land & Building	50,000
Retained Earnings	50,000	Furniture	25,000
12 % Debenture	1,00,000	Stock of raw material	75,000
Sundry Creditors	50,000	Sundry Debtors	50,000
Bills Payable	25,000	Bank Balance	25,000
	3,25,000	Stock of finished goods	50,000
			3,25,000

Solution:**Profit and Loss Account of M/s Sharma Ltd.**

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Opening Stock :		By Sales	5,00,000
Raw Materials	25,000		
Add : Purchases	1,50,000		
	1,75,000		
Less : Closing Stock of Raw Materials	75,000		
Raw Materials Consumed -1	1,00,000		
To Wages	1,00,000		
To Factory Expenses	50,000		
Cost of Production - 2	2,50,000		
Add : Opening Stock of Finished Goods	50,000		
	3,00,000		
Less : Closing Stock of Finished Goods	50,000		
Cost of Goods Sold - 3	2,50,000		
To Gross Profit c/d	2,50,000		
	5,00,000		5,00,000

To Administrative Expenses	25,000	By Gross Profit b/d	2,50,000
To Selling and Distribution Expenses	25,000		
Operating Expenses – 5	50,000		
To Operating Profit c/d – 6	2,00,000		
	2,50,000		2,50,000
To Loss on Sale of Plant	25,000	By Operating Profit b/d By Profit on Sale of investment (Non-operating income)	2,00,000
To Interest on Debenture	5,000		
Non-operating Expenses – 7	30,000		
To Net Profit - 8	1,95,000		
	2,25,000		

Balance Sheet

Particulars	Rs.	Rs.	
Plant and Machinery	50,000	1,25,000	
Land and Building	50,000		
Furniture	25,000		
Fixed Assets – 1			
Bank Balances	25,000		
Sundry Debtors	50,000		
Liquid Assets – 2	75,000		
Stock of Raw Materials	75,000		
Stock of Finished Goods	50,000		
Current Assets – 3	2,00,000		
Sundry Creditors	50,000	1,25,000	
Bills Payable	25,000		
Current Liabilities – 4	75,000		
Working Capital (3 – 4) = 5 (Current Assets – Current Liabilities)	1,25,000		
Capital Employed (1+5) = 6 (Fixed Assets + Working Capital)			2,50,000
Less : Long-Term Debt:			
12 % Debenture			1,00,000
Shareholders' Fund – 7			1,50,000
Less : Preference Share Capital			50,000
Equity Shareholders' Fund or Net Worth – 8			1,00,000
Net Worth Represented by :			
Equity Share Capital	50,000		
Retained Earnings	50,000		
Equity Shareholders' Net Worth	1,00,000		

$$\begin{aligned}
 (1) \text{ Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Sales}} \times 100 \\
 &= \frac{2,50,000}{5,00,000} \times 100 = 50\%
 \end{aligned}$$

(2) <i>Net Profit Ratio</i>	=	$\frac{\text{Net Profit}}{\text{Sales}} \times 100$	
	=	$\frac{1,95,000}{5,00,000} \times 100 = 39\%$	
(3) <i>Operating Ratio</i>	=	$\frac{\text{Operating Cost}}{\text{Sales}} \times 100$	
	=	$\frac{50,000}{5,00,000} \times 100 = 10\%$	
(4) <i>Operating Profit Ratio</i>	=	$\frac{\text{Operating Profit}}{\text{Sales}} \times 100$	
	=	$\frac{2,00,000}{5,00,000} \times 100 = 40\%$	
(5) <i>Return on Investment Ratio</i>	=	$\frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Fund}} \times 100$	
Net Profit after Interest & Tax	=	Net Profit – (Interest and Taxes)	
Tax Net Profit	=	Rs. 1,95,000	
12% on Debenture	=	Rs. 18,000	
Net Profit after Interest & Tax	=	Rs. 1,95,000 – 18,000	
	=	Rs. 1,77,000	
Return on Investment Ratio	=	$\frac{1,77,000}{1,50,000} \times 100$	
	=	118 %	
(6) <i>Return on Capital Employed Ratio</i>	} =	$\frac{\text{Net Profit after Tax}}{\text{Capital Employed}} \times 100$	
	=	$\frac{1,95,000}{2,50,000} \times 100$	
	=	78%	
(7) <i>Earning Per Equity Share Ratio</i>	} =	$\frac{\text{Net Profit after and Preference Dividend}}{\text{No. of Equity Shares}}$	
	=	$\frac{1,95,000}{5,000} = \text{Rs. } 39$	
(8) <i>Net Profit to Net Worth Ratio</i>	=	$\frac{\text{Net Profit after Taxes}}{\text{Shareholders' Net Worth}} \times 100$	
	=	$\frac{1,95,000}{1,50,000} \times 100 = \text{Rs. } 130\%$	

$$\begin{aligned}
 (9) \quad \text{Stock Turnover Ratio (or)} & \quad \left. \begin{array}{l} \text{Stock Velocity} \end{array} \right\} & = & \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} \\
 & & & = \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 \text{Average Stock} & & = & \frac{(25,000 + 50,000) + (75,000 + 50,000)}{2} \\
 & & = & \frac{75,000 + 1,25,000}{2} \\
 & & = & \frac{\text{Rs. } 2,00,000}{2} = 1,00,000 \\
 \text{Stock Turnover Ratio} & & = & \frac{2,50,000}{1,00,000} = 2.5 \text{ times} \\
 \\
 (10) \quad \text{Debtors' Turnover Ratio} & & = & \frac{\text{Credit Sales}}{\text{Average Receivables}} \\
 & & = & \frac{5,00,000}{50,000} = 10 \text{ times} \\
 \\
 (11) \quad \text{Creditors' Turnover Ratio} & & = & \frac{\text{Credit Purchases}}{\text{Average Payables}} \\
 & & = & \frac{1,00,000}{50,000} = 2 \text{ times} \\
 \\
 (12) \quad \text{Working Capital Turnover Ratio} & & = & \frac{\text{Net Sales}}{\text{Working Capital}} \\
 & & = & \frac{5,00,000}{1,25,000} = 4 \text{ times} \\
 \\
 (13) \quad \text{Fixed Assets Turnover Ratio} & & = & \frac{\text{Cost of Goods Sold}}{\text{Total Fixed Assets}} \\
 & & = & \frac{2,50,000}{1,25,000} = 2 \text{ times} \\
 \\
 (14) \quad \text{Capital Turnover Ratio} & & = & \frac{\text{Sales}}{\text{Capital Employed}} \\
 & & = & \frac{5,00,000}{2,50,000} = 2 \text{ times} \\
 \\
 (15) \quad \text{Current Ratio} & & = & \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 & & = & \frac{2,00,000}{75,000} = 2.66 \text{ times}
 \end{aligned}$$

(16) <i>Liquid Ratio</i>	=	$\frac{\text{Liquid Assets}}{\text{Current Liabilities}}$	
	=	$\frac{75,000}{75,000} = 1 \text{ time}$	
(17) <i>Absolute Liquid Assets</i>	=	$\frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$	
	=	$\frac{25,000}{75,000} = 0.33 \text{ times}$	
(18) <i>Debt Equity Ratio</i>	=	$\frac{\text{Total Long-Term Debt}}{\text{Shareholders' Fund}}$	
	=	$\frac{1,00,000}{1,50,000} = 0.66 \text{ times}$	
(19) <i>Proprietary Ratio</i>	=	$\frac{\text{Shareholders' Fund}}{\text{Total Assets}}$	
	=	$\frac{1,50,000}{3,25,000} = 0.46 \text{ times}$	
(20) <i>Capital Gearing Ratio</i>	=	$\frac{\text{Equity Share Capital}}{\text{Fixed Interest Bearing Funds}}$	
Fixed Interest Bearing Funds	=	Debenture + Preference Share Capital + Other Long-Term Loans Rs. 1,00,000 + 50,000 = Rs. 1,50,000	
Capital Gearing Ratio	=	$\frac{1,00,000}{1,50,000} = 0.66 \text{ times}$	
(21) <i>Overall Profitability Ratio</i>	=	$\frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$	
	=	$\frac{195000}{500000} \times \frac{500000}{325000} = 0.6 \text{ times}$	

SUMMARY OF RATIOS

I. Liquidity Ratios

S. No.	Ratio to be Computed	Formula	Components
1	Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	1. Current Assets 2. Current Liabilities
2	Quick Ratio (or) Acid Test Ratio (or) Liquid Ratio	$\frac{\text{Liquid Assets}}{\text{Current Liabilities}}$	1. Liquid Assets = Current Assets – (Stock Liquid Ratio & Prepaid Expenses) 2. Current Liabilities

3	Absolute Liquid Ratio (or) Cash Position Ratio	$\frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$	<ol style="list-style-type: none"> 1. Absolute Liquid Assets = Cash in Hand + Cash at Bank + Marketable Securities 2. Current Liabilities
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II. Profitability Ratios

S. No.	Ratio to be Computed	Formula	Components
1	Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$	<ol style="list-style-type: none"> 1. Gross Profit = (Sales – Cost of goods sold) 2. Net Sales = (Gross Sales – Sales Return)
2	Operating Ratio	$\frac{\text{Operating Cost}}{\text{Net Sales}} \times 100$	<ol style="list-style-type: none"> 1. Operating Cost = (Cost of goods Sold + Administrative Expenses + Selling and Distribution Expenses) 2. Net Sales
3	Operating Profit Ratio	$\frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$	<ol style="list-style-type: none"> 1. Operating Profit = (Net Sales – Operating Cost) 2. Net Sales
4	Net Profit Ratio	$\frac{\text{Net Profit after tax}}{\text{Net Sales}} \times 100$	<ol style="list-style-type: none"> 1. Net Profit after tax = (Net Profit – Tax paid) 2. Net Sales
5	Return on Investment Ratio	$\frac{\text{Net Profit after Interest and Taxes}}{\text{Shareholders' Funds or Investments}} \times 100$	<ol style="list-style-type: none"> 1. Net Profit = Net Profit – Interest and Taxes 2. Shareholders' Investment = (Equity Share Capital + Preference Share Capital + Reserves and Surplus – Accumulated Losses)
6	Return on Capital Employed Ratio	$\frac{\text{Net Profit after taxes}}{\text{Gross Capital Employed}} \times 100$ <p style="text-align: center;">(or)</p> $\frac{\text{Net Profit after taxes before Interest}}{\text{Gross Capital Employed}} \times 100$ <p style="text-align: center;">(or)</p> $\frac{\text{Net Profit after taxes before Interest}}{\text{Average Capital Employed or Net Capital Employed}} \times 100$	<ol style="list-style-type: none"> 1. Net Profit after tax = (Net Profit – Tax Paid) 2. Gross Capital Employed = (Fixed Assets + Current Assets) 3. Average Capital Employed = $\frac{\text{Opening Capital Employed} + \text{Closing Capital Employed}}{2}$ (or) Average Capital Employed = Net Capital Employed + ½ of Profit after tax 4. Net Capital Employed = (Total Assets – Current Liabilities)
7	Earning Per Share Ratio	$\frac{\text{Net Profit after Tax and Preference Dividend}}{\text{No. of Equity Shares}}$	<ol style="list-style-type: none"> 1. Net Profit after tax and preference dividend = Net Profit – (Tax paid + Preference Dividend) 2. No. of Equity Shares

8	Dividend Pay Out Ratio	$\frac{\text{Equity Dividend}}{\text{Net Profit after tax and Preference Dividend}} \times 100$ (or) $\frac{\text{Dividend Per Equity Share}}{\text{Earning Per Equity Share}} \times 100$	1. Equity Dividend = (No. of Equity Shares x Dividend Per Equity Share) 2. Net Profit after tax and preference dividend = Net Profit – (Tax Paid + Preference Dividend)
9	Earning Per Equity Share	$\frac{\text{Net Profit after tax and Preference Dividend}}{\text{No. of Equity Shares}}$	1. No. of Equity Shares 2. Net Profit after tax and Preference Dividend
10	Dividend Yield Ratio	$\frac{\text{Dividend Per share}}{\text{Market Value Per Share}} \times 100$	1. Dividend Per Share 2. Market Value Per Share
11	Price Earning Ratio	$\frac{\text{Market Price Per Share Equity Share}}{\text{Earning Per Share}} \times 100$	1. Market Price Per Equity Share 2. Earning Per Share
12	Net Profit to Net Worth Ratio	$\frac{\text{Net Profit after taxes}}{\text{Shareholders Net Worth}} \times 100$	1. Net Profit after taxes 2. Shareholder Net Worth = (Company's Net Assets – Long-Term Liabilities) (or) Total Tangible Net Worth = (Shareholders' fund + Profits Retained in business)

III. Turnover Ratios

S. No.	Ratio to be Computed	Formula	Components
1	Inventory Ratio (or) Stock Turnover Ratio (or) Stock Velocity	$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory at cost Net Sales}} \text{ (or)}$ $\frac{\text{Average Inventory at cost Net Sales}}{\text{Average Inventory at Selling Price}} \text{ (or)}$ $\frac{\text{Net Sales}}{\text{Inventory}}$	1. Cost of Goods Sold = (Opening Stock + Purchases + Direct Expenses – Closing Stock) 2. Cost of Goods Sold = (Sales – Gross Profit) 3. Average Stock = $\frac{\text{Opening Stock} + \text{Closing Stock}}{2}$

2	Debtors' Turnover Ratio	$\frac{\text{Net Credit Sales}}{\text{Average Receivables (or) Average Accounts Receivables (or) Total Sales}} \times \frac{\text{Account Receivable}}{\text{Account Receivable}}$	<ol style="list-style-type: none"> 1. Net Credit Sales = (Total Sales – Cash Sales) 2. Accounts Receivables = (Sundry Debtors + Bills Receivables) Average Accounts = $\frac{\text{Opening Receivable} + \text{Closing Receivable}}{2}$
3	Debt Collection Period Ratio	$\frac{\text{Month or Days in a year}}{\text{Debtors Turnover (or) Average Accounts Receivable} \times \frac{\text{Months or Days in a year}}{\text{Net Credit Sales for the year}}}$	<ol style="list-style-type: none"> 1. Months or Days in a year 2. Net Credit Sales 3. Net Credit Sales = (Total Sales – Cash Sales) 4. Average Accounts Receivable
4	Creditors' Turnover Ratio	$\frac{\text{Net Credit Purchases}}{\text{Average Accounts Payable}}$	<ol style="list-style-type: none"> 1. Net Credit Purchases = Total Purchases – Cash Purchases 2. Average Accounts Payable = $\frac{\text{Opening Payable} + \text{Closing Payable}}{2}$
5	Average Payment Period	$\frac{\text{Month or Days in a year}}{\text{Creditors' Turnover Ratio} \times \frac{\text{Average Trade Creditors}}{\text{Net Credit Purchases}} \times 100}$	<ol style="list-style-type: none"> 1. Month or Days in a year 2. Average Trade Creditors 3. Creditors' Turnover Ratio 4. Net Credit Purchase
6	Working Capital Turnover Ratio	$\frac{\text{Net Sales}}{\text{Working Capital}}$	<ol style="list-style-type: none"> 1. Net Sales = (Gross Sales – Sales Return) 2. Working Capital = (Current Assets – Current Liabilities)
7	Fixed Assets Turnover Ratio	$\frac{\text{Cost of goods sold}}{\text{Total Fixed Assets (or) Sales}} \times \frac{\text{Net fixed Assets}}{\text{Net fixed Assets}}$	<ol style="list-style-type: none"> 1. Cost of Goods Sold 2. Total Fixed Assets 3. Sales 4. Net Fixed Assets
8	Capital Turnover Ratio	$\frac{\text{Cost of Sales}}{\text{Capital Employed (or) Sales}} \times \frac{\text{Capital Employed (or) Cost of Sales or Sales}}{\text{Shareholders' Fund}}$	<ol style="list-style-type: none"> 1. Capital Employed = (Total Assets – Current Liabilities) (or) Capital Employed = (Shareholders' Fund + Long-Term Loans) 2. Cost of Sales (or) Sales

IV. Solvency Ratios

S. No.	Ratio to be Computed	Formula	Components
1	Debt Equity Ratio	$\frac{\text{External Equities}}{\text{Internal Equities} \quad \text{(or)} \quad \text{Outsiders' Funds}}$ $\frac{\text{Shareholders' Funds}}{\text{Total Long-Term Debt} \quad \text{(or)} \quad \text{Total Long-Term Funds}}$ $\frac{\text{Total Long-Term Debt}}{\text{Shareholders' Funds}}$	<ol style="list-style-type: none"> 1. External Equities = Total Outside Liabilities 2. Internal Equities = All claims of preference shareholders + Equity shareholders + Reserves and Surplus 3. Total Long-Term Debt = Outside Debt (Debenture and Long-Term Loans)
2	Proprietary Ratio	$\frac{\text{Shareholders' Fund}}{\text{Total Assets}}$	<ol style="list-style-type: none"> 1. Shareholders' fund = Preference Share Capital + Equity Share Capital + All Reserves and surplus 2. Total Assets = Tangible Assets + Non-Tangible Assets + Current Assets (or) All assets including Goodwill
3	Capital Gearing Ratio	$\frac{\text{Equity Share Capital}}{\text{Fixed Interest Bearing Funds}}$	<ol style="list-style-type: none"> 1. Equity Share Capital = Equity Share Capital + Reserves and Surplus 2. Fixed Interest Bearing Funds = (Debentures + Preference Share Capital + Other Long-Term Loans)
4	Debt Service Ratio	$\frac{\text{Net Profit before Interest and Taxes}}{\text{Fixed Interest Charges}}$	<ol style="list-style-type: none"> 1. Net Profit before Interest and Taxes 2. Fixed Interest Charges

V. Over All Profitability Ratios

S. No.	Ratio to be Computed	Formula	Components
V	Overall Profit Ability Ratio	$\frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$ $\frac{\text{Net Profit}}{\text{Total Assets}}$	<ol style="list-style-type: none"> 1. Net Profit 2. Sales 3. Total Assets

QUESTIONS

1. What is meant by Ratio?
2. What do understand by Accounting Ratio? Explain the Principles of ratio selection.
3. What are the advantages of Ratio Analysis?
4. What are the limitations of ratio analysis?
5. What are the different categories of ratios? How are they classified?

6. Write short notes on :
- (a) Liquidity Ratios. (b) Profitability Ratios. (c) Turnover Ratios.
 (d) Solvency Ratios. (e) Overall Profitability Ratios.
7. What do you understand by current ratio? What are its uses? What are its limitations?
8. Ratio analysis is widely used as a tool of financial analysis, yet it suffers from various limitations. Explain.
9. How can solvency of a firm be measured?
10. What do you understand by Liquidity ratios? Discuss their significance.
11. Explain the importance of profitability Ratio. How they are worked out?
12. Discuss the usefulness of the following ratios :
- (a) Inventory Ratio. (b) Operating Ratio. (c) Price Earning Ratio.
 (d) Creditor's Turnover Ratio. (e) Debtor's Turnover Ratio.

EXERCISES

- (1) From the following, compute both the purchases made during the year and the Stock Turnover Ratio :

	Rs.
Inventory (at cost price) :	
At the beginning	14,000
At the end of the year	21,000
Sales revenue	1,20,000
Sales return	6,000
Gross profit	26,500

[Ans : Purchases Rs. 94,500; Stock Turnover Ratio = 5 times]

- (2) From the following particulars, you are required to find out :

(a) Current Ratio, (b) Net Profit Ratio; and (c) Gross Profit Ratio.

Stock	Rs. 50,000	Cash in Hand	Rs. 30,000
Debtors	Rs. 40,000	Creditors	Rs. 60,000
Bills Receivable	Rs. 10,000	Bills Payable	Rs. 40,000
Advances	Rs. 4,000	Bank Overdraft	Rs. 4,000
		Sales (Net)	Rs. 7,00,000
		Gross Profit	Rs. 50,000
		Net Profit	Rs. 30,000

[Ans: Current Ratio = 1.28:1; Net Profit Ratio = 4.29%; Gross Profit Ratio = 7.14%].

- (3) Calculate: (a) Current Assets; (b) Liquid Assets; (c) Inventory.

Current Ratio = 2.6 : 1
 Liquid Ratio = 1.5 : 1
 Current Liabilities = Rs. 40,000

[Ans : Current Assets Rs. 1,04,000 ; Liquid Assets Rs. 60,000; Inventory Rs. 44,000]

- (4) From the following details, you are required to find out :

(a) Gross profit; (b) Purchases; (c) Opening Stock; (d) Closing Stock; (e) Debtors; (f) Creditors; (g) Fixed Assets

(1) Stock Velocity = 6
 (2) Capital Turnover Ratio = 2
 (3) Fixed Turnover Ratio = 4
 (4) Gross Profit Turnover Ratio = 20%
 (5) Debtor's Velocity = 2 months
 (6) Creditor's Velocity = 73 days

The Gross Profit was Rs. 60,000. Reserve and surplus amount to Rs. 20,000. Closing stock was Rs. 5,000 in excess on opening stock.

[Ans : (a) Rs. 60,000; (b) Rs. 2,45,000; (c) Rs. 37,500; (d) Rs. 42,500; (e) Rs. 50,000; (f) Rs. 49,000; (g) Rs. 60,000].

- (5) From the following Profit and Loss Account and Balance sheet, compute : (1) Current Ratio (2) Liquid Ratio (3) Fixed Asset to Net Worth Ratio (4) Proprietary Ratio (5) Debt Equity Ratio (6) Operating Ratio (7) Stock Turnover Ratio (8) Fixed Assets Turnover Ratio (9) Creditors Turnover Ratio (10) Gross Profit Turnover Ratio (11) Net Profit to Sales Ratio (12) Return on Investment Ratio.

Dr.		Profit and Loss Account for the year ended 31.12.2002		Dr.	
Particulars		Rs.	Particulars		Rs.
To Opening Stock of Raw materials		5,000	By Sales	50,000	
To Purchases	32,000		Less: Return	1,000	49,000
Less : Returns	2,000	30,000	By Closing Stock of Raw Materials		8,750
To Factory Expenses		1,000			
To Gross profit c/d		21,750			
		57,750			57,750
To Operating expenses		8,750			
To Interest on Debenture		400	By Gross Profit b/d		21,750
To Provision for income tax		6,300			
To Net Profit		6,300			
		21,750			21,750

Balance Sheet as on 31st Dec. 2003

Liabilities	Rs.	Assets	Rs.
Equity Share Capital	12,500	Land & Building	10,000
Capital Reserves	5,000	Plant & Machinery	6,000
Profit and Loss Account	2,500	Stock	8,750
8 % Debenture	5,000	Debtors	4,500
Sundry Creditors	5,000	Cash	2,000
Bank Overdraft	1,250		
	31,250		31,250

[Ans : (1) Current Ratio = 2.44:1; (2) Liquid Ratio = 1.04 :1; (3) Fixed Asset Net Worth Ratio = 80%; (4) Debt-Equity Ratio = 25 :1; (5) Operating Ratio = 0.74 :1; (6) Stock Turnover Ratio = 7.1 3times; (7) Fixed Asset Turnover Ratio = 3.06 times; (or) 3.1 times; (8) Creditors' Turnover Ratio = 6 times; (9) Gross Profit Turnover Ratio = 44.39%; (10) Net Profit to Sales = 25.71 %; (11) Return on Investment Ratio = 52%; (12) Proprietary Ratio = 0.64].

(6) Ranjit Ltd. provides the following information for the year ending 31st March 2003 and request you to ascertain (a) Operating Ratio (b) Operating Profit Ratio and (c) Operating Profit :

	Rs.
Sales	1,00,000
Gross Profit	4,00,000
Office Expenses	30,000
Selling Expenses	20,000
Administrative Expenses	15,000
Loss on Sale of Plant	2,000
Interest received on investments	2,500
Net Profit	3,35,000

[Ans : Operating Ratio = 65% (b) Operating Profit Ratio = 35% (c) Operating Profit = Rs. 3,35,000].

- (7) From the following information find out (a) Sales (b) Closing Stock (c) Sundry Debtors and (d) Sundry Creditors
- Gross Profit Ratio 25%
- Debtors' Turnover Ratio 2 months
- Stock Turnover Ratio 2 times
- Creditors' Turnover Ratio 3 months
- Closing stock is Rs. 10,000 more than the opening stock. Bills receivable amount to Rs. 30,000 and Bills payable to Rs. 40,000. Cost of goods sold for the year is Rs. 6,00,000
- [Ans : (a) Sales = Rs. 8,00,000; (b) Closing Stock Rs. 3,05,000; (d) Sundry Debtors Rs. 93,333; (d) Sundry Creditors Rs. 71,666].

- (8) Calculate the average collection period from the following details by adopting 360 days to an year.

Average Inventory	Rs. 3,60,000
Debtors	Rs. 2,30,000
Inventory Turnover Ratio = 6	
Gross Profit Ratio 10 %	
Credit Sales to Total Sales 20 %	

[Ans : Average Collection Period = 172.5 days].

- (9) You are required to calculate Return on Investment from the following details of Mary Ltd. for the year ending 31st March 2003.

Net Profit after tax	Rs.	3,25,000
Rate of Income tax		50 %
12.5% Debenture of 100 each	Rs.	4,00,000
Fixed Assets	Rs.	12,30,000
Depreciation	Rs.	2,30,000
Current Assets	Rs.	7,50,000
Current Liabilities	Rs.	3,50,000

[Ans : Return on Investment = 50 %].

- (10) The following balance sheet is given to you :

	Rs.		Rs.
Preference Share Capital	1,00,000	Fixed Assets	2,00,000
Reserve for Contingencies	20,000	Sundry Debtors	30,000
Term Loans	80,000	Inventories	30,000
Sundry Creditors	50,000	Bills Receivable	10,000
Profit & Loss A/c	30,000	Cash at Bank	30,000
Provision for Taxation	20,000		
	3,00,000		3,00,000

You are required to calculate :

(a) Acid Test Ratio (b) Debit Equity Ratio and (c) Current Ratio.

- (11) From the following particulars, you are required to calculate (a) Current Ratio (b) Gross Profit Ratio (c) Stock Turnover Ratio (d) Debt Equity Ratio (e) Proprietary Ratio (f) Debtor's Turnover Ratio

	Rs.		Rs.
Annual Sales	74,40,000	Paid up Capital	15,00,000
Gross Profit	7,44,000	Reserve & Surplus	6,00,000
Fixed Assets	16,50,000	7% Debentures	5,00,000
Inventories	9,10,000	Bank Overdraft	2,00,000
Sundry Debtors	12,40,000	Sundry Creditors	12,00,000
Short-Term Investments	1,60,000		
Cash Balances	40,000		

- (12) Calculate the current assets of a company from the following information:

- (1) Stock turnover : 5 times
- (2) Stock at the end is Rs. 5,000 more than stock in the beginning
- (3) Sales (all credit) : Rs. 2,00,000
- (4) Gross Profit Ratio : 20%
- (5) Current liabilities = Rs. 60,000
- (6) Quick Ratio 0.75

[Ans: Current Assets Rs. 79,500]

- (13) From the following details prepare statement of proprietary funds with as many details as possible :

- (1) Stock Velocity – 6
- (2) Capital turnover ratio – 2
- (3) Fixed asset turnover ratio – 4
- (4) Gross Profit turnover ratio – 20%
- (5) Debtor's Velocity – 2 months
- (6) Creditor's Velocity – 73 days

The Gross Profit was Rs. 60,000. Reserve and Surplus amounted to Rs. 20,000. Closing Stock was Rs. 5,000 in excess opening stock.

[Ans : Proprietary Fund Rs. 1,20,000]

(14) A company has an inventory of Rs. 7,20,000, debtors Rs. 4,30,000 and an inventory turnover ratio of 12. The gross profit margin is 10% and its credit sales are 20% of the total sales. Calculate the average collection period.

[Ans: 81 days]

(15) From the following Balance Sheet and other information, you are required to calculate the following ratios : (a) Gross Profit Ratio (b) Operating Profit Ratio (c) Current Ratio and (d) Liquidity Ratio

Balance Sheet

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital	2,00,000	Land & Buildings	2,00,000
Preference Share Capital	80,000	Plant & Machinery	40,400
General Reserves	4,800	Inventories	78,400
Profit & Loss A/c	67,200	Sundry Debtors	36,000
Bank Overdraft	2,800	Bank	10,000
Sundry Creditors	12,000	Cash Balances	2,000
	3,66,800		3,66,800

[Ans : Gross Profit Ratio – 39.96%

Operating Ratio – 17.38%

Current Ratio – 8.54%

Liquidity Ratio – 3.24%]

(16) From the following information, calculate the following ratios: (a) Debt Equity Ratio (b) Interest Coverage Ratio (c) Debt to Total Fund Ratio (d) Return on Investment Ratio and (e) Capital Turnover Ratio

	<i>Rs.</i>
Share Capital	3,20,000
General Reserve	1,20,000
Profit and Loss A/c	2,00,000
Loan @ 15% interest	4,00,000
Sales for the year	11,20,000
Tax Paid during the year	80,000
Profit for the year after interest and tax	1,60,000

[Ans: Debt Equity Ratio 1:16; Interest Coverage Ratio – 5 times; Debt to total Fund Ratio 1:2.6; Return on Investment – 28.84%; Capital Turnover Ratio 1.08 times]

(17) From the following particulars, you are required to find out (a) Current Assets and (b) Stock :

- (1) Current Ratio – 2.5
- (2) Quick Ratio – 1.5
- (3) Working Capital Rs. 75,000
- (4) Bank Overdraft Rs. 25,000
- (5) Cash in hand Rs. 1,000

[Ans: Current Assets 1,25,000; Stock Rs.50,000]

The following information relates to Gupta & Co. Ltd. for the year ended 31st December 2003 :

<i>Dr.</i>	<i>Trading and Profit and Loss A/c</i>		<i>Cr.</i>
<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock	1,50,000	By Sales	10,40,000
To Purchases	6,50,000	Less: Returns	40,000
To Gross Profit c/d	4,00,000	By Closing Stock	2,00,000
	12,00,000		12,00,000
		By Gross Profit b/d	4,00,000

To Operating Expenses:			By Non-Trading Income:		
Administration	80,000		Dividend	18,000	
Selling & Distribution	50,000	1,30,000	Profit on Sale of Shares	22,000	40,000
To Non-Operating Exp.					
Loss on Sale of Assets		10,000			
To Net Profit		3,00,000			
		4,40,000			4,40,000

Balance Sheet

<i>Liabilities</i>	<i>Amount Rs.</i>	<i>Assets</i>	<i>Amount Rs.</i>
Share Capital	4,00,000	Land and Building	3,00,000
Reserves	1,80,000	Plant and Machinery	1,60,000
Current Liabilities	3,00,000	Stock	3,20,000
Profit and Loss A/c	1,20,000	Sundry Debtors	1,60,000
		Cash at Bank	60,000
	10,00,000		10,00,000

Calculate:

- | | | |
|-------------------------------|------------------------------|------------------------------|
| (a) Gross Profit Ratio | (b) Operating Profit Ratio | (c) Expenses Ratio |
| (d) Return on Total Resources | (e) Turnover to Total Assets | (f) Operating Ratio |
| (g) Net Profit Ratio | (h) Stock Turnover Ratio | (i) Turnover of Fixed Assets |

- [Ans: (a) Gross Profit Ratio 40%
 (b) Operating Profit Ratio 27%
 (c) Expenses Ratio :
 (I) Administrative Expenses Ratio 8%
 (II) Selling & Distribution Expenses Ratio 5%
 (d) Return on Total Resources 30%
 (e) Turnover to Total Assets 1 time
 (f) Operating Ratio 73%
 (g) Net Profit Ratio 30%
 (h) Stock Turnover Ratio 3.43 times
 (i) Turnover of fixed Assets 1.30 times.]

- (18) The Capital of Patel & Co. Ltd. is as follows:

	<i>Rs.</i>
9% Preference Shares of 10 each	3,00,000
Equity Shares of Rs. 10 each	8,00,000
	11,00,000

Additional Information

Profit (after tax at 60%) Rs. 2,70,000; Depreciation Rs. 60,000;
 Equity dividend paid 20%; Market Price of Equity Shares Rs. 40. You are required to calculate the following:

- (a) Dividend yield on the Equity Shares
 (b) Cover for the Preference and Equity Dividends
 (c) Earnings for Equity Shares
 (d) Price-Earnings Ratio

- [Ans: (a) 5% (b) Preference 10 times, Equity 1.52 times (c) Rs. 3.04 per Share
 (d) 13.2 times.]

CHAPTER 10

Cost Accounting

Introduction

Cost Accounting is one of the important disciplines of accountancy to give proper information required to the management for effectively discharging its functions such as planning, organizing, controlling, directing, co-ordinating and decision making. In this regard Financial Accounting is concerned with record keeping directed towards the preparation of Profit and Loss Account and Balance Sheet. It provides information about the enterprise in a general way. Accordingly Financial Accounts are prepared as per the requirement of the Companies Act and Income Tax Act. The main purpose of financial accounting is to ascertain profit or loss of a concern as a whole for a particular period. Thus, financial accounting does not serve as the needs of management for effective control, determination of prices, making effective plan for future operations and formulating various policy decisions.

To overcome the limitations of the financial accounting, the cost accounting is a recent development born in response to the needs of management for detailed information about cost of a product or a unit of services. Every business firm is expected to make profit in the long run and, keep costs within control. Recently the Companies Act has made obligatory the keeping of cost records in some manufacturing companies. In essence, therefore Cost Accounting is now widely used by large manufacturing and non-manufacturing operations.

Definitions of Important Concepts

The definitions of the following important concepts of Cost Accountancy are given below :

- | | | |
|----------------------|---------------------|---------------------|
| (a) Cost | (b) Costing | (c) Cost Accounting |
| (d) Cost Accountancy | (e) Cost Control | (f) Cost Reduction |
| (g) Cost Allocation | (h) Cost Absorption | (i) Cost Audit |
| (j) Cost Unit | (k) Cost Centre | |

(a) Cost: The word 'Cost' is used in a variety of ways. Cost may be defined as a total of all expenses incurred in a given thing. A I C P A defines cost as "the amount measured in money or cash expended or other property transferred, capital stock issued, services performed or a liability incurred in considerations of goods or services received or to be received."

'Cost' is defined by W.M. Harper in the following words "Cost is the value of economic resources used as a result of producing or doing the thing cost."

(b) Costing: I C M A London has defined costing as "the technique and process of ascertaining costs." As a technique, it refers to costing as the body of principles and rules concerned with appropriate allocation of expenditure for the determination of cost of products and services.

(c) Cost Accounting: Cost accounting is the method of accounting for cost. The I C W A defines Cost Accounting as the technique and process of ascertainment of costs. Cost accounting begins with the recording of all income and expenditure, and ends with the presentation of statistical data.

(d) Cost Accountancy: According to the Chartered Institute of Management Accountants London, cost accountancy means "the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived therefore for the purpose of managerial decision making. Thus, cost accountancy is the science, art and practice of a cost accountant."

(e) Cost Control: Cost control is the guidance and regulation by executive action of cost of operating an undertaking. It involves pre-determination of targeted costs, measuring the actual costs, investigating into the causes of variations and instituting the corrective action.

(f) Cost Reduction: The term 'cost reduction' refers to the achievement of real and permanent reduction in the unit of cost of goods manufactured or services rendered without impairing their suitability or diminution in the quality of product. Cost reduction involves saving in unit cost ; such saving is of permanent nature and the utility and quality of the goods and services remain unaffected.

(g) Cost Allocation: Cost allocation is the allotment of whole item of cost to cost centres. The technique of charging the entire overhead expenses to a cost centre is known as Cost Allocation.

(h) Cost Absorption: The term 'Cost Absorption' refers to the process of absorption of all overhead costs allocated to or apportioned over particular cost centre or production department by the units produced.

(i) Cost Ascertainment: The term 'Cost Ascertainment' means to ascertain the cost of each product, process or operation and ensure that all the expenses have been absorbed in the cost of products. Cost Ascertainment is one of the important objectives of Cost Accounting.

(j) Cost Audit: I C M A defines 'Cost Audit' as a detailed examination or verification of cost accounts and check on the adherence to the cost accounting plan. The purpose of cost audit is to examine whether the methods laid down for ascertaining costs and other decisions are being properly implemented and whether the cost accounting plan is being adhered to or not. The purpose can be (i) Protective and (ii) Constructive. Protective purpose aims to examine that there is no undue wastage or losses and that the cost accounting system reflects the correct and realistic cost of production. Constructive purpose aims at providing the management with information useful in regulating production, choosing economic methods of operations, reducing the operational costs, etc. based on the findings during the course of cost audit.

(k) Cost Unit: The term 'Cost Unit' refers to a unit of product, service or time in relation to which costs may be ascertained. It is a unit of quantity in terms of which costs can be measured. Cost Unit may be selected on the basis of (a) Single and (b) Composite (or) Commonly used.

The following are some examples of Cost Units used in different industries :

<i>Name of Industry</i>	<i>Cost Units used</i>
Paper	Per Tonne (or) Per Kg
Steel	Per Tonne
Sugar	Per Quintal
Cement	Per Tonne
Textile (cloth)	Per Metre
Transport	Passenger Kilometre
Electricity	Per Kilo Watt-hour
Bricks	Per 1000 bricks

Cost Centre

According to the Chartered Institute of Management Accountants, London, Cost Centre is defined as a location, person or items of equipment (or group of these) for which costs may be ascertained and used for purposes of cost control. In other words, cost centre is a part of an organization which includes location, processes, equipment, (or) machine centres, various departments, persons etc. in relation to which costs can be charged or ascertained.

Cost Centres can be classified into the following types :

- (1) **Personal Cost Centre:** It consists of a person or group of persons, e.g., salesmen, Marketing Manager, etc.
- (2) **Impersonal Cost Centre:** It is a Cost Centre which consists of a location or items of equipment.
- (3) **Operation Cost Centre:** It consists of machines and/or persons carrying out similar operations.
- (4) **Process Cost Centre:** It is a Cost Centre which consists of a specific process or a continuous sequence of operations.

Objectives of Cost Accounting

The following are the important objectives of Cost Accounting :

- (1) Ascertainment of cost.
- (2) Determination of selling price.
- (3) Cost control and cost reduction.
- (4) Ascertainment of profit of each activity.
- (5) Assisting Management in decision making.
- (6) Formulating business policy.
- (7) Matching costs with revenue.

Distinction between Financial Accounting and Cost Accounting

The following are the differences between Financial Accounting and Cost Accounting:

	<i>Financial Accounting</i>	<i>Cost Accounting</i>
(1) Purpose	It is prepared for providing information about the final results of the business activities as a whole for a particular period to its proprietors, outsiders etc.	The main purpose of Cost Accounting is to provide information to the management for the proper planning, control and decision making.

	<i>Financial Accounting</i>	<i>Cost Accounting</i>
(2) Need	Financial Accounts are maintained as per the requirements of Companies Act and Income Tax Act.	Cost accounts are maintained to meet the requirement of the Management.
(3) Recording	Transactions are classified, recorded and analysed subjectively.	In cost accounting, transactions are classified, recorded and analysed objectively according to the purpose for which costs are incurred.
(4) Analysis of Profit	Financial accounting reveals the profit of a business as a whole.	Cost Accounting shows the profit made on each product, job or process.
(5) Accounting period	Financial accounts are prepared for a definite period.	Cost reports are prepared frequently and submitted to the management may be daily, weekly, etc.
(6) Stock valuation	In financial accounts, stocks are valued at cost price or market price whichever is less.	Cost accounting stocks are valued at cost.
(7) Dealings	Financial accounts deal with actual facts and figures.	In cost account lays emphasis on both actual facts and estimates or predetermined cost.
(8) Relative Efficiency	Financial accounts do not reveal the relative efficiency of each department or section.	Cost account provides information on the relative efficiencies of various plant and Machinery.

Management Accounting

Management Accounting helps the management in effectively performing its functions of planning, organizing, controlling, co-ordinating and decision-making.

The Institute of Cost and Management Accountants London has defined Management Accounting as “the application of professional knowledge and skill in the preparation of accounting information in such a way as to assist management in the formation of policies, and in the planning and control of the operations of the undertaking.”

Cost Accounting Vs Management Accounting

The following are the main distinctions between Cost Accounting and Management Accounting :

- (1) Cost Accounting deals with cost ascertainment, cost allocation, cost apportionment and cost control. Management Accounting provides all accounting informations to the management for discharge of its functions effectively.
- (2) Management Accounting has a wider scope as compared to cost accounting. Therefore Management Accounting uses more advanced techniques of Management reporting.
- (3) Management Accounting deals with both Cost Accounting and Financial Accounting. But cost accounting deals with cost data.
- (4) Standard Costing, Budgetary Control, Break-Even Analysis, Inventory Control etc. are the basic tools and techniques used in Cost Accounting. But in Management Accounting, fund flow analysis, cash flow analysis, ratio analysis etc. are the important tools used for analysis and interpretation of financial statements.

Advantages of Cost Accounting

Cost Accounting helps the Management to ascertain the true cost of every operation, through setting objectives and standard of operation, comparison of actual performance with standard to reveal the discrepancies or Variances. If the variances are adverse, the management takes up corrective measure to eliminate variations. The following are the advantages of cost accounting to the management, to the employees, to the creditors, to the government and to the public:

Advantages to the Management

- (1) Facilitates planning.
- (2) Helps in formulating policies.
- (3) Useful in setting up objectives and standards of performance.
- (4) Facilitates cost comparison.
- (5) Leads to effective cost control.
- (6) Determines of selling price.
- (7) Ascertain profit of each activity.
- (8) Assists the Management in decision making.
- (9) Facilitates cost reduction.
- (10) Measures performance.

Advantages to the Employees

- (1) Ensures fair incentive wage schemes.
- (2) Facilitates job security, recognition and promotion.
- (3) Useful in measuring operating efficiency of the employees.

Advantages to the Creditors

- (1) Measures the financial strength and creditworthiness of the business.
- (2) Attract investors for extending their credit facilities.
- (3) Creates trustworthiness among the creditors, debentureholders, banks, etc.

Advantages to the Government

- (1) It helps to formulate business policies and national plans for industrial development.
- (2) It facilitates assessment of taxation, and establishment of indexes.
- (3) It assists in effective utilization of resources, i.e., materials, labour and machines etc.
- (4) It assists the government for cost reduction, price fixation, export and import and granting subsidy etc.

Advantages to the Public

- (1) It helps in elimination of wastages and inefficiencies.
- (2) It facilitates the consumers to pay fair price for products.
- (3) It leads to progress of national economic growth.

- (4) Creates employment opportunities.
- (5) Increases the living standards of the people.

Limitations of Cost Accounting

The following are some of the limitations of cost accounting :

- (1) There is lack of uniformity in regard to its procedure and practices.
- (2) Cost are classified and interpreted in such different manners that though given the same title, they are computed on a different basis.
- (3) Lack of consistency becomes more acute when projections are made beyond the recorded cost data.
- (4) Inherent limitations of cost accounting objections raised by different sections of business societies against the introduction of cost accounting.
- (5) Cost accounting is unnecessary for recently established industries. And also modern methods of costing systems are not suitable for all types of industries.
- (6) Cost accounting system involves considerable amount of expenditure at the installation stage. Thus costing system is not economical for a small concern.
- (7) Cost accounting involves accounting procedures and record-keeping. These are far more detailed and difficult than those required in financial accounting.

Installation of Cost Accounting System

While installing a cost system, the cost accountant should consider the following factors :

(1) Objectives of Costing System: While installing a cost accounting system, it should be ensured that it will aid in ascertainment of cost, determination of selling price, cost control and cost reduction etc.

(2) Nature of Business: Cost Accounting system should be suited to the nature of products and business. The nature of product and business is essential to determine proper method of costing on the basis of types of product, methods and product life cycle, quantity, quality etc.

(3) Nature of Organization: It is essential to examine existing organization structure of the company before introducing the costing system. Since the system is to be designed to suit the organization it is necessary to ascertain the layout, nature and size of the organization, scope of authority and responsibility.

(4) Methods and Procedures: Before introducing the costing system, the Cost Accountant should carefully study the existing manufacturing procedures, processes, methods, system of wage payments, receipts and issue of materials. This will help him to select the proper method of costing.

(5) Communication: A good system of cost accounting will provide information which helps in decision making. Cost information should be made available promptly and regularly. It is necessary to examine the prompt reporting system.

(6) Standardization: The system should be introduced after a detailed study of the standardization. Standard Forms should be used in order to reduce clerical work to the minimum.

(7) Simplicity: The system to be adopted should be simple and easy to adopt to the changing requirement. The costing system should be capable of being understood by the operating personnel.

(8) Co-operation: There is need for co-operation and support of the various departments involved in the cost accounting process for being successfully implemented.

(9) **Reconciliation:** Emphasis should be on whether separate set of cost and financial books are required or an integrated system has to be followed. This depends upon the nature and size of the industry. Where cost books are maintained independently of financial records there must be provision for reconciliation between the cost and financial records.

Practical Difficulties in Installing Costing System

The following are the practical difficulties confronted in installing a costing system :

- (1) Lack of top management support.
- (2) Resistance from accounting departmental staff.
- (3) Non co-operation from user departments.
- (4) Shortage of trained staff in costing department.
- (5) Heavy cost of installing the system.

Steps to Overcome Practical Difficulties

To overcome these difficulties, the steps required are given below:

- (1) To sell the idea to top management to convince them of the utility of the system.
- (2) Resistance and non co-operation can be overcome by behavioural approach to deal with the staff concerned effectively.
- (3) Proper training should be given to the staff at each level.
- (4) Regular meetings should be held with the cost accounting staff, user departments staff and top management to clarify points.

QUESTIONS :

1. What do you understand by Cost Accounting?
2. Define the terms Cost Centre and "Cost Unit."
3. What are the important objectives of Cost Accounting?
4. What are the differences between financial account and cost accounting?
5. Distinguish between cost accounting and management accounting.
6. What are the factors to be considered for installation of good costing system?
7. Describe the practical difficulties in installation of costing system.
8. Cost Accounting has become an essential tool of management. Give your comments on this statement.
9. Indicate the various advantages of Cost Accounting.
10. Define costing and discuss briefly its objects and advantages.
11. What are the limitations of cost accounting?
12. Write short notes on :
 - (a) Costing;
 - (b) Cost Accountancy;
 - (c) Cost Control;
 - (d) Cost Reduction;
 - (e) Cost Unit and Cost Centre.

CHAPTER 11

Cost — Methods, Techniques of Cost Accounting and Classification of Cost

I. METHODS OF COSTING

Meaning: The term 'methods' and 'systems' are used synonymously to indicate an integrated set of procedures based on a complex concept of ideas, principles and concepts. The term method of costing refers to cost ascertainment. Different methods of costing for different industries depend upon the production activities and the nature of business. For these, costing methods can be grouped into two broad categories : (1) Job costing and (2) Process costing.

(1) Job Costing

Job costing is also termed as Specific Order Costing (or) Terminal Costing. In job costing, costs are collected and accumulated according to jobs, contracts, products or work orders. Each job is treated as a separate entity for the purpose of costing. The material and labour costs are compiled through the respective abstracts and overheads are charged on predetermined basis to arrive at the total cost. Job costing is used in printing, furniture making, ship building, etc.

Job costing is further classified into (a) Contract costing (b) Cost plus contract and (c) Batch costing

(a) Contract Costing: This method of costing is applicable where the job work is big like contract work of building. Under this method, costs are collected according to each contract work. Contract costing is also termed as Terminal Costing. The principles of job costing are applied in contract costing.

(b) Cost plus Contract: These contracts provide for the payment by the contracted of the actual cost of manufacture plus a stipulated profit. The profit to be added to the cost. It may be a fixed amount or it may be a stipulated percentage of cost. These contracts are generally entered into when at the time of undertaking of a work, it is not possible to estimate its cost with reasonable accuracy due to unstable condition of material, labour etc. or when the work is spread over a long period of time and prices of materials, rates of labour etc. are liable to fluctuate.

(c) Batch Costing: In Batch Costing, a lot of similar units which comprise the batch may be used as a cost unit for ascertainment of cost. Separate Cost Sheet is maintained for each batch by assigning a batch

number. Cost per unit of product is determined by dividing the total cost of a batch by the number of units of the batch. Batch Costing is used in drug industries, ready-made garments industries, electronic components manufacturing, T V Sets, etc.

(2) Process Costing

This costing method refers to continuous operation or continuous process costing. Process costing method is applicable where goods or services pass through different processes to be converted into finished goods. Process costing is used in Cement industries, Sugar industries, Textiles, Chemical industries etc.

The following are the important variants of process costing system:

(a) Operation Costing: It is concerned with the determination of the cost of each operation rather than process. It offers scope for computation of unit operation cost at the end of each operation by dividing the total operation cost by total output of units.

(b) Operating Costing: Operating costing is also termed as service costing. Operating costing is similar to process costing and is used in service industries. This method of costing is suitable for concerns rendering services. For example, Hospitals, Transport, Canteen, Hotels, etc.

(c) Output Costing: Output costing is also called Unit Costing (or) Single Costing. This method of costing is applicable where a concern undertakes mass and continuous production of single unit or two or three types of similar products or different grades of the same products. Under this method cost per unit is measured by dividing the total cost by number of units produced. Output Costing is used in industries like Cement, Cigarettes, Pencils, Quarries etc.

(d) Multiple Costing: This method of costing means combination of two or more methods of costing like operation costing and output costing. Under this method the cost of different sections of production are combined after finding out the cost of each and every part manufactured. This method of costing is suitable for the industries manufacturing motor cars, engines, aircraft, tractors, etc.

II. TECHNIQUES OF COSTING

Costing is the technique and process useful to allocation of expenditure, cost ascertainment and cost control. In order to fulfil the needs of the management it supplies necessary information to the management. The following are the various techniques of costing:

- (a) Uniform Costing
- (b) Marginal Costing
- (c) Standard Costing
- (d) Historical Costing
- (e) Absorption Costing

(a) Uniform Costing: Uniform Costing is not a distinct method of costing. In fact when several undertakings start using the same costing principles and/ or practices, they are said to be following uniform costing. The basic idea behind uniform costing is that the different firms in an industry should adopt a common method of costing and apply uniformly the same principles and techniques for better cost comparison and common good.

(b) Marginal Costing: The C. I. M. A. London defines Marginal costing as “a technique of costing which aims at ascertaining marginal costs, determining the effects of changes in costs, volume, price etc. on the Company’s profitability, stability etc. and furnishing the relevant data to the management for enabling it to take various management decisions by segregating total costs into variable and fixed costs.”

(c) **Standard Costing:** Standard Costing is a technique of cost accounting which compares the standard cost of each product or service with actual cost to determine the efficiency of the operation, so that any remedial action may be taken immediately.

(d) **Historical Costing:** Historical costing is the ascertainment and recording of actual costs when, or after, they have been incurred and was one of the first stages in the growth of the Cost Accountant's work. Actual costs refer to material cost, labour cost and overhead cost.

(e) **Absorption Costing:** Absorption Costing is also termed as Full Costing (or) Orthodox Costing. It is the technique that takes into account charging of all costs both variable and fixed costs to operation processed or products or services.

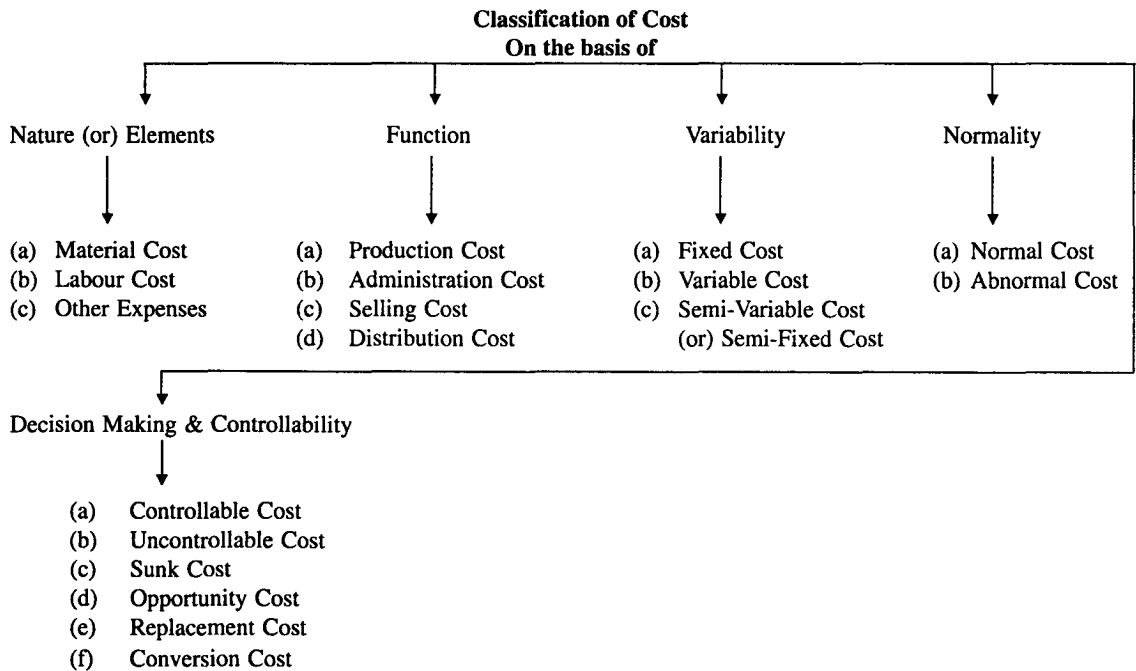
III. CLASSIFICATION OF COST

Classification is the process of grouping costs according to their common characteristics or features. There are various methods of classifying costs on the basis of requirements.

The following are the important bases on which costs are classified:

- (a) On the basis of Nature (or) Elements.
- (b) On the basis of Function.
- (c) On the basis of Variability.
- (d) On the basis of Normality.
- (e) On the basis of Controllability and Decision Making.

The following chart can explain further the classifications cost:



(1) On the basis of Nature or Elements: One of the important classification cost is on the basis of nature or elements. Based on elements, it is classified into Material Cost, Labour Cost and Other Expenses. They can be further subdivided into Direct and Indirect Material Cost, Direct and Indirect Labour Cost and Direct and Indirect Other Expenses.

(2) On the basis of Function: The classification of costs on the basis of the various function of a concern is known as function-wise classification. Here there are four important functional divisions in the business organization, viz.: (a) Production Cost (b) Administration Cost (c) Selling Cost and (d) Distribution Cost.

(3) On the basis of Variability: On the basis of variability with the volume of production Cost is classified into Fixed Cost, Variable Cost and Semi Variable Cost; Fixed Costs are those costs incurred which remain constant with the volume of production. Rent and rates of office and factory buildings are examples of fixed cost.

Variable costs are those costs incurred directly with the volume of output. For example, cost of materials and wages to workers are the expenses chargeable with direct proportion to the volume of production.

Semi-Variable Costs are those costs incurred, partly fixed and partly variable, with the volume of production. Accordingly, it has both fixed and variable features. For example, depreciations and maintenance cost of plant and machinery.

(4) On the basis of Normality: Costs are classified into normal costs and abnormal costs on the basis of normality features. Normal costs are those incurred normally within the target output or fixed plan.

(5) On the basis of Controllability and Decision Making: Based on the managerial decision making and controllability the classifications are as follows: (a) Controllable Cost; (b) Uncontrollable Cost; (c) Sunk Cost; (d) Opportunity Cost; (e) Replacement Cost; and (f) Conversion Cost.

- (a) Controllable Costs:** Controllable Costs are the costs which can be influenced by the action of a specified number of an undertaking. Controllable Costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre. For example, direct materials and indirect materials.
- (b) Uncontrollable Costs:** Uncontrollable Costs are those costs which cannot be influenced by the action of a specified number of an undertaking. In fact, no cost is controllable, it is only in relation to a particular individual that may specify a particular cost to either controllable or non-controllable. For example, rent and rates.
- (c) Sunk Cost:** These are historical costs which were incurred in the past and are not relevant to the particular decision making problem being considered. While considering the replacement of a plant, the depreciated book-value of the old asset is irrelevant as the amount is a sunk cost which is to be written-off at the time of replacement. Unlike incremental or decremental costs, sunk costs are not affected by increase or decrease of volume. Example of sunk cost include dedicated fixed assets, development cost already incurred.
- (d) Opportunity Cost:** Opportunity costs mean the costs of forgoing or giving up an opportunity. It is the notional value of going without the next best use of time, effort and money. These indicate the income or potential benefits sacrificed because a certain course of action has been taken. An example of opportunity costs is the market value forgone or sacrificed when an old machine is being used.
- (e) Replacement Cost:** Such expenses may be incurred due to factors like change in method of production, an addition or alteration in the factory building, change in flow of production

etc. All such expenses are treated as production overheads; when amount of such expenses is large, it may be spread over a period of time.

- (f) **Conversion Cost:** Conversion Costs are those costs incurred while converting materials into semi-finished or finished goods. It is the aggregate of direct wages, direct expenses and overhead costs of converting raw materials into finished products.

QUESTIONS

1. What are the important methods of Costing? Describe each of them briefly.
2. What are the important techniques of costing?
3. What method of costing would you recommend for the following industries? Give reasons.
 - (a) Ship Building
 - (b) Ready-made Garment
 - (c) Sugar Industries
 - (d) Hospitals
 - (e) Cigarettes
 - (f) Motor Cars Manufacture.
4. Describe the different classification of cost in detail.
5. What are the important basic requisites for classification of cost? Explain them briefly.
6. Write short notes on :
 - (a) Uniform Costing
 - (b) Historical Costing
 - (c) Marginal Costing
 - (d) Standard Costing
 - (e) Sunk Costing
 - (f) Standard Costing.
7. What are the differences between controllable costs and uncontrollable costs?



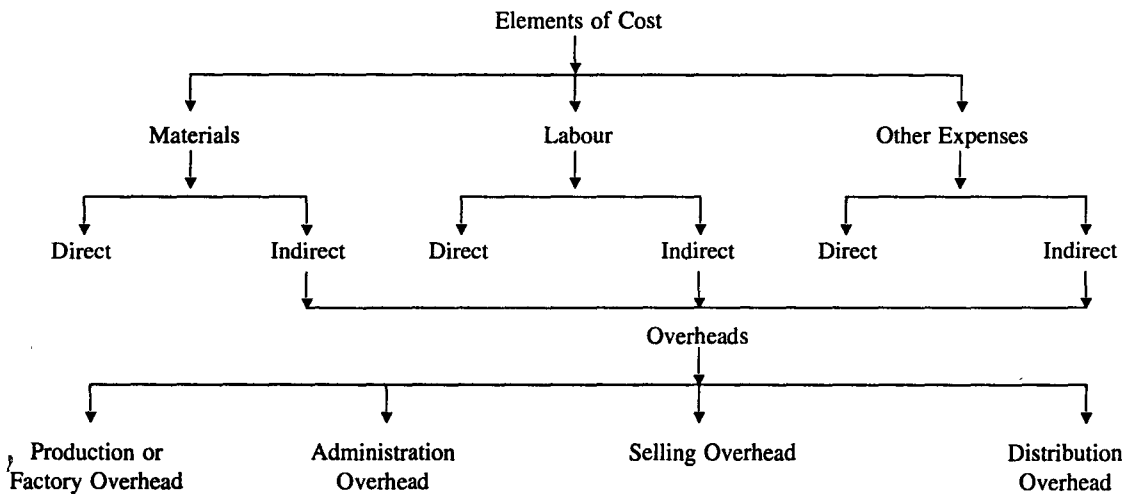
CHAPTER 12

Cost Sheet (or) Statement of Cost

ELEMENTS OF COST

Introduction

Elements of cost are necessary to have a proper classification and analysis of total cost. Thus, elements of cost provide the management with necessary information for proper control and management decisions. For this purpose, the total cost is analysed by the elements or nature of cost, i.e., material, labour and overheads. The various elements of costs may be illustrated as below:



By grouping of the above elements of cost, the following divisions of cost are obtained:

- | | | |
|--------------------------|---|--|
| (1) Prime Cost | = | Direct Materials + Direct Labour + Direct Expenses |
| (2) Works Cost (Factory) | = | Prime Cost + Factory Overhead |

- (3) Cost of Production = Factory Cost + Office and Administrative Overhead
- (4) Cost of Sales (or) Total Cost = Cost of Production + Selling and Distribution Overhead

(I) Materials Cost

Materials Costs refer to cost of materials which are the major substances used in production and are converted into finished goods and semi-finished goods. Materials are grouped as direct materials and indirect materials.

Direct Materials: Direct materials are those that form part of a product. Raw materials, semi-finished products, and finished products which can be identified with production of a product are known as direct materials. Sugar cane, cotton, oilseeds, woods etc. are examples of direct materials. The cost of materials involves conversion of raw materials into finished products.

Indirect Materials: Material costs, other than direct material cost are known as indirect material cost. Indirect materials cannot be identified with a particular unit of cost or product. Indirect materials are indirectly used for producing the products. Lubricating oil, consumable stores, fuel, design, layout etc. are examples of indirect material cost.

(II) Labour Cost

In actual production of the product, labour is the prime factor which is physically and mentally involved. The payment of remuneration of wages is made for their effort. The labour costs are grouped into (a) Direct Labour and (b) Indirect Labour.

(a) Direct Labour: Direct labour cost or direct wages refer to those specifically incurred for or can be readily charged to or identified with a specific job, contract, work order or any other unit of cost are termed as direct labour cost. Wages for supervision, wages for foremen, wages for labours who are actually engaged in operation or process are examples of direct labour cost.

(b) Indirect Labour: Indirect labour is for work in general. The importance of the distinction lies in the fact that whereas direct labour can be identified with and charged to the job, indirect labour cannot be so charged and has therefore to be treated as part of the factory overheads to be included in the cost of production. Examples are salaries and wages of supervisors, store keepers, maintenance labour etc.

(III) Expenses

All expenses are other than material and labour that are incurred for a particular product or process. They are defined by ICMA as "The cost of service provided to an undertaking and the notional cost of the use of owned assets." Expenses are further grouped into (a) Direct Expenses and (b) Indirect Expenses.

(a) Direct Expenses: Direct expenses which are incurred directly and identified with a unit of output or process are treated as direct expenses. Hire charges of special plant or tool, royalty on product, cost of special pattern etc. are the examples of direct expenses.

(b) Indirect Expenses: Indirect expenses are expenses other than indirect materials and indirect labour, which cannot be directly identified with a unit of output. Rent, power, lighting, repairs, telephone etc. are examples of indirect expenses.

Overheads

All indirect material cost, indirect labour cost, and indirect expenses are termed as Overheads. Overheads may also be classified into (a) Production or Factory Overhead (b) Office and Administrative Overheads (c) Selling Overhead and (d) Distribution Overhead.

(a) **Production Overhead:** Production Overhead is also termed as Factory Overhead. Factory overhead includes indirect material, indirect labour and indirect wages which are incurred in the factory. For example, rent of factory building, repairs, depreciation, wages of indirect workers, etc.

(b) **Office and Administrative Overhead:** Office and Administrative Overhead is the indirect expenditure incurred in formulating the policies, establishment of objectives, planning, organizing and controlling the operations of an undertaking. All office and administrative expenses like rent, staff salaries, postage, telegram, general expenses etc. are examples.

(c) **Selling Overhead:** Selling Overhead is the indirect expenses which are incurred for promoting sales, stimulating demand, securing orders and retaining customers. For example, advertisement, salesmen's commission, salaries of salesmen etc.

(d) **Distribution Overhead:** These costs are incurred from the time the product is packed until it reaches its destination. Cost of warehousing, cost of packing, transportation cost etc. are some of the examples of distribution overhead.

COST SHEET

Meaning: Cost Sheet or a Cost Statement is "a document which provides for the assembly of the estimated detailed elements of cost in respect of cost centre or a cost unit." The analysis for the different elements of cost of the product is shown in the form of a statement called "Cost Sheet." The statement summarises the cost of manufacturing a particular list of product and discloses for a particular period:

- (I) Prime Cost;
- (II) Works Cost (or) Factory Cost;
- (III) Cost of Production;
- (IV) Total Cost (or) Cost of Sales.

Importance of Cost Sheet

- (1) It provides for the presentation of the total cost on the basis of the logical classification.
- (2) Cost sheet helps in determination of cost per unit and total cost at different stages of production.
- (3) Assists in fixing of selling price.
- (4) It facilitates effective cost control and cost comparison.
- (5) It discloses operational efficiency and inefficiency to the management for taking corrective actions.
- (6) Enables the management in the preparation of cost estimates to tenders and quotations.

SPECIMEN OF COST SHEET

Cost Sheet for the Period

<i>Particulars</i>	<i>Total Cost Rs.</i>	<i>Cost per Unit Rs.</i>
Direct Materials :		
Opening Stock of Raw Materials	xxx	
Purchases	xxx	
Carriage Inwards	xxx	
<i>Less</i> : Closing Stock of Raw Materials	xxx	
Direct Materials Consumed	xxx	
<i>Add</i> : Direct Wages	xxx	
Direct Expenses	xxx	

<i>Particulars</i>	<i>Total Cost Rs.</i>	<i>Cost per Unit Rs.</i>
Prime Cost (1)	xxx	xxx
<i>Add</i> : Works or Factory Overheads :	xxx	xxx
Indirect Materials		
Indirect Labour		
Factory Rent and Rates		
Factory Lighting and Heating		
Power and Fuel		
Repairs and Maintenance		
Cleaning		
Drawing Office Expenses		
Cost of Research and Equipments		
Depreciation of Factory Plant		
Factory Stationery		
Insurance of Factory		
Factory or Work Manager's Salary		
Other Factory Expenses	xxx	xxx
Total Factory Cost	xxx	xxx
<i>Add</i> : Opening Stock of Work in Progress		
<i>Less</i> : Closing Stock of Work in Progress		
Works Cost (or) Factory Cost (2)		
<i>Add</i> : Office & Administrative Overheads:		
Office Rent and Rates		
Office Salaries		
Lighting and Heating		
Office Stationery		
Office Insurance		
Postage and Telegrams		
Office Cleaning		
Legal Charges		
Depreciation of Furniture and Office		
Equipments and Buildings Audit Fees		
Bank Charges and Commission	xxx	xxx
Total Cost of Production (3)	xxx	xxx
<i>Add</i> : Opening Stock of Finished Goods	xxx	
<i>Less</i> : Closing Stock of Finished Goods	xxx	xxx
Cost of Production (4)	xxx	xxx
<i>Add</i> : Selling and Distribution Overheads :		
Showroom Rent and Rates		
Salesmen's Salaries		
Salesmen's Commission		
Sales Office Rent and Rates		
Travelling Expenses of Salesmen		
Warehouse Rent and Rates		
Advertisement Expenses		
Warehouse Staff Salaries		
Carriage Outwards		
Sales Manager's Salaries		
Repairs and Depreciation of Delivery Van		

<i>Particulars</i>	<i>Total Cost Rs.</i>	<i>Cost per Unit Rs.</i>
Sample and Free Gifts		
Bad debts, Debt Collection Expenses	xxx	xxx
Cost of sales (5)		xxx
Profit / Loss (6)		xxx
Sales		xxx

Illustration: 1

From the following particulars, prepare a Cost Sheet showing (1) Cost of Materials Consumed (2) Prime Cost (3) Factory Cost (4) Cost of Production and (5) Profit

	<i>Rs.</i>
Opening stock of raw materials	20,000
Opening stock of work in progress	10,000
Opening stock of finished goods	50,000
Raw materials purchased	5,00,000
Direct wages	3,80,000
Sales for the year	12,00,000
Closing stock of raw materials	75,000
Closing stock of work in progress	15,000
Factory overhead	80,000
Direct expenses	50,000
Office and Administrative overhead	60,000
Selling and Distribution expenses	30,000

Solution:**Cost Sheet for the year**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening Stock of Raw Materials	20,000	
Purchases	5,00,000	
	5,20,000	
<i>Less</i> : Closing Stock of Raw Materials	75,000	
Cost of Raw Materials Consumed (1)		4,45,000
<i>Add</i> : Direct Wages	3,80,000	
Direct Expenses	50,000	
Prime Cost (2)		8,75,000
<i>Add</i> : Factory overheads	80,000	
<i>Add</i> : Opening stock of work in progress	10,000	
	90,000	
<i>Less</i> : Closing stock of Work in Progress	15,000	
Works Cost (or) Factory Cost (3)		9,50,000
<i>Add</i> : Office & Administrative Overhead		60,000
Cost of Production (4)		10,10,000
<i>Add</i> : Opening Stock of Finished Goods		50,000
		10,60,000
<i>Less</i> : Closing Stock of Finished Goods		50,000

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Cost of Goods Sold (5)		10,10,000
Add : Selling and Distribution Overhead		30,000
Cost of Sales (6)		10,40,000
Profit (7)		1,60,000
Sales for the year		12,00,000

Illustration: 2

The following information relates to the manufacture of a product during the month of Jan. 2003:

Raw materials consumed	Rs. 20,000
Direct wages	Rs. 12,000
Machine hours worked	1,000 hours
Machine hour rate	Rs. 2 per hour
Office overhead	20% on works cost
Selling overhead	Re. 0.40 per unit
Units produced	20,000 units
Units sold at Rs. 3 each; 18,000 units	

Prepare a Cost Sheet and show (a) Prime Cost (b) Work Cost (c) Cost of Production (d) Cost of Goods Sold (e) Cost of Sales (f) Profit

Solution:

Cost Sheet for Jan. 2003

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Raw Materials Consumed	20,000	
Direct Wages	12,000	
Prime Cost (1)		32,000
Add : Factory Overhead 1000 x Rs. 2		2,000
Work Cost (2)		34,000
Add : Office Overhead 20% on Works Cost		6,800
Cost of Production (3)		40,800
Less : Closing Stock of Finished Goods (20000 – 18000 = 2000 Units)		
$= 40,800 \times \frac{2,000}{20,000}$ }		4,080
Cost of Goods Sold (4)		36,720
Add : Selling Overhead 18000 @ Re. 0.40		7,200
Cost of Sales (5)		43,920
Profit (6)		10,080
Sales 18000 Units @ Rs. 3		54,000

Illustration: 3

The following information relates to the manufacture of a product during the month of Jan. 2003:

Direct raw materials	Rs. 1,60,000
Direct wages	Rs. 90,000
Machine hours worked	6000
Machine hour rate	Rs. 6

Office overhead 15% of work cost
 Selling overhead Rs. 2 per unit
 Units produced 5000 units
 Units Sold 5,000 units @ Rs. 80 each

Prepare a cost sheet and show (a) Cost per unit and (b) Profit for the period.

Solution:

Cost Sheet for January 2003

<i>Particulars</i>	<i>Total Cost Rs.</i>	<i>Total per Unit Rs.</i>
Direct Raw Materials	1,60,000	32.00
Direct wages	90,000	18.00
Prime cost	2,50,000	50.00
Add : Factory Overhead (6000 x Rs. 6)	36,000	7.20
Works Cost	2,86,000	57.20
Add : Office Overhead $\left\{ \frac{2,86,000 \times 15}{100} \right\}$	42,900	8.58
Cost of Production	3,28,900	65.78
Add : Selling Overhead (5000 x Rs. 2)	10,000	2.00
Cost of Good Sold	3,38,900	67.78
Profit	61,100	12.22
Sales 5,000 x Rs. 80	4,00,000	80.00

Illustration: 4

From the following particulars calculate (1) Prime Cost (2) Factory Cost (3) Cost of Production and (4) Cost of Sales :

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
Direct Raw Materials	33,000	Depreciation of office building	1,000
Direct Wages	35,000	Depreciation of delivery Van	200
Direct Expenses	3,000	Bad debts	100
Factory Rent and rates	7,500	Advertising	300
Indirect Wages (Factory)	10,500	Salaries of salesmen	1,500
Factory Lighting	2,050	Up keeping of delivery Van	700
Factory Heating	1,500	Bank charges	100
Power (Factory)	4,400	Commission on sales	1,500
Office Stationery	900	Rent and rates (Office)	500
Director's Remuneration (Factory)	2,000	Loose tools written off	600
Director's Remuneration (Office)	4,000	Output (tonnes)	
Factory Cleaning	1,000	(sales @ Rs.40 per unit)	5,000
Sundry Office Expenses	200		
Factory Stationery	750		
Water supply (Factory)	1,300		
Factory Insurance	1,100		
Office Insurance	500		
Legal Expenses (Office)	400		
Rent of Warehouse	300		
Depreciation Plant & Machinery	2,000		

Solution:

Cost Sheet for the year

<i>Particulars</i>	<i>Rs.</i>	<i>Rs.</i>
Direct materials	33,000	
Direct wages	35,000	
Direct expenses	3,000	
Prime Cost (1)		71,000
<i>Add : Factory overheads</i>		
Factory rent and rates	7,500	
Indirect wages	10,500	
Factory lighting	2,050	
Factory heating	1,500	
Power (Factory)	4,400	
Director's remuneration (Factory)	2,000	
Factory cleaning	1,000	
Factory stationery	750	
Water supply (Factory)	1,300	
Factory Insurance	1,100	
Depreciation of Plant & Machinery	2,000	
Loose Tools written off	600	
Works Cost (or) Factory Cost (2)		1,05,700
<i>Add : Office and Administrative Overhead:</i>		
Office stationery	900	
Director's remuneration (Office)	4,000	
Sundry office expenses	200	
Office insurance	500	
Legal expenses (Office)	400	
Depreciation of office building	1,000	
Bank charges	100	
Rent and rates (Office)	500	
Cost of production (3)		1,13,300
<i>Add : Selling and Distribution Overhead:</i>		
Rent of warehouse	300	
Depreciation of delivery van	200	
Bad debts	100	
Advertising	300	
Salesmen salaries	1,500	
Up keep of delivery van	700	
Commission on sales	1,500	
Total Cost of Sales (4)		1,17,900
Profit		82,100
Sales 5000 tones @ Rs. 40 per unit		2,00,000

Illustration: 5

From the following particulars calculate: (a) Prime Cost; (b) Works Cost; (c) Cost of Production; (d) Cost of Sales; (e) Profit; and (f) Cost per unit.

Pandey Industries manufacture a product A. On 1st January 2003 finished goods in Stock Rs. 50,000. Other stocks such as :

Work in progress (1.1.2002)	Rs.	40,000
Raw materials (1.1.2002)	Rs.	1,00,000

The information available from cost records for the year ended 31st December, 2002 was as follows :

	<i>Rs.</i>
Direct materials	8,00,000
Direct wages	3,00,000
Carriage inward	40,000
Indirect wages	90,000
Factory cost	2,75,000
Stock on raw materials (31.12.2002)	80,000
Work in progress (31.12.2002)	70,000
Sales (1,20,000 units)	25,00,000
Indirect materials	1,75,000
Office and Administrative overhead	80,000
Selling and Distribution overhead	1,00,000
Stock on finished goods (31.12.2002)	60,000

Solution:

Cost Sheet for the year ending 31st Dec. 2002

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Total cost Rs.</i>
Stock of raw materials (1.1.02)	1,00,000	
<i>Add :</i> Direct materials	8,00,000	
Carriage inwards	40,000	
	9,40,000	
<i>Less :</i> Stock of raw materials (31.12.02)	80,000	
Raw Materials Consumed	8,60,000	
<i>Add :</i> Direct Wages	3,00,000	
Prime Cost (1)	11,60,000	
<i>Add :</i> Factory overhead	2,75,000	
<i>Add :</i> Work in Progress (1.1.02)	40,000	
	3,15,000	
<i>Less :</i> Work in Progress (31.12.02)	70,000	2,45,000
Work cost (or) Factory cost (2)		14,05,000
<i>Add :</i> Office & Administrative overhead		80,000
Cost of production (3)		14,85,000
<i>Add :</i> Stock of finished goods (1.1.02)		50,000
		15,35,000
<i>Less :</i> Stock of finished goods (31.12.02)		60,000
Cost of goods sold (4)		14,75,000
<i>Add :</i> Selling and distribution expenses		1,00,000
Cost of sales (5)		15,75,000
Profit (6)		9,205,000
Sales for the year		25,00,000

Illustration: 6

The following particulars have been extracted from the books of Sharma & Co. Ltd., Chennai for the year ended 31st March 2003

Raw Materials Consumed	Rs.	1,82,000
Direct Wages	Rs.	58,000
Other Direct Expenses	Rs.	22,000
Factory Overheads 80% of direct wages		
Office Overheads 10% of Work Cost		
Selling and distribution expenses Rs. 2 per unit sold		

Units produced and sold during the month 20,000. You are required to prepare a cost sheet for the year 2003 and also find the selling price per unit on the basis that profit mark up is uniformly made to yield a profit of 20% of the selling price.

Solution:

Cost Sheet (units produced : 2000 units)

<i>Particulars</i>	<i>Per unit Rs.</i>	<i>Amount Rs.</i>
Raw Materials Consumed	9.10	1,82,000
Direct Wages	2.90	58,000
Other Direct Expenses	1.10	22,000
Prime Cost (1)	13.10	2,62,000
Add : Factory Overheads :		
80% of direct wages $\left[58,000 \times \frac{80}{100} \right]$	2.32	46,400
Work Cost (2)	15.42	3,08,400
Add : Office Overheads :		
10% of work cost $\left[3,08,400 \times \frac{10}{100} \right]$	1.542	30,840
Cost of Production (3)	16.962	3,39,240
Add : Selling & Distribution Expenses	2.00	40,000
Cost of Goods Sold (4)	18.962	3,79,240
Add : Profit 20% of Selling Price (E)	4.740	94,810
Selling Price	23,702	4,74,050

Illustration: 7

From the following informations of Mani & Co. Ltd., for the year 2003 you are required to prepare:
(a) Prime Cost (b) Work Cost (c) Cost of Production (d) Cost of goods sold and (e) Net Profit

	<i>Rs.</i>
Stock of raw materials (1.1.2003)	50,000
Purchase of raw materials	1,70,000
Stock of raw materials (31.12.2003)	80,000
Carriage Inward	10,000
Direct Wages	1,50,000

Indirect Wages	20,000
Other Direct Charges	30,000
Office rent and rates	1,000
Factory rent and rates	10,000
Indirect consumption of materials	1,000
Depreciation on plant	3,000
Depreciation on office furniture	200
Salesmen salary	4,000
Salary to office supervisor	5,000
Other factory expenses	11,400
Other office expenses	1,800
General Manager's remunerations :	
Office Rs.	4,000
Factory Rs.	8,000
Selling Dept.	12,000
Other selling expenses	2,000
Traveling expenses of salesmen	2,200
Carriage & Freight outward	2,000
Sales	5,00,000
Advertisement	4,000

Solution:**Statement of Cost**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Stock of raw materials (1.1.2003)	50,000	
<i>Add:</i> Purchases	1,70,000	
Carriage Inwards	10,000	
	2,30,000	
<i>Less:</i> Stock of raw materials (31.12.2003)	80,000	
Raw Materials Consumed (1)		1,50,000
Wages		1,50,000
Other Direct Charges		30,000
Prime Cost (2)		3,30,000
<i>Add:</i> Factory Overhead: (3)		
Indirect Charges	20,000	
Factory rent and rates	10,000	
Indirect Materials	1,000	
Depreciation of Plant	3,000	
Other factory Expenses	11,400	
General Manager's remuneration	8,000	53,400
Factory Cost (2+3) = 4		3,83,400
<i>Add:</i> Office & Administrative Overheads: (5)		
Office rent and rates	1,000	
Depreciation on office furniture	200	
Salary to Office Supervisor	5,000	
Other Office Expenses	1,800	
General Managers remuneration	4,000	12,000
Cost of Production: (4+5) = 6		3,95,400

Add : Selling & Distribution Overheads: (7)		
Salary to Salesmen	4,000	
General Manager's Salary	12,000	
Other Selling Expenses	2,000	
Advertisement	4,000	
Traveling expenses	2,200	
Carriage and freight overhead	2,000	26,200
Cost of Goods Sold (8)		4,21,600
Profit (9)		78,400
Sales (10)		5,00,000

Illustration: 8

A fire occurred in the factory premises on October 31, 2003. The accounting records have been destroyed. Certain accounting records were kept in another building. They reveal the following for the period September 1, 2003 to October 31, 2003:

(i) Direct materials purchased	Rs.	2,50,000
(ii) Work in process inventory, 1.9.2003	Rs.	40,000
(iii) Direct materials inventory, 1.9.2003	Rs.	20,000
(iv) Finished goods inventory, 1.9.2003	Rs.	37,750
(v) Indirect manufacturing costs		40% of conversion cost
(vi) Sales revenues	Rs.	7,50,000
(vii) Direct manufacturing labour	Rs.	2,22,250
(viii) Prime costs	Rs.	3,97,750
(ix) Gross margin percentage based on revenues		30%
(x) Cost of Goods available for sale	Rs.	5,55,775

The loss is fully covered by insurance. The insurance Company wants to know the historical cost of the inventories as a basis for negotiating a settlement, although the settlement is actually to be based on replacement cost, not historical cost.

Required:

- (i) Finished goods inventory, 31.10.2003
- (ii) Work-in-process inventory, 31.10.2003
- (iii) Direct materials inventory, 31.10.2003

Solution:

(CA Inter, Nov. 2003)

Prime Cost (given) Rs.3,97,750

Direct material used

$$= \text{Prime cost} - \text{Direct manufacturing labour cost}$$

$$= 3,97,750 - 2,22,250$$

$$= \text{Rs. } 1,75,500$$

$$\text{Conversion cost} = \frac{\text{Direct manufacturing labour cost}}{0.6}$$

$$= \frac{2,22,250}{0.6}$$

$$= \text{Rs. } 3,70,416.67$$

Indirect manufacturing cost

$$= \text{Rs. } 3,70,416.67 - \text{Rs. } 2,22,250$$

$$= \text{Rs. } 1,48,166.67$$

Schedule of Computations

	<i>Rs.</i>
Direct materials 1.9.2003	20,000
Direct materials purchased	2,50,000
	2,70,000
Direct materials available for use	2,70,000
<i>Less</i> : Direct material 31.10.2003	94,500
(Balancing figure)	
Direct materials used	1,75,500
<i>Add</i> : Direct manufacturing labour cost	2,22,250
	3,97,750
Prime costs (1)	3,97,750
<i>Add</i> : Indirect manufacturing cost	1,48,166.67
	5,45,916.67
Manufacturing cost incurred during current period	5,45,916.67
<i>Add</i> : WIP 1.9.2003	40,000
	5,85,916.67
Manufacturing cost to account for	5,85,916.67
<i>Less</i> : WIP 31.10.2003	67,891.67
	5,18,025
Cost of goods manufactured (2)	5,18,025
<i>Add</i> : Finished goods 1.9.2003	37,750
	5,55,775
Cost of goods available for sale 31.10.2003	5,55,775
<i>Less</i> : Finished goods 31.10.2003	30,775
	5,25,000
Cost of goods sold (70% of 7,50,000) (3)	5,25,000
 Alternatively:	
Finished goods inventory 31.10.2003	Rs. 30,775
WIP inventory 31.10.2003	Rs. 67,891.67
Raw material inventory 31.10.2003	Rs. 94,500

QUESTIONS

1. What do you understand by 'cost sheet'? Briefly explain with specimen of cost sheet.
2. Explain the different elements of total costs.
3. Explain the importance of cost sheet.
4. Explain the different functional classification of overheads.
5. What items constitute (a) Prime Cost (b) Cost of Production and (c) Cost of Goods Sold.
6. Distinguish between :
 - (a) Direct material and Indirect material.
 - (b) Direct labour and Indirect labour.
 - (c) Direct expenses and Indirect expenses.
7. From the following particulars of a manufacturing firm prepare a statement showing:
 - (1) Cost of Materials Consumed
 - (2) Factory or Work Cost

<i>Cost of Production</i>	<i>Rs.</i>
Stock of materials on 1 st January 2003	80,000
Purchases during the period	22,00,000
Stock of finished goods on 1 st January 2003	1,00,000
Direct wages	10,00,000
Sales	48,00,000
Factory on cost	30,00,000
Office and Administrative Expenses	2,00,000
Stock of raw materials on 31 st December 2003	2,80,000
Stock of finished goods on 31 st December 2003	1,20,000
Ans : (1) Rs. 20,00,000 (2) Rs. 33,00,000 (3) Rs. 35,00,000	

8. Mr. Ramesh furnishes the following data relating to the manufacture of a standard product during the month of April 2003.

Raw materials consumed	Rs. 15,000
Direct labour charges	Rs. 9,000
Machine hour worked	900
Machine hour rate	Rs. 5

Administrative overheads 20% on works cost
 Selling and distribution expenses Re.0.50 per unit
 Units Produced 17,100
 Units Sold 16,000 at Rs.4 per unit

You are required to prepare a cost sheet from the above, showing : (a) the cost of production per unit. (b) Profit per unit sold and profit for the period.

[Ans : (a) Rs. 2; (b) Rs. 1.50; and Rs. 24,000]

9. From the following particulars of a manufacturing firm, prepare a statement showing : (a) Prime Cost (b) Works Cost (c) Cost of Production (d) Cost of Sales and (e) Profit.

	Rs.
Materials used in manufacturing	60,000
Materials used in primary packing	10,000
Materials used in selling the product	1,500
Materials used in the factory	750
Administrative expenses	1,250
Depreciation on office building	750
Depreciation on factory building	1,750
Materials used in the office	1,250
Wages – production	10,000
Wages – factory supervision	2,000
Indirect expenses – factory	1,000
Selling expenses	3,500
Freight on materials purchased	5,000
Advertising	1,250

Assuming that all the products manufactured are sold, what should be the selling price to obtain a profit of 20% on selling price?

Ans : (1) Prime Cost Rs. 85,000; (2) Works Cost Rs. 90,500; (3) Cost of Production Rs. 93,750; (4) Cost of Sales Rs. 1,00,000; (5) Profit Rs. 25,000; (6) Selling Price Rs. 1,25,000

10. From the following particulars prepare a Cost Sheet showing production 4,000 units in 2002 and 6,000 units in 2003:

	Rs.
Cost of materials	3,20,000
Wages	4,80,000
Manufacturing Expenses	2,00,000
Depreciation	2,40,000
Rent, Rates and Insurance	40,000
Selling Expenses	1,20,000
General Expenses	80,000
Sales	16,00,000
Actual Production in Units	4,000

The company plans to manufacture 6,000 units during 2003

Additional Information

- (1) Price of materials is expected to rise by 20%
- (2) Wage rates are expected to show an increase of 5%
- (3) Manufacturing expenses will rise in proportion to the combined cost of materials and wages
- (4) Selling expenses per unit will remain the same
- (5) Materials sold to earn a profit of 10% on selling price

[Ans: Production of 2,000 units: Prime cost Rs. 8,00,000; Total cost Rs. 14,80,000; Profit Rs. 1,20,000; Production of 3,000 units: Prime Cost Rs. 13,32,000; Total Cost 22,04,000; Profit Rs. 2,63,000]

11. Gowda & Co. Ltd. is Manufacturing a Sewing Machine and the following details are furnished in respect of its factory operations for the year ended 31st December 2003.

	Rs.	Rs.
Work in progress in the beginning	1,02,000	
Manufacturing Expenses	<u>30,000</u>	1,22,000
Work in Progress at the end:		
At Prime Cost	90,000	
Manufacturing Expenses	<u>18,000</u>	1,08,000
Opening Stock of raw materials	4,50,000	
Purchase of raw materials	9,54,000	
Direct Labour	2,42,000	
Manufacturing Expenses	1,68,000	
Closing Stock of raw materials	4,08,000	

On the basis of the above data, prepare a statement showing the cost of production
[Ans: Prime Cost Rs.13,50,000; works cost Rs.15,30,000]

12. From the following particulars of a manufacturing firm prepare a statement showing :
(a) Cost of production of goods manufactured
(b) Cost of goods sold and
(c) Profit

	Rs.
Stock of materials on 1 st January 2003	30,000
Purchase of raw materials	4,50,000
Wages paid	2,30,000
Works overhead	92,000
Work in progress (1-1-2003)	12,000
Work in progress (31-12-2003)	15,000
Stock of raw materials on 31 st December 2003	25,000
Stock of finished goods (1-1-2003)	60,000
Stock of finished goods (31-12-2003)	35,000
Selling and distribution expenses	20,000
Office and administration expenses	30,000
Sales	9,00,000

[Ans : Cost of production Rs. 8,04,000

Cost of goods sold Rs. 8,09,000

Profit Rs. 70,000]

13. Prepare cost sheet for the year 2003 from the following showing the total cost and cost per unit number of unit produced 2000 units :

	Rs.
Raw materials 1.1.2003	20,000
Purchases	3,60,000
Direct wages	1,12,000
Indirect wages	96,000
Raw materials 31.12.2003	24,000
Work in progress 1.1.2003	10,000
Work in progress 31.12.2003	12,000
Factory overheads	52,000
Office overheads	90,000
Selling overheads	32,000

Stock of finished goods 1.1.2003 (100 units) 40,000 stock of finished goods 31.12.2003 120 units. During the year 2003, it is decided to increase the production to 2400 units. It is anticipated that :

- (a) Material prices will increase by 10% (b) Wages will reduce by 20%
(c) Other expenses will remain constant per unit (d) Expected profit 20% on sales

Ascertain selling price to be fixed per unit.

[Ans : Productions 2000 units : Prime cost Rs.4,68,000; Cost of goods sold Rs. 7,33,760; Profit Rs.81,528; Production 2400 units : Prime Cost Rs. 5,77,440; Cost of goods sold Rs. 9,01,824; Profit Rs. 2,25,456]

14. From the following particulars relating to the manufacture of a standard product during the 2003, you are required to prepare a statement of cost and profit per unit.

Raw materials used	Rs. 40,000
Direct wages	Rs. 24,000
Man hours worked	9,500 hours
Man hour rate	Rs. 4 per hour
Office overheads	20% on works cost
Selling overheads	Rs. 1 per unit
Units produced	20,000 units
Units sold	18,000 @ Rs. 10 per unit

[Ans : Prime cost Rs. 64,000 ; Cost of production Rs. 1,22,400 at Rs. 6.12 per unit ; Cost of goods sold Rs. 1,28,160 at Rs. 7.12 per unit ; Profit Rs. 51,840 at Rs. 2.88 per unit]

15. From the following particulars, prepare cost sheet

Opening stock of raw materials	61,000
Opening stock of finished goods	40,800
Closing stock of raw materials	97,000
Closing stock of finished goods	20,000
Purchase of raw materials	50,000
Opening stock of work in progress	16,000
Closing stock of work in progress	18,000
Sales during the year	1,90,000
Direct wages	40,800
Factory expenses	21,000
Office expenses	11,000
Selling expenses	7,600
Distribution expenses	5,000

[Ans : Prime cost Rs. 54,800
 Cost of goods sold Rs. 1,05,400
 Net Profit Rs. 72,000]



CHAPTER 13

Materials Cost Control

Meaning of Materials

Materials cost is one of the important elements of cost of product or unit. It constitutes a substantial proportion of the total cost of production. For material cost control purposes, it is very essential to know the important aspects of material, material control and material purchase control.

Materials : The term 'materials' refers to all commodities or components which are consumed in the process of manufacture. The materials may be classified into Direct Materials and Indirect Materials.

Direct Materials : Direct Materials form part of the finished products. They can be easily identified with a particular cost unit. For example, cotton used in textile mills, timber used in furniture industries.

Indirect Materials : Indirect materials indirectly used for conversion from raw materials into finished products. They cannot be easily identified with a particular cost unit. For example, spare parts, tools, nails, lubrications etc.

Materials are further classified on the basis of the nature which have to be used such as:

- (a) Raw Materials, e.g., rubber, timber, steel etc.
- (b) Components, e.g., instruments
- (c) Consumable stores, e.g., cotton waste, brushes
- (d) Maintenance Materials, e.g., spare parts
- (e) Tools, e.g., jigs and fixtures

Materials Control

Materials control may be defined as the systematic control over the procurement, storage and usage of materials so as to maintain an even flow of materials and at the same time avoiding excessive investment in inventories.

From the above definition we can derive the following important aspects :

- (1) To ensure the smooth flow of production without interruptions.
- (2) Prevention of excessive investments in materials stock.

Functions of Materials Control

The following are the important functions involved in materials control in order to achieve the objectives of the stores department :

- (1) Purchasing of Materials
- (2) Receiving of Materials
- (3) Inspection of Materials
- (4) Storage of Materials
- (5) Issue of Materials
- (6) Maintenance of Stores Records
- (7) Stock Audit.

Objectives of Stores Control

The following are the objectives of stores control :

- (1) To receive materials and store them properly.
- (2) To ensure proper production and preservation of materials.
- (3) To make sure proper classification and codification of materials.
- (4) To provide proper information to the management about stock of materials.
- (5) To ensure good housekeeping and effective material handlings.
- (6) To assist in verification and provision of supporting information for effective purchase action.
- (7) To minimize obsolescence of materials adopted through effective control measures.
- (8) To ensure the optimum investment in materials to avoid overstocking or understocking of materials.
- (9) To maintain proper records about materials, receipts, issues and balances.
- (10) To issue materials as per specifications.
- (11) To make sure of the availability of all types of materials.
- (12) To ensure proper utilization of floor space.

Essentials of Material Control

Effective materials control is required for the following essentials to be considered :

- (1) Systematic planning for requirement of materials.
- (2) Essentials for co-ordination and co-operation among different departments.
- (3) Fixing of stock level is essential for avoiding overstocking.
- (4) Floor space is required for smooth handling of materials.

- (5) Proper filing system should be adopted.
- (6) Proper codification and classification of materials as per specifications.
- (7) Perpetual inventory system should be adopted for verification of materials in stock.
- (8) Proper planned storage control and issue.
- (9) Systematic procedure should be adopted for materials, receipts and issues.
- (10) Qualified personnel required to manage the materials functions effectively.
- (11) Appropriate system of internal auditing should be adopted.

Advantages of Materials Control

The following are the advantages of materials control :

- (1) It ensures continuous flow of production.
- (2) There is maximum utilization of stores resources.
- (3) It facilitates economy of buying.
- (4) It ensures optimum investments in inventories.
- (5) There is possibility of reduction of loss of theft, leakage, obsolescence etc.
- (6) It minimizes cost of materials during purchase, storage and issue of materials.
- (7) It facilitates effective information system to management.

Materials Purchase Control

Materials Purchase is one of the important functions of stores department. The basic objectives of the material purchasing is to ensure continuous supply of raw materials to production and maximum reduction of cost product. In other words, the chief aim of purchasing is to ensure, not only to procure the raw materials at the lowest price but to reduce the cost of the finished product. In order to achieve the above said objectives the following aspects and procedure should be adapted :

Organization of Purchasing

Materials may be purchased based on the size of the concern, nature of materials to be used, nature of operations and management polices etc. A large company will have a separate purchase department while a small firm on the other hand may have all functions including purchasing, carried out by the owner himself. Materials may be purchased through Centralized Organization or Decentralized Organization.

Centralized Organization

Under this system, all the materials purchased are centralized. Accordingly all type of materials are purchased through one purchase department. The following are the advantages of centralized purchasing :

Advantages of Centralized Purchasing

- (1) Cheaper rate and favourable trade discounts are possible because of bulk purchasing.
- (2) It ensures right quality and quantity because of specialized personnels.
- (3) Buying and carrying cost can be reduced because of bulk purchasing.
- (4) Blocking of funds in inventories can be avoided.
- (5) Effective material purchase control is possible.

Disadvantages of Centralized Purchasing

- (1) Centralized Purchasing involves high initial cost.
- (2) Material issue may be delayed because of many formalities.
- (3) Purchasing procedure becomes rigid.
- (4) There is lack of good housekeeping and material handling because of overcrowding.
- (5) It is not suited where the plant is located far away.

Decentralized Purchasing

In decentralized purchasing each department is authorized to make its own purchase. This system is suited where different production units are located at different places far away from each other. The material procurement is done by different purchase departments.

It may be concluded that, most business concerns are operating on central purchasing system subject to the terms and conditions of purchases.

Purchase Manager

Management is becoming increasingly concerned over the costs and risks of carrying investments. It is a great pressure on the operating division to reduce the cost of inventories and cost of finished products. In this regard, an efficient purchase manager plays a vital role in handling the purchasing functions in order to reduce the inventory cost. The duties and responsibilities of the purchasing managers depend on the nature of product, size of the concern and management policies.

Qualities of the Purchasing Manager

- (1) **Integrity:** Personal integrity is the important quality of the purchase manager because purchasing involves huge sums of company money.
- (2) **Dependability:** He must have this personality trait because continuous operations depend on the reliability of the supplies.
- (3) **Initiative:** He must have the ability of initiative to continuous search for alternative sources of supply or alternative materials.
- (4) **Co-operation:** Purchasing Manager must possess an unusual ability to co-operate.
- (5) **Tact:** To maintain a sound and friendly relationship with suppliers, tact is considered to be an important characteristic of the purchasing manager.
- (6) **Ability to Learn:** A Purchasing personnel must have an inquiring mind. He must always be seeking information about company's products, materials and process.
- (7) **Ability to Work on Details:** He must have ability to work on details even though it is routine in nature.
- (8) He must have the technical knowledge of materials and sources acquired.

Duties of Purchasing Manager

The following are the most important and essential duties of a purchase manager :

- (1) To organize and direct the purchasing functions effectively.
- (2) To prepare a purchase budget.
- (3) To search right source of supply.

- (4) To execute agreement and placing of orders on supplies.
- (5) Follow up of purchase orders for ensuring the delivery of ordered goods on time.
- (6) Receiving the materials as per the specifications and placing of orders.
- (7) Inspecting and testing of materials.
- (8) Return the materials which are not in accordance with orders.
- (9) Checking and passing of bills of payment.
- (10) He should maintain the reputation of the concern for integrity and fair dealings with others.
- (11) To spend on purchases very carefully and wisely.
- (12) To give suggestions to the top management for important decision making.

Functions of the Purchase Department

The basic objectives of the purchasing department is to ensure not only to procure the raw materials at the cost price but to reduce the cost of finished products. For ensuring this, it will be useful to take into consideration the well-known factors such as right quality, right quantity, right price, right materials, right source, right suppliers, right mode of transports and right attitude etc. This responsibility involves the following procedure to be adopted :

Purchasing Procedure

- (1) Bill of Materials.
- (2) Purchase Requisition.
- (3) Selection of Suppliers.
- (4) Purchase Orders.
- (5) Goods Received Note.
- (6) Inspection of Materials.

(1) **Bill of Materials (Specification of Materials):** Bill of Materials is a list of containing all materials required for manufacturing a product. In other words, it is a form which indicates the quantity and quality and other specifications of materials required for a particular job or process or operation. This is a form sent to the purchase department for asking to purchase the said materials required for a particular work order. At least five copies of bill of materials are prepared by materials requiring department. Out of these copies one copy is sent to purchase department, to the stores, to the production section, to the cost office and to the office copy for further reference.

(2) **Purchase Requisition:** It is a form which indicates indent for materials. In any industry, the purchase department places orders for materials based on the purchase requisition form. Usually the purchase requisition form is initiated by the storekeeper for the standard items, the stock which require restocking again and again. Sometimes, it is initiated by other departments for special materials which are not stocked in stores. Whenever any special material is required for production, the purchase requisition form is prepared in three copies. Out of these copies one copy is sent to purchase department, one to the production control department and one to the initiating department.

(3) **Selection of Suppliers:** On receipt of the purchase requisition, the purchasing department prepares a list of suppliers who deals with the business of the materials to be purchased and are reliable. It is useful for the purchasing department to call for quotations. If the material to be purchased is of small

quantities and is required urgently, it may be purchased locally. After receiving the quotations, prepare a comparative statement of the rates, terms and conditions mentioned in the tenders. If required samples may be received from the suppliers who have quoted the lowest rates. After satisfying the above, select the suitable suppliers to place the purchase order for required materials.

(4) Purchase Order: Purchase order is a letter which is sent to the suppliers for asking to supply the specified materials. Purchase order must contain the rates, terms, quantity, quality, time of delivery and other conditions mentioned therein. At least five copies of purchase order are prepared by the purchase section and each copy sent to :

- (1) Original to the Suppliers.
- (2) Storekeeping Department.
- (3) Account Section.
- (4) Inspection Department.
- (5) Retained in the purchase department for further reference.

(5) Goods Received Note: The materials receiving section is responsible to receive the goods and verify the contents of the packages along with Goods Received Note sent by the suppliers. This section should ensure that the goods have been received as per the purchase order and record the same in the Consignment Note. Five copies of the materials received report are generally prepared. Out of these copies, the original is sent to purchasing department and remaining each copy sent to Stores department, Inspection, Accounts department and one copy retained by it for future reference.

(6) Inspections of Materials: A detailed inspection is carried out after the materials are received. The Inspection Section should ensure that the goods have been received according to purchase order specification. Return of materials to suppliers, if any, damaged, spoiled, excess or not in accordance with orders. If the materials are found to be satisfactory the bill of the suppliers is passed and the payment is made to the suppliers.

QUESTIONS

1. What do you understand by the concept material?
2. Define Material Control.
3. What are the important functions of Materials Control?
4. Explain the objectives of Material Control.
5. Explain briefly the essentials of Materials Control.
6. What are the advantages of Material Control?
7. What do you mean by material purchase control?
8. What is Centralized Purchasing? What are its merits and demerits?
9. What is meant by Decentralized Purchasing?
10. What are the important functions of the purchasing department?
11. Explain briefly the duties of a purchase Manager in a large organization.
12. What are the important functions of the purchasing department?
13. What are the procedure to be adopted for purchasing the materials?
14. Write Short notes on:
 - (a) Bill of Materials
 - (b) Material Requisition
 - (c) Goods Received Note
 - (d) Purchase Order

CHAPTER 14

Materials: Inventory Control

Store and Storekeeping

Stores play a vital role in the operation of a company. Generally unworked material is stored and the place where it is stored is called Store Room. It is in direct touch with the user departments in its day-to-day activities. The chief aim of the stores is to ensure the smooth flow of production without any interruption. Stores generally include raw materials, work in progress and finished goods.

Effective storekeeping and inventory control are indispensable to the control of material cost. Further, stores often equated directly with money, as capital is blocked in inventories.

Purpose of Storekeeping

- (1) Storekeeping helps to examine carefully all goods and materials on receipts.
- (2) It is essential to arrange for a systematic and efficient storing of materials.
- (3) Storekeeping ensure accurate and prompt distribution of materials to user departments as per issue requisition note.
- (4) It is essential because stores often equated directly with money, as capital is blocked in inventories.

Functions of the Storekeeper

The store is a service department headed by the storekeeper who holds the responsible position in the organisation of the stores department. He is as much responsible for the articles incharge as a cashier for the cash. Important functions of the storekeeper are given below:

- (1) He must receive raw materials, components, tools, equipment and other items and account for them properly.
- (2) He must provide adequate and proper storage and preservation to the various items.
- (3) He must check, and provide proper classification and codification of materials.

- (4) Issue the materials as per material issue requisition duly signed by an authorized person.
- (5) He has to take steps to prevent leakage, theft, wastage and deterioration.
- (6) He must ensure good storekeeping.
- (7) He should not permit any person without authorization.
- (8) He should maintain proper records in order to know desired quantities available.
- (9) He must provide adequate informations to the top executives for verifications and effective decision making.

Stores Layout

In order to achieve the objectives of effective inventory control, well planned layout of stores should be required. A planned stores layout will facilitate easy movement of materials, good housekeeping, sufficient space for materials handling. It ensures effective utilization of storage space and judicious use of storage equipments. The stores department should be equipped with shelves, racks, pallets and proper preservation from rain, light and other such elements. An ideal location of stores should facilitate the volume and variety of goods to be handled. In order to bring down the transport cost it should be close to roads or railway stations. And also as far as possible, a the stores department should be near to the receiving department. In the case of large organizations usually stores attached to each consuming department, whereas receiving is done centrally.

Types of Stores

The types of stores depend on the size, types and policy of the organization. Organization of stores varies from concern to concern. As per the requirement of the firm the stores organization may be classified into :

- (a) Centralized Stores.
- (b) Decentralized Stores.
- (c) Combination of both, i.e., Centralized Stores with Sub Stores.

(a) Centralized Stores: This system is suitable to small-scale industries where it is desirable to centralize the materials in one department. Under this system, the store room will be most conveniently situated where it is near to all the departments.

Advantages of Centralized Stores

- (1) Well planned layout of stores.
- (2) Effective utilization of floor space.
- (3) Better supervision of stores is possible.
- (4) Effective material handling is possible.
- (5) Lot of manual work may be eliminated.
- (6) Better control is possible.
- (7) Less investment is required.
- (8) Ensures minimum wastages.
- (9) Facilitates prompt flow of materials.
- (10) Better forecasting is possible.

Disadvantages

- (1) Increases transportation costs.
- (2) Delay and inconvenience because of over-crowding of materials.
- (3) Greater risk of loss in case of fire.
- (4) Break down in transport will affect continuous flow of production.
- (5) Increases cost of materials handling.

(b) Decentralized Stores: Under this system each department has its own stores. It is suitable to large concern where there are several departments each using a different type of material from its own stores. In this system all the disadvantages of centralized stores can be eliminated.

(c) Combination of Both : This system is also termed as Imprest System or stores control. Centralized Stores with Sub Stores is usually adopted in large factories where departments are situated at a distance from the central stores. In order to minimize the cost of transportation and materials handling, this type of organization would be located nearer to the receiving department. Under this system material receipts are stored in the central stores and issues are made to the sub-stores. Under imprest system of stores control sub stores which are located nearer to the central stores for the purpose of draw supplies from central stores and issue the required quantity to production. To maintain the stocks at the predetermined level, the sub-stores make requisition from the central stores.

Fixation of Stock Level

Material control involves physical control of materials, preservation of stores, minimization of obsolescence and damages through timely disposal and efficient handling. Effective stock control system should ensure the minimization of inventory carrying cost and materials holding cost. Level of stock is the important aspect of inventory control. Stock level may be overstocking or understocking. Overstocking requires large capital with high cost of holding. In the case of understocking, production and overall performance of the concern as a whole will affect. Thus, fixation of stock level is essential to maintain sufficient stock for the smooth flow of production and sales. The following are the important techniques usually adopted in different industries :

- (a) Maximum Stock Level.
- (b) Minimum Stock Level.
- (c) Danger Level.
- (d) Re-Order Level.
- (e) Economic Ordering Quantity (EOQ).
- (f) Average of Stock Level.

(a) Maximum Stock Level: The maximum stock level indicates the maximum quantity of an item should not be allowed to increase. The maximum quantity of an item can be held in stock at any time. The following factors can be considered while fixing the maximum stock levels :

- (1) Availability of capital.
- (2) Availability of floor space.
- (3) Cost of storage.
- (4) Possibility of fluctuation of prices in raw materials.
- (5) Cost of insurance.
- (6) Economic order of quantity.

- (7) Average rate of consumption.
- (8) Re-order level and lead time.
- (9) Seasonal nature of supply.
- (10) Risk of obsolescence, depletion, evaporation etc.

The maximum stock level can be calculated by the following formula :

$$\text{Maximum Stock Level} = \text{Re-Order Level} + \text{Re-Ordering Quantity} \\ (\text{Minimum Consumption} \times \text{Minimum Re-Ordering Period})$$

(b) Minimum Stock Level: Minimum stock level indicates the minimum quantity of material to be maintained in stock. Accordingly, the minimum quantity of an item should not be allowed to fall. The minimum stock is also known as Safety Stock or Buffer Stock. The following formula is adopted for calculation of minimum stock level :

$$\text{Minimum Stock Level} = \text{Re-Order Level} - (\text{Normal Consumption} \times \text{Normal Re-Order Period})$$

(c) Danger Level: It is the stock level below the Minimum Level. This level indicates the danger point to affect the normal production. When materials reach danger level, necessary steps should be taken to restock the materials. If there is any emergency, special arrangements should be made for fresh issue. Generally this level is fixed above the minimum level but below the reordering level. The formula for determination of danger level is :

$$\text{Danger Level} = \text{Average Rate of Consumption} \times \text{Emergency Supply Time}$$

(d) Re-order Level: Re-order level is also termed as Ordering Level. It indicates when to order, i.e., orders for its fresh supplies. This is the stock level between maximum and the minimum stock levels. The re-order stock level is fixed on the basis of economic order quantity, lead time and average rate of consumption. Calculation of re-order level is adopted by the following formula :

$$\text{Re-order Level} = \text{Minimum Level} + \text{Consumption during the time to get fresh delivery}$$

(or)

$$\text{Re-order Level} = \text{Maximum Consumption} \times \text{Maximum Re-ordering Period}$$

(e) Economic Order Quantity (EOQ): Economic Order Quantity is one of the important techniques used to determine the optimum quantity or number of orders to be placed from the suppliers. The main objectives of economic order quantity is to minimize the cost of ordering, cost of carrying materials and total cost of production. Ordering costs include cost of stationery, salaries of those engaged in receiving and inspecting, general office and administrative expenses of purchase departments. Carrying costs are incurred on stationery, salaries, rent, materials handling cost, interest on capital, insurance cost, risk of obsolescence, deterioration and wastage of materials and evaporation. Economic Order Quantity can be calculated by the following formula :

$$E O Q = \sqrt{\frac{2 A B}{C S}}$$

Where :

E O Q	=	Economic Ordering Quantity
A	=	Annual Consumption
B	=	Buying Cost per Order
C	=	Cost Per Unit
S	=	Storage and Carrying Cost per Annum

(f) Average Stock Level: Average stock level is determined on the basis of minimum stock level and re-order quantity. This is calculated with the help of the following formula :

Average Stock Level

$$= \text{Minimum Stock Level} + \frac{1}{2} \text{ of Re-order Quantity}$$

(or)

$$= \frac{\text{Minimum Level} + \text{Maximum Level}}{2}$$

Illustration: 1

From the following particulars calculate the

- (a) Maximum Stock Level.
 - (b) Minimum Stock Level.
 - (c) Re-ordering Level.
 - (d) Average Stock Level.
- (1) Normal consumption = 600 units per week.
 - (2) Maximum consumption = 840 units per week.
 - (3) Minimum consumption = 480 unit per week.
 - (4) Re-order quantity = 7200 units.
 - (5) Re-order period = 10 to 15 weeks.
 - (6) Normal reorder period = 12 weeks.

Solution:

Re-order Level

$$= \text{Maximum Consumption} \times \text{Maximum Re-order Period}$$

$$= 840 \times 15 = 12600 \text{ units}$$

Minimum Stock Level

$$= \text{Re-order Level} - (\text{Normal Consumption} \times \text{Normal Re-order Period})$$

$$= 12600 - (600 \times 12)$$

$$= 12600 - 7200 = 5400 \text{ units}$$

Maximum Stock Level

$$= \text{Re-order Level} + \text{Re-order Quantity} - (\text{Minimum Consumption} \times \text{Minimum Re-order Period})$$

$$= 12600 + 7200 - (480 \times 10)$$

$$= 19800 - 4800 = 15000 \text{ units.}$$

Average Stock Level

$$= \frac{\text{Minimum Stock Level} + \text{Maximum Stock Level}}{2}$$

$$= \frac{5400 + 15000}{2}$$

$$= \frac{20400}{2}$$

$$= 10200 \text{ units}$$

Illustration: 2

The following information available in respect of a material X :

Re-order Quantity	=	1800 units
Maximum Consumption	=	450 units per week
Minimum Consumption	=	150 units per week
Normal Consumption	=	300 units per week
Re-order Period	=	3 to 5 weeks

Calculate the following :

- (a) Re-order Level
- (b) Minimum Stock Level
- (c) Maximum Stock Level

Solution:

(a) Re-order Level :

$$= \text{Maximum Consumption} \times \text{Maximum Re-order Period}$$

$$= 450 \times 5 = 2250 \text{ units}$$

(b) Minimum Stock Level :

$$= \text{Re-order Level} - (\text{Normal Consumption} \times \text{Normal Re-order Period})$$

$$= 2250 - (300 \times 4)$$

$$= 2250 - 1200 = 1050 \text{ units.}$$

(c) Maximum Stock Level :

$$= \text{Re-order Level} + \text{Re-order Quantity} - (\text{Minimum Consumption} \times \text{Minimum Re-order Period})$$

$$= 2250 + 1800 - (150 \times 3)$$

$$= 4050 - 450 = 3600 \text{ units.}$$

(d) Normal Re-order Period:

$$= \frac{\text{Minimum Re-order period} + \text{Maximum Re-order Period}}{2}$$

$$= \frac{3 \text{ weeks} + 5 \text{ weeks}}{2}$$

$$= \frac{8}{2} = 4 \text{ weeks}$$

Illustration: 3

Two components P, Q are used as follows. Normal usage 1000 units per week each. Re-ordering quantity P – 20,000; Q 8,000. Re-ordering period P – 4 to 6; weeks; Q 2 to 4; minimum usage 2000 units per week; each maximum usage 3000 units per week each.

You are required to calculate the following each of the components :

- (1) Minimum Stock Level
- (2) Maximum Stock Level
- (3) Average Stock Level
- (4) Re-ordering Level

Solution:

(1) <i>Re-ordering Level</i>	=	Maximum Consumption x Maximum Re-Order Period
Product P	=	3000 x 6 = 18,000 units
Product Q	=	3000 x 4 = 12,000 units
(2) <i>Minimum Level</i>	=	Re-order Level – (Normal Consumption x Normal Re-order Period)
Product P	=	18,000 – (1,000 x 5)
	=	18,000 – 5,000 = 13,000 units
Product Q	=	12,000 – (1,000 x 3)
	=	12,000 – 3,000 = 9,000 units
(3) <i>Maximum Level</i>	=	Re-order Level + Re-order Quantity – (Minimum Consumption x Minimum Re-order Period)
Product P	=	18,000 + 20,000 – (2,000 x 4)
	=	38,000 – 8,000 = 30,000 units
Product Q	=	12,000 + 8,000 – (2,000 x 2)
	=	20,000 – 4,000 = 16,000 units
(4) <i>Average Stock Level</i>	=	Minimum Level + ½ of Re-order Quantity
Product P	=	13,000 + ½ (20,000)
	=	13,000 + 10,000 = 23,000 units
Product Q	=	9,000 + ½ (8,000)
	=	9,000 + 4,000 = 13,000 units

Illustration: 4

From the following information for last twelve months, compute the

- (1) Re-order Level
- (2) Minimum Level
- (3) Maximum Level
- (4) Average Stock Level for the components of X and Y

	<i>Components</i>	
	X	Y
Maximum Consumption in a month	3,000	3,000
Minimum Consumption in a month	2,000	2,000
Average Consumption in a month	1,000	1,000
Re-order period in a month	8 to 12	4 to 8
Re-order quantity in units	8,000	12,000

Solution:

$$\begin{aligned}
 (1) \quad \text{Re-order level} &= \text{Maximum Consumption} \times \text{Maximum Re-order period} \\
 \text{Product X} &= 3,000 \times 12 = 36,000 \text{ units} \\
 \text{Product Y} &= 3,000 \times 8 = 24,000 \text{ units} \\
 (2) \quad \text{Minimum Level} &= \text{Re-order Level} - (\text{Normal Consumption} \times \text{Normal Re-order Period}) \\
 \text{Product X} &= 36,000 - (1,000 \times 10) \\
 &= 36,000 - 10,000 = 26,000 \text{ units} \\
 \text{Product Y} &= 24,000 - (1,000 \times 6) \\
 &= 24,000 - 6,000 = 18,000 \text{ units} \\
 (3) \quad \text{Maximum Level} &= \text{Re-order Level} + \text{Re-order quantity} - \\
 &\quad (\text{Minimum Consumption} \times \text{Minimum Re-order Period}) \\
 \text{Product X} &= 36,000 + 8,000 - (2,000 \times 8) \\
 &= 44,000 - 16,000 = 28,000 \text{ units} \\
 \text{Product Y} &= 24,000 + 12,000 - (2,000 \times 4) \\
 &= 36,000 - 8,000 = 28,000 \text{ units} \\
 (4) \quad \text{Average Stock Level} &= \text{Minimum Level} + \frac{1}{2} \text{ of Re-order Quantity} \\
 \text{Product X} &= 28,000 + \frac{1}{2} (8,000) \\
 &= 28,000 + 4,000 = 32,000 \text{ units} \\
 \text{Product Y} &= 28,000 + \frac{1}{2} (12,000) \\
 &= 28,000 + 6,000 = 34,000 \text{ units}
 \end{aligned}$$

Normal Re-order Period :

$$\begin{aligned}
 \text{Product X} &= \frac{8 \text{ Months} + 12 \text{ Months}}{2} \\
 &= \frac{20}{2} = 10 \text{ months} \\
 \text{Product Y} &= \frac{4 \text{ Months} + 8 \text{ Months}}{2} \\
 &= \frac{12}{2} = 6 \text{ months}
 \end{aligned}$$

Illustration: 5

From the following particulars calculate Economic Order Quantity :

Annual Consumption = 16,000 Units

Buying Cost per order = Rs. 18

Cost per unit of material = Re. 1

Storage and Carrying cost = 20% of average inventory

Solution:

Calculation of Economic Order Quantity:

$$\text{Economic Order Quantity} = \sqrt{\frac{2 A B}{C S}}$$

Where :

A = Annual Consumption

B = Buying Cost per order

C = Cost per unit of material

S = Storage and Carrying cost

$$\begin{aligned} \text{E O Q} &= \sqrt{\frac{2 A B}{C S}} \\ &= \sqrt{\frac{2 \times 16000 \times 18}{1 \times 20 \%}} = \sqrt{\frac{2 \times 16000 \times 18}{1 \times \frac{20}{100}}} \\ &= 1700 \text{ units} \end{aligned}$$

Illustration: 6

A company uses a particular material in a factory which is 20000 units per year. The cost per unit of material is Rs. 10. The cost of placing one order is Rs. 100 and the inventory carrying cost 20% on average inventory. From the above information calculate Economic Order Quantity.

Solution:

Calculation of Economic Order Quantity :

$$\text{E O Q} = \sqrt{\frac{2 A B}{C S}}$$

A – Annual Consumption = 20000 units

B – Buying Cost per order = Rs. 100

C – Cost per unit = Rs. 10

S – Storage and Carrying cost = 20% on average inventory

$$\begin{aligned} \text{E O Q} &= \sqrt{\frac{2 A B}{C S}} \\ &= \sqrt{\frac{2 \times 20000 \times 100}{10 \times 20 \%}} = \sqrt{\frac{2 \times 20000 \times 100}{10 \times \frac{20}{100}}} \\ &= 1414 \text{ units} \end{aligned}$$

Illustration: 7

Find out the Economic Order Quantity and order schedule of raw materials and packing materials with the following data given to you :

(1) *Cost of ordering :*

Raw materials = Rs. 1000 per order

Packing materials = Rs. 5000 per order

(2) *Cost of holding Inventory :*

Raw materials = 1 Paise per unit per month

Packing materials = 5 Paise per unit per month

(3) *Production rate :*

2,00,000 Units per month

Solution:

Calculation of Economic Order Quantity :

$$E O Q = \sqrt{\frac{2 A B}{C S}}$$

Where :

E O Q = Economic Order Quantity

A = Units Consumed in a month

B = Buying Cost per order

C = Cost per unit

S = Inventory Carrying Cost per month

(a) **Raw materials :**

$$\begin{aligned} E O Q &= \sqrt{\frac{2 \times 2,00,000 \times 1000}{0.01}} \\ &= \sqrt{40,00,00,00,000} \\ &= 2,00,000 \text{ units} \end{aligned}$$

Thus one order for 2,00,000 units each month

(b) **Packaging Materials**

$$\begin{aligned} E O Q &= \sqrt{\frac{2 \times 2,00,000 \times 5000}{0.05}} \\ &= \sqrt{40,00,00,00,000} \\ &= 2,00,000 \text{ units} \end{aligned}$$

Thus one order for 2,00,000 units per month

Illustration: 8 *

A Ltd. Co. is committed to supply 24000 bearings per annum to B Ltd. on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 324.

- (1) What should be the optimum run size for bearing manufacture?
- (2) What would be the interval between two consecutive optimum runs?
- (3) Find out the minimum inventory cost per annum.

Solution:**(1) Economic batch or run size**

$$E O Q = \sqrt{\frac{2 A B}{C S}}$$

Where :

- A = Annual Consumptions
 B = Buying Cost or set up cost
 C = Cost per unit
 S = Carrying Cost or Holding Cost per unit

$$= \sqrt{\frac{2 \times 324 \times 24000}{10}} = 3600 \text{ units}$$

Alternative Solution

The economic batch size figure can also be obtained by taking monthly figure as follows :

$$= \sqrt{\frac{2 \times 2000 \text{ units} \times \text{Rs. } 324}{0.10}}$$

$$= 3600 \text{ units}$$

(2) Number of Set Up per Annum

$$\begin{aligned} \text{Number of set up per annum} &= \frac{\text{Annual Production}}{\text{Economic run size}} \\ &= \frac{24,000}{3,600} \\ &= 6 \frac{2}{3} \text{ times} \end{aligned}$$

$$\text{Interval between two consecutive optimum runs} = \frac{12}{20} = \frac{12 \times 3}{20} = \frac{36}{20} = 1.8 \text{ months}$$

(3) Minimum Inventory Cost per Year

$$\begin{aligned} &= \frac{24,000}{3,600} \times 324 + \frac{3,600}{2} \times 1.2 \\ &= \text{Rs. } 2,160 + \text{Rs. } 2,160 = \text{Rs. } 4320 \end{aligned}$$

Illustration: 9

A company manufactures a product from a raw material which is purchased at Rs. 60 per kg. The company incurs a handling cost of Rs. 360 plus freight of Rs.390 per order. The incremental carrying cost of inventory of raw material is Re. 0.50 per kg. per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs. 9 per kg. per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg. of raw material.

Required :

- (1) Calculate the Economic Order Quantity of raw materials.
- (2) Advise, how frequently should order for procurement be placed.
- (3) If the company proposes to rationalize placement of orders on quarterly basis, what percentage of discount in the prices of raw material should be negotiated?

[CA Inter, Nov. 2001]

Solution:

$$(1) \text{ Economic Order Quantity} = \sqrt{\frac{2 A B}{S}}$$

- A = Annual Consumption
 B = Buying Cost per order
 S = Storage and Carrying cost

$$\begin{aligned} A \text{ (Annual requirement of Raw materials in kgs)} &= \frac{1 \text{ kg} \times 1,00,000 \text{ units}}{2.5 \text{ units}} \\ &= 40000 \text{ kg.} \\ S \text{ Carrying Cost and Storage Expenses} &= (0.5 \times 12) + \text{Rs.}9 \\ &= \text{Rs.} 15 \text{ per unit} \\ B \text{ Buying Cost per order} &= \text{Rs.} 360 = \text{Rs.} 390 = \text{Rs.} 750 \end{aligned}$$

$$\begin{aligned} \text{E O Q} &= \sqrt{\frac{2 \times 40000 \times 750}{15}} \\ &= 2000 \text{ kgs} \\ (2) \text{ Annual Consumption} &= 40000 \text{ kgs} \\ \text{Quantity per order} &= 2000 \text{ kgs} \\ \text{No. of orders} &= \frac{40,000}{2,000} = 20 \text{ orders in 12 months} \\ \text{Frequency} &= \frac{12 \text{ months}}{20 \text{ orders}} = 0.6 \text{ months} \\ \text{(or)} &= \frac{365 \text{ months}}{20 \text{ orders}} = 18 \text{ days (approx.)} \\ (3) \text{ Quarterly Orders} &= \frac{40,000 \text{ kgs}}{4 \text{ orders}} = 10000 \text{ kgs per order} \\ \text{No. of orders} &= \frac{40,000}{10,000} = 4 \text{ orders} \\ \text{Total Cost :} & \text{Rs.} \\ \text{Order Placing Cost (4 x 750)} &= 3,000 \\ \text{Carrying Cost} = \frac{10,000}{0.5 \times 4} \times 15 &= \frac{75,000}{78,000} \end{aligned}$$

Total Cost of EOQ :			
No. of Orders	=	20	Rs.
Order Placing Cost (20 x 750)	=		15,000
Carrying Cost = $\frac{2,000}{0.5 \times 4} \times 15$	=		15,000
			30,000
Increase in cost to be compensated by discount :			
Total Cost	=		Rs. 78,000
Total Cost E O Q	=		Rs. 30,000
Increase in Cost			48,000
Price of discount per unit	=		48,000
			40,000 kg
			= Rs. 1.20 per unit
Percentage of discount in the prices of raw materials = $\frac{\text{Rs. 1.20}}{60} \times 100$			
			= 2% discount

The ABC Analysis

A B C Analysis is one of the important techniques which is based on grading the items according to the importance of materials. This method is popularly known as Always Better Control. This is also termed as Proportional Value Analysis – In inventory control, this technique helps to analyze the distribution of any characteristic by money value of importance in order to determine its importance. Accordingly, materials are grouped into three categories on the basis of the money value of importance of materials.

- (1) High Value Materials – A
- (2) Medium Value Materials – B
- (3) Low Value Materials – C

The items, which are of high value and less than 10 per cent of the total consumption or inventory can be called as 'A' grouped materials. It is required to exercise selective control and focus more attention because of high value items. Similarly, 70 per cent of materials in total consumption or inventory which lies 10 per cent of the inventory value can be grouped under 'C' categories. The materials which have moderate value that lies between the high value materials and low value materials are grouped under 'B' category. The following table shows more explanation about A B C Analysis :

Category	Percentage to total inventory	Percentage to total inventory cost
A	Less than 10	70 to 80
B	10 to 20	15 to 25
C	70 to 80	Less than 10

Advantages of A B C Analysis

- (1) Exercise selective control is possible.
- (2) Focus high attention on high value items is possible.
- (3) It helps to reduce the clerical efforts and costs.
- (4) It facilitates better planning and improved inventory turnover.
- (5) It facilitates goods storekeeping and effective materials handling.

Classification and Codification

In order to ensure the effective inventory control, it should be carried out with the classification and codification of materials. Codification is the process of representing each item by a number, the digits of which indicate the group, the sub group, the type and the size and shape of the items. The codification process could be obtained by the nature of materials in grouping all items of the same metal content say ferrous and non-ferrous etc. The system of codification could be built by the end use of items, that is, items grouped according to maintenance, spinning, weaving, packing, foundry, machine shop etc.

Advantages of Codification

- (1) Codes ensure the secrecy of materials.
- (2) It is essential for mechanical accounting.
- (3) Easy identification of material is possible.
- (4) It ensures effective material control.
- (5) It minimizes length in description of materials.
- (6) Effective materials handling is possible.
- (7) It helps in avoiding duplication of materials.
- (8) Codification facilitates less clerical work.
- (9) Cost reduction is possible.

Methods of Coding

The following are the three important Methods of Codification :

- (1) Numerical Method.
- (2) Alphabetical Method.
- (3) Numerical Cum Alphabetical Method.

(1) Numerical Method: Under this method, each number or numerical digit is allotted to each item or material. Accordingly, each code should uniquely indicate one item. For example, in printing press following codes may be assigned :

Paper	145
Ink	155
Gum	165

There are various universal decimal classification of codification used in libraries may be indicated for identification of items.

(2) Alphabetical Method: In this method alphabets or letters are used for codification of each category of materials. Accordingly each letter or alphabet is allotted for each item or material. For example, 'C' for copper, 'S' for steel and so on.

(3) Numerical Cum Alphabetical Method: This method is done by a combination of numerical and alphabetical method. Under this method both numerical along with alphabet is allotted for each item. For example, IR 5 may indicate Ink Red of Grade 5, Steel wire 6 may be denoted by SW 6 etc.

Inventory System

The chief aims of inventory control is as follows :

- (1) To maintain a balanced inventory.
- (2) To ensure the smooth flow of production.
- (3) To keep the investment in inventory as low as possible.

Accordingly stock verification is an important aspect to ensure and maintain a balanced inventory. The following are the two systems of stock verification adopted in different industries :

- (1) Periodic Inventory System.
- (2) Perpetual Inventory System.
- (3) Continuous Stock Verification.

(1) Periodic Inventory System: Under this system, quantity and value of materials are checked and verified at the end of the accounting period after having a physical verification of the units in hand.

(2) Perpetual Inventory System: The Perpetual Inventory System is also known as Automatic Inventory System. This is one of the important methods adopted for verification inventories to know the physical balances. According to I C M A London defines Perpetual Inventory System as a method of recording stores balances after every receipt and issue to facilitate regular checking and to obviate closing down for stock taking.

Advantages of Perpetual Inventory System

- (1) It facilitates rigid control over stock of materials.
- (2) It gives upto date details about materials in stock.
- (3) Not necessary to stop production for stock taking.
- (4) It assists to minimize pilferage and fraudulent practices.
- (5) It enables to reconcile the stock records and document for accuracy.
- (6) It helps to take the important decisions for corrective actions.

Perpetual Inventory Records

Perpetual Inventory represents a system of records maintained by the organization. The records are of two types, viz. :

- (a) Bin Cards
- (b) Stores Ledger

A constant comparison of the quantity balances of these two set of records is made and the balances are reconciled.

(a) Bin Cards: Bin Card is only quantitative record of stores receipt, issue and balance and is kept by the Storekeeper for each item of stores.

(b) Stores Ledger: Stores ledger is both quantitative and monetary value record of stores receipt, issue and balance and is prepared by the Cost Accounting Department.

Bin Card Vs Stores Ledger

The Difference between Bin Card and the Stores Ledger can be summarized as follows :

<i>Bin Card</i>	<i>Stores Ledger</i>
(1) Bin Cards are maintained at the stores	(1) Stores Ledger is maintained in the Accounts Department.
(2) It is posted by Issue Clerk	(2) It is posted by Ledger Clerk.
(3) Bin Cards meant for recording record of quantity only	(3) It is as a record of quantity and value.
(4) Transactions posted individually	(4) Transactions can be posted periodically.
(5) Posting can be made at the time of issue.	(5) In stores ledger posting can be made after issue.

(3) Continuous Stock Verification : Since Verification of physical inventory is an essential feature of a sound system of material control, a system of continuous stock taking is introduced. Continuous stock taking ensures that the balances of all items of stocks are checked at least three to four times in a year by physical verification. It avoids long and costly procedure of closing down the stores for stock taking on periodical basis. Stock discrepancies are detected on timely basis and preventive measures can be taken. The correctness of the physical stocks as reflected in the books is ensured and thus the monthly accounts represent a true and fair view of the business. Continuous Stock Verification not only serves as an essential tool of material control but also will help in proper presentation of accounting information to the management.

Continuous Stock Taking Vs Periodic Stock Taking

The differences between Continuous Stock Taking and Periodic Stock Taking can be summarized as follows :

<i>Continuous Stock Taking</i>	<i>Periodic Stock Taking</i>
(1) Continuous stock taking is held throughout the year.	(1) It is held once in a year.
(2) Stock discrepancies are detected and prevented without delay.	(2) Under this system preventive measures is the delay process.
(3) Under this system normal work will not be disrupted.	(3) Under this system there is closing down the stores for stock taking.
(4) Permanent personnels are required.	(4) Temporary personnel are required.
(5) Long and costly procedure on continuous stock verification.	(5) It is cheaper and shorter period is required.
(6) Physical verification of materials are on random basis.	(6) All materials are thoroughly checked.

Material Storage Losses

The investment in materials constitute a major portion of current assets, so it is essential to exercise effective stores control. Stores control helps to avoid losses from misappropriation, damage, deterioration etc. Generally material storage losses arising during storage may be classified as :

- (1) Normal Loss
- (2) Abnormal Loss

(1) Normal Loss: Normal Losses arise during the storage of materials due to the avoidable reasons of pilferage, theft, careless of materials handling, clerical errors, improper storage, wrong entries etc.

(2) Abnormal Loss: Abnormal Losses arise during the storage of materials due to unavoidable causes of evaporation, shrinkage, bulk losses due to accident, fire, etc.

Accounting Treatment of Normal Loss and Abnormal Loss

The following are the accounting treatment of normal and abnormal loss of materials arising during storage :

- (1) **Normal Loss** : (a) Inflate the issue price. (b) Charge to stores overheads. (c) Treat it as a separate item of overheads to be recovered as a percentage of materials consumed.
- (2) **Abnormal Loss** : Abnormal losses are directly charged to Costing Profit and Loss Account.
- (3) If the loss is due to error in documentation it should be corrected through adjustment entries.

Inventory Turnover Ratio

Inventory Turnover Ratio may be defined as “a ratio which measures the number of times a firm’s average inventory is sold during a year.” It is a ratio which is useful to measure the firm’s inventory performance. High rate of inventory turnover ratio denotes that materials are fast moving stock. A low turnover rate indicates the locking up of working capital in undesirable items. The Inventory turnover ratio is calculated by the following formula :

$$\text{Material Turnover Ratio} = \frac{\text{Cost of Material Used}}{\text{Average Value of Material in Stock}}$$

$$\text{Material Turnover in days} = \frac{\text{Days during the period}}{\text{Inventory Turnover Ratio}}$$

Illustration: 10

Calculate the Inventory Turnover Ratio for the year 2003 from the following details :

	<i>Material X</i> Rs.	<i>Material Y</i> Rs.
Opening Stock	50,000	1,75,000
Closing Stock	30,000	1,25,000
Purchases	3,80,000	2,50,000

Determine fast moving materials

Solution:

	X Rs.	Y Rs.
Opening Stock	50,000	1,75,000
Add : Purchases	3,80,000	2,50,000
	4,30,000	4,25,000
Less : Closing Stock	30,000	1,25,000
Materials Consumed	4,00,000	3,00,000

$$\begin{aligned} \text{Average Inventory} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\ &= \frac{50,000 + 30,000}{2} \quad \frac{1,75,000 + 1,25,000}{2} \\ &= \frac{80,000}{2} ; \quad \frac{3,00,000}{2} \\ &= \text{Rs. } 40,000; \text{ Rs. } 1,50,000 \end{aligned}$$

$$\text{Material Turnover Ratio} = \frac{\text{Materials Consumed}}{\text{Average Inventory}}$$

$$\text{Material X} = \frac{4,00,000}{40,000} = 10 \text{ times}$$

$$\text{Material X} = \frac{3,00,000}{1,50,000} = 2 \text{ times}$$

The turnover ratio of Material X being higher than that of Material Y, the former is a fast moving material.

QUESTIONS

1. What do you mean by store and storekeeping?
2. Explain the purpose of storekeeping.
3. What are the important functions of storekeeper?
4. What do you mean by stores layout?
5. Explain briefly the different types of stores.
6. What do you understand by Maximum Stock, Minimum Stock and Re-order Level?
7. What is Economic Order Quantity? Explain its significance.
8. Explain the concept of A B C Analysis.
9. Explain briefly the Classification and Codification of materials.
10. What are the advantages of Codification?
11. Explain briefly the Methods of Coding.
12. What is Perpetual Inventory System? Explain its advantages.
13. What do you understand by Bin Card and Stores Ledger?
14. What are the differences between Bin Card and Stores Ledger?
15. What is Continuous Stock Verification? What are the differences between Continuous Stock Taking and Periodic Stock Taking?
16. Explain briefly the material storage losses.
17. What is Inventory Turnover Ratio? Explain its importance.
18. From the following particulars calculate :
(a) Re-order Level. (b) Minimum Level. (c) Maximum Level. (d) Average Level.
Normal usage 100 units per day
Maximum usage 130 units per day
Minimum usage 60 units per day
Economic Order Quantity 5000 units
Re-order Period 25 to 30 days.
[Ans : (a) Re-order Level = 3900 units. (b) Minimum Level = 1150 units. (c) Maximum Level = 7400 units. (d) Average Level = 4275 units]
19. Calculate E O Q from the following:
Annual Consumption = 600 units.
Ordering Cost Rs. 12 per order.
Carrying Cost 20% Price per unit Rs. 20.
[Ans : E O Q = 60 units].
20. Calculate (a) Maximum Level, (b) Minimum Level, and (c) Re-order Level.
Re-order Quantity = 1500 units.
Re-order Period = 4 to 6 weeks.
Maximum Consumption = 400 units per week.
Normal Consumption = 300 units per week.
Maximum consumption = 250 units per week.
[Ans : Re order Level = 2400 units.
Maximum Level = 2900 units.
Minimum Level = 900 units.
Normal Re order Period = 5 weeks].

21. A manufacturing company purchases 2000 units of a particular material per year at a unit cost of Rs.20, the ordering cost per order is Rs.50 and the inventory carrying cost is 25%. Find out the Economic Order Quantity and number of orders to be placed in a year.
[Ans : E O Q 200 units each in 10 orders].
22. Calculate Economic Order Quantity from the following particulars :
Annual Consumption = 20000 units.
Buying Cost per order Rs. 10.
Cost per unit Rs. 100.
Inventory Carrying Cost 10% of cost.
[Ans : E O Q = 200 units].
23. The following information is available in respect of Material X
Re-order Quantity = 3000 units
Re-order Period = 4 to 6 weeks
Maximum Consumption = 800 units per week
Normal Consumption = 600 units per week
Minimum Consumption = 500 units per week
Calculate : (a) Re-order Level, (b) Minimum Level,
(c) Maximum Level, (d) Average Stock Level.
[Ans : (a) Re-order Level = 4800 units ; Minimum Level = 1800 units;
Maximum Level 5800 units ; Average Stock Level : 3800].
24. The following information is available in respect of Component Y :
Maximum Stock Level 8,400 units
Maximum Consumption 1,500 units per month
Minimum Consumption 800 units per month
Re-order period 2 to 4 months
You are required to calculate :
(1) Re-order Level
(2) Re-order quantity
[Ans : 6,000 units; 4,000 units]
25. Two Components of X and Y are used as follows :
Normal usage 50 units per week each
Minimum usage 25 units per week each
Maximum usage 75 units per week each
Re-order quantity X : 400 units, Y : 600 units
Re-order period X : 4 weeks , Y : 2 to 4 weeks
Calculate for each components :
(a) Re-order Level
(b) Minimum Level
(c) Maximum Level
(d) Average Stock Level
[Ans : (a) 300 units (b) 150 units (c) 850 units (d) 500 units].
26. Calculate the economic order quantity from the following particulars :
Annual requirement 1,600 units
Cost of materials per units Rs.40
Cost of placing and receiving one order Rs.50
Annual carrying cost of inventory 10% of inventory value
27. Calculate Economic Order Quantity from the following :
Annual consumption 600 units
Ordering cost Rs.12 per unit
Carrying cost 20%
Price per unit Rs.20
[Ans : 60 units]
28. Find out the Economic Order Quantity and the number of orders per year from the following information :
Annual consumption 36,000 units
Cost per unit Rs. 54
Ordering cost Rs. 150 per order

Inventory carrying cost 20% of the average inventory

[Ans : EOQ – 1000 units ; No. of orders 36]

29. The following information relating material Q.75 is available :

Annual consumption 2,400 units

Cost per unit Rs. 2.40

Ordering cost per order Rs. 4

Storage cost 2% per annum

Interest rate 10% per annum

Calculate EOQ and No. of orders to be placed in a year.

[Ans : EOQ – 258 units ; No. of orders 10]



CHAPTER 15

Valuation of Materials Issues

Introduction

All receipts and issues of materials are the important aspects to continuous flow of production. A systematic procedure should be adopted for movement of materials from one place to another place. Materials received and stored are issued on the basis of stores requisition, bills of materials, stock in balance, proper authorization and pricing material issues etc. It is clear that ascertainment of accurate material cost, fixing of material issue and effective cost control are the primary objective in order to fulfil the needs of management. For this reasons the following aspects considered to be the subject matter of valuation of materials issues.

1. Valuation of total cost of materials purchased.
2. Material Issue Procedure.
3. Important methods of pricing of materials issued .

1. VALUATION OF TOTAL COST OF MATERIALS PURCHASED

Material costing is very important in terms of the valuation of the cost of materials consumed by the production department as well as in terms of the estimation of the value of materials in stock. For costing purposes, the material cost is worked out by the actual cost incurred by taking price quoted by supplier as the basis subtracting the discounts and adding any other expenses not covered. In practice discounts may be allowed by the supplier in the following ways such as : (a) Trade Discount, (b) Quantity Discount and (c) Cash Discount.

(a) Trade Discount: Trade Discount is allowed by the seller to the buyer who has to resell the goods. This allowance is to compensate the buyer for the cost of storage, breaking bulk, selling repacking the goods etc.

(b) Quantity Discount: This discount refers to the allowance which is allowed by the supplier to the buyer to encourage large orders. Placing the large orders from the buyers gives savings in costs which arise from large-scale production to the supplier. Part of the savings allowed by supplier to the buyer by means of a quantity discount.

(c) **Cash Discount:** Cash Discount is allowed by the supplier to a buyer to encourage prompt payment of cash within the stipulated period.

2. MATERIALS ISSUE PROCEDURE

Issues of materials are based on production programme. Based on this and the bill of materials work orders are printed, listing for each material quantity to be issued against each component requiring that material. The storekeeper is very much concerned with the material control, as he is responsible for the issue of materials based on the proper authorization of material requisition and bills of materials.

Materials Requisition: Purchase or Material Requisition is also known as Intent for Materials. This is a document prepared by the production department for requisition of materials is known as Materials Requisition. The storekeeper is authorized to issue the materials based on the proper authority to avoid the misappropriation of material. The store keeper is responsible to maintained a record of serial number on requisition, issues and stock balances are up to date are must be posted in stores ledger.

Bill of Materials: Bill of materials is a document which shows a complete listing for each material, quantity to be issued against each component requiring that materials for a particular job order or process. Bill of Materials is prepared by the production department before the quantity of the components to be manufactured. This is helpful for the purpose of initiate material requisition and estimation of cost materials to collect quotations.

3. METHOD OF PRICING OF MATERIALS ISSUES

In the relation to the estimation of the cost of the product for pricing decisions, material issues assures a key role. Material price usually refers to the price quoted and accepted in the purchase orders. Materials are issued from the stores to work orders based on the material requisition. But stock of materials consists of different consignment received at different dates and prices. There are different methods used for pricing the materials issues may be summarized in the following categories :

(A) Actual Price Method (or) Cost Price Method

- (1) First In First Out (FIFO).
- (2) Last In First Out (LIFO).
- (3) Specific Price Method.
- (4) Base Stock Method.
- (5) Highest In First Out (HIFO).

(B) Average Cost Method

- (1) Simple Average Method.
- (2) Weighted Average Method.
- (3) Periodic Simple Average Method.
- (4) Periodic Weighted Average Method.

(C) Standard Price Method.

(D) Inflated Price Method.

(E) Market Price Method (or) Replacement Price Method.

A. Actual Price Method

In this method, the materials issued are priced at their actual cost and this involves identification of each lot purchased. This method is suitable only in the case of materials purchased for a specific job. There are several methods frequently used under actual cost price method which will be discussed in details :

(1) **First In First Out (FIFO):** First In First Out is also known as FIFO. Under this method, the pricing of issue is based on an assumption made that the oldest stock is issued first. Therefore at the time of issue, the rate pertaining to that will be applied until the whole lots is exhausted.

Advantages

- (1) It is simple and easy to adaptability.
- (2) It is beneficial when the prices are falling.
- (3) As actual prices are issued, it reflects on profit no loss in the pricing.
- (4) This method is very useful for slow moving materials.

Disadvantages

- (1) Calculation becomes complicated due to fluctuation of material prices.
- (2) More chances of clerical errors due to complicated calculations.
- (3) Under fluctuating prices, one requisition involves more than one price.
- (4) In times of raising prices this method tends to show the production at low cost since the cost of replacing the material will be higher.

Illustration: 1

From the following particulars, prepare the Stores Ledger Account showing how the value of the issues would be recorded under FIFO methods.

01.12.2003	Opening Stock 1,000 Units at Rs. 26 each
05.12.2003	Purchased 500 Units at Rs. 24.50 each
07.12.2003	Issued 750 Units
10.12.2003	Purchased 1,500 Units at Rs. 24 each
12.12.2003	Issued 1,100 Units
15.12.2003	Purchased 1,000 Units at Rs. 25 each
17.12.2003	Issued 500 Units
18.12.2003	Issued 300 Units
25.12.2003	Purchased 1,500 Units at Rs. 26 each
29.12.2003	Issued 1,500 Units

Solution:**Stores Ledger Account (FIFO)**

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.12.2003	-	-	-	-	-	-	1,000	26	26,000
05.12.2003	500	24.50	12,250				1,000	26	26,000
							500	24.50	12,250
07.12.2003				750	26	19,500	250	26	6,500
							500	24.50	12,250
10.12.2003	1,500	24	36,000				250	26	6,500
							500	24.50	12,250
							500	24.50	12,250
12.12.2003				250	26	6,500	1,500	24	36,000
				500	24.50	12,250			
				350	24	8,400			
				1,100			1,150	24	27,600
15.12.2003	1,000	25	25,000				1,150	24	27,600
							1,000	25	25,000
17.12.2003				500	24	12,000	650	24	15,600
							1,000	25	25,000
18.12.2003				300	24	7,200	350	24	8,400
							1,000	25	25,000
25.12.2003	1,500	26	39,000				350	24	8,400
							1,000	25	25,000
							1,500	26	39,000
29.12.2003				350	24	8,400			
				1,000	25	25,000			
				150	26	3,900	1,350	26	35,100
				1,500					

(2) **Last In First Out (LIFO):** This method is just opposite to First In First Out method. The basic assumption here is that the most recent receipts are issued first. The price of the materials to be issued would be the cost price of the last lots of materials purchased.

Advantages

- (1) It is beneficial when the period of raising prices.
- (2) Under this method, latest prices are issued thereby leading to lower reported profits hence savings in taxes.
- (3) When there are wide fluctuations in price levels this methods tends to minimize unrealized gains or losses in inventory.

Disadvantages

- (1) This method involves more clerical work which leads to complicated calculations.
- (2) Under this method more than one price is to be adopted for the same issue lot of material.
- (3) Due to wide fluctuation of prices, comparison of cost of similar jobs is very difficult.

Illustration: 2

By Solving the illustration No.1, under LIFO method.

Solution:**Stores Ledger Account (LIFO)**

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.12.2002	-	-	-	-	-	-	1,000	26	26,000
05.12.2002	500	24.50	12,250				1,000	26	26,000
							500	24.50	12,250
07.12.2002				500	24.50	12,250			
				250	26	6,500	750	26	19,500
				750					
10.12.2002	1,500	24	36,000				750	26	19,500
							1,500	24	36,000
12.12.2002				1100	24	26,400	750	26	19,500
							400	24	9,600
15.12.2002	1,000	25	25,000				750	26	19,500
							400	24	9,600
							1,000	25	25,000
17.12.2002				500	25	12,500	750	26	19,500
							400	24	9,600
							500	25	25,000
18.12.2002				300	25	7,500	750	26	19,500
							400	24	9,600
							200	25	5,000
25.12.2002	1,500	26	39,000				750	26	19,500
							400	24	9,600
							200	25	5,000
							1,500	26	39,000
29.12.2002				1500	26	39,000	750	26	19,500
							400	24	9,600
							200	25	5,000

(3) Specific Price Method: Specific Price Method is one of the methods of actual price method. In this method adopted where the materials are purchased for particular job or operation and the issue is charged with the actual cost price. This method is suitable only in the case of special purpose materials are purchased for a particular job. This method has been widely used in job order industries which carry out individual jobs or contract against specific orders.

Advantages

- (1) This method is simple and easy to operate.
- (2) This method is useful where the job costing is in operation.
- (3) Under this method, the actual material cost can be easily identified.
- (4) This method is desirable because actual cost of materials is charged to production and therefore no profit no loss.

Disadvantages

- (1) This method involves considerable amount of clerical work.
- (2) If the purchases and issues are numerous, it is difficult to identification of issues for a particular job.

(4) Base Stock Method: Under this method pricing is determined on the basis of assumption made here is that a certain minimum quantity of materials maintained in stock. This minimum quantity is known as Base Stock or Safety Stock. This quantity cannot be used unless an emergency arises. The minimum stock is in the nature of fixed assets because it is created out of the first lot of the material purchased. Therefore it always valued at the actual cost price of the first lot and is carried forward as fixed assets. This method is usually applied with FIFO or LIFO.

Illustration: 3

From the following details of stores receipts and issues of materials in a manufacturing unit, prepare the stores ledger using Base Stock Method of valuing the issues; assume base stock 200 tonnes.

1.1.2003	Purchased 500 tones at Rs. 2 per ton
10.1.2003	Purchased 300 tones at Rs. 2.10 per ton
15.1.2003	Issued 600 tons
20.1.2003	Purchased 400 tones at Rs. 2.20 per ton
25.1.2003	Issued 300 tons
27.1.2003	Purchased 500 tons at Rs. 2.10 per ton
31.1.2003	Issued 200 tons

Solution:**Stores Ledger Account (Base Stock - FIFO)**

Date	Receipts			Issues			Balance		
	Qty	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	500	2	1,000				500	2	1000
10.01.2003	300	2.10	630				500	2	1000
							300	2.10	630
15.01.2003				300	2	600			
				300	2.10	630			
							200	2	400
20.01.2003	400	2.20	880				200	2	400
							400	2.20	880
25.01.2003				300	2.20	660			
							200	2	400
							100	2.20	220
27.01.2003	500	2.10	1,050				200	2	400
							100	2.20	220
							500	2.10	1,050
31.01.2003				100	2.20	220			
				100	2.10	210			
							200	2	400
							400	2.10	840

Closing Stock = 600 tons (200 x Rs. 2 + 400 x Rs. 2.10) = Rs. 1,240

Illustration:

By solving illustration 3 Under Base Stock – LIFO method

Solution:**Stores Ledger Account (Base Stock—LIFO)**

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	500	2	1,000				500	2	1,000
10.01.2003	300	2.10	630				500	2	1,000
							300	2.10	630
15.01.2003				300	2	600			
				300	2.10	630			
20.01.2003	400	2.20	880				200	2	400
							200	2	400
25.01.2003				300	2.20	660			
							400	2.20	880
27.01.2003	500	2.10	1,050				200	2	400
							100	2.20	220
							500	2.10	1,050
31.01.2003				200	2.10	420			
							200	2	400
							100	2.20	220
							300	2.10	330

Closing stock = 600 tons (200 x Rs. 2 + 100 x Rs. 2.20 + 300 x Rs. 2.10) = Rs. 1,250.

(5) Highest In First Out (HIFO): This method is based on the assumption that the stock of materials should always be valued at the lowest possible price. Accordingly materials purchased at the highest price should be used for making the issue. This method is useful because issues are based on actual cost. It aims at recovering the highest cost of materials when the market is constantly fluctuating. But at the same time this method involves too many complicated calculations. And also this method has not been adopted widely.

Illustration: 4

From the following details of stores receipts and issues of material "XYZ" in a manufacturing unit, prepare the Stores Ledger using Highest In First Out Method (HIFO):

- 2003 January
- 1 Opening stock 4,000 units at Rs. 5
 - 4 Purchased 1,000 units at Rs. 7 per unit
 - 8 Purchased 1,200 units at Rs. 8 per unit
 - 12 Issued 1,000 units
 - 15 Purchased 700 units at Rs. 10 per units
 - 19 Purchased 300 units at Rs. 8 per unit
 - 23 Issued 800 units
 - 25 Purchased 500 units at Rs. 10 per unit
 - 31 Issued 400 units.

Solution:

Stores Ledger Account
(Highest In First Out (HIFO) Method)

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
2003 Jan.1							4,000	5	20,000
" 4	1,000	7	7,000				4,000	5	20,000
							1,000	7	7,000
" 8	1,200	8	9,600				4,000	5	20,000
							1,000	7	7,000
							1,200	8	96,000
" 12				1,000	8	8,000	4,000	5	20,000
							1,000	7	7,000
							200	8	1,600
" 15	700	10	7,000				4,000	5	20,000
							1,000	7	7,000
							200	8	1,600
							700	10	7,000
" 19	300	9	2,700				4,000	5	20,000
							1,000	7	7,000
							200	8	1,600
							700	10	7,000
							300	9	2,700
" 23				700	10	7,000	4,000	5	20,000
				100	9	900	1,000	7	7,000
				<u>800</u>			200	8	1,600
							200	9	1,800
"25	500	10	5,000				4,000	5	20,000
							1,000	7	7,000
							200	8	1,600
							200	9	1,800
							500	10	5,000
"31				400	10	4,000	4,000	5	20,000
							1,000	7	7,000
							200	8	1,600
							200	9	1,800
							100	10	1,000

B. Average Cost Method

In this method, the issues to the production department are split into equal batches from each shipment at stock. It is a realistic method reflecting the price levels and stabilizing the cost price. The following various methods of averaging issue prices may be used :

- (1) Simple Average Method
- (2) Weighted Average Method
- (3) Periodic Simple Average Method
- (4) Periodic Weighted Average Method

(1) Simple Average Method: Under this method, price of issue materials is determined by dividing the total of the prices of the materials in stock, i.e., adding of different prices by the number of different prices. Then, this average price is applied to the issues to production. This method is simple and easy to operate. The value of closing stock becomes unrealistic. The following formula is applied for calculation of material issue price under simple average method :

$$\text{Issue Price} = \frac{\text{Total of Unit Prices of Materials in Stock}}{\text{Number of Prices}}$$

Illustration: 5

From the following prepare stores ledger account using Simple Average Method for the month of January 2003:

January 1	opening balance 500 units at Rs. 2 per unit
3	Issued 100 units
4	Issued 100 units
8	Issued 100 units
13	Purchased 400 units at Rs. 3 per unit
14	Purchased 200 units at Re. 1 per unit
16	Issued 150 units
20	Purchased 400 units at Rs. 4 Per unit
24	Issued 250 units
25	Purchased 500 units at Rs. 5 per unit
26	Issued 300 units
28	Purchased 200 units at Rs. 2 per unit
31	Purchased 200 units at Rs. 4 per unit

Solution:

Stores Ledger Account (Simple Average Method)

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	500	2	1,000				500	2	1,000
03.01.2003				100	2	200	400	2	800
04.01.2003				100	2	200	300	2	600
08.01.2003				100	2	200	200	2	400
13.01.2003	400	3	1,200				200	2	400
							400	3	1,200
14.1.2003	200	1	200				200	2	400
							400	3	1,200
							200	1	200
16.01.2003				150	2	300	650		1,500
20.01.2003	400	4	1,600				1,050		3,100
24.01.2003				250	2.5	625	800		2,475
25.01.2003	500	5	2,500				1,300		4,975
26.01.2003				300	3.25	975	1,000		4,000
28.01.2003	200	4	400				1,200		4,400
31.01.2003	200	4	800				1,400		5,200

Working Notes

Issue rate on 3rd, 4th and 8th at Rs. 2 per unit

$$\text{Issue rate on 16}^{\text{th}} = \frac{\text{Rs. 2} + \text{Rs. 3} + \text{Rs. 1}}{3} = \frac{\text{Rs. 6}}{3} = \text{Rs. 2}$$

$$\text{Issue rate on 24}^{\text{th}} = \frac{\text{Rs. 2} + \text{Rs. 3} + \text{Rs. 1} + \text{Rs. 4}}{4} = \frac{10}{4} = \text{Rs. 2.5}$$

$$\text{Issue rate on 26}^{\text{th}} = \frac{\text{Rs. 3} + \text{Rs. 1} + \text{Rs. 4} + \text{Rs. 5}}{4} = \frac{13}{4} = \text{Rs. 3.25}$$

$$\text{Simple Average Rate} = \frac{\text{Total Unit Prices of Materials in Stock}}{\text{Number of Prices}}$$

(2) Weighted Average Method : Under this method, the price of materials issue is determined by dividing the total cost of materials in stock by the total quantity of material in stock. Here weighted average rate is calculated based on both quantity and price of the materials in stock. As more issues are made, a new average rate is computed and this average rate is applied to the subsequent issues. The material issue price is calculated by the formula given below :

$$\text{Weighted Average Price} = \frac{\text{Value of Materials in Stock}}{\text{Quantity in Stock}}$$

Illustration: 6

From the following particulars, prepare stores Ledger Account on weight Average basis :

2003 March	1	Opening balance	200 units at Rs. 2 per unit
	10	Purchased	300 units at Rs. 2.40 per unit
	15	Issued	250 units
	18	Purchased	250 units at Rs. 2.60 per unit
	20	Issued	200 units.
	25	Purchased	300 units at Rs. 2.50 per unit
	31	Purchased	100 units at Rs. 2 per unit

Solution:**Stores Ledger Account (Weighted Average Method)**

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.03.2003	200	2	400				200	2	400
10.03.2003	300	2.40	720				200	2	400
							300	2.40	720
15.03.2003				250	2.24	560	250		560
18.03.2003	250	2.60	650				500		1,210
20.03.2003				200	2.42	484	300		726
25.03.2003	300	2.50	750				600		1,476
31.03.2003	100	2	200				700		1,676

Working Notes

$$\text{Issue Price} = \frac{\text{Value of Materials in Stock}}{\text{Quantity in Stock}}$$

$$\text{Issue Rate on 15}^{\text{th}} = \frac{400 + 720}{200 + 300} = \frac{1120}{500} = \text{Rs. 2.24}$$

$$\text{Issue Rate on 20}^{\text{th}} = \frac{560 + 650}{250 + 250} = \frac{1210}{500} = \text{Rs. 2.42}$$

(3) Periodic Simple Average Method: Under this method, the simple average rate is calculated for a particular period ignoring the rate of opening stock. The issue price is calculated by totaling the unit price of all materials purchased during a particular period by the total number of prices during that period. Thus this rate is applied to the issue to production for a particular period say a month and not at the occasion of each issue of materials.

Illustration: 7

From the following detail of stores receipts and issues of material "EXE" in a manufacturing unit, prepare the Stores Ledger using Periodic Simple Average Method.

- 2003 Jan. 1 Opening Stock 200 units at Rs. 2 per unit
 Jan. 5 Purchased 400 units at Rs. 3 per unit
 Jan. 10 Issued 250 units
 Jan. 16 Purchased 500 units at Rs. 3 per unit
 Jan. 20 Issued 300 units
 Jan. 31 Purchased 200 units at Rs. 4 per unit
 Feb. 10 Issued 500 units
 Feb. 15 Purchased 400 units at Rs. 4.50 per unit
 Feb. 20 Issued 300 units
 Feb. 25 Purchased 200 units at Rs. 6 per unit

Stores Ledger Account (Periodic Simple Average Method)

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	200	2	400				200	2	400
05.01.2003	400	3	1,200				400		
10.01.2003				250			350		
16.01.2003	500	3	1,500				850		
20.01.2003				300			550		
31.01.2003	200	4	800				750		
	1,300		3,900	550	4.66	2,563	750	4.66	3,495
Feb.1 Balance	750	4.66	3,495				750	4.66	3,495
10.02.2003				500			250		
15.02.2003	400	4.50	1,800				650		
20.02.2003				300			350		
25.02.2003	200	6	1,200				550		
	1,350		6,495	800	5.25	4,200	550	5.25	2,888

Working Notes

$$\begin{aligned} \text{Issue rate on Jan.} &= \frac{3 + 3 + 4}{3} = \frac{14}{3} = \text{Rs. 4.66} \\ \text{Issue rate on Feb.} &= \frac{4.50 + 6}{2} = \frac{10.50}{2} = \text{Rs. 5.25} \end{aligned}$$

(4) Periodic Weighted Average Method : This method is similar to the periodic simple average method. In this method issue rate is calculated by total cost of materials purchased during a period by the total quantity of materials purchased during that period. Here both quantity and prices of materials in stock during a particular period are taken into account for calculation of periodic weighted average rate. Under this method the issue rate is determined for a particular period ignoring the rate and quantity of opening stock. A new average rate is computed at the end of each period say a month and this average rate is applied to subsequent issues.

Illustration: 8

By solving the illustration No.6, under Periodic Weighted Average Method.

Solution:**Stores Ledger Account (Periodic Simple Average Method)**

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	200	2	400				200		
05.01.2003	400	3	1,200				400		
10.01.2003				250			350		
16.01.2003	500	3	1,500				850		
20.01.2003				300			550		
31.01.2003	200	4	800				750		
	1,300		3,900	550	3.18	1,749	750	3.18	2,385
Feb.1 Balance	750	3.18	2,385				750		
10.02.2003				500			250		
15.02.2003	400	4.50	1,800				650		
20.02.2003				300			350		
25.02.2003	200	6	1,200				550		
	1,350		5,385	800	5	4,000	550	5	2,750

Working Notes

$$\begin{aligned} \text{Issue rate on Jan.} &= \frac{1200 + 1500 + 800}{400 + 500 + 200} = \frac{3500}{1100} = \text{Rs. 3.18} \\ \text{Issue rate on Feb.} &= \frac{1800 + 1200}{400 + 200} = \frac{3000}{600} = \text{Rs. 5} \end{aligned}$$

Ignoring Opening Stock of Jan. & Feb.

C. Standard Price Method

Under this method, standard price of material issues are calculated on the basis of detailed analysis of market prices and trends. The standard price also referred to as predetermined price is fixed for a definite period of six months or more. Accordingly the material issue is done on the basis of standard price irrespective of actual rate. The difference between actual price and standard price is treated as material variance. At the end of the period, new standard price is fixed for a further period.

Illustration: 9

From the following particulars, prepare a stores Ledger Account by Standard Price Method of issue of materials. The standard price of a material is fixed at Rs. 10 per unit.

2003

Mar. 1	Opening stock of materials 1,000 units at Rs. 15 per unit
3	Purchased 500 units at Rs.10 per unit
7	Issued 500 units
12	Purchased 1,000 units at Rs.15
15	Purchased 800 units at Rs.10
19	Issued 700 units
22	Issued 500 units
27	Purchased 600 units at Rs.12
29	Issued 300 units
30	Purchased 100 units at Rs.14
31	Issued 400 units

Solution:

STORES LEDGER ACCOUNT (Standard Price Method)

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
2003 Mar.1							1,000	15	15,000
3	500	10	5,000				1,500		20,000
7				500	10	5,000	1,000		15,000
12	1,000	15	15,000				2,000		30,000
15	800	10	8,000				2,800		38,000
19				700	10	7,000	2,100		31,000
22				500	10	5,000	1,600		26,000
27	600	12	7,200				2,200		33,200
29				300	10	3,000	1,900		30,200
30	100	14	1,400				2,000		31,600
31				400	10	4,000	1,600		27,600

D. Inflated Price Method

This method is used to cover material losses on account of obsolescence, deterioration, and materials handling expenses. Under this method cost of materials issue, such losses and expenses are directly charged to material cost. Therefore, when the issue of materials is made, the price is to be inflated to cover all the losses and expenses.

E. Market Price Method

This method is also known as Replacement Rate Method. Under this method issue materials that are valued at the market rate prevailing at the time issue. It therefore follows that when prices increase the stock on hand is continuously under estimated because receipts are cost at actual and issued at higher rates. Conversely Hand grossly over estimated. This method is most suitable when quotations or tenders have to be made because they are to be quoted at competitive prices. Besides this system requires continuous monitoring of market price for all materials and hence it is very unwieldy.

QUESTIONS

1. Discuss the various methods of pricing materials issues to production.
2. Which of the issuing methods would you recommend under conditions of raising prices and why?
3. What do you understand by FIFO? What are its merits and demerits?
4. What do you understand by LIFO? What are its merits and demerits?
5. What is Specific Price Method? Explain its significance.
6. Write short notes on : (a) Base Stock Method. (b) Market Price Method. (c) Inflated Price Method. (d) Standard Price Method.
7. What do you understand by Simple Average Method and Weighted Average Method?
8. Explain briefly the Periodic Simple Average Method and Periodic Weighted Average Method.
9. The following transactions occur in the purchase and issue :

2003 Jan. 2 Purchased 4000 units at Rs. 4.40 per unit
 Jan. 20 Purchased 500 units at Rs. 5 per unit
 Feb. 5 Issued 2000 units
 Feb. 10 Purchased 6000 units at Rs. 6 per unit
 Feb. 12 Issued 4000 units
 March 2 Issued 1000 units
 March 5 Issued 2000 units
 March 15 Purchased 4500 units at Rs. 5.50 per unit
 March 20 Issued 3000 units

From the above, prepare the stores ledger account in two ways (a) by adopting FIFO (b) by adopting LIFO method.

[Ans : (1) FIFO Closing Stock = 3,000 units at Rs. 5.50 = Rs. 16,500

(2) LIFO Closing Stock = 3,000 units

1,500 units at Rs. 4 =	6,000
1,500 units at Rs. 5.50 =	8,250
	14,250
	Total 3000 units =

10. From the following receipts and payments of a material X prepare a stores ledger account showing under Simple Average Method and Weighted Average Method.

2003 Jan. 1 Opening stock 200 units at Rs. 3.50 per unit
 3 Purchased 300 units at Rs. 4 per unit
 5 Issued 400 units
 13 Purchased 900 units at Rs. 4.30 per unit
 15 Issued 600 units
 23 Purchased 600 units at Rs. 3.80 per unit
 25 Issued 600 units.

[Ans : Issued price rate 5th, 15th, 25th, closing stock

(a) Simple Average Rs. 3.75, 4.15, 4. 400 units Rs. 1,630

(b) Weighted Average Rs. 3.80, 4.25, 3.98, 400 units Rs. 1,592]

11. From the following receipts and payments of a material X prepare stores ledger account under Base Stock Method with FIFO. Assume base stock of 400 units out of opening stock.

2003 Jan.1 Opening stock 1000 units at Rs. 2 each
 3 Purchased 800 units at Rs. 2.10 per unit
 5 Issued 800 units
 12 Purchased 1,600 units at Rs. 2.10 per unit
 17 Issued 1,500 units
 20 Purchased 900 units at Rs. 2.50 per unit
 25 Issued 600 units

[Ans : Closing stock : Base Stock 400 units at Rs. 2 per unit = Rs. 800

Closing Balance 100 units at Rs. 2.10 = Rs. 210 900 units at Rs. 2.50 = Rs. 2250]

12. From the following details of store receipts and issues of materials 'PQ' in a manufacturing visit prepare the stock ledger using weighted average methods of valuing the issues.

2003 January 1	Opening stock 2,000 units at Rs. 5 per unit
4	Issued 1,500 units
5	purchased 4,500 units at Rs. 6 per unit
9	issued 1,600 units
12	Returned to stock 100 units (from the issue of January 4)
15	Purchased 2,400 units at Rs. 6.50 per unit
18	Purchased to supplier 200 units out of the quantity received on January 5 th
25	Purchased 1,000 units at Rs. 7 each
28	Issued 2,100 units
29	Purchased 1,200 units at Rs. 7.50 per unit
30	Issued 2800 units

[Ans : Value of closing stock Rs. 19,558 (i.e. 3,000 units @ Rs. 6.52 per unit)]

13. Show the Stores Ledger entries as then would appear when using: (a) Weighted Average Method (b) Simple Average Method and (c) LIFO Method.

		<i>Units</i>	<i>Rater Per unit</i>
2003 March 1	Opening Balance	600	2.00
4	Purchased	400	2.20
7	Issued	300	
9	Purchased	400	2.30
15	Issued	300	
20	Issued	400	
25	Purchased	400	2.40
29	Issued	300	

[Ans : Value of Stock (a) Rs. 1,140 (i.e., 500 units @ Rs. 2.28

(b) Rs. 1,074

(c) Rs. 1,040 (i.e., 400 units @ Rs. 2.750 units Rs. 2.50 units @ Rs. 2.40)]

14. The following information refers to the receipts and issues of a certain material during January 2003.

2003 January 1	Purchased 1,000 units at Re. 1 per unit
" 5	Purchased 1,000 units at Rs. 1.10 per unit
" 11	Issued 500 units
" 15	Purchased 1,600 units at Rs. 1.15 per unit
" 18	Issued 1,200 units
" 20	Purchased 1,500 units
" 25	Purchased 1,500 units at Rs. 1.20 per unit
" 29	Issued 200 units

Write up the priced stores ledger card adopting the standard method of issue at Rs. 1.10 per unit

[Ans : 29.01.2003 Balance 1,700 units, Rs. 2,000]

15. Kapur & Co. Ltd. Purchased and Issued the Materials during the month of March 2003 is the following order.

2003 March 1	Opening stock 1,000 units at Rs. 26 each
3	Purchased 500 units at Rs. 24.50 each
7	Issued 750 units
12	Purchased 1,500 units at Rs. 24 per unit
17	Issued 1,100 units
19	Purchased 1,000 units at Rs. 25 each
25	Issued 500 units
27	Issued 300 units
29	Purchased 1,500 units at Rs. 26 each
30	Issued 1,500 units

Adopt first in first out method of issue and find out the value of the chasing stock.

[Ans : 1,350 units at Rs. 26 per unit worth of Rs. 35,100]

16. The following were the receipts and issues of materials Zed during January 2003.

January 2003 1	Opening stock 1,100 unit at Rs. 60 per unit
4	Issued to production 140 units
7	Issued to production 250 unit
9	Issued to production 210 unit
10	Purchased materials 400 unit at Rs. 59 per unit
15	Returned to stores 30 unit at Rs. 58 per unit
17	Issued to production 350 unit
25	Purchased materials 480 unit at Rs. 62 per unit
26	Issued to production 60 unit

- 27 Purchased materials 640 unit at Rs. 60 per unit
- 29 Issued to production 524 unit
- 30 Returned to stores 24 units at Rs 60 per unit
- 31 Purchased materials 150 units at Rs. 64 per unit

From the above information write the stores ledger account on simple average basis.

[Ans : closing balance 742 units for Rs. 45,598]

17. Prepare a stores ledger account from the following transactions assuring that the issue of stores has been priced on the principle of the last in first out.

- March 2003
- 1 Opening balance of 1,000 units at Rs. 20 per unit
 - 5 Purchased 260 units at Rs. 21 per unit
 - 7 Issued to production 700 units
 - 11 Purchased 400 units at Rs. 23 per unit
 - 15 Purchased materials 300 units at Rs. 25 per unit
 - 20 Issued to production 620 units
 - 23 Issued to production 240 units
 - 25 Purchased materials 500 units at Rs. 22 per unit.
 - 31 Issued to production 380 units.

[Ans: Closing balance 520 units of Rs 10,640]

18. Prepare a stores ledger account from the following information adopting FIFO method of Principle of issue of materials.

- March 2003
- 1 Opening balance 500 units at Rs. 200 per unit
 - 4 Issued to production 70 units
 - 5 Issued to production 100 units
 - 7 Issued to production 80 units
 - 12 Purchased materials 200 units at Rs. 190 per unit
 - 15 Returned to stores 15 units
 - 17 Issued to production 180 units
 - 20 Purchased materials 240 units Rs. 195 per unit
 - 23 Issued to production 300 units
 - 25 Purchased materials 320 units at Rs. 200 per unit
 - 27 Issued to production 115 units
 - 29 Returned to stores 35 units
 - 31 Purchased materials 100 units at Rs. 200 per unit

[Ans: Closing balance 565 units valued at Rs. 1,12,275]



CHAPTER 16

Labour Cost Control

Introduction

Labour cost is the second important element of cost of production. Wages, salaries and other forms of remunerations represent a major portion of the total cost of a product or services. The growth and profitability of the concern depends upon proper utilization of human resources or labour forces which in turn needs proper accounting and control of cost. Thus, control of labour cost is a very significant issue from the viewpoint of management.

Types of Labour Cost

The labour cost can be classified into two types :

- (1) Direct Labour Cost.
- (2) Indirect Labour Cost.

(1) Direct Labour Cost: Any labour cost that is specially incurred for or can be readily charged to or identified with a specific job, contract, work order or any other unit of cost is termed as direct labour cost. Wages for supervision, wages for foremen, wages for labours who are actually engaged in operation or process are the examples of direct labour cost.

(2) Indirect Labour Cost: Indirect labour is for work in general. The importance of the distinction lies in the fact that whereas direct labour can be identified with and charged to the job, indirect labour cannot be so charged and has, therefore to be treated as part of the factory overheads to be included in the cost of production. For example, salaries and wages of supervisors, storekeepers and maintenance labour etc.

Control of Labour Cost

Control of labour cost is a significant influence on the growth, profitability and cost of production. Labour cost may become unduly high rate due to inefficiency of labour, ineffective supervision, ideal time, unusual overtime work etc. The primary objectives of the management therefore is to efficiently utilize the labour as economically as possible.

Techniques of Labour Cost Control

In order to achieve the effective utilization of manpower resources, the management has to apply proper system of labour cost control. The labour cost control may be determined on the basis of establishment of standard of efficiency and comparison of actuals with standards. The management applies various techniques for the effective control of labour costs as under :

- (1) Scientific method of production planning.
- (2) Use of labour budgets.
- (3) Establishment of labour standards.
- (4) Proper system of labour performance report.
- (5) Effective system of job evaluation and job analysis.
- (6) Devise a proper system of control over ideal time and unusual overtime work.
- (7) Establish a fair and equitable remuneration system.
- (8) Effective cost accounting system.

Organisation for Control of Labour Cost

The objectives of proper control on labour cost is effectively achieved through the functions of various departments responsible for controlling labour cost in an organisation. The following are the important departments for control over labour costs:

- (1) Personnel Departments.
- (2) Engineering and Works Study Department.
- (3) Time Keeping Departments.
- (4) Pay Roll Department.
- (5) Cost Accounting Department.

(1) Personnel Department

Personnel department plays a very important role in control of labour costs. It is primarily concerned with the recruitment of labours on the basis of employee placement requisition and imparting training to them. And thereafter placing them to the job for which they are best suited. In order to achieve the efficient utilization of manpower resources, this department is responsible to execution of labour policies which have been laid down by top management.

(2) Engineering and Works Study Department

Engineering department is primarily concerned with maintaining control over working conditions and production methods for each job, process, operation or departments. It is performed by undertaking the following functions :

- (1) Preparation of plan and specification of each job.
- (2) Maintaining required safety and efficient working conditions.
- (3) Making time and motion studies.
- (4) Conducting job analysis, job evaluation and merit rating.

- (5) Setting fair and equitable piece rate or time wage system.
- (6) Conducting research and experimental work.

In order to maintain control over working conditions and production methods carrying a detailed study of the following operations is necessary :

- (a) Method Study
- (b) Motion Study
- (c) Time Study
- (d) Job Analysis
- (e) Job Evaluation
- (f) Merit Rating.

(a) Method Study: It is one of the important components of work study. The chief aims of this study is to find a scheme of least wastage. Method Study is defined as “a systematic and scientific evaluation of existing and proposed plans and performance of any work system and the evaluation of improvement, through analytical process of critical examination.”

(b) Motion Study: Frank Gilbreth, who is the real founder of Motion Study. According to him motion study may be defined as the “science of eliminating wastefulness resulting from ill-directed and inefficient motions. The following are the important objectives of the motion study :

- (1) Effective utilisation of material, machine and labours.
- (2) Elimination of wastage of time and labours.
- (3) Maintaining higher standards of safety and health.
- (4) Reducing unnecessary movements in order to minimize wastages.
- (5) Better design of work place layout for effective production process.
- (6) Ensure fair remuneration with job satisfaction.

(c) Time Study: Time study is also called work measurement. Time study may be defined as “the art of observing and recording the time required to do each detailed element of an industrial operation.”

Uses of Time Study

- (1) It assists in setting standard time for each operation.
- (2) It facilitates effective labour cost control.
- (3) It helps to ascertain ideal time and over time to men and machines.
- (4) It is useful to establish fair and suitable wage rates and incentives.
- (5) It facilitates effective utilization of resources.

(d) Job Analysis: Job Analysis is a formal and detailed study of jobs. Job analysis may be defined as “the process of determining by observation and study the task, which comprise the job, the methods and equipment used and the skills and attitudes required for successful performance of the job.”

Advantages of Job Analysis

The following are the important advantages of job analysis :

- (1) It is useful in classifying job and interrelationship among them.
- (2) It facilitates forecasting of manpower requirements.
- (3) It helps in effective utilization of manpower resources.
- (4) Effective employee development programme can be established.
- (5) Enables in determining performance standards of each process or job.

(e) Job Evaluation: Job evaluation may be defined as “a process of analyzing and describing positions, grouping them and determining their relative value by comparing the duties of different positions in terms of their different responsibilities and other requirements.” Job evaluation is determined on the basis of job description and job analysis. The primary purpose of job evaluation is developing appropriate wage and salary structure with internal pay equity between jobs.

(f) Merit Rating: Merit rating may be defined as “a systematic evaluation of an employee’s performance on the job in terms of the requirement of the job.” Merit rating is a system of measuring both qualitatively and quantitatively of an employee’s capacity in relation to his job. The following are the personal qualities of an employee which are usually considered for determining merit and worth of labours as:

- (1) Academic qualification and knowledge.
- (2) Skill and experience.
- (3) Attitude to the work.
- (4) Quality of work done.
- (5) Initiative intelligence.
- (6) Accuracy.
- (7) Judgement.
- (8) Leadership.
- (9) Adaptability and Co-operation.
- (10) Leadership and self-confidence.
- (11) Reliability and Integrity.
- (12) Discipline.

Importance of Merit Rating: The following are some of the important advantages of merit rating :

- (1) It assists in determining fair rates of wages for each worker on the basis of his / her performance.
- (2) It helps to know the suitability of the worker for a particular job.
- (3) This method helps in removing grievances and it improves labour-management relations.
- (4) Enables to ascertaining an employee’s merit for grant of promotion or demotion or transfer or increment etc.
- (5) It facilitates effective labour cost control.

Distinction Between Job Evaluation and Merit Rating: The following are the important points of differences between Job Evaluation and Merit Rating :

- (1) Job evaluation is the assessment of the relative worth of jobs within a company and merit rating is the assessment of the relative worth of the man behind the job.
- (2) Job evaluation and its accomplishments are means to setup a rational wage and salary structure whereas merit rating provides a scientific basis for determining fair wages for each worker based on his ability and performance.
- (3) Job evaluation simplifies wage administration by bringing uniformity in wage rates whereas merit rating is used to determine fair rate of pay for different workers.

(3) Timekeeping Department

This department is concerned with following two important activities : (1) Timekeeping and (2) Time Booking

Timekeeping: It refers to recording of each worker's time of coming in and going out of the factory during engagement of the factory. It is essential for the purpose of attendance and determination of wage payable to each worker.

Objectives of Timekeeping : The following are the important objectives of timekeeping :

- (1) Preparation of payrolls
- (2) Ensuring discipline in attendance
- (3) Apportionment of overhead on the basis of labour hours
- (4) Effective utilization of human resources
- (5) Minimization of labour costs
- (6) Ascertaining ideal labour time and ideal machine time.

Methods of Timekeeping : The following are the two important methods of timekeeping :

(1) Manual Method:

- (a) Attendance Register Method.
- (b) Token or Disc Method.

(2) Mechanical Method:

- (a) Time Recording clocks.
- (b) Dial Time Records.
- (c) Key Recorder System.

Manual Method: The choice of the manual method adopted by the factory depends upon its size, number of workers employed, nature of the business and policy of a firm. Under manual methods, there are two important methods which are in use : (a) Attendance Register Method and (b) Token or Disc Method.

- (a) **Attendance Register Method:** Under this method, an Attendance Register is maintained by the Timekeeper in the time office. This register may be filled in by the Timekeeper when the worker gets inside the factory and the time of departure, normal time and overtime. Workers may be required to sign both at the time of arrival and time of departure. This

method is very simple and most suitable to small-scale industries. It is very difficult to operate when the number of workers is large.

- (b) **Token or Metal Disc Method :** In this method, each worker is given a metal disc or a token bearing his identification number. All the tokens or discs are hung on a board serially at the entrance of the gate in the factory. As the worker enters the gates of the factory, he removes his disc from the board and drops it into a box. This process is continued until the scheduled time expires. Latecomers may drop their tokens in a separate box or handover personally to the timekeeper. In the case of absentees the tokens are not removed from the board. Based on the above process, the Timekeeper records the attendance in the register known as Muster Roll for the purpose of pay rolls.

This method is simple and economical. But it suffers from certain disadvantages given below :

- (a) There is chance to remove the disc of fellow worker's token from the board to ensure his presence.
- (b) Difficult to ascertain about overtime work, early leaving, ideal time etc.
- (c) Lack of accuracy regarding the exact time of arrival of a worker which may result in many disputes.
- (d) Unless there is strict supervision, the timekeeper may include dummy or ghost workers in the Muster Rolls.

Mechanical Method

In order to achieve the accuracy and reliability of recording of time of workers, the following different mechanical devices are used :

- (1) Time Recording Clocks.
- (2) Dial Time Records.
- (3) Key Recorder System.

(a) **Time Recording Clocks:** Under this system, each worker is given a time card for a week or fortnight. These time or clock cards are serially arranged in a tray at the entrance to the factory. When the worker enters the factory, he takes his allotted card from the tray and puts it in the time recording clock that records the exact arrival time at the space provided on the card against the particular day. This process is repeated for recording time of departure for lunch, return from lunch, leaving the factory after his day's work. Late arrivals, early leavings and over time are printed in red so as to distinguish these from normal period spent in the factory. This method is very popular for correct recording of attendance.

(b) **Dial Time Records:** This is a machine which is used for recording correct attendance time of arrival and departure of worker automatically. This recorder has a number of holes about the circumference. Each hole represents worker's number which corresponds to identification of allotted clock numbers. At the time of arrival and departure of worker, by operating this machine, the dial arm into a hole and the time is automatically recorded on an attendance sheet placed inside. This machine is most suitable in small-scale industries.

(c) **Key Recorder System:** In this machine there are a number of keys, each key denotes worker's number. When the time of arrival and departure the worker inserts his allotted key in the key hole and gives a turn, the ticket time and clock time are recorded on a sheet of paper. This method is economical and easy to operate.

Time Booking

It refers recording the time of each worker for each department, operation, process or job during engagement of the factory. It is useful for the purpose of cost analysis and effective cost control.

Objectives of Time Booking : The following are the main objectives of time booking :

- (1) To ascertain the cost of each job, operation or process.
- (2) To ascertain the cost of ideal time.
- (3) Apportionment of overhead based on the suitable basis.
- (4) To establish the fair and suitable wage system.
- (5) To ensure the proper utilization of attendance time.
- (6) To ensure the effective cost control and cost reduction.

Methods of Time Booking: In order to achieve the effective utilization of manpower resources, recording the correct time of workers and labour cost control is essential to adopt various methods of time booking. The following are the important methods used for time booking :

- (1) Daily Time Sheet
- (2) Weekly Time Sheet
- (3) Job Cards or Job Tickets
 - (a) Job Card For Each Worker
 - (b) Job Card For Each Job
 - (c) Combined Time and Job Card
 - (d) Piece Work Card

(1) Daily Time Sheet : This is one of the important methods which is used for a daily record of the work done by each worker. This record indicates that the nature of work, actual time spent by the worker on each job or operation. The daily time sheet is allotted to each worker on which the record is made by the worker himself or by the official incharge. This method is suitable only for small-scale industries.

(2) Weekly Time Sheet : This system may be done as in the case of daily time sheet. Under this method, instead of recording time on daily time sheets, worker is given a weekly time sheet on which recording by the worker on each job for a week. This method is useful for those concerns where the workers usually carry on a few jobs in a week.

(3) Job Card or Job Tickets : This method is adopted for recording of time booking for a worker's time spent on a job. A job card is prepared for each job giving detailed particulars of the work to be carried out by the worker. Job cards are classified into four types :

- (a) Job Card for Each Worker
- (b) Job Card for Each Job
- (c) Combined Time and Job Card
- (d) Piece Work Card.

(a) Job Card For Each Worker: Under this system, job card is issued to each worker at the beginning of each day or week. The job card is used to record the time of starting and finishing the each job or work. It indicates the nature of work, time spent by the worker for each job or operation, idle time, total hours, rates and remuneration of different jobs during a scheduled time.

- (b) **Job Card for Each Job:** In this system, separate card is prepared and allotted to each job. The job card is used to each job passes along with the job from worker to worker. As soon as the worker receives the job card he records the time of starting and finishing the job or operation. This system is useful not only for correct calculation of wages for each job but also it shows the details of the work to be done by the worker.
- (c) **Combined Time and Job Card:** Under this system, job card is prepared on the basis of attendance time and actual time spent by the worker. This system is useful to ascertain idle time, time taken and time booking on account of pay rolls.
- (d) **Piece Work Card:** This system is adopted where the piece wage payment is applicable. Accordingly wage payment is made on the basis of quantity of output produced by the worker. A piece work card is allotted to each worker on which recording the quantity of work to be done by each worker. For determination of piece wage payment, the time spent by the worker is not taken into account. This method is suitable only for small-scale industries.

I. Idle Time

Idle Time is that time during which the workers spend their time without giving any production or benefit to the employer and concern. The idle time may arise due to non-availability of raw materials, shortage of power, machine breakdown etc.

Types of Idle Time: It refers that any loss of time is inherent in every situation which cannot be avoided. Any cost associated with the normal idle time are mostly fixed in nature. The normal idle time arises due to the following reasons :

- (1) Time taken for personal affairs.
- (2) Time taken for lunch and tea break.
- (3) Time taken for obtaining work.
- (4) Time taken for changing from one job to another.
- (5) Waiting time for getting instructions, tools and or raw materials, spare parts etc.
- (6) Time taken by the workers to walk between factory gate and place of work.

II. Abnormal Idle Time

Abnormal idle time refers that any loss of time which may occur due to some abnormal reasons. Abnormal idle time can be prevented through effective planning and control. The abnormal idle time may arise due to the following avoidable reasons :

- (1) Faulty planning.
- (2) Lack of co-operation and co-ordination.
- (3) Power failure.
- (4) Time lost due to delayed instructions.
- (5) Time lost due to inefficiency of workers.
- (6) Time lost due to non-availability of raw materials, spare parts, tools etc.
- (7) Time lost due to strikes, lock outs and lay-off.

Accounting Treatment of Normal Idle Time and Abnormal Ideal Time

Normal Idle Time: Normal idle time wages is treated as a part of cost of production. Thus, in case of direct workers an allowance for normal idle time is built into labour cost rates. In the case of indirect workers, normal idle time wage is spread over all the products or jobs through the process of absorption of factory overheads.

Abnormal Idle Time: Abnormal idle time cost is not included as a part of production cost and is shown as a separate item in the Costing Profit and Loss Account. So that normal cost are not distributed.

Over Time: The term “over time” refers to when a worker works beyond the normal working hours or scheduled time is known as ‘overtime.’ According to Factories Act, the wage rate of overtime work to be paid at double the normal rate of wages. The extra amount of remuneration is paid to the worker in addition to normal rate of wages is said to be overtime premium.

Effect of Over Time Payment on Productivity: The following are the effects of over time payment on productivity :

- (1) Overtime premium is an extra payment over normal wages and hence will increase the production cost.
- (2) The efficiency of workers during overtime work may fall and hence output may be reduced.
- (3) To earn more, workers may not concentrate on work during normal hours and thus the output during normal hours may fall.
- (4) Reduced output and increased premium will increase the cost of production.

Accounting Treatment of Overtime Wages

The following are the ways of charging of overtime premium:

- (1) If overtime is resorted to at the desire of the customer then overtime premium is charged to concerned job directly.
- (2) If overtime is required to cope with general production schedule or for meeting urgent orders, the overtime premium should be treated as overhead cost of particular department or cost center which works overtime.
- (3) If overtime is worked on account of abnormal conditions such as flood, earthquake etc. that should be charged to costing profit and loss account.

Control of Overtime: Control of overtime is essential to minimize the cost of production and increase the overall performance of the efficiency. Effective control of overtime can be possible through the following ways :

- (1) Effective sound planning of production
- (2) Adequate supervision
- (3) Ensuring availability of raw materials, spare parts
- (4) Encouraging productivity
- (5) Reducing labour turnover
- (6) Ensuring effective system of repairs and maintenance, material handling and smooth flow of production
- (7) Fair and equitable remuneration to efficient and inefficient workers.

Casual Workers: Casual workers are those who are engaged casually whenever there is extra load of work or due to planned maintenance during off season.

System of Control: In order to achieve the effective control of casual workers the following system to be adopted :

- (1) Assess work load, for example, planned maintenance during off season.
- (2) Asses manpower requirement.
- (3) Obtain prior sanction for number of workers giving the period for which engagement is to be done.
- (4) Obtain periodical report on performance and compare with the plan to ensure that there is no lagging behind.
- (5) Provide for automatic termination after the period for which sanction is given expenses.

Out Workers: Out workers are those who are engaged in production operations outside the factory. For example, works carried on construction and electricity.

Control of Out Workers : The following are the important aspects to be considered for effective control of out workers :

- (1) Keep a log book at reception.
- (2) Record complaint specifying date and time of receipt of complaint.
- (3) Keep proper complaint slips and send the same to technical department.
- (4) Prepare duty sheets in duplicate to note down time on and time off.
- (5) Summarise time spent by each service man daily.
- (6) Summarise chargeable amount and non-chargeable amount.
- (7) Advise accounts department for billing.

(4) Pay Roll Department

This is one of the important departments which is responsible for computation, preparation and payment of wages to all employees of the entire organization. Wage Sheet or Pay Roll is prepared on the basis of the Piece Work Card or Time Card or both. It is a statement which shows the detailed records of the employees' remunerations such as gross wages, various reductions and net wages for particular period.

In order to ensure the proper determination and preparation of wage sheet, the pay roll department should be taken a special care. A systematic procedure for payment of wages should be adopted to preventing of frauds and irregularities in wage payments. Effective supervision and strict control are essential to ensure that the worker is not paid twice or no dummy name of workmen have been entered in the pay roll.

Labour Turnover: Labour Turnover may be defined as "the rate of changes in labour force, i.e., the percentage of changes in the labour force of an organization during a specific period. Higher rate of labour turnover indicates that labour is not stable and there are frequent changes in the labour force in the organization. It will affect the efficiency of the workers and overall profitability of the firm. The determinant result of labour turnover is expressed in terms of percentage.

Methods of Measurement of Labour Turnover : The following are the important methods of measuring labour turnover :

- (a) Separation Method
- (b) Replacement Method
- (c) Flux Method.

(a) **Separation Method:** Under this method, labour turnover is calculated by dividing the total number of separation (number of employees left or discharged) during the period by the average number of workers on the pay roll. Thus the formula is :

$$\text{Labour Turnover} = \frac{\text{No. of Separation during the period}}{\text{Average No. of Workers during the period}} \times 100$$

(b) **Replacement Method:** In this method, labour turnover is measured by dividing the number of replacement of workers during the period by average number of workers during the period. Thus formula may be expressed as :

$$\text{Labour Turnover} = \frac{\text{No. of Workers Replaced during the period}}{\text{Average No. of Workers during the period}} \times 100$$

(c) **Flux Method:** Under this method, labour turnover is measured by dividing the total number of separation and replacement of workers by the average number of workers during the period. Thus the formula is :

$$\text{Labour Turnover} = \frac{\text{No. of Separation} + \text{No. of Replacement}}{\text{Average No. of Workers during the period}} \times 100$$

Illustration: 1

From the following information, calculate labour turnover ratio and turnover flux rate

No. of workers as on 1st Jan. 2003 = 7,600

No. of workers as on 31st Dec. 2003 = 8,400

During the year, 80 workers left while 320 workers were discharged, 1,500 workers were recruited during the year of these, 300 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

Solution:

Labour Turnover Ratio

(1) Replacement Method :

(A) Due to Exit :

No. of Replacement = 300 workers

$$\text{Average No. of Workers} = \frac{7600 + 8400}{2} = 8000$$

$$\begin{aligned} \text{Labour Turnover} &= \frac{\text{No. of Replacement}}{\text{Average No. of Workers}} \times 100 \\ &= \frac{300}{8000} \times 100 = 3.75 \% \end{aligned}$$

(B) Due to New Recruitment:

$$\text{No. of new recruitment} = 1200 \text{ workers}$$

$$\begin{aligned} \text{Labour Turnover} &= \frac{\text{No. of New Recruitment}}{\text{Average No. of Workers}} \times 100 \\ &= \frac{1200}{8000} \times 100 = 15 \% \end{aligned}$$

$$\begin{aligned} \text{Labour Turnover} &= \frac{\text{No. of Accession}}{\text{Average No. of Workers}} \times 100 \\ &= \frac{1500}{8000} \times 100 = 18.75 \% \end{aligned}$$

(2) Flux Method

$$\begin{aligned} \text{Labour Turnover} &= \frac{\text{No. of Separation} + \text{No. of Replacement}}{\text{Average No. of workers}} \times 100 \\ &= \frac{1500 + 400}{8000} \times 100 = 23.75 \% \end{aligned}$$

$$= \frac{1900}{8000} \times 100 = 8.75 \%$$

(or)

$$\begin{aligned} \text{Labour Turnover} &= \frac{400 + 300}{8000} \times 100 = \frac{700}{8000} \times 100 \\ &= 8.75\% \end{aligned}$$

Causes for Labour Turnover: The causes for labour turnover can be classified into two categories :

- (1) Avoidable Causes
- (2) Unavoidable Causes.

(1) Avoidable Causes

- (1) Lack of job involvement
- (2) Lack of co-operation among the employees
- (3) Lack of smooth relationship between employer and employees
- (4) Dissatisfaction with wages and incentives
- (5) Bias attitude of Management
- (6) Poor working conditions
- (7) Dissatisfaction with promotion, recognition, transfer etc.
- (8) Lack of Co-ordination
- (9) Non-availability of adequate protection, proper instructions, accommodation etc.

(2) Unavoidable Causes

- (1) Retirement or Death of employer
- (2) Marriage in the case of female workers
- (3) Permanent disability due to accident or illness
- (4) Dismissal or discharged due to inefficiency or disciplinary ground
- (5) Dissatisfaction with job
- (6) Shortage of power, raw materials etc.
- (7) Personal responsibilities
- (8) Personal betterment with regard to new job
- (9) Change in nature of business and plant location.

Effect of Labour Turnover:

- (1) Increased cost of recruitment, training and placement
- (2) Increased cost of production
- (3) Decrease in output due to inefficient or newly recruited workers
- (4) Higher accident rate due to negligence or mishandling of machines
- (5) Low team spirit due to lack of co-operation and co-ordination between the workers and employers.

Cost of Labour Turnover:

The chief aim of the preventive costs which are incurred in order to keep the workers satisfied and reduce the labour turnover rate as much as possible. These preventive costs which include the following :

- (a) Cost of providing medical facilities, canteen and other welfare facilities
- (b) Cost of administration
- (c) Cost of providing better working conditions
- (d) Cost of pension, gratuity, provident fund and other retirement benefits.

Replacement Costs:

These cost include the following :

- (a) Cost of recruitment, training, placement
- (b) Increase wastages and scrap
- (c) Cost of repairs and maintenance including machine breakdowns
- (d) Cost of compensation on account of accidents
- (e) Loss of output due to inefficiency or newly recruited workers.

QUESTIONS

1. What do you understand by labour cost control?
2. Explain briefly the techniques of labour cost control.
3. Explain briefly the organization for labour cost control.
4. What do you understand by time study? Explain its significance.
5. What do you understand by Job Analysis? Explain its merits.
6. What is motion study? What are the objectives of motion study?
7. Write short notes on : (a) Method Study. (b) Job Evaluation. (c) Merit Rating.
8. What is Merit Rating? Explain briefly its significance.
9. Distinguish between job evaluation and merit rating.
10. What do you understand by timekeeping?
11. Explain briefly the different methods of timekeeping.
12. What do you understand by time booking? What are the objectives of time booking?
13. Distinguish between timekeeping and time booking.
14. Write short notes on: (a) Daily Time Sheet. (b) Weekly Time Sheet. (c) Job Card.
15. What is job card? Explain briefly the types of cards.
16. What is idle time? Explain briefly the types of idle time.
17. Explain briefly the reasons for normal idle time and abnormal idle time.
18. Explain briefly the accounting treatment of idle time and abnormal idle time.
19. What is meant by overtime? What are its effects?
20. Explain briefly the accounting treatment of overtime wages.
21. What is labour turnover? How is it measured? What are the cost of labour turnover? How can these be reduced?
22. What do you understand by labour turnover? How is it measured? Suggest measures to minimize labour turnover.
23. What is meant by labour turnover? What is the effect of labour turnover on cost of production?
24. From the following particulars calculate labour turnover rate by applying :
(1) Separation Method; (2) Replacement Method; and (3) Flux Method.
No. of workers on the pay roll
At the beginning of the month = 900 At the end of the month = 1100
During the month 10 workers left, 40 workers were discharged and 150 workers were recruited. Of these 25 workers are recruited in the vacancies of those leaving while the rest were engaged for an expansion scheme
[Ans: (1) Separation Method = 5% (2) Replacement Method = 25% and (3) Flux Method = 7.5%]



CHAPTER 17

Labour Cost Accounting

Introduction

Labour cost is one of the important elements of production. Wage, salaries and other incentives of employee remuneration constitute a very large component of operating costs. Remuneration of employees is a vital factor not only affecting the cost of production but also industrial relations of the organization. No organization can expect to attract and attain qualified and motivated employees unless it pays them fair remuneration. Employee remuneration, therefore, influences vitally the growth and profitability of the company. For employees, remuneration is more than a means of satisfying their physical needs. Wages and salaries have significant influence on our distribution of income, consumption, savings, employment and prices. Thus, employee remuneration is a very significant issue from the viewpoint of employers, employees and the nation as whole.

Objectives of an Ideal Wage System

An ideal wage system is required to achieve the following objectives :

- (1) The wage system should establish a fair and equitable remuneration.
- (2) A sound wage system helps to attract qualified and efficient worker by ensuring an adequate payment.
- (3) It assists to improve the motivation and moral of employees which in turn lead to higher productivity.
- (4) It enables effective control of labour cost.
- (5) An Ideal wage system helps to improve union-management relations. It should reduce grievances arising out of wage inequities.
- (6) It should facilitate job sequences and lines of promotion wherever applicable.
- (7) An ideal system seeks to project the image of a progressive employer and to comply with legal requirements relating to wages and salaries.

Principles of an Ideal Wage System

The following principles should be adopted for an ideal wage system :

- (1) Differences in pay should be based on differences in job requirements.
- (2) Follow the principle of equal pay for equal work.
- (3) The scheme should be based on work study, and the work contents of various jobs should be stabilized.
- (4) Recognize individual differences in ability and contributions.
- (5) The scheme should not be very costly in operation.
- (6) The scheme should be flexible.
- (7) The scheme should encourage productivity.
- (8) The scheme should not undermine co-operation amongst the workers.
- (9) The scheme should be sufficient to ensure for the worker and his family reasonable standard of living.

Method of Remuneration

There are two basic methods of wage payment : (1) Time Wage System and (2) Piece Wage System. Under time wage system, wages are paid on the basis of time spent on the job irrespective of the amount of work done. This is known as Time Rate or Day Wage System. The unit of time may be a day, a week, a fortnight or a month. Under piece wage system, remuneration is based on the amount of work done or output of a worker. This is known as "Piece Rate System" or "Payment by Result." Thus, a workman is paid in direct proportion to his output. A variety of bonus and premium plans have been designed to overcome the drawbacks of two basic methods of wage payments. A system of incentive plans also takes into consideration the primary principles of these two basic plans known as Incentive or Bonus or Premium Plan.

The following are the important methods of remuneration which may be grouped into :

- (1) Time Rate Systems
- (2) Piece Rate Systems
- (3) Bonus System (or) Incentives Schemes.
- (4) Indirect Monetary Incentives.

These may be further classified as under :

(1) Time Rate Systems:

- (a) At Ordinary Levels
- (b) At High Wage Levels
- (c) Guaranteed Time Rates.

(2) Piece Rate Systems:

- (a) Straight Piece Rate
- (b) Piece Rates with Guaranteed Time Rate

(c) Differential Piece Rates:

- (i) Taylor's Differential Piece Rate System
- (ii) Merrick Differential Piece Rate System
- (iii) Gantt Task and Bonus Plan.

(3) Bonus System or Incentive Schemes:

- (1) Halsey Premium Plan
- (2) Halsey-Weir Premium Plan
- (3) Rowan Plan
- (4) Barth Variable Sharing Plan
- (5) Emerson Efficiency Plan
- (6) Bedaux Point Premium System
- (7) Accelerating Premium Plan
- (8) Group or Collective Bonus Plans.

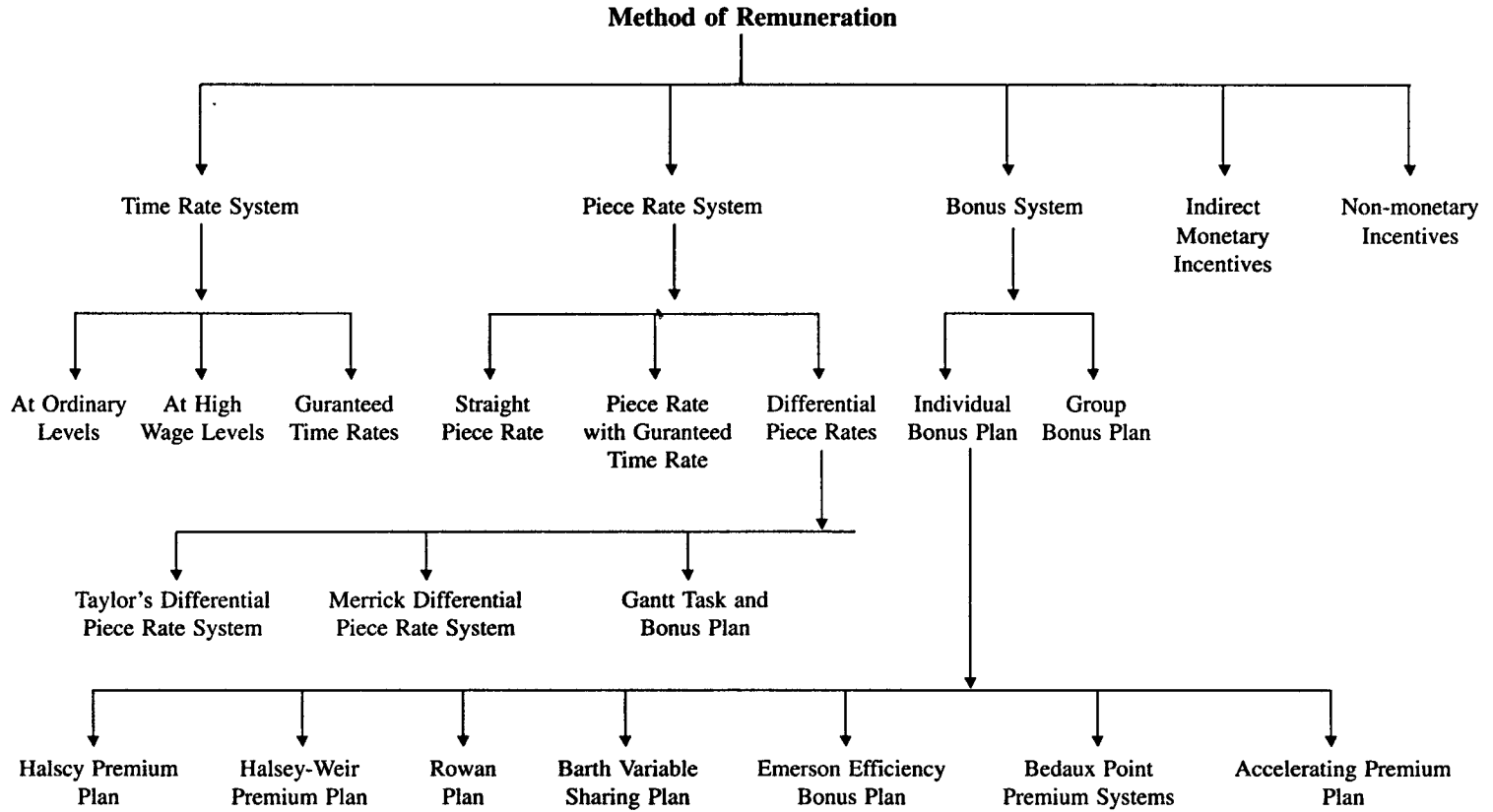
(4) Indirect Monetary Incentives:**(5) Non-Monetary Incentives:****Comparison between Time Rate and Piece Rate System**

<i>Time Rate System</i>	<i>Piece Rate System</i>
(1) Under this system earnings of a worker are calculated on the basis of time spent on the job	(1) In this system earnings of a worker are calculated on the basis of number of units produced.
(2) In this system, minimum guaranteed time rate is paid to every worker.	(2) Under this system, no guarantee of minimum payment to every worker.
(3) Under time rate system, remunerations are not directly linked with productivity.	(3) Remuneration of workers directly linked with productivity.
(4) Under this system emphasis is on high quality of work.	(4) Under piece rate system there is no consideration for the quality of work.
(5) Under time rate system, strict supervision is essential.	(5) In this system, close supervision is not required.
(6) This method may lead to trade unions to support it.	(6) Under this method the attitude of trade unions is not to co-operate with the schemes.
(7) More idle time arises in time rate systems.	(7) Compared with time rate system there is no change of idle time in piece rate schemes.

(1) Time Wage System

(a) Time Rate at Ordinary Levels: This is also termed as "Day Wage System" or "Flat Rate System." Under this system, wages are paid to the workers on the basis of time spent on the job irrespective of the quantity of work produced by the workers. Payment can be made at a rate per day or a

The following chart can explain this more about the methods of remuneration :



week, a fortnight or a month. The formula for calculation of payment of time rate of ordinary levels is as follows :

Remuneration or Earnings = Hours Worked x Rate Per Hour

Time wage system is suitable under the following conditions :

- (1) Where the units of output are difficult to measurable, e.g., watchman.
- (2) Where the quality of work is more important, e.g., artistic furniture, fine jewellery, carving etc.
- (3) Where machinery and materials used are very sophisticated and expensive.
- (4) Where supervision is effective and close supervision is possible.
- (5) Where the workers are new and learning the job.
- (6) Where the work is of a highly varied nature and standard of performance cannot be established.

Advantages

- (1) It is simple and easy to calculate.
- (2) Earning of workers are regular and fixed.
- (3) Time rate system is accepted by trade unions.
- (4) Quality of the work is not affected.
- (5) This method also avoids inefficient handling of materials and tools.

Disadvantages

- (1) No distinction between efficient and inefficient worker is made and hence they get the same remuneration.
- (2) Cost of supervision are high due to strict supervision used for high productivity of labour.
- (3) Labour cost is difficult to control due to more payment may be made for the lesser amount of work.
- (4) No incentive is given to efficient workers. It will depress the efficient workers.
- (5) There is no specific standards for evaluating the merit of different employees for promotions.

(b) **Time Rate at High Levels:** Under this system, efficient workers are paid higher wages in order to increase production. The main object of this method designed to remove the drawbacks of time rate at ordinary levels. This system is simple and easily understandable. When higher rate of wages are paid, it not only reduces labour turnover but also increases production and efficiency.

(c) **Guaranteed Time Rates:** Under this method, the wage rate is calculated by considering to changes in cost of living index. Accordingly, the wage rate is varied for each worker according to the change in cost of living index. This system is suitable during the period of raising prices.

(2) Piece Rate System

This is also known as “Piece Wage System” or “Payment By Result.” Under this system, wages of a worker are calculated on the basis of amount of work done or output of a worker. Accordingly, a worker is paid in direct proportion to his output.

Advantages

- (1) It facilitates direct relation between efforts and reward.
- (2) This system encourages the efficient workers to increase production.
- (3) Under this system efficient workers are recognized and rewarded.
- (4) It helps to reduce the cost of supervision and idle time.
- (5) Tenders or quotations can be prepared confidently and accurately.

Disadvantages

- (1) Where a concern is producing large quantities, it is difficult to fix a piece rate.
- (2) In order to maximize their earnings, workers working with high speed may affect their health.
- (3) The quality of output cannot be maintained.
- (4) This system is not encouraging to the inefficient workers.
- (5) Temporary delays or difficulties may affect the earnings of the workers.

Piece Rate System is Suitable Where

- (1) Quality and workmanship are not important.
- (2) Work can be measured accurately.
- (3) Quantity of output directly depends upon the efforts of the worker.
- (4) Production of standardized goods in a factory.
- (5) Job is of a repetitive nature.

There are three important methods of paying labour remuneration falling under this type : (a) Straight Piece Rate (2) Piece Rates with Guaranteed Time Rates and (c) Differential Piece Rates.

(a) Straight Piece Rate: Under this system, workers are paid according to the number of units produced at a given rate per unit. Thus, total earnings of each worker is calculated on the basis of his output irrespective of the time taken by him. The following formula is used for measuring piece work earning:

$$\text{Straight Piece Work Earnings} = \text{Units Produced} \times \text{Rate Per Hour}$$

(b) Piece Rates with Guaranteed Time Rates: Under this method, the worker earning from piece work less than the guaranteed minimum wage, will get the fixed amount of guaranteed time rate. A guaranteed rate would be paid per hour rate or day rate or week rate.

(c) Differential Piece Rates: This system is designed to provide for variation of piece rates at different levels of output. Accordingly increase in wages is proportionate to increase in output. Under this system, efficient workers get ample reward and at the same time inefficient workers are motivated to earn more. The following are the three important types of differential piece rates :

- (a) Taylor's Differential Piece Rates System.
- (b) Merrick's Differential Piece Rates System.
- (c) Gantt Task Bonus Plan.

(a) Taylor's Differential Piece Rates System

F.W. Taylor, who is the father of scientific management introduced this plan. Under this system, two piece rates are applicable on the basis of standard of performance established. Accordingly one is high rate and the other one is lower rate. Thus high piece rate is applicable for standard and above the standard performance. Lower piece rate for those workers with below the standard performance.

Illustration: 1

Calculate the earnings of workers A and B under Straight Piece Rate System and Taylor's Differential Piece Rate System from the following particulars :

Standard time allowed 50 units per hour.

Normal time rate per hour Rs.100.

Differentials to be applied.

80% of Piece rate below standard.

120% of Piece rate at or above standard.

In a day of 8 hours A produced 300 units and B produced 450 units.

Solution:**Calculation of Piece Rates :**

Standard production per hour = 50 units.

Standard production for 8 hours = $50 \times 8 = 400$ units.

Rate per hour = Rs. 100.

$$\text{Piece Rate per unit} = \frac{100}{50} = \text{Rs. 2 per unit}$$

Straight Piece Rate System

A for 200 units @ Rs. 2 = $200 \times 2 = \text{Rs. 400}$

B for 250 units @ Rs. 2 = $250 \times 2 = \text{Rs. 500}$

Differential Piece Rate System

$$\text{Low Piece Rate at 80\% differential} = \frac{2 \times 80}{100} = \text{Rs. 1.60}$$

$$\text{High Piece Rate at 120\% differential} = \frac{2 \times 120}{100} = \text{Rs. 2.40}$$

Standard production in 8 hours = 8×50 units per hour

= 400 units

Earnings

A produced 300 units (below standard)	}	=	300 x 1.60
Therefore low Piece rate of Rs. 1.60 applicable			

$$\left. \begin{array}{l} \text{B Produced 450 units (above standard)} \\ \text{Therefore high Piece rate of Rs. 240 applicable} \end{array} \right\} = 450 \times 2.40$$

$$\hspace{10em} \text{Rs.1080}$$

(b) Merrick Differential Piece Rate System

This is also termed as Multiple Piece Rate system. This plan is designed to overcome the drawback of Taylor's Differential Piece Rate System. Under this method, three piece rates are applied with different levels of performance. Accordingly

<i>Performance</i>	<i>Differential Piece Rate</i>
(1) Less than 83%	Normal Piece Rate (or) Basic Piece Rate
(2) From 83% to 100%	110% of Normal Piece Rate
(3) More than 100%	120% of Normal Piece Rate

Illustration: 2

From the following particulars calculate the total earning of the three workers under Merrick Differential Piece Rate System.

Normal rate per hour Rs. 5 per unit
 Standard production per hour 10 units
 In an 8 hours a day :
 A produced 70 units.
 B produced 90 units.
 C produced 65 units.
 D produced 110 units.

Solution:

$$\begin{aligned} \text{Standard output per day} &= 10 \text{ units} \times 8 \text{ hours} \\ &= 80 \text{ units} \\ \text{Piece rate} &= \text{Rs.5 per units} \end{aligned}$$

Level Performance:

A produced = 70 units

$$\begin{aligned} \text{A's level of performance} &= \frac{\text{Actual Output}}{\text{Standard Output}} \times 100 \\ &= \frac{70}{80} \times 100 = 87.5 \% \end{aligned}$$

$$\text{B's level of performance} = \frac{90}{80} \times 100 = 112.5 \%$$

$$\text{C's level of performance} = \frac{65}{80} \times 100 = 81.25 \%$$

$$\text{D's level of performance} = \frac{110}{80} \times 100 = 137.5 \%$$

Piece Rate Applicable:

Up to 83 %	-	Normal Piece Rate
83 % to 100%	-	110 % of Normal Piece Rate
Above 100%	-	120% of Normal Piece Rate

Earning of Workers:

A's level of performance is 87.5 %

$$\begin{aligned} \text{Earnings} &= \text{Units Produced} \times \text{Normal Piece Rate} \times \frac{110}{100} \\ &= 70 \times 5 \times \frac{110}{100} \\ &= \text{Rs. 385} \end{aligned}$$

B's level of performance is 112.5 %

$$\begin{aligned} \text{Earnings} &= \text{Units Produced} \times \text{Normal Piece Rate} \times \frac{120}{100} \\ &= 90 \times 5 \times \frac{120}{100} \\ &= \text{Rs. 540} \end{aligned}$$

C's level of performance is 81.25 %

$$\begin{aligned} \text{Earnings} &= \text{Units Produced} \times \text{Normal Piece Rate} \\ &= 65 \times 5 \\ &= \text{Rs. 325} \end{aligned}$$

D's level of performance is 137.5 %

$$\begin{aligned} \text{Earnings} &= \text{Units Produced} \times \text{Normal Piece Rate} \times \frac{120}{100} \\ &= 110 \times 5 \times \frac{120}{100} \\ &= \text{Rs. 660} \end{aligned}$$

(c) Gantt's Task Bonus Plan

This system is designed by Henry L. Gantt. Under this system, standard time for every task is fixed through time and motion study. The main feature of this system is a good combination of time rate, differential piece rate and bonus. In this system day wages are guaranteed to all workers. Wages under this system are calculated as follows :

<i>Performance</i>	<i>Earnings</i>
(Output)	
(1) Output Below Standard	- Time Rate (Guaranteed)
(2) Output at Standard	- Wages of Time Rate plus Bonus of 20% of the Time Rate
(3) Output at Above Standard	- High Piece Rate on worker's output

Illustration: 3

From the following particulars, calculate total earnings of each worker under Gantt's Task and Bonus Scheme :

Standard production per week per worker is 2000 units, piece work rate Rs. 5 per unit

Actual production during the month :

A – 1000 units

B – 2000 units

C – 2500 units

Solution:

Standard production per month = 2000 units

Piece work rate = Re. 0.50 per unit

$$\therefore \text{Guaranteed Time Rate} = \frac{2000}{0.50} = \text{Rs. 4000 per month}$$

Level of Efficiency:

Standard output per month = 2000 units

(100% efficiency)

A's actual production = 1000 units

$$\text{A's level of efficiency} = \frac{1000}{2000} \times 100 = 50 \%$$

B's actual production = 2000 units

$$\text{B's level of efficiency} = \frac{2000}{2000} \times 100 = 100 \%$$

C's actual production = 2500 units

$$\text{A's level of efficiency} = \frac{2500}{2000} \times 100 = 125 \%$$

Earnings:

Under Gantt's Task and Bonus Plan wages are computed as follows :

<i>Output</i>	-	<i>Rate</i>
Below Standard	-	Guaranteed Time Wages
At Standard	-	Given piece wages plus bonus of 20%
Above Standard	-	High piece rate on worker's whole output.

The earnings of the worker will be as follows :

$$\begin{aligned} \text{A (50\% below the standard)} &= \text{Rs. 4000 (Guaranteed monthly wages)} \\ \text{B (100\% efficiency)} &= 2000 \text{ units} \times \text{Re. 0.50 per unit} + \text{Bonus of 20\%} \\ &= \text{Rs. 1000} + 20\% \text{ of Rs. 1000} \\ &= \text{Rs. 1000} + 200 = \text{Rs. 1200} \\ \text{C (125\% efficiency above standard)} &= 2500 \text{ units} \times \text{Re. 0.50} + \text{Bonus of 20\%} \\ &= \text{Rs. 1250} + 20\% \text{ of Rs. 1250} \\ &= \text{Rs. 1500} \end{aligned}$$

Bonus or Incentives Schemes

Incentive schemes of wage payment are also known as Premium Bonus Plans. introduced in order to increase production with ensuring proper industrial climate. Wage incentive plans may be of two types : (1) Individual Incentive Plans and (2) Group Incentive Plans. Under individual incentive plans, remuneration can be measured on the performance of the individual worker. In the case of the group incentive scheme earnings can be measured on the basis of the productivity of the group of workers or entire work force of the organization. Various types of incentive schemes are combinations of time and piece rate systems. The following are the important individual incentive plans discussed below :

(1) **Halsey Premium Plan:** This Plan was developed by F. A. Halsey. This system also termed as Split Bonus Plan or Fifty-Fifty Plan. Under this plan, standard time is fixed for each job or operation on the basis of past performance. If a worker completes his job within or more than the standard time then the worker is paid a guaranteed time wage. If a worker completes his job within or less than the standard time, then he gets a bonus of 50% of the time saved plus normal earnings. Under this method, the total earnings is calculated as follows :

$$\begin{aligned} \text{Total Earning} &= \text{Guaranteed Time Wages} + \text{Bonus of 50\% of Time Saved} \\ &\quad (\text{or}) \\ \text{Total Earnings} &= T \times R + 50\% (S - T) R \end{aligned}$$

Where

T – Time Taken

R – Hourly Rate

S – Standard Time

$$\therefore \text{Total Earnings} = \text{Time Taken} \times \text{Hourly Rate} + \frac{50}{100} (\text{Time Saved} \times \text{Hourly Rate})$$

Illustration: 4

Calculate the total earnings of the worker under Halsey Premium Plans:

Standard Time 12 hours
Hourly Rate Rs. 3
Time Taken 8 hours

Solution:

Earnings under Halsey Premium Plan:

$$\begin{aligned} \text{Standard Time} &= 12 \text{ hours} \\ \text{Time Taken} &= 8 \text{ hours} \\ \text{Time Saved} &= \text{Standard Time} - \text{Time Taken} \\ &= 12 - 8 = 4 \text{ hours} \\ \text{Rate per hour} &= \text{Rs. 3} \\ \text{Total Earnings} &= T \times R + 50\% (S - T) R \\ &= 8 \times 3 + \frac{50}{100} (4 \times 3) \\ &= 24 + 6 = \text{Rs. 30} \\ \text{Total Earnings} &= \text{Rs. 30} \end{aligned}$$

Merits

- (1) It is simple to understand.
- (2) Total earnings of each worker can be easy to calculate.
- (3) Both employer and employee get equal benefit of time saved.
- (4) This system not only benefits efficient worker but also provides average worker to get guaranteed minimum wages.
- (5) This system is based on time saved and it can reduce the labour cost.

Demerits

- (1) Lack of co-operation among the employees.
- (2) Under this system establishment of standard is very difficult.
- (3) Earning are reduced at high level of efficiency.

(2) **The Halsey-Weir Scheme:** Under this system, the worker gets the bonus of 30% of the time saved instead of 50% of time saved under Halsey Plan. Except for this, Halsey Plan and Halsey-Weir Systems are similar in all other respects.

Illustration: 5

From the following particulars calculate total earnings of a worker under Halsey-Weir Plan :

Standard Time	=	10 hours
Time Taken	=	8 hours
Hourly Rate	=	Rs.2 per hour

Solution:

Earnings Under Halsey-Weir Premium Plan :

Standard Time	=	10 hours
Time Taken	=	8 hours
Time Saved	=	Standard Time – Time Taken 10 – 8 = 2 hours
Rate per hour	=	Rs. 2
Total earnings	=	$T \times R + 30 \% (S - T) R$
	=	$8 \times 2 + \frac{30}{100} (10 - 8) \times 2$
	=	16 + 1.20
Total Earnings	=	Rs. 17.20

(3) **Rowan Plan:** This plan was introduced by James Rowan of England. It was similar to the Halsey Plan in many respects except that it differs in calculation of bonus. Under this system, bonus is determined as the proportion of the time taken which the time saved bears to the standard time allowed. Under this system the following formula is applied to calculation of bonus :

$$\text{Bonus} = \frac{\text{Time Saved}}{\text{Standard Time}} \times \text{Time Wages}$$

$$\text{Total Earnings} = \frac{\text{Time Taken}}{\text{Taken}} \times \text{Hourly Rate} + \frac{\text{Time Saved}}{\text{Standard Time}} \times T \times R$$

$$\begin{aligned}\text{Time Saved} &= \text{Standard Time} - \text{Time Taken} \\ \text{Time Wages} &= \text{Time Taken} \times \text{Hourly Rate}\end{aligned}$$

Illustration: 6

From the following information, calculate total earnings of a worker under Rowan System :

$$\begin{aligned}\text{Standard Time} &= 10 \text{ hours} \\ \text{Time Taken} &= 8 \text{ hours} \\ \text{Rate per hour} &= \text{Rs. } 3\end{aligned}$$

Solution:

Calculation of total earnings under Rowan Plan :

$$\begin{aligned}\text{Standard Time} &= 10 \text{ hours} \\ \text{Time Taken} &= 8 \text{ hours} \\ \text{Time Saved} &= \text{Standard Time} - \text{Time Taken} \\ &= 10 - 8 = 2 \text{ hours} \\ \text{Rate per hour} &= \text{Rs. } 3 \text{ per hour} \\ \text{Total Earnings} &= T \times R + \frac{\text{Time Saved}}{\text{Standard Time}} \times T \times R \\ &= 8 \times 3 + \frac{2}{10} \times 8 \times 3 \\ &= 24 + 4.8 = \text{Rs. } 28.8\end{aligned}$$

Illustration: 7

Calculate the earnings of a worker under (a) Halsey Premium Plan and (b) Rowan Premium Plan :

$$\begin{aligned}\text{Time Allowed or Standard Time} &= 56 \text{ hours} \\ \text{Time Taken} &= 48 \text{ hours} \\ \text{Rate per hour} &= \text{Rs. } 2\end{aligned}$$

Solution:

(a) Earning under Halsey Premium Plan:

$$\begin{aligned}\text{Standard Time} &= 56 \text{ hours} \\ \text{Time Taken} &= 48 \text{ hours} \\ \text{Hourly Rate} &= \text{Rs. } 2 \\ \text{Time Saved} &= 56 - 48 \\ &= 8 \text{ hours} \\ \text{Total Earnings} &= T \times R + \frac{50}{100} (S - T) R \\ &= 48 \times 2 + \frac{50}{100} (56 - 48) 2 \\ &= 96 + \frac{50}{100} (8 \times 2) \\ &= 96 + 8 = \text{Rs. } 104\end{aligned}$$

$$\begin{aligned}
 \text{Total Earnings} &= T \times R + \frac{S - T}{S} \times T \times R \\
 &= 48 \times 2 + \frac{56 - 48}{56} \times 48 \times 2 \\
 &= 96 + \frac{8}{56} \times 96 \\
 &= 96 + 13.71 \\
 &= \text{Rs. } 109.7
 \end{aligned}$$

[Ans : (a) Earning under Halsey plan = Rs. 104

(b) Earnings under Rowan Plan = Rs. 109.71]

Illustration: 8

The finished shop of a company employs 60 direct workers. Each worker is paid Rs. 400 as wages per week of 40 hours. When necessary, overtime is worked upto a maximum of 15 hours per week per worker at time rate plus one-half as premium. The current output on an average is 6 units per man hour which may be regarded a standard output. If bonus scheme is introduced, it is expected that the output will increase to 8 units per man hour. The workers will, if necessary, continue to work overtime upto the specified limit although no premium on incentives will be paid.

The company is considering introduction of either Halsey Scheme or Rowan Scheme of wage incentive system. The budgeted weekly output is 19200 units. The selling price is Rs. 11 per unit and the direct material cost is Rs. 8 per unit. The variable overheads amount to Rs. 0.50 per direct labour hour and the fixed overhead is Rs. 9000 per week.

Prepare a statement to show the effect on the company's weekly profit of the proposal to introduce (a) Halsey Scheme, and (b) Rowan Scheme.

Solution:

Total hours 60 workers x 40 = 2400 hours

Output = 8 units per hour

$$\text{Hours required} = \frac{(2400 \times 8)}{8 \text{ hours}} = \frac{19200 \text{ units}}{8 \text{ hours}} = 2400 \text{ hours}$$

$$\text{Standard hours allowed} = \frac{19200 \text{ units}}{6 \text{ hours}} = 3200 \text{ hours}$$

$$\text{Time Saved} = 3200 - 2400 = 800 \text{ hours}$$

$$\text{Rate per hour} = \frac{\text{Rs. } 400}{40 \text{ hours}} = \text{Rs. } 10$$

Bonus

$$\begin{aligned}
 \text{Halsey Scheme} &= 50\% \text{ of Time Saved} \\
 \text{Bonus} &= 50\% \text{ of Time Saved} \\
 &= \frac{800}{2} = 400 \text{ hrs.} \times \text{Rs. } 10 = \text{Rs. } 4000
 \end{aligned}$$

Rowan Scheme

$$\begin{aligned} \text{Bonus} &= \frac{\text{Time Saved}}{\text{Std. Hrs}} \times \text{Actual Hrs.} \times \text{Hourly Rate} \\ &= \frac{800 \text{ hrs.}}{3200 \text{ hrs.}} \times 2400 \text{ hrs.} \times 10 = \text{Rs. } 6000 \end{aligned}$$

Comparative Statement

<i>Particulars</i>	<i>Present Rs.</i>	<i>Halsey Rs.</i>	<i>Rowan Rs.</i>
Sales 19200 units x Rs. 11	2,11,200	2,11,200	2,11,200
Direct Materials (19200 units x Rs. 8)	1,53,600	1,53,600	1,53,600
$\left[\frac{19200 \text{ units}}{6} = 3200 \text{ hrs} \times \text{Rs. } 10 \right]$ $\left[\frac{19200 \text{ units}}{6} = 2400 \text{ hrs} \times \text{Rs. } 10 \right]$	32,000	24,000	24,000
Overtime 800 hrs. x Rs. 5	4,000		
Bonus	—	4,000	6,000
Variable overheads (3200 hrs x Rs. 0.50)	1,600	1,200	1,200
2400 hrs x Rs. 0.50)			
Fixed Overheads	9,000	9,000	9,000
	2,00,200	1,91,800	1,93,800
Profit	11,000	19,400	17,400

(4) Emerson's Efficiency Sharing Plan: Under this plan, earning of a worker is by combining guaranteed day wages with a differential piece rate. Accordingly the level of efficiency is determined on the basis of establishment of standard task for a unit of time. If the level of worker's efficiency reaches 67% the bonus is paid to him at a normal rate. The rate of bonus increases in a given rate as the output increases from 67% to 100% efficiency. Above 100% efficiency, the bonus increases to 20% of the wage earned plus additional bonus of 1% is added for each increase of 1% in efficiency.

Illustration: 9

From the following particulars calculate total earnings of a worker under Emerson's Efficiency Sharing Plan :

Standard output per day of 8 hours is 16 units
Actual output of a worker for 8 hours is 20 units
Rate per hour is Rs. 2.50

Solution:

Calculation of earnings under Emerson's Sharing Plan :

$$\begin{aligned} \text{Level of performance} &= \frac{\text{Actual Output}}{\text{Standard Output}} \times 100 \\ &= \frac{20 \text{ units}}{16 \text{ units}} \times 100 = 125\% \end{aligned}$$

Bonus Payable

At 100% efficiency = 20% of time wages

Further increase of 1% in the bonus is given for every 1% increase in the efficiency.

∴ For next 25% efficiency @ 1% for
each 1% increase in efficiency } = 25% of Time Wages

Total Bonus payable = 45% of Time Wages.

Earning

Time Wages for 8 hours @ Rs. 2.50 per hour = Rs. 20.

Add: 45% bonus of time wages = $\frac{45}{100} \times 20 = \text{Rs. } 9$

Total Earning = Rs. 20 + Rs. 9 = Rs. 29

(5) Barth Variable Sharing Plan: This scheme introduced to attract newly recruited and skilled employees who are motivated to learn work. It provides sufficient incentives to inefficient workers who are motivated to increase productivity. Earning under this method is calculated by applying the following formula:

Earnings = Rate per hour $\times \sqrt{\text{Standard Time} \times \text{Time Taken}}$

Illustration: 10

From the following particulars calculate earnings of a worker under Brath Variable sharing plan :

Standard Time = 12 hours
Time Taken = 8 hours
Rate per hour = Rs. 5

Solution:

Calculation of earnings under Barth Variable sharing plan :

Earnings = Rate per hour $\times \sqrt{\text{Standard Time} \times \text{Time Taken}}$
= $5 \times \sqrt{12 \times 8}$
= Rs. 48.98

(6) Bedaux Point Premium System: This plan was introduced by Charles E. Bedaux in 1911. Under this plan, standard time fixed for each operation or job is expressed in terms of Bedaux point or 'B.' For example, a standard time of 360 B means the operation or job should be completed within 360 minutes. The chief advantage of this plan is that it can be applied to any kind of a job. Under this system, worker is paid at the time for actual hours worked, and 75% of the wages for the time saved are paid as bonus to the worker and 25% to the foremen, supervisors etc. The following is the formula for calculation of total wages of a worker:

Total earnings = $S \times R + 75\% \text{ of } R (S - T)$

Illustration: 11

From the following particulars, calculate total earnings of a worker under Bedaux Point Premium System :

Standard Time = 360 B
Time Taken = 240 B
Rate per hour = Re. 1

Solution:

Calculation of total earnings under Bedaux Point System :

$$\begin{aligned}
 \text{Standard Time} &= 360 \text{ B's} = \frac{360}{60} \\
 &= 6 \text{ hours} \\
 \text{Time Taken} &= 240 \text{ B's} = \frac{240}{60} \\
 &= 4 \text{ hours} \\
 \text{Rate per hour} &= \text{Re. 1} \\
 \text{Total earnings} &= S \times R + 75\% \text{ of } R (S - T) \\
 &= 360 \times 1 + \frac{75}{100} \times 1 (360 - 240) \\
 &= 360 + \frac{75}{100} \times 120 \\
 &= \text{Rs. } 360 + \text{Rs. } 90 = \text{Rs. } 450
 \end{aligned}$$

(7) Accelerating Premium Bonus Plan: Under this plan, bonus is determined on the basis of time saved unlike a fixed percentage under Halsey Plan and as a decreasing percentage under Rowan Plan. The bonus is paid to workers at an increased rate according to more and more time saved. This provides increasing incentives to efficient workers.

Group or Collective Bonus Plan

The incentive schemes explained so far are applicable to individual performance depending directly on production. However, it is not the individual worker who produce the goods or services (operation) alone but group of several other workers are required to jointly perform a single operation. It is, therefore, essential that a group incentive scheme be introduced. Bonus is calculated for a group incentive scheme. The bonus is calculated for a group of workers and the total amount is distributed among the group of workers on any one of the following basis :

- (a) Equally by all the workers of the group.
- (b) Pro rata on the time rate basis.
- (c) Pre determined percentage basis.
- (d) Specified proportion basis.

Types of Group Incentive Plans

The following are the important types of group incentive bonus plans :

- (1) Budgeted Expenses Bonus Plan
- (2) Priest Man Bonus Plan
- (3) Towne's Gain-sharing Plan
- (4) Scanlon Plan

(1) Budgeted Expenses Bonus Plan: Under this method, bonus is determined on the basis of savings in actual expenditure compared with total budgeted expenditure.

(2) **Priest Man Bonus Plan:** Under this plan, standard performance is fixed by the management and committee of workers. The group of workers get bonus when actual performance exceeds the standard performance irrespective of individual's efficiency or inefficiency.

(3) **Towne's Gain-sharing Plan:** Under this plan, bonus is calculated on the basis of savings in labour cost. The group of workers get bonus when actual costs is less than the standard costs, one-half of the savings is distributed among workers including foremen in proportion with the wages earned.

(4) **Scanlon Plan:** Scanlon Plan is designed with the chief aim of reducing the cost of operations in order to increase the production efficiency. This plan is generally applicable in industries where the operation cost is high. Under this scheme, bonus is determined on the basis of standard costs or wastages and percentage of the reduction in operation cost.

Indirect Monetary Incentives

Incentive schemes are regarded beneficial to both employers and workers. In this regard, under indirect monetary incentives by giving them a share of profit and introducing co-partnership schemes or as they have become partners in the business in order to make a very profitable enterprise.

Profit Sharing: Profit sharing and bonus is also known as Profit sharing bonus. Under this scheme, there is an agreement between the employer and employee by which employee receives a share, fixed in advance of the profits. Accordingly profit sharing bonus refers to the distribution of profit on the basis of a certain percentage of one's monthly earnings. The amount to be distributed depends on the profits earned by an enterprise. The proportion of the profits to be distributed among the employees is determined in advance.

Co-partnership: This system provides not only a worker to become partner in the business but also to share in the profits of the concern. There are different degrees of partnership and share of responsibilities allowed to the workers to take part in its control.

Non-Monetary Incentive Schemes: Under this system, employees are provided better facilities, instead of additional monetary payments. Some of the examples of non-monetary incentives are free education for children, rent free accommodation, medical facilities, canteen facilities, welfare facilities, and entertainment facilities etc.

QUESTIONS

1. What are the important objectives of ideal wage system?
2. Describe the factors to be considered for an ideal wage system.
3. What are the different methods of wage payment?
4. Critically examine the advantages and disadvantages of time wage system.
5. What are the differences between time rate system and piece rate system?
6. What do you understand by piece rate system? Discuss the merit and demerits of piece rate system.
7. What do you understand by Taylor's Differential Piece Rate System? Explain its significance.
8. How are incentive wages calculated under Halsey and Rowan incentive schemes of wage payment?
9. Explain the different types of time rate system.
10. Differentiate between the Differential piece rate system of Taylor and Merrick.
11. What do you understand by Incentive scheme of wage payment?
12. Write short notes on :
 - (a) Halsey Plan. (b) Rowan Plan. (c) Emerson's Efficiency Plan. (d) Halsey-Weir Plan. (e) Gantt Task Bonus Plan. (f) Barth's System.
13. What do you mean by collective bonus plan? Explain the types of group incentive plans.
14. From the following particulars, calculate the earnings of workers X and Y under Piece Rate System and Taylor's Differential piece rate system :

Standard time allowed = 10 units per hour
 Normal time rate per hour = Re.1
 Differential to be applied:
 80% of piece rate when below standard

120% of piece rate at or above standard

In a day of 8 hours X produced 75 units and Y produced 100 units

[Ans : Earning of workers	X	Y
	Rs.	Rs.
Straight piece rate	7.5	10
Taylor's Differential Piece rate	6	12]

15. From the following particulars, calculate total earnings of the worker under Halsey Premium Plan :
- Time allowed for job = 20 hours
 Time taken = 15 hours
 Rate per hour = Rs. 1.50 per hour
 [Ans : Total earning = Rs. 26.25]
16. From the following particulars, calculate total earnings of the worker under Rowan Plan :
- Standard time = 20 hours
 Time taken = 16 hours
 Hourly rate = Rs. 2 per hour
 [Ans : Total earnings = Rs. 38.40]
17. A worker takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by result. His daily rate is 75 paise an hour : the material cost of the product is Rs. 4 and the overheads are recovered at 150% of the total direct wages. Calculate the factory cost of the product under :
- (a) Piece work plan; (b) Rowan plan; and (c) Halsey plan.
 [Ans : Piece work plan = Rs. 20.88
 Rowan plan = Rs. 19
 Halsey plan = Rs. 18.07]
18. A workman's wage for a guaranteed 44 week is Rs. 0.19 per hour. The week time produce of one article is 30 minutes and under incentive scheme the time allowed is increased by 20%. During one week the workman manufactured 100 articles. Calculate his gross wages under each of the following methods of remuneration :
- (1) Time rate
 (2) Piece work with a guaranteed weekly wage
 (3) Rowan premium bonus
 (4) Halsey premium bonus, 50% to workman
 [Ans : (1) Rs. 8.36 (2) Rs. 11.40 (3) Rs. 10.59 (4) Rs. 9.88]
19. An employee working under a bonus scheme saves in a job for which the standard time is 60 hours. Calculate the rate per hour worked and wages payable to a worker if incentive bonus of 10% on the hourly rate is payable when standard time (namely, 100% efficiency) is achieved, and a further incentive bonus of 1% on hourly rate for each 1% in excess of that 100% efficiency is payable.
 Assume that the normal rate payment is Rs. 5 per hour.
 [Ans : Wages payable to workers = Rs. 325]
20. A worker takes hours to complete a job on daily wages and hours on a scheme of payment by results. His day rate is 75 paise an hour, the material cost on the product is Rs. 4 and the overheads are recorded at 150% of the total direct wages. Calculate the factory cast of the product under :
- (a) Piece work plan (b) Rowan plan (c) Halsey plan
 [Ans : Piece work Rs. 15.25 , Halsey Rs. 18.5, Rowan plan Rs. 19.00]
21. Jobs are issued to operation X, to make 89 units to operation Y, to make 204 units, for which a time allowance of 20 standard minutes and 15 standard minutes per units respectively, is credited for every hour saved bonus is paid at 50% of the basic rate which is Rs. 2 per hour for both the employee. The basic working week is 42 hours. Hours in excess are paid at double the normal rate.
 X completes his units in 45 hours and Y completes his units in 39 hours (but works a full week). Due to defective material 6 units of X and 4 units of Y are subsequently scrapped although all units produced are paid for.
 You are required to calculate for each of X and Y:
- (a) The amount of bonus payable
 (b) Total gross wages payable and
 (c) The wages cost per good unit made.
 [Ans: Bonus payable : X Rs. 18; Y Rs. 12
 Gross wages : X Rs. 114; Y Rs. 90
 Wage cost per unit : Y Rs. 62; Rs. 42]
22. From the following informations you are required to calculate the earnings of X, Y, Z and W under Merrick Differential piece rate system.
 Standard production per hour 12 units
 Normal rate per hour Rs 0.60
 X Produced 64 Units

Y	Produced	96	Units
Z	Produced	84	Units
W	Produced	100	Units

[Ans : X – Rs. 38.40; Y – Rs. 13.36; Z – Rs. 5.44; W – Rs. 72]

23. Standard output per day of 8 hour is 16 units, actual output of a worker for 8 hours is 20 units, rate per hour is Rs. 2.50. Calculate the wages payable to the worker according to the Emerson's Efficiency plan.

[Ans : Rs. 29]

24. The standard hours of job is 100 hours. The job has been completed by Gupta in 60 hours, Ram in 70 hours and Kumar in 95 hours. The bonus system applicable to the job is as follows :

Percentage of time

<i>Saved to time allowed</i>	<i>Bonus</i>
Saving up to 10%	10% of time saved
11% to 20%	15% of time saved
21% to 40%	20% of time saved
41% to 100%	25% of time saved

The rate of pay is Re. 1 per hour. Calculate the total earning of each worker and also rate of earning per hour.

[Ans : Total earning Gupta Rs. 68; Ram Rs. 76; Kumar Rs. 95.50, Earnings per hour Rs. 1.13; Rs. 1.08; Rs. 1.00]

25. (1) Calculate the earning of workers P & Q under :

(a) Straight piece rate system and

(b) Taylor's Differential piece rate system from the following details:

Standard time per unit = 12 units

Standard rate per hour = Rs. 60

Differential to be used 80% and 120%.

In a particular day if 8 hours, worker P produced 30 units and worker Q produced 50 units

[Ans : Earnings under straight piece rate system.

Worker P - Rs. 360; Q - Rs. 600.

Earnings under Taylor's Differential piece rate system

Worker P - Rs. 288; Y - Rs. 720]

(2) Calculate the earnings of a worker under :

(a) Halsey premium plan and

(b) Rowan plan

Time allowed - 48 hours

Time taken - 40 hours

Rate per hour - Rs. 1

[Ans : Halsey premium plan Rs. 44; Rowan Scheme Rs. 46.67]

26. From the following data, you are required to calculate the total earnings of a worker under :

(a) Halsey premium plan

Hourly rate - Rs. 3

Standard time - 16 hours

Time taken - 12 hours

(b) Under Halsey-Weir premium plan

Time allowed - 48 hours

Time taken - 40 hours

Rate per hour - Rs. 3

[Ans : (a) Rs. 42 (36 + 6); (b) Rs. 127.2 (120 + 7.2)]

CHAPTER 18

Overheads

Meaning and Definition

Aggregate of all expenses relating to indirect material cost, indirect labour cost and indirect expenses is known as Overhead. Accordingly, all expenses other than direct material cost, direct wages and direct expenses are referred to as overhead.

According to Wheldon, Overhead may be defined as “the cost of indirect material, indirect labour and such other expenses including services as cannot conveniently be charged to a specific unit.”

Blocker and Weltmer define overhead as follows :

“Overhead costs are operating cost of a business enterprise which cannot be traced directly to a particular unit of output. Further such costs are invisible or unaccountable.”

Importance of Overhead Cost

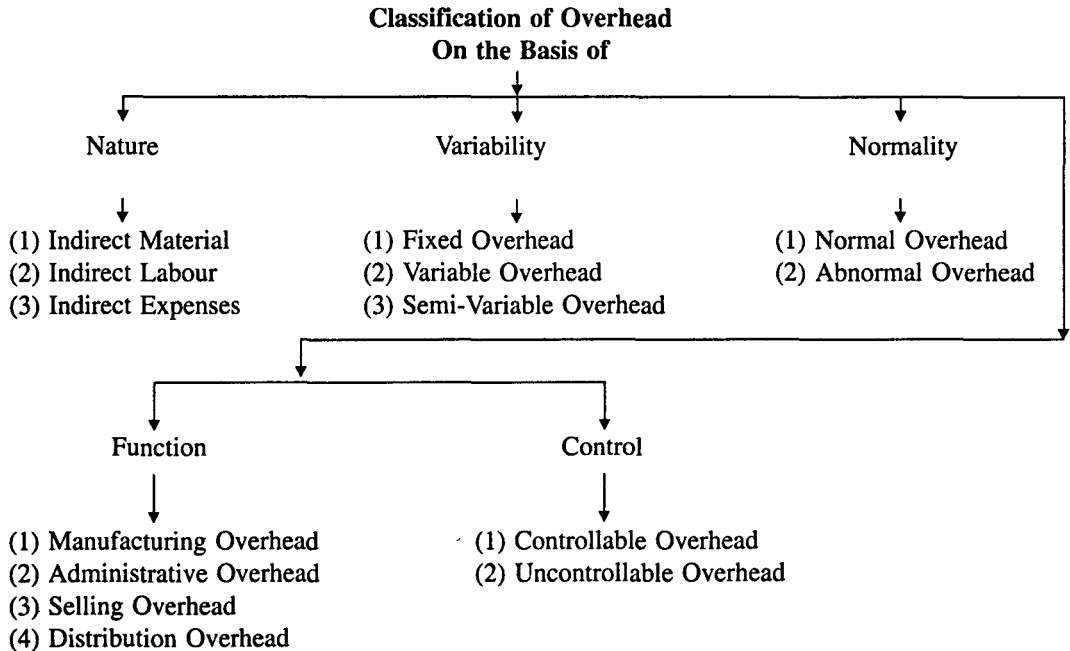
Nowadays business is a dynamic organism. Advancement of technological development and innovation, economic situations and social considerations are the important factors for modernization of industries at mass production to meet its more demand. The overhead charges are heavily increased and they represent major portion of total cost. Therefore, it assumes greater importance for cost control and cost reduction.

Classification of Overheads

Classification of overheads is the process of grouping of costs based on the features and objectives of the business organization. The following are the important methods on which the overheads are classified:

- (a) On the basis of Nature.
- (b) On the basis of Function.
- (c) On the basis of Variability.
- (d) On the basis of Normality.
- (e) On the basis of Control.

The following chart can explain the further classification of overhead :



(1) On the Basis of Nature

One of the important classifications is on the basis of nature or elements. Based on nature the aggregate of all indirect material cost, indirect labour cost and indirect other expenses are known as overheads. Accordingly, overheads are grouped into (a) Indirect Material Cost (b) Indirect Labour Cost and (c) Indirect Expenses.

(a) Indirect Material Cost: Indirect materials do not form part of the finished products. Indirect materials are indirectly or generally used for production which cannot be identified directly. For example, oil, lubricants, cotton waste, tools for repairs and maintenance etc. are indirect materials.

(b) Indirect Labour Cost: Indirect labour is for work in general. The importance of the distribution lies in the fact that whereas direct labour can be identified with and charged to the job, indirect labour cannot be so charged and has, therefore, to be treated as part of the factory overheads to be included in the cost of production. Examples are salaries and wages of supervisors, storekeepers, maintenance labour etc.

(c) Indirect Expenses: Any expenses that are not specifically incurred for or can be readily charged to or identified with a specific job. These are the expenses incurred in general for more than one cost centre. Examples of indirect expenses are rent, insurance, lighting, telephone, stationery expenses etc.

(2) On the Basis of Function

The classification overheads on the basis of the various function of the business concern is known as function wise overheads. Here there are four important functional overheads such as :

- | | |
|-------------------------|-----------------------------|
| (a) Production Overhead | (b) Administration Overhead |
| (c) Selling Overhead | (d) Distribution Overhead |

(a) Production Overhead: Production overhead is also termed as manufacturing overhead or works overhead or factory overhead. It is the aggregate of all indirect expenses which are incurred for work in

operation or factory. These costs are normally incurred during the period when the production process is carried on. For example, factory rent, factory light, power, factory employees' salary, oil, lubrication of plant & machinery, etc.

(b) Administrative Overhead: Administrative expenses are incurred in general for management to discharge its functions of planning organizing, controlling, co-ordination and directing. These expenses are not specifically incurred and cannot be identified with the specific job. It is also termed as office cost. For example, office rent, rates, printing, stationery, postage, telegram, legal expenses etc. are the office and administrative costs.

(c) Selling Overheads: Selling expenses are overheads which are incurred for promoting sales, securing orders, creating demand and retaining customers. For example, salesmen's salaries, advertisement, rent and rates of show room, samples, commission etc.

(d) Distribution Overhead: Distribution overhead are incurred for distribution of products or output from producers to the ultimate consumers. For example, warehouse staff salaries, expenses of delivery van, storage expenses, packing etc.

(3) On the Basis of Variability

One of the important classifications is on the basis of variability. According to this, the expenses can be grouped into (a) Fixed Overhead (b) Variable Overhead and (c) Semi-Variable Overhead.

(a) Fixed Overhead: Fixed cost or overhead incurred remain constant due to change in the volume output or change in the volume of sales. For example, rent and rates of buildings, depreciation of plant, salaries of supervisors etc.

(b) Variable Overhead: Variable overhead may be defined as "they tend to increase or decrease in total amount with changes in the volume of output or volume of sales." Accordingly the change is in direct proportion to output. Indirect materials, Indirect labour, repair and maintenance, power, fuel, lubricants etc. are examples of variable overhead costs.

(c) Semi-Variable Overheads: Semi-variable overheads are incurred with a change in the volume of output or turnover. They neither remain fixed nor do they tend to vary directly with the output. These costs remain fixed upto a certain volume of output but they will vary at other part of activity. Semi-variable overheads are mixed cost, i.e., partly fixed and partly variable. For example, power, repairs and maintenance, depreciation of plant and machinery telephone etc.

(4) On the Basis of Normality

Overheads are classified into normal overheads and abnormal overheads on the basis of normality features. According to this normal overheads are incurred in achieving the target output or fixed plan. On the other hand, abnormal overhead costs are not expected to be incurred at a given level of output in the conditions in which the level of output is normally produced. For example, abnormal idle time, abnormal wastage etc. Such expenses are transferred to Profit and Loss Account.

(5) On the Basis of Control

It is one of important classifications of overhead on the basis of control. Based on control it is grouped into controllable overhead and uncontrollable overhead. Controllable overhead which can be controlled by the action of a specified number of undertaking. For example, idle time, wastages etc. can be controlled. Uncontrollable overheads cannot be controlled by the action of the executive heading the responsibility centre. For example, rent and rates of building cannot be controlled.

Usefulness of Overhead Classification

- (1) It ensures effective cost control.
- (2) It helps the management for effective decision making.
- (3) The application of marginal costing is essentially for profit planning, cost control, decision making etc. are based on the classification of overheads.
- (4) On the basis of classification of fixed and variable cost, flexible budgets are prepared at different levels of activity.
- (5) It facilitates fixing of selling price.
- (6) Cost classification is useful for break-even analysis. Break-even analysis mainly depends on overall cost and profit which can be useful for making or buying decision.
- (7) It helps to find out the unit cost of production.

Codification of Overhead

Codification is a process of representing each item by a number, the digits of which indicate the group, the subgroup, the type and the dimension of the item.

Advantages of Codification

- (1) It enables systematic grouping of similar items and avoids confusion caused by long description of the items.
- (2) It serves as the starting point of implication and standardization.
- (3) It helps in avoiding duplication of items and results in the minimisation of number of items, leading to accurate records.
- (4) It helps in allocation and apportionment of overheads to different cost centres.
- (5) It assists the grouping of overheads for cost control.
- (6) It helps in reducing clerical efforts to the minimum.

Methods of Codification

There are different methods used for codification. The following are the three important methods used :

- (1) Numerical Codes Method.
- (2) Decimal Codes Method.
- (3) Codes with a Combination of Numbers and Alphabets.

(1) **Numerical Method** : Under this method, numerical codes are assigned to each item of expenses. For example,

- 100 Indirect labour.
- 400 Power.
- 500 Maintenance.
- 800 Fixed charges.

(2) **Decimal Codes** : Under this method, the whole numbers are allotted to indicate master group and the decimals indicate the sub-group. For example,

Factory Overheads :

- 1.1.1 Indirect materials.
- 1.1.2 Consumable stores.
- 1.1.3 Lubricating oils.

(3) **Codes with a Combination of Numbers and Alphabet** : Under this method the alphabet indicates the main group and the type of expenses is indicated by the numerical. For example,

- R1 – Repairs to machinery.
- R2 – Repairs to plant.
- R3 – Repairs to furniture.

Procedure or Steps in Overhead

Overheads are incurred for work in general. Overhead is added to the prime cost in order to measure the total cost of production or cost of goods sold. For allocation and apportionment of overhead in the cost of production or cost of goods sold the following procedures are involved :

- (1) Classification of Overhead
- (2) Collection of Overhead
- (3) Overhead Analysis:
 - (a) Distribution of overhead to production and service departments, i.e., Allocation and Apportionment of overhead to cost centre.
 - (b) Re-distribution of overhead from service department to production department, i.e., Allocation and Apportionment of service centres to production centres or departments.
- (4) Absorption of overhead by cost units, i.e., computation of overhead absorption rates.

(1) **Classification Overhead:** We have already discussed the classification of overhead in the preceding pages, and the discussion on other procedures would follow in this chapter and the subsequent one.

(2) **Collection of Overhead:** The production overheads or factory overheads are collected and identified under separate overhead code numbers or standing order numbers. These overheads are collected from different sources and documents. The following are the important sources and documents :

<i>Overhead Expenses</i>		<i>Sources and Documents Used</i>
(1) Indirect Materials	-	Materials Requisition
(2) Power and light	-	Meter Reading
(3) Indirect wages	-	Time Cards, Pay Rolls, Wage Analysis
(4) Salaries	-	Salaries Sheet
(5) Depreciation	-	Plant Register, Machinery Register
(6) Rates	-	Lease
(7) Rates	-	Local Government Assessment
(8) Office Stationery	-	Supplier's Invoices
(9) Postage	-	Postage Book

(3) Overhead Analysis : (a) Allocation and Apportionment of Overhead to Cost Centres

The first step of overhead analysis is distribution of overhead to production department and service department. Before analysing overhead, we should know the concept of Allocation, Absorption and Apportionment.

Allocation: Cost allocation refers to the allotment of whole item of cost to cost centres. The technique of charging the entire overhead expenses to a cost centre is known as cost allocation.

Absorption: Cost absorption refers to the process of absorbing all overhead costs allocated to apportioned over particular cost centre or production department by the unit produced.

Apportionment: Apportionment is the process of distribution factory overheads to cost centres or cost units on an equitable basis. The term apportionment refers to the allotment of expenses which cannot be identified wholly with a particular department. Such expenses require division and apportionment over two or more cost centres in proportion to estimated benefits received.

Allocation Vs Apportionment

- (1) Allocation deals with whole amount of factory overheads while apportionment deals with proportion of item of cost or proportion to cost centres.
- (2) The item of factory overhead directly allocated and identified with specific cost centers. Whereas apportionment requires suitable and equitable basis. For example, factory rent may be allocated to the factory and has to be apportioned among the producing and service departments on an equitable basis.

Basis of Apportionment

Overhead apportionment depends upon matching with principles. Accordingly the basis for apportionment should be related to the basis on which the expenditure is incurred. The following are the usual basis adopted for apportionment of overhead :

Basis of Apportionment

<i>Overhead Cost</i>	<i>Basis of Distribution</i>
(1) Lighting	- No. of light points, floor space or meter reading
(2) Rent, Rates and Taxes	- Floor Area
(3) Insurance of building Depreciation of building, Heating	- Area of floor
(4) Depreciation of plant and Machinery and Equipments	
(5) E S I, Canteen, Safety, compensation, supervision welfare, fringe benefits	- No. of employees
(6) Delivery Van, Internal Transport	- Weight, volume ton
(7) Audit fees	- Sales or Total Cost
(8) Storekeeper's expenses	- Weight, value of materials or Number of requisitions
(9) Power	- H. P. Hours or K.W. Hours

Illustration: 1

A departmental store has several departments. What bases would you recommend for apportioning the following items of expenses to its departments :

- (1) Fire Insurance of building
- (2) Sales commission
- (3) Advertisement
- (4) Salesmen's salaries
- (5) Commission paid to salesmen
- (6) Show room expenses
- (7) Depreciation on plant
- (8) Rent of finished goods, warehouse
- (9) Factory power
- (10) Delivery Van expenses

Solution:

<i>Items</i>	<i>Basis of Apportionment</i>
(1) Fire Insurance Building	- Floor space or Value
(2) Sales Commission	- Sales value
(3) Advertisement	- Sales value
(4) Salesmen's Salaries	- Sales value
(5) Commission paid to Salesmen	- Sales value
(6) Show room expenses	- Sales value or Total cost
(7) Depreciation on plant	- Value of plant
(8) Rent of finished goods warehouse	- Floor space or Area
(9) Factory power	- H.P. Power (or) K.W. hours
(10) Delivery Van expenses	- Weight, Volume

Illustration: 2

A factory has three production departments and two service departments. The following figures have been extracted from the financial books :

	<i>Rs.</i>
Supervision	6,000
Repairs of Plant and Machinery	3,000
Rent	8,000
Light	2,000
Power	3,000
Employer's contribution to ESI	600
Canteen Expenses	1,000

The following further details have been extracted from the books of the respective departments :

<i>Particulars</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
Direct Wages (Rs.)	4,000	3,000	2,000	2,000	1,000
Area of Square feet	2,000	1,000	500	500	100
No. of Employees	50	40	20	20	10
Value of Machinery	10,000	5,000	3,000	3,000	1,000
Light Points	80	60	30	30	20
H.P. of Machines	200	100	50	50	20

Solution:**Primary Overhead Distribution Summary**

Particulars	Basis of Apportionment	Total Rs.	Production Department			Service Dept.	
			Departments			Department	
			A	B	C	D	E
Supervision	No. of Employees 5 : 4 : 2 : 2 : 1	6,000	2,142	1,715	857	857	429
Repairs of Plant and Machinery	Value Machinery 10 : 5 : 3 : 3 : 1	3,000	1,364	681	409	409	137
Rent	Area of square feet 20 : 10 : 5 : 5 : 1	8,000	3,902	1,951	976	976	195
Light	Light points 8 : 6 : 3 : 3 : 2	2,000	727	545	273	273	182
Power	H.P. of Machines 20 : 10 : 5 : 5 : 2	3,000	1,429	714	357	357	143
Employers Contribution to ESI	Direct Wages 4 : 3 : 2 : 2 : 1	600	200	150	100	100	50
Canteen Expenses	No. of Employees 5 : 4 : 2 : 2 : 1	1,000	357	286	143	143	71
Total		23,600	10,121	6,044	3,115	3,115	1,207

(b) Re-apportionment (Re-distribution) : Re-distribution of overhead from various service departments to production departments is known as Re-apportionment or Secondary distribution. Accordingly, allocation and apportionment of overheads from service departments or centres to production centres or departments. The following are the important bases adopted for apportionment of secondary distribution :

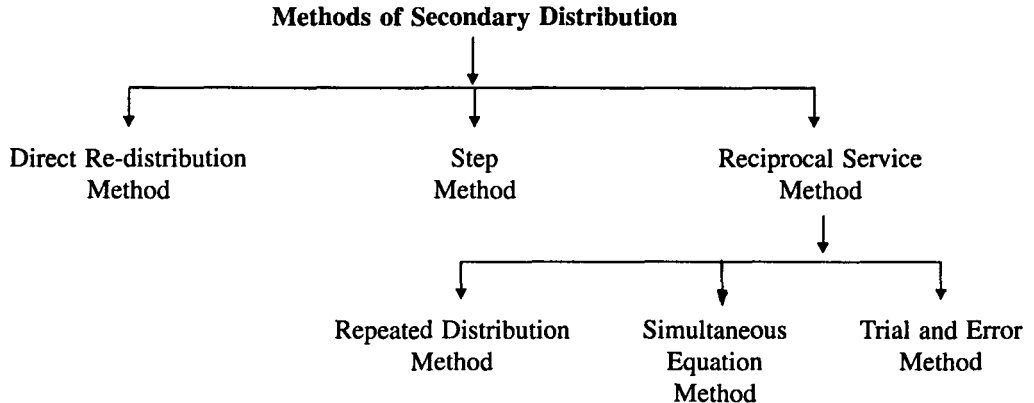
Service Department	Basis of Apportionment
(1) Purchase Department	Number of Purchase Orders or Number of Purchase Requisition or Value of Materials
(2) Maintenance and Repairs Department	Hours worked
(3) Stores Department	No. of Requisition or Value of Materials
(4) Personnel Department (Canteen, Welfare, Medical, Employer's liability)	No. of Employees or Direct wages
(5) Time Keeping Department	No. of Employee or Labour Hours or Direct Wages
(6) Pay roll Department	No. of Employees or Direct Wages
(7) Accounts Department	No. of Employees
(8) Tool Room	Direct Labour Hours or Machine Hours or Direct Wages
Service Department	Basis of Apportionment
(9) Transport Department	Car hours, Truck hours, Tonnage handled
(10) Power House	K.W. Hours
(11) Fire Insurance	Stock Value

Methods of Re-apportionment or Re-distribution

The following are the important methods of re-distribution of service department overheads to production department :

- (1) Direct Re-distribution Method
- (2) Step Distribution Method
- (3) Reciprocal Service Method — this method further grouped into :
 - (a) Repeated Distribution Method
 - (b) Simultaneous Equation Method
 - (c) Trial and Error Method

The following chart explains more about the method of re-apportionment of service department cost :



(1) Direct Re-distribution Method : Under this method, the cost of service department is directed to re-distribution to the production departments without considering the services rendered by one service department to another service department.

Illustration: 3

Ramesh Ltd. has three production departments A, B and C and six service departments. The following figures are extracted from the records of the company :

Production Departmentss

A	Rs. 16,000
B	Rs. 10,000
C	Rs. 12,000
	Rs. 38,000

Service Departments

Stores	Rs. 2,000
Timekeeping	Rs. 3,000
Maintenance	Rs. 1,000
Power	Rs. 2,000
Welfare	Rs. 1,000
Supervision	Rs. 2,000
Total	Rs. 49,000

The other information available in respect of the production departments :

Particulars	Production Departments		
	A	B	C
No. of Employees	40	30	20
No. of Stores Requisition	30	20	10
Horse Power of Machines	500	500	600
Machine Hours	2500	1500	1000

You are required to apportion the costs of various service departments to production departments.

Solution:

Departmental Overhead Re-distribution Summary

Expenses	Basis	Total Rs.	Production Departments		
			A Rs.	B Rs.	C Rs.
As per primary Departmental summary } <u>Service Departments :</u>	—	38,000	16,000	10,000	12,000
Stores	No. of Stores Requisitioned 30 : 20 : 10	2,000	1,000	667	333
Timekeeping	No. of Employees 40 : 30 : 20	3,000	1,333	1,000	667
Maintenance	Machine Hours 25 : 15 : 10	1,000	500	300	200
Power	Horse Power 5 : 5 : 6	2,000	625	625	750
Welfare	No. of Employees 40 : 30 : 20	1,000	445	333	222
Supervision	No. of Employees 40 : 30 : 20	2,000	889	667	444
Total		49,000	20,792	13,592	14,616

(2) Step Method: Under this method the cost of most serviceable department is first distributed to production departments and other service departments. Thereafter, the next service department is distributed and later the last service department until the cost of all the service departments are redistributed to the production department.

Illustration: 4

A manufacturing company has two production departments A and B and three Service Departments — Timekeeping, Stores and Maintenance. The departmental summary showed the following expenses for Dec. 2003.

<i>Production Departments:</i>	Rs.
A	32,000
B	10,000
<i>Service Departments:</i>	
Timekeeping	8,000
Stores	10,000
Maintenance	6,000
Total Overhead Expenses	<u>66,000</u>

The following information about departments is available and is used as a basis for distribution :

Particular	Production Departments		Service Departments		
	A	B	Timekeeping	Stores	Maintenance
No. of Employees	20	15	10	8	5
No. of Stores Requisitions	12	10	—	—	3
Machine Hours	1200	800	—	—	—

You are required to apportion these costs to production departments :

Solution:

Departments	Primary Distribution Rs.				
Timekeeping	8000	(-) 8,000			
Stores	10,000	3,334	(-) 13,334		
Maintenance	6,000	2,500	1,600	(-) 10,100	
A	32,000	1,333	6,400	6,060	45,793
B	10,000	833	5,334	4,040	20,207
Total	66,000				66,000

Basis of Apportionment :

Timekeeping : 20 : 15 : 8 : 5 (No. of Employees)

Stores : 12 : 10 : 3 (No. of Stores Requisition)

Maintenance : 12 : 8 (Machine Hours)

(3) **Reciprocal Service Method** : This method recognizes the fact that if a service department receives services from other department, the services should be charged in the receiving department. Thus, the cost of inter departmental services is taken into account on reciprocal basis. The following are the three important methods available for dealing with reciprocal distribution :

- (a) Simultaneous Equation Method.
- (b) Repeated Distribution Method.
- (c) Trail and Error Method.

(a) **Simultaneous Equation Method**: Under this method, the true cost of total overhead of each service department is ascertained with the help of Simultaneous or Algebraic Equation. The obtained result reapportioned to production department on the basis of given percentage.

(b) **Repeated Distribution Method**: Under this method, the total overhead costs of the service departments are distributed to service and production departments according to given percentage of the service departments are exhausted, in turn repeatedly until the figures become too small to matter.

(c) **Trail and Error Method**: In this method, the cost of a service centre is apportioned to another service centre. Then, the cost of another service centre along with the apportioned cost from the first centre is again apportioned back to the first service centre. This process is repeated till the amount to be apportioned becomes zero or negligible.

Illustration: 5

The following particulars related to a manufacturing company has three production departments : P, Q, : and R and two service departments X and Y :

Production Departments:

P	Rs. 2,000
Q	Rs. 1,500
R	Rs. 1,000

Service Departments:

S	Rs. 500
T	Rs. 400

The service department expenses are charged on a percentage basis as follows :

Service Depts. :	Productions Departments			Service Departments	
	P	Q	R	S	T
S	20%	30%	40%	—	10%
T	30%	30%	20%	20%	—

Prepare a statement showing the distribution of the two service departments expenses to three production departments under (1) Simultaneous Equation Method and (2) Repeated Distribution Method.

Solution:**(1) Simultaneous Equation Method:**

Let X be the total expenses of Departments S

Let Y be the total expenses of Department T

$$X = 500 + 0.20 Y$$

$$Y = 400 + 0.10 X$$

$$X = 500 + 0.20 (400 + 0.10X)$$

$$X = 500 + 80 + 0.02X$$

$$X - 0.02X = 580$$

$$(or) 0.98 X = 580$$

$$\therefore X = \frac{580}{0.98} = 591.83$$

$$Y = 400 + 0.10 (592)$$

$$= 400 + 59$$

$$Y = 459$$

Departmental Overhead Distribution Summary

Particulars	Production Departments			Service Departments	
	P Rs.	Q Rs.	R Rs.	S Rs.	T Rs.
Overhead as per Summary	2,000	1,500	1,000	500	400
Department S	118	178	237	(-) 592	59
Department T	138	137	92	92	(-) 459
Total	2,256	1,815	1,329	—	—

Repeated Distribution Method

<i>Particulars</i>	<i>Production Departments</i>			<i>Service Departments</i>	
	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Total Department overhead as per Primary Distribution	2,000	1,500	1,000	500	400
Service Department S	100	150	200	(–) 500	50
Service Department T	135	135	90	90	(–) 450
Service Department S	18	27	36	(–) 90	9
Service Department T	3	3	3	—	(–) 9
Total	2,256	1,815	1,329	—	—

Illustration: 6

You are supplied with the following information and required to work out the production hour rate of recovery of overhead in Departments X, Y and Z.

<i>Particulars</i>	<i>Total</i>	<i>Production Deptts.</i>			<i>Service Deptts.</i>	
		<i>X</i>	<i>Y</i>	<i>Z</i>	<i>P</i>	<i>Q</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Rent	12,000	2,400	4,800	2,000	2,000	800
Electricity	4,000	800	2,000	500	400	300
Indirect Labour	6,000	1,200	2,000	1,000	800	1,000
Depreciation	5,000	2,500	1,600	200	500	200
Sundries	4,500	910	2,143	847	300	300
Estimated working Hours		1,000	2,500	1,400		

Expenses of Service Department P and Q are apportioned as under :

	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>P</i>	<i>Q</i>
P	30%	40%	20%	-	10%
Q	10%	20%	50%	20%	-

(CA Inter, 2001)

Solution:

Departmental Overhead Distribution Summary

<i>Particulars</i>	<i>Total</i>	<i>Production Deptts.</i>			<i>Service Deptts.</i>	
		<i>X</i>	<i>Y</i>	<i>Z</i>	<i>P</i>	<i>Q</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Rent	12,000	2,400	4,800	2,000	2,000	800
Electricity	4,000	800	2,000	500	400	300
Indirect Labour	6,000	1,200	2,000	1,000	800	1,000
Depreciation	5,000	2,500	1,600	200	500	200
Sundries	4,500	910	2,143	847	300	300
Total	31,500	7,810	12,543	4,547	4,000	2,600

Repeated Distribution Method

Particulars	Total	Production Depts.			Service Depts.	
		X	Y	Z	P	Q
Total Departmental Overheads as per Primary distribution		7,810	12,543	4,574	4,000	2,600
Exp. of P Dept.		1,200	1,600	800	(-4,000)	400
Total Exp. of Q Dept.		9,010	14,143	5,437	-	3,000
Exp. of P Dept.		300	600	1,500	600	(-3000)
Total Exp. of P Dept.		9,310	14,743	6,847	600	-
Exp. of Q Dept.		180	240	120	(-600)	60
Total Exp. of Q Dept.		9,490	14,983	6,967	-	60
Exp. of P Dept.		6	12	30	12	(-60)
Total Exp. of P Dept.		9,496	14,995	6,997	12	-
Exp. of Q Dept.		4	5	3	(-12)	-
Total Working hours	31,500	9,500	15,000	7,000	-	-
Rate per hour		Rs. 9.53	Rs. 6	Rs. 5.00		

(ii) Simultaneous Equations Method

Let p be the expenses of Service Dept. P and

Let q be the expenses of Service Dept. Q

Then $p = 1,000 + \frac{1}{5} q$ (service 20% of q will be apportioned to dept. P) and

$$q = 2,600 + \frac{1}{10} p$$

$$q = 2,600 + \frac{1}{10} (4,000 + \frac{1}{5} q) \text{ (putting the value of p)}$$

$$q = 2,600 + 400 + \frac{1}{50} q$$

$$q = 3,000 + \frac{1}{50} q$$

$$50q = 1,50,000 + q$$

$$49q = 1,50,000$$

$$q = 3,061$$

$$p = 4,000 + \frac{1}{5} (3061) = 4612$$

Departmental Overhead Distribution Summary

	X Rs.	Y Rs.	Z Rs.	P Rs.	Q Rs.
Total (given)	7,810	12,543	4,547	4,000	2,600
Exp. of P Dept. Rs. 4,612	1,384	1,845	922	(-4,612)	461
Exp. of Deptt Q Rs. 3,061	306	612	1,531	612	(-3,061)
	9,500	15,000	7,000		-
Estimated Working Hours	1,000	2,500	1,400		
Rate Per Hour Rs.	9.50	6.00	5.00		

Illustration: 7

RST Ltd. produces machine parts on a job order basis. Most of the business is obtained through bidding. Most of the firms competing with RST Ltd. bid full cost plus a 20% markup. Recently, with the expectation of gaining more sales, RST Ltd. reduced its markup from 25% to 20%. The company operates two service departments and two producing departments. The budgeted costs and the normal levels of activity for each department are given below :

Particulars	Service Department		Production Department	
	A	B	C	D
Overhead Costs	5,00,000	10,00,000	5,00,000	2,50,000
Number of Employees	40	35	150	150
Maintenance Hours	10,000	1,000	32,000	8,000
Machine Hours	—	—	50,000	5,000
Labour Hours	—	—	5,000	50,000

The direct costs of Department A are allocated on the basis of employees; those of Department B are allocated on the basis of maintenance hours. Departmental overhead rates are used to assign costs to products. Department C uses machine hours, and Department D uses labour hours. The firm is preparing to on a job (job Z) that requires three machine hours per unit produced in Department C and no time in Department D. The expected prime cost per unit is Rs. 85.

Required

- (1) Allocate the service costs to the production departments using the direct method.
- (2) What will be the bid for Job Z, if the direct method of allocation is used?
- (3) Allocate the service costs to the production departments using the Sequential or Repeated Method.
- (4) What will be the bid for Job Z, if the Sequential Method is used?
- (5) Allocate the service costs to the production departments using the Reciprocal Method.
- (6) What will be the bid for Job Z, if the Reciprocal Method is used?

(CA Inter., Nov. 2002)

Solution:

(1) Allocation of Service Costs to Production Department (Direct Method)

Particulars	Service Department		Production Department	
	A	B	C	D
Direct Cost (Rs.)	5,00,000	10,00,000	5,00,000	2,50,000
Department A (No. of Employees 1:1)	(5,00,000)	—	2,50,000	2,50,000
Department B (Maintenance hours4:1)	—	(10,00,000)	8,00,000	2,00,000
Total Rs.			15,50,000	7,00,000

$$\begin{aligned} \text{Department C Overhead Rate} &= \frac{\text{Total Cost}}{\text{Machine Hours}} \\ &= \frac{15,50,000}{50,000} = \text{Rs. 31 Per machine hours} \end{aligned}$$

(2) Product Cost and bid price for job Z

	Rs.
Prime Cost	85
Overheads (3 hours x Rs.31 per hour)	93
Total unit cost	Rs. 178

∴ Bid Price [Rs. 178 x 1.2] @ 20% makeup = Rs. 213.60

(3) Statement Showing allocation of Service Cost to Production Department (Sequential method)

<i>Particulars</i>	<i>Service Departments</i>		<i>Production Departments</i>	
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
Over heads	5,00,000	10,00,000	5,00,000	2,50,000
Dept. A Cost allocated				
[No. of Employees]	(5,00,000)	46,667	2,00,000	2,00,000
40 : 35 : 150 : 150]	53,333			
Dept. B Cost allocated		(10,46,667)		
Maintenance Hours	2,05,229	20,523	6,56,732	1,64,183
10 : 1 : 32 : 8				
Dept. A Cost allocated	(2,58,562)			
	27,580	24,132	1,03,425	1,03,425
	8,756	(44,655)	28,019	7,005
Dept. B Cost allocated	(36,336)	875		
	3,876	3,391	14,535	14,534
Dept. A Cost allocated		(4,266)		
	836	84	2,677	669
Dept. B Cost allocated	(4,172)			
	503	440	1,884	1,885
Dept. A Cost allocated		(524)		
	103	10	329	82
Dept. B Cost allocated	(606)			
	65	56	243	242
Dept. A Cost allocated		(66)		
	13	—	41	12
Dept. B Cost allocated	(78)			
Dept A Cost allocated	—	39	39	
Total Costs			15,07,924	7,42,076

$$\begin{aligned} \text{Department C Overhead Rate} &= \frac{\text{Total Cost of Dept. C}}{\text{Machine Hours}} \\ &= \frac{15,07,924}{50,000} = \text{Rs. 30.16 per hour} \end{aligned}$$

(4) Product cost and bid price for job Z

Prime Cost	=	Rs. 85.00
Overheads		
(3 hours x Rs.30.16)	=	Rs. 90.48
Total unit cost	=	Rs. 175.48
Profit @ 20% of 175.48	=	Rs. 35.10
Total	=	<u>Rs. 210.58</u>

(5) Allocation of Service costs to production department (Reciprocal Method)

Working Notes:

Allocation of Ratios

	Proportion of output used by			
	A	B	C	D
'A' (based on number of Employees)	—	10.45%	44.78%	44.78%
'B' (based on maintenance hours)	20%	—	64%	16%

$$A = \text{Rs.}5,00,000 + 20\% \text{ of } B$$

$$B = \text{Rs.}10,00,000 + 10.45\% \text{ of } A$$

$$A = \text{Rs.}5,00,000 + 20\% [10,00,000 + 10.45\% \text{ of } A]$$

$$A = \text{Rs.}5,00,000 + \text{Rs.}2,00,000 + 2.09\% \text{ of } A$$

$$0.9791 A = \text{Rs.}7,00,000$$

$$A = \frac{7,00,000}{0.9791} = \text{Rs.}7,14,942$$

$$\begin{aligned} B &= \text{Rs.}10,00,000 + 10.45\% (7,14,942) \\ &= 10,00,000 + 74,711 \\ &= \text{Rs.}10,74,711 \end{aligned}$$

Statement of allocation of Service Department cost to Production Department

Particulars	A	B	C	D
Direct Cost Dept. B (as per note above)	Rs.5,00,000	Rs.10,00,000	Rs.5,00,000	Rs.2,50,000
Dept. A (as per note above)	(7,14,942)	(10,74,711)	6,87,815 (64%)	1,71,954 (16%)
Total Costs			15,07,966	7,42,105

$$\begin{aligned} \text{Department C Overhead Rate} &= \frac{\text{Total Cost}}{\text{Machine Hours}} \\ &= \frac{15,07,966}{50,000} = \text{Rs. 30.16 per machine hour} \end{aligned}$$

(6) Product cost and Bid price for job Z

$$\begin{aligned} \text{Prime cost Overheads} &= \text{Rs. 85} \\ \text{(3 hours x Rs.30.16 per machine hours)} &= \text{Rs. 90.48} \\ \text{Total unit cost} &= \text{Rs.175.48} \\ \text{Bid Price (Rs.175.48 x 1.20)} &= \text{Rs.210.58} \end{aligned}$$

Illustration: 8

e-books is an online book retailer. The Company has four departments. The two sales departments are Corporate Sales and Consumer Sales. The two support-departments are Administrative (Human resources, Accounting), and Information systems. Each of the sales departments conducts merchandising and marketing operations independently.

The following data are available for October, 2003 :

<i>Departments</i>	<i>Revenues</i>	<i>Number of Employees</i>	<i>Processing Time used (in minutes)</i>
Corporate Sales	Rs. 16,67,750	42	2,400
Consumer Sales	Rs. 8,33,875	28	2,000
Administrative	-	14	400
Information Systems	-	21	1,400

Cost incurred in each of four departments for October, 2003 are as follows:

Corporate Sales	Rs. 12,97,751
Consumers Sales	Rs. 6,36,818
Administrative	Rs. 94,510
Information Systems	Rs. 3,04,720

The company uses number of employees as a basis to allocate Administrative costs and processing time as a basis to allocate Information systems costs.

Required:

- (I) Allocate the support department costs to the sales departments using the direct method.
- (II) Rank the support departments based on percentage of their services rendered to other support departments. Use this ranking to allocate support costs based on the step-down allocation method.
- (III) How could you have ranked the support departments differently?
- (IV) Allocate the support department costs to two sales departments using the reciprocal allocation method.

(CA PE II, Nov., 2003)

Solution:

(i) Direct and step-down allocation

	(i) Support Departments		(ii) Operating Departments	
	Admn.	Information Systems	Corporate	Consumer
	Rs.	Rs.	Rs.	Rs.
Costs incurred	94,510	3,04,720	12,97,750	6,36,818
Allocation of Admn. (42/70,28/70)	(94,510)		56,706	37,804
Allocation of Information Systems (24/44,20/44)		(3,04,720)	<u>1,66,211</u>	<u>1,38,509</u>
			15,20,667	8,13,131

(ii) Rank on percentage of services rendered to other support departments.

Administration provides 23.077% of its services to information systems

$$= \frac{21}{42+28+21} = \frac{21}{91} = 23.077\%$$

Information system provides 8.333% of its services to administrative department.

$$= \frac{400}{2,400+2,000+400} \times 100 = \frac{400}{4800} \times 100 = 8.33\%$$

Thus 23.07% of Rs. 94,510 Admn. Dept costs is = Rs. 21,810

Thus 8.33% of Rs. 3,04,720 Information systems dept. cost is Rs. 25,392

	(i) Support Departments		(ii) Operating Departments	
	Admn.	Information Systems	Corporate	Consumer
	Rs.	Rs.	Rs.	Rs.
Costs incurred	94,510	3,04,720	12,97,750	6,36,818
Allocation of Admn. } (42/70,28/70)	(94,510)	21,810	43,620	29,080
Allocation of } Information Systems (24/44,20/44)		3,26,530 (3,26,530)	<u>1,78,107</u>	<u>1,48,423</u>
			Rs. 15,19,477	Rs. 8,14,321

(iii) An alternative + ranking is based on the Re-amount of services rendered to other service departments, using the numbers from requirement 2, this approach would use the following sequence.

- Allocation of information systems overheads first (Rs. 25,383 provided to administrative).
- Allocated administrative overheads second (Rs. 21,810 provided to information systems).

- (iv) Administrative (AD) = Rs.94,510 + 0.08333 IS
 Information Services (IS) = Rs.3,04,720 + 0.23077 AD
 AD = 94,510 + 0.08333 {3,04,720 + 0.23077 AD}
 AD = 94,510 + 25,392.32 + 0.01923 AD
 0.98077 AD = 1,19,902.32
 AD = Rs. 1,22,253
 IS = Rs. 3,04,720 + 0.23077 x 1,22,253
 = Rs. 3,32,932

	(i) Support Departments		(ii) Operating Departments	
	Admn. Rs.	Information Systems Rs.	Corporate Rs.	Consumer Rs.
Costs incurred	94,510	3,04,720	12,97,750	6,36,818
Allocation of Admn. (42/70,28/70)	(1,22,253)	28,212	56,424	37,616
Allocation of Information Systems (24/44,20/44)	27,744	(3,32,932)	1,66,466	1,38,722
			15,20,640	8,13,156

QUESTIONS

- What do you understand by overhead charges?
- "Overheads may be classified according to their nature and a number of other characteristics." Discuss this statement while classifying cost.
- Define overhead charges. Explain the different methods of classification of overhead.
- Discuss the usefulness of overhead classification.
- What do you understand by codification of overhead charges?
- Discuss in brief the different methods used in codification of overhead.
- What is meant by allocation and apportionment? Distinguish between allocation and apportionment of overhead.
- What basis you would adopt for apportionment of the following items of overhead expenses to different departments?
 (a) Power and light. (b) Depreciation on building. (c) Rent and Rates. (d) Postage. (e) Indirect Wages.
- Explain the different methods of re-apportionment of overheads.
- The following particulars were obtained from the books of a light Engineering Company for the half year ended 30th September, 2003. Calculate the departmental overhead rate for each of the production departments assuming the overheads are recovered as a percentage of direct wages.

Particulars	Production Departments			Service Departments	
	A Rs.	B Rs.	C Rs.	X Rs.	Y Rs.
Direct wages	7,000	6,000	5,000	1,000	1,000
Direct materials	3,000	2,500	2,000	1,500	1,000
Employees	200	150	150	50	50
Electricity	8,000	6,000	6,000	2,000	3,000
Light points	10	15	15	5	5
Assets value	50,000	30,000	20,000	10,000	10,000
Area occupied	800	600	600	200	200

The expenses for 6 months were :

Stores overhead	Rs. 400	Depreciation	Rs. 6,000
Motive power	Rs. 1500	Repairs & Maintenance	Rs. 1,200
Electric lighting	200	General overheads	Rs. 10,000
Labour welfare	Rs. 3000	Rent and Taxes	Rs. 600

Apportion the expenses of Department X in the ratio of 4 : 3 : 3 and that of department Y, in proportion of direct wages, to departments A, B, and C respectively.

[Ans : Total overheads cost : A – Rs.11396, B – Rs.8663, C – Rs.7341

Dept. overhead rate : A – 162.8%, B – 144.4%, C – 146.8%]

11. A company has three departments A, B, and C and two service departments X and Y. The expenses incurred by them during the month of may 2003 are incurred by them during the month of may 2003 are :

A – 8000

B – 7000

C – 5000

X – 2340

Y – 3000

The expenses of service departments are apportioned to the production departments in the following basis :

Particulars	A	B	C	X	Y
Expenses of X	20%	40%	30%	—	10%
Expenses of Y	40%	20%	20%	20%	—

Show clearly as to how the expenses of X and Y departments would be apportioned to A, B and C departments under Simultaneous Equitation Method

[Ans : Total cost of service department X = Rs. 3000

Total cost of service department Y = Rs. 3300]

12. You are supplied with the following information and required to work out the production hour rate of recovery of overheads A, B, and C under the Repeated Distribution Method.

	Production Departments			Service Departments	
	A	B	C	P	Q
	Rs.	Rs.	Rs.	Rs.	Rs.
As per primary Distribution summary	7,810	12,543	4,547	4,000	2,600

Expenses of service departments P and Q are apportioned as under :

	A	B	C	P	Q
P	30%	40%	20%	—	10%
Q	10%	20%	50%	20%	—

Estimated working hours of production are as under :

Departments :

A – 1,000 hours

B – 2,500 hours

C – 1,400 hours

[Ans : Total Overhead cost of

Dept. A – Rs. 9,500

Dept. B – Rs. 1,5000

Dept. C – Rs. 7,000

Overhead Rate : A – Rs. 9.50; B – Rs. 6; C – Rs. 5]

13. A factory consists of three Production Departments, viz., Turning, Milling and Grinding. Though maintenance is done by the departments, the factory keeps four service departments too, viz., Stores, Planning, Canteen and Time Office. For the month of November 2003 the Direct Departmental Expenses were recorded as follows:

Turning	Rs. 72,000	Stores	Rs. 36,000
Milling	Rs. 84,000	Planning	Rs. 60,000
Grinding	Rs. 1,08,000	Canteen	Rs. 48,000
		Time Office	Rs. 12,000

The expenses of stores are to be distributed on a percentage basis, viz., 20%, 40% to Turning, Milling and Grinding respectively. The expenses of Planning are to be apportioned on the basis of Machine Hours worked and those of Canteen and Time Office according to number of men employed in Production Departments.

Men employed	No. of hours worked	
22	10,000	Turning
32	15,000	Milling
46	25,000	Grinding

Prepare a statement showing the distribution of the Service Department's Expenses to the Production Departments and also determine the final absorption rate.

[Ans: Total of Turning Rs. 1,04,400; Milling Rs. 1,35,600; Grinding Rs. 1,80,000; Absorption rate per hour 10.44:9.04 and 7.20]

14. The following particulars relate to a manufacturing company which has three production departments, A, B, C and two service departments X and Y :

	Departments				
	A	B	C	X	Y
Total departmental Overhead as primary distribution	Rs. 63,000	74,000	28,000	45,000	20,000

The company decided to charge the service departments cost on the basis of the following percentages :

	Production Depts.			Service Dept.	
	A	B	C	X	Y
X	40%	30%	20%	-	10%
Y	30%	30%	29%	20%	-

Find the total overheads of production departments charging service departmental costs to production on the repeated distribution method.

[Ans : A Rs. 90,500; B Rs. 96,500; C Rs. 43,000]

15. In a factory, there are two service departments P and Q and three production departments A, B and C. In April 1988 the departmental expenses were :

Departments	Rs.
A	6,50,000
B	6,00,000
C	5,00,000
P	1,20,000
Q	1,00,000

The service departments, expenses are allocated on a percentage basis as follows :

Service Dept.	Production Depts.			Service Dept.	
	A	B	C	X	Y
X	30%	40%	15%	-	15%
Y	40%	30%	25%	5%	-

Prepare a statement showing the distribution of the two service departments expenses to the three departments under the "Repeated Distribution Method."

[Ans : Rs. 7,35,340; Rs. 6,86,045; Rs. 5,48,615]

16. A manufacturing concern has three production departments and two service departments. In July 2003, the departmental expenses were as follows :

Production Departments	Rs.
X	16,000
Y	13,000
Z	14,000
Service Departments	Rs.
P	4,000
Q	6,000

The service department expenses are charged out on a percentage basis, viz. :

	X	Y	Z	P	Q
Expenses of dept. P	20%	25%	35%	-	20%
Expenses of dept. Q	25%	25%	40%	10%	-

Prepare a statement of secondary distribution under repeated distribution method.

[Ans : Total Cost of Dept. X Rs. 18,674; Dept. Y Rs. 15,908; Dept. Z Rs. 18,418]

17. A Company has three production departments and two service departments and distribution summary of overhead is as follows :

Production Departments	Rs.
A	30,000
B	20,000
C	10,000
Service Department	Rs.
X	2,340
Y	3,000

The expenses of service departments are charged on a percentage basis which is as follows :

	A	B	C	X	Y
Service Dept. X	20%	40%	30%	-	10%
Service Dept. Y	40%	20%	20%	20%	-

[Ans : Dept. A Rs. 65,340 ; Dept. B Rs. 31,920; Dept. C Rs. 11,560]

18. In a factory, there are two service departments, P and Q and three production departments A, B and C. In March 2003 the departmental expenses were.

A	Rs .6,50,000	P	Rs. 1,20,000
B	Rs. 6,00,000	Q	Rs. 1,00,000
C	Rs. 5,00,000		

The service department expenses are allocated on a percentage basis as follows .

	X	Y	Z	P	Q
Dept. P	3%	40	15%	-	15%
Dept. Q	40%	30%	25%	5%	-

Prepare Q statement showing the distribution of two service departments expenses to three departments under simultaneous equation method.

[Ans : Dept. A Rs. 7,35,342; Dept. B Rs. 6,86,046 Dept. C Rs. 5,48,612]



CHAPTER 19

Absorption of Overhead

Meaning

Absorption of overhead is also termed as levy, recovery, or application of overhead. Cost absorption refers to the process of absorbing all overhead costs allocated to apportioned over particular cost centre or production department by the unit produced. Accordingly, the distribution of the overhead cost to the cost centres or cost units is known as Overhead Absorption.

Overhead Rate

The apportionment of overhead expenses is done by adopting suitable basis such as output, materials, prime cost, labour hours, machine hours etc. In order to determine the absorption of overhead in costs of jobs, products or process, a rate is calculated and it is called as “Overhead Absorption Rate” or “Overhead Rate.” The overhead rate can be calculated as below :

$$\text{Overhead Rate} = \frac{\text{Overhead Expenses}}{\text{Total Quantity or Value}}$$

Different overhead rates are applied based on the features and objectives of the business organization. The following are the important overhead absorption rates generally employed :

- (1) Actual Overhead Rate
- (2) Predetermined Overhead Rate
- (3) Blanket Overhead Rate
- (4) Multiple Overhead Rate
- (5) Normal Overhead Rate
- (6) Supplementary Overhead Rate

Each of the above overhead absorption rates has been explained in the following pages :

(1) Actual Overhead Rate: Actual overhead rate as otherwise called the historical rate. This rate is calculated by dividing the actual overhead absorbed by the actual quantity or value of the base selected for a particular period. Assuming that overhead rate is calculated on monthly basis, the following formula is expressed as :

$$\text{Actual Overhead Rate} = \frac{\text{Actual Overhead during the month}}{\text{Actual Quantity or Value of the base for the month}} \times 100$$

(2) Predetermined Overhead Rate: Predetermined overhead rate is determined in advance of actual production and the rate is computed by dividing the budgeted overhead for the accounting period by the budgeted base for the period. The formula is :

$$\text{Pre-determined Overhead Rate} = \frac{\text{Budgeted Overheads for the Period}}{\text{Budgeted Base for the Period}} \times 100$$

(3) Blanket Overhead Rate: Blanket overhead rate is also termed as Single Overhead Rate. A single overhead rate when computed for the entire factory is known as Blanket Rate. It is calculated as :

$$\text{Blanket Rate} = \frac{\text{Overhead of Entire Factory}}{\text{Total Quantum of the Base Selected}}$$

Single rate may be applied suitably in small concerns and only where a single product is manufactured.

(4) Multiple Overhead Rate: Multiple overhead rates involve computation of separate rates for each production department, service department, cost centre, each product or line and for each production factor. The following formula is used for calculating multiple overhead rate :

$$\text{Multiple Overhead Rate} = \frac{\text{Overhead Cost Allocated and Apportioned to Each Cost Centre}}{\text{Corresponding Base}}$$

(5) Normal Overhead Rate: Normal Overhead Rate is a predetermined rate calculated with reference to normal capacity. It is calculated as :

$$\text{Normal Overhead Rate} = \frac{\text{Normal Overhead}}{\text{Base at Normal Capacity}}$$

(6) Supplementary Overhead Rates: These rates used to carryout adjustment between overhead absorbed and overhead incurred. These are used in addition to some other rates and is calculated as under:

$$\text{Supplementary Overhead Rate} = \frac{\text{Actual Overhead Incurred} - \text{Absorbed Overhead}}{\text{Base Unit or Hours}}$$

Methods of Absorption of Overhead

There are number of methods applicable for computing overhead absorption rate. The following are the various methods of absorbing "Manufacturing Overhead" depending upon the suitable basis selected for the purpose :

- (1) Direct Material Cost Method
- (2) Direct Labour Cost Method
- (3) Direct Labour Hours Method
- (4) Prime Cost Method
- (5) Unit of Output Method
- (6) Machine Hour Rate Method

(1) Direct Material Cost Method: Under this method, the rate of absorption is calculated on the basis of direct material cost method. The rate of manufacturing overhead absorption is determined by dividing the manufacturing overhead by the direct material cost. The result obtained the rate of absorption is expressed as percentage. Thus, the overhead rate is calculated by the following formula :

$$\text{Direct Material Percentage Rate} = \frac{\text{Factory Overheads}}{\text{Direct Material Cost}} \times 100$$

Example: 1

Manufacturing overhead budgeted for 2003 Rs. 20,000

Cost of direct materials Rs. 80,000

Calculation:

$$\begin{aligned} \text{Direct Material Percentage Rate} &= \frac{20,000}{80,000} \times 100 \\ &= 25\% \end{aligned}$$

(2) Direct Labour Cost Method: Direct Labour Cost Method is also termed as Direct Wages Method. Under this method direct wage rate can be determined by dividing the estimated factory overhead cost apportioned by the predetermined direct wages, and the result obtained is expressed as a percentage. The following formula for calculating the percentage rate is :

$$\text{Percentage of Direct Labour Rate} = \frac{\text{Factory Overhead}}{\text{Direct Wages}} \times 100$$

Example: 2

Direct Wages paid in factory during the year 2003, Rs. 10,000

Factory overhead during that the period was Rs. 4,000

$$\text{Direct Labour Percentage Rate} = \frac{4,000}{10,000} \times 100 = 40\%$$

(3) Direct Labour Hours Method: Under this method the rate is determined by dividing the production overheads by direct labour hours of each department. This method is designed to overcome the objections of direct labour cost method. This method is most suitable in such industries where the production is carried out manually or by skilled labours. Thus, the direct labour hour rate will be calculated by applying the following formula :

$$\text{Direct Labour Hour Rate} = \frac{\text{Factory Overhead}}{\text{Direct Labour Hours}}$$

(4) Prime Cost Method: Under this method, both direct material cost and direct labour cost are taken into account for determination of recovery rate. The actual or predetermined rate of factory absorption is computed by dividing actual or budgeted overhead expenses by the aggregate of direct material or direct labour cost of the department. The following formula is used for calculation of overhead recovery rate :

$$\text{Overhead Recovery Rate} = \frac{\text{Factory Overhead}}{\text{Prime Cost}} \times 100$$

Illustration: 3

You are required to find out (1) Direct Material Cost Rate (2) Direct Labour Cost Rate (3) Direct Labour Hours and (4) Prime Cost Rate from the following particulars :

Total overhead for the period	Rs. 25,000
Total direct labour cost (Direct wages)	Rs. 8,000
Total materials used or Direct material cost	Rs. 10,000
Total direct labour hours	Rs. 2,000

Solution:

$$\begin{aligned} \text{(1) Direct Material Cost Rate} &= \frac{\text{Factory Overhead}}{\text{Direct Material Cost}} \times 100 \\ &= \frac{25000}{10000} \times 100 = 250\% \end{aligned}$$

$$\begin{aligned} \text{(2) Direct Labour Cost Rate} &= \frac{\text{Factory Overhead}}{\text{Direct Wages}} \times 100 \\ &= \frac{25000}{8000} \times 100 = 312.5\% \end{aligned}$$

$$\begin{aligned} \text{(3) Direct Labour Hours Rate} &= \frac{\text{Factory Overhead}}{\text{Direct Labour Hours}} \times 100 \\ &= \frac{25000}{2000} \times 100 = \text{Rs.}12.5\% \end{aligned}$$

$$\begin{aligned} \text{(4) Prime Cost Rate} &= \frac{\text{Factory Overhead}}{\text{Prime Cost}} \times 100 \\ &= \frac{25000}{10000 + 8000} \times 100 \\ &= \frac{25000}{18000} \times 100 = 138.88\% \end{aligned}$$

Illustration: 4

The following figures have been extracted from the books of a manufacturing concern. All jobs pass through the company's two departments :

	<i>Prod. Dept.</i> Rs.	<i>Finishing Dept.</i> Rs.
Direct materials used	6,000	500
Direct labour cost	3,000	1,500
Factory overheads	1,800	1,200
Direct labour hours	12,000	5,000
Machine hours	10,000	2,000

The following information pertains to work order No.555

	<i>Prod. Dept.</i> Rs.	<i>Finishing Dept.</i> Rs.
Direct materials used	240	20
Direct labour cost	130	50
Direct labour hours	530	140
Machine hours	510	50

You are required to prepare a statement showing the different cost results for work order No. 555 under the three commonly used method.

Solution:

$$1. \text{ Direct Labour Cost Rate} = \frac{\text{Factory Overheads}}{\text{Direct Material Cost}} \times 100$$

$$\text{Production Dept.} = \frac{1,800}{3,000} \times 100 = 60\%$$

$$\text{Finishing Dept.} = \frac{1,200}{1,500} \times 100 = 80\%$$

$$2. \text{ Direct Labour Hour Rate} = \frac{\text{Factory Overheads}}{\text{Direct Labour Hours}} \times 100$$

$$\text{Production Dept.} = \frac{1,800}{12,000} = 15 \text{ paise per hour}$$

$$\text{Finishing Dept.} = \frac{1,200}{5,000} = 24 \text{ paise per hour}$$

$$3. \text{ Machine Hour Rate} = \frac{\text{Factory Overheads}}{\text{Machine Hours}}$$

$$\text{Production Dept.} = \frac{1,800}{10,000} = 18 \text{ paise per hour}$$

$$\text{Finishing Dept.} = \frac{1,200}{2,000} = 60 \text{ paise per hour}$$

Comparative Statement of Work Order No. 555

Particulars	Labour Cost		Labour Hour Method		Machine Hour Method	
	Prod. Dept. Rs.	Finish Dept. Rs.	Prod. Dept. Rs.	Finish Dept. Rs.	Prod. Dept. Rs.	Finish Dept. Rs.
Materials used	240	20	240	20	240	20
Direct labour	130	50	130	50	130	50
Prime Cost	370	70	370	70	370	70
Factory Overheads	78	40				
(i) Direct Labour Cost	$\left[130 \times \frac{60}{100} \right]$	$\left[50 \times \frac{80}{100} \right]$				
(ii) Labour Hours			530 x 15 paise Rs. 79.50	140 x 24 paise Rs. 33.60		
(iii) Mach.Hours					510 x 18 paise Rs. 91.80	50 x 60 paise Rs. 30.00
Total	448	110	449.50	103.60	461.80	100

(5) Unit of Output Method: This method is also termed as Production Unit Method or Cost Unit Rate Method. Under this method absorption rate is determined on the basis of number of units produced is known as Cost Unit Rate. The recovery rate is calculated by dividing the actual or budgeted factory overheads by the number of cost units produced. The formula is :

$$\text{Cost Unit Rate} = \frac{\text{Factory Overhead}}{\text{No. of Units Produced}}$$

This method is most suitable in such industries where the production of same grade is carried out.

(6) Machine Hour Rate: Machine hour rate means the cost or expenses incurred in running a machine for one hour. It is one of the scientific methods of absorbing factory expenses where the process of manufacturing are carried out by machines. Under this method overhead costs are allocated on the basis of the number of hours a machine or machines are used for a particular job. According to the Institute of Cost and Management Accountants, England a machine hour rate is "an actual or predetermined rate of cost apportionment or overhead absorption, which is calculated by dividing the cost to be apportioned or absorbed by the number of machine hours expended or to be expended."

The machine hour rate is determined by dividing the amount of overhead cost to be apportioned or absorbed by the number of machine hours. Machine hour rate can be calculated as below :

$$\text{Machine Hour Rate} = \frac{\text{Factory Overhead}}{\text{Machine Hours}}$$

Calculation Machine Hour Rate : The following steps are required for computing the machine hour rate:

- (1) Identify the overhead expenses relating to a specific machine or group of machine in order to require for computing machine hour rate.

- (2) Each machine or group of machine treated as a cost centre.
- (3) Manufacturing overhead or machine expenses are grouped into two types :
 - (a) Fixed or Standing Charges (b) Variable Machine Expenses.
 - (a) **Fixed or Standing Charges:** Fixed or Standing Charges which remain constant irrespective of the use of machine. For example, rent, insurance charges, rates, supervision etc.
 - (b) **Variable Machine Expenses:** These expenses are variable with use of the machine. For example, power, depreciation, repairs etc.
- (4) An hourly rate of fixed or standing charges will be calculated by totalling of fixed charges and dividing by the number of normal hours worked by machine.
- (5) Normal working hours are calculated by adding the cost relating to non-productive time, i.e., normal ideal time for maintenance and setting up etc.
- (6) Separate hourly rate for each machine expenses will be calculated.
- (7) The total of the standing charges rate and the machine expenses rates per hour will give the machine hour rate.

Basis for Apportionment of Machine Expenses

The following bases of apportionment of different expenses are required to be considered for the calculation of machine hour rate :

<i>Expenses</i>	<i>Basis</i>
Fixed or Standing Expenses :	
(1) Rent and Rates	Floor area occupied by each machine
(2) Heating and Lighting	No. of points used or Floor area or heating any machine
(3) Supervision	Time spent on each machine
(4) Lubricating Oil and Consumable Stores	Machine hours, Past experience or Capital value.
(5) Insurance	Insurance value of each machine.
Machine Expenses :	
1. Depreciation	Value of Machine
2. Power	Horse power of each machine
3. Repairs	Cost of repairs spread over its working life

Advantages

- (1) It helps to measure the relative efficiency of different machines.
- (2) It facilitates comparison of cost of operating different machines.
- (3) It helps to ascertain idle time of machines relating to non-productive time.
- (4) It is the most desirable scientific method, where the time factor is taken into account.

Disadvantages

- (1) It involves more clerical labour in determining the number of machine hours worked.
- (2) It does not consider where the expenses not proportional to the working hours of machines.
- (3) It is very difficult to measure the machine hours where the works are completed without operating any machinery.

Illustration: 5

Calculate machine hour rate of Machine X

	Rs.
Consumable stores	600
Repairs	800
Heat and light	360
Rent	1,200
Insurance of building	4,800
Insurance of machines	800
Depreciation of machines	700
Room services	60
General charges	90
Normal working hours	10,000 hours
Area of sq. fit.	100
Book value of machines	12,000

Solution:**Computation of Machine Hour Rate for Machine X**

<i>Particulars</i>	<i>Total per hour Rs.</i>	<i>Rate per hour Rs.</i>
Standing Charges :		
Consumable stores	600	
Heat and light (360 x 100 / 600)	60	
Rent (1200 x 100 / 600)	200	
Insurance of building (4800 x 100 / 600)	800	
Insurance of Machines (800 x 12000 / 32000)	300	
Room service (60 x 100 / 600)	10	
General charge (90 x 100 / 600)	15	
Total Standing Charges	1,985	
Standing charges per hour $\frac{1,985}{10,000} =$		0.199
Machine Expenses :		
Repairs (800 / 10,000)		0.080
Depreciation of machines (135.48 / 10,000)		0.014
Machine Hour Rate		0.293

Working Notes

- Heat and light, rent, insurance of building, room service and general charges have been distributed on the basis of floor area.
- Depreciation of machine has been calculated on the basis of book value of machines and working hours, i.e., $10,000 \times 12,000$ (or) $120 : 500 = 6 : 25$.
 $\therefore 700 \times \frac{6}{31} = \text{Rs.}135.48$
- Insurance of machine has been apportioned on the basis of book value of machines.

Illustration: 6

Compute the machine hour rate from the following information :

	Rs.
Cost of Machine	1,00,000
Installation charges	10,000
Estimated scrap value after the expiry of its life (15 years)	5,000
Rent and Rates per month	200
General lighting per month	300
Insurance premium for the machine per annum	960
Repairs and maintenance per month	1,000
Power consumption – 10 units per hour	—
Rate per hour 100 units	20
Estimated working hours per annum	2,200
Supervisor's salary per month	600

The machine occupies $\frac{1}{4}$ th of the total area of the shop. The supervisor is expected to devote $\frac{1}{5}$ th of his time for supervising the machine.

Solution:**Computation of Machine Hour Rate**

<i>Particulars</i>	<i>Per annum Rs.</i>	<i>Rate Per hour Rs.</i>
Standing Charges :		
Rent and Rates (200 x 12 x $\frac{1}{4}$)	600	
General lighting (300 x 12 x $\frac{1}{4}$)	900	
Insurance premium	960	
Repairs and Maintenance	1,000	
Supervisor's salary (600 x 12 x $\frac{1}{5}$)	1,440	
Total Standing Charges	4,900	
Standing charges per hour = $\frac{4,900}{2,000}$		2.45
Machine Expenses :		
Depreciation $\frac{(1,00,000+10,000-5,000)}{15 \times 2,000}$		3.50
Power		2.00
Machine Hour Rate		7.95

Illustration: 7

Cost of machine Rs. 1,80,000
 Freight and installation Rs. 20,000
 Working life 10 years
 Working hours 4,000 per year
 Repair charges 50% of depreciation
 Power 10 units per hour @ 10 paise per unit
 Lubricating oil @ Rs. 2 per day of 8 hours
 Consumable stores @ Rs. 10 per day of 8 hours
 Wages of operator @ Rs. 2 per day
 Scrap value of machine Rs. 20,000

Calculate machine hour rate from the above information :

Solution:

Computation of Machine Hour Rate

<i>Particulars</i>	<i>Per day of 8 hours Rs.</i>	<i>Rate Per hour Rs.</i>
Standing Charges :		
Lubricating oil	2	
Consumable stores (10 x Re.1)	10	
Wages of Operator	2	
Standing charges per day	14	
Standing charges per hour $\frac{14}{8}$		1.30
Machine Expenses :		
Depreciation = $\frac{\text{Cost} + \text{Freight} - \text{Scrap value}}{\text{Life in hours}}$		
= $\frac{1,80,000 + 20,000 - 20,000}{4,000 \times 10}$ =		4.50
= $\frac{1,80,000}{40,000}$		
Repairs 50% of depreciation $4.50 \times \frac{50}{100}$ =		2.25
Power 10 units @ Re. 0.10 each 10×0.10 =		1.00
Machine Hour Rate		9.05

Illustration: 8

In a factory, a machine is considered to work for 208 hours in a month. It includes maintenance time of 8 hours and setup time of 20 hours.

The expense data relating to the machine are as under :

Cost of the machine is Rs.5,00,000 Life 10 years

Estimate scrap value at the end of life is Rs. 20,000

Repairs and maintenance per Annum Rs. 60,480

Consumable stores per annum Rs. 47,520

Rent of building per annum (The machine under

Reference occupies 1/6th of the area) Rs. 72,000

Supervisor's salary per month

(Common to three machines) Rs. 6,000

Wages of Operator per month per machine Rs. 2,500

General lighting charges per month allocated to the machine Rs. 1,000

Power 25 units per hour at Rs. 2 per unit

Power is required for productive purposes only. Setup time through productive does not require power. The supervisor and operator are permanent. Repairs and maintenance and consumable stores vary with the running of the machine.

Required:

Calculate Machine Hour Rate for :

- (a) Setup Time and
(b) Running Time. .

Solution:

Effective hours

For fixed costs $208 - 8 = 200$ hoursFor variable costs $208 - 28 = 180$ hours**Computation of Machine Hour Rate**

<i>Particulars</i>	<i>Per month</i> <i>Rs.</i>	<i>Setup time</i> <i>Per hour</i> <i>Rs.</i>	<i>Running time</i> <i>Per hour</i> <i>Rs.</i>
Standing Charges :			
Supervision Rs. $\frac{6000}{3} =$	2,000	$\frac{2000}{200} = 10$	10
General lighting =	1,000	$\frac{1000}{200} = 5$	5
Rent = $\frac{72,000}{12} = \frac{6,000}{6} =$	1,000	$\frac{1000}{200} = 5$	5
Machine Expenses :			
Depreciation = $\frac{5,00,000 - 20,000}{10} = \frac{4,80,000}{10} = \frac{48,000}{12} =$	4,000	$\frac{4000}{200} = 20$	20
Repairs = $\frac{60,480}{12} =$	5,040		$\frac{5040}{180} = 28$
Consumable Stores = $\frac{47,520}{12} =$	3,960		$\frac{3960}{180} = 22$
Power = $25 \times 2 \times 180$	9,000		$\frac{9000}{180} = 50$
Wages	2,500	$\frac{2500}{200} = 12.50$	12.50
Machine Hour Rate		52.50	152.50

Illustration: 9

Calculate the machine hour rate from the following informations :

Cost of machine	Rs. 20,000
Scrap value	Rs. 2,000
Repairs and maintenance per month	Rs. 200
Standing charges per month	Rs. 100

Effective working life 10,000 hours
 Running time per month 200 hours

Power used 5 units at 20 paise a unit per hour.

Solution:**Computation of Machine Hour Rate**

<i>Particulars</i>	<i>Rate Per hour Rs.</i>
Standing Charges :	
Allocated Rs.100 per month of 200 hours	
For 200 hours Rs.100 = $\frac{100}{200}$	0.50
Variable Charges :	
Cost of machine Rs. 20,000	
Less : scrap Rs. 2,000	
Depreciation for 10,000 hours = $\frac{18,000}{10,000}$	1.80
Hence, for one hour = $\frac{18,000}{10,000}$ =	
Repairs and maintenance	
Rs.200 per month of 200 hours } = $\frac{200}{200}$ =	1.00
Power 5 units per hour @ 20 paise	1.00
Machine Hour Rate.	4.30

Illustration: 10

A department is having 3 machines. The figures indicate the departmental expenses. Calculate the machine hour rate in respect of these machines from the informations given below:

	<i>Rs.</i>
Depreciation of machinery	12,000
Depreciation of building	2,880
Repairs to machinery	4,000
Insurance of Machinery	800
Indirect wages	6,000
Power	6,000
Lighting	800
Miscellaneous expenditure	4,200
	<u>36,680</u>

Additional Information

Particulars	Machine A	Machine B	Machine D
Direct Wages	Rs.1,200	2,400	2,400
Power units	30,000	10,000	20,000
No. of workers	4	8	8
Light points	8	24	48
Space	400 sq.fit	800 sq.fit	800 sq.fit
Cost of Machine	Rs.3,00,000	Rs.1,20,000	Rs. 1,80,000
Hours worked	200	300	300

Solution:

Computation of Machine Hours Rate

Expenses	Basis	Total	Machine A	Machine B	Machine C
Depreciation on Machinery]	Machine Value	12,000	6,000	2,400	3,600
Depreciation on Building]	Space	2,880	576	1,152	1,152
Machine Repairs]	Machine Value	4,000	2,000	800	1,200
Insurance	- do -	800	400	160	240
Indirect Wages	No. of workers	6,000	1,200	2,400	2,400
Power	Power units	6,000	3,000	1,000	2,000
Lighting	Light points	800	80	240	480
Miscellaneous Expenses]	Direct wages	4,200	840	1,680	1,680
Total		36,680	14,096	9,832	12,752

Hours worked	200	300	300
Machine hour rate	Rs. 70.48	32.77	42.51

Working Notes :

Basis :

Direct Wages = 12 : 24 : 24 or 1 : 2 : 2

Power units = 3 : 1 : 2

Cost of machine = 30 : 12 : 18

Space = 1 : 2 : 2

Hours worked = 2 : 3 : 3

Light points = 1 : 3 : 6

No. of workers = 1 : 2 : 2

Illustration: 11

From the undernoted data calculate the machine-hour rate of a Mailing Machine.

Cost of Machine	Rs. 30,500	} Estimated life 12 years
Scrap Value	Rs. 2,500	

Effective Work days	200 days of 8 hrs 100 days of 6 hrs
Maintenance & Repairs	7.5% of capital cost
Stores consumed	Rs.1,000
Power Consumption	Rs.2 per operating hour
Insurance Premium	1% of capital cost
Supervision Expenses	Rs.7,500
Idle time estimated	10%

Solution:

Computation of Machine Hour Rate

Effective working days	200 x 8 hours	=	1,600 hours
	100 x 6 hours	=	600
Total			2,200 hours
Less : Idle Time estimated 10%		=	220 hours
Net working hours		=	1,980 hours in a year

Items	Basis of Apportionment	Amount per annum Rs.	Rate per hour Rs.
(A) Standing Charges			
Depreciation	$\frac{30,500 - 2,500}{12}$	= 2,333.33	
Maintenance & Repairs	7.5 of capital cost	= 2,287.40	
Stores consumed	Actuals	= 1,000.00	
Insurance premium	1% of capital cost	= 305.00	
Supervision expenses	Actuals	= 7,500.00	
Total Standing Charges		13,425.83	6.78
(B) Variable cost-power consumption			2.00
Machine hour rate (a + b)			8.78

Illustration: 12

Particulars of three machines used in a factory are as under (six week period; 160 hours working) :

	Machine X Rs.	Machine Y Rs.	Machine Z Rs.
Cost of Machine	10,000	15,000	20,000
No. of workers	2	5	10
Direct wages	Rs. 300	Rs. 800	Rs. 1,200
Power	Rs. 45	Rs. 80	Rs. 150
Light points	2	4	6
Area Occupied 100 sq. ft.		250 sq. ft.	400 sq. ft.

The expenses incurred during the period were as follows :

	Rs.
Power	275
Lighting	48
Rent and Rates	450
Depreciation	1,350
Repairs	1,800
Indirect wages	460
Canteen expenses	51
Sundries	300
Total	<u>4,734</u>

Compute the machine hour rate for each machine.

Solution:

Computation of Machine Hour Rate - 160 working hours

Expenses	Basis of Apportionment	Total Rs.	Machine		
			X Rs.	Y Rs.	Z Rs.
Power	Actuals	275	45	80	150
Lighting	Lighting Points	41	8	16	24
Rent & Rates	Area	450	60	150	240
Depreciation	Cost of Machine	1,350	300	450	600
Repairs	Cost of Machine	1,800	400	600	800
Indirect wages	Direct Wages	460	60	160	240
Canteen exp.	No. of workers	51	6	15	30
Sundries	Area	300	40	100	160
Total	(a)	4,734	919	1,571	2,244
Working hour	(b)		160	160	160
Machine hours rate		$\frac{a}{b}$	= Rs. 5,744	9.819	14.025
	say		Rs. 5.74	9.82	14.03

Under Absorption and Over Absorption of Overheads

Absorption of overhead may be based either on the actual rate or predetermined rate. If the actual rates are used, the costs having been actually incurred and overhead absorbed are equal. But in the case of predetermined rates, the costs have been determined in advance of incurrence of the overhead expenditure. This may lead to difference of overhead incurred and overhead absorbed. Such a difference of Overhead is said to be under absorption of overhead or over absorption of overhead.

According to the term over absorption means that the amount of overhead absorption is more than the actual overhead is said to be over absorption of overhead.

The term under absorption of overhead means that the amount of overhead absorption is less than the actual overhead incurred is said to be under absorption of overhead.

Causes of Under or Overhead Absorption of Overhead

The following reasons for over and under absorption of overheads :

- (1) Actual overhead cost incurred may be more or less than the budgeted overhead.

- (2) Actual machine hours, labour hour and output may be lower or higher than the budgeted or predetermined base.
- (3) Seasonal fluctuations.
- (4) Wrong computation of overhead absorption rate, output and machine hours.
- (5) Under or Over utilization of production capacity.

Methods of Treatment

The following three important methods may be adopted for overhead adjustment and disposal of over or under absorption of overheads :

- (1) Carrying Over of Overheads
- (2) Application or use of supplementary rates
- (3) Write off to Costing Profit and Loss Account.

(1) Carrying Over of Overheads: Under this method, the amount of over or under absorption is carry forward to the next year. This method may be adopted in situation where the normal business cycle extends for more than one year.

(2) Application of Supplementary Rate: Under this method, the supplementary rate is adopted when the amount of under or over absorbed overheads is quite large. Supplementary rate is calculated by dividing the amount of under or over absorbed overheads by the actual base.

$$\text{Supplementary Rate} = \frac{\text{Amount of Under or Over Absorbed Overheads}}{\text{Actual Base}}$$

The supplementary rate may be used as positive supplementary rate or negative supplementary rate. In the case of positive supplementary rate it is intended to add under absorbed overhead to cost of production. A negative rate, however, adjusted the cost by deducting the amount of over absorbed overhead.

(3) Write off to Costing Profit and Loss Account: Under this method, if the amount of under or over absorbed overhead is small it may be written off to Costing Profit and Loss Account. If due to some abnormal factors, the amount of under or over absorbed is large it should be transferred to Profit and Loss Account.

Illustration: 13

In a factory, the overheads of a production department are absorbed on the basis of Rs. 18 per machine hour. The details for the month of October 2002 are as under :

Factory overheads incurred Rs. 16,50,000.

Of the above Rs. 16,50,000

Amount became payable due to an award of labour hour	Rs. 2,50,000
Prior period expenses booked in the month of October 2002	Rs. 1,50,000
Actual Machine hours worked	Rs. 65,000

Actual production was 2,60,000 units, of which 1,95,000 units were sold. On analyzing the reasons it was found that 40% of the under absorbed overheads was due to defective planning and the rest was attributed to normal cost increase.

How would you treat under absorbed overheads in Cost Accounts?

(C A Inter, Nov. 2002)

Solution:**Under absorbed overhead expenses for the month of Oct. 2002**

	Rs.
Total expenses incurred	16,50,000
Less : Amount paid according to labour court award (assumed to be non-recurring)	2,50,000
Prior period expenses	1,50,000
Net overhead expenses incurred for the month	12,50,000
Factory overhead absorbed 6,500 hrs x Rs. 18	11,70,000
Under absorbed overheads	Rs. 80,000

Treatment of under absorbed overheads in cost account :

(1) 40% due to defective planning. This being abnormal should be debited to P & L :

$$= 80,000 \times \frac{40}{100} = \text{Rs. } 32,000$$

(2) Balance 60% should be distributed over finished goods. Inventory and cost of

$$\text{sales by supplementary rate} = 80,000 \times \frac{60}{100} = \text{Rs. } 48,000$$

$$\begin{aligned} \text{Under absorbed overheads in Cost Account} &= \text{Rs. } 32,000 + \text{Rs. } 48,000 \\ &= \text{Rs. } 80,000 \end{aligned}$$

$$\text{Finished goods inventory} = 48000 \times \frac{1}{4} = \text{Rs. } 12,000$$

$$\text{Cost of Sales} = 48000 \times \frac{3}{4} = \text{Rs. } 36,000$$

Illustration: 14

The total overhead expenses of a factory are Rs. 4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at Rs. 1.25 per hour. The actual hours worked were Rs. 2,93,104. How would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were equivalent units in work in progress?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency. Also give the profit implication of the method suggested.

(C A Inter, Nov. 2000)

Solution:

Overhead Recovered from production	Rs.
(Rs. 293104 x 1.25)	= 3,66,380
Actual overhead expenses incurred	= 4,46,380
Amount of under-recovered overhead	= 80,000

50% of the above amount is due to increase in the cost of indirect material and indirect labour and should be charged to units produced by means of a supplementary rate.

No. of total units produced = 7,800 + 200 = 8,000 units

Supplementary rate = 50% of Rs. 80,000 / 8,000 = Rs. 5 per unit

The amount of Rs. 40,000 should be apportioned among cost of sales, finished goods and work in progress at the rate of Rs.5 per unit.

	Rs.
Cost of sales = 7,000 x Rs. 5	= 35,000
Finished goods = 800 x Rs. 5	= 4,000
Work in progress = 200 x Rs. 5	= 1,000
	40,000

By using this method, the profit for the period will be reduced by Rs.35,000 and the value of stock will increase by Rs.5,000.

The balance amount of Rs.40,000 due to factory inefficiency should be charged to Costing Profit and Loss Account as this is abnormal cost for which the production should not be penalized.

Administration, Selling and Distribution Overheads

Administration Overhead: Administrative overhead are incurred in general for management to discharge its functions of planning, organizing, controlling, co-ordination and directing. These expenses are not specifically incurred which cannot be identified with the specific. Thus, the overheads are collected under a standing order number, allocated and apportioned to various cost centres and units.

The administrative overhead is absorbed under any one of the following methods :

- (1) Transferring to Profit and Loss Account
- (2) Apportioning to Works Overheads
- (3) Apportioning to Selling Overheads.

Selling and Distribution Overhead : Selling and distribution expenses are incurred for promoting sales, securing orders, creating demand and distribution of products or output from producers to the ultimate consumers. The incidence of selling and distribution overheads depends on external factors such as distance of market, nature of competition etc. which are beyond the control of management. They are dependent upon customer's behaviour, liking etc. These expenses are the nature of policy costs and hence not amenable to control. The overhead rate of selling and distribution overheads can be determined by anyone of the following basis :

- (a) A rate per article or unit of production
- (b) A percentage on the selling price of each article or production unit
- (c) A percentage on the factory cost.

Treatment of Important Overhead Charges

Expenses on Removal and Reelection of Machine : Such expenses may be incurred due to factors like change in method of production, an addition or alteration in the factory building, change in flow of production. All such expenses are treated as production overheads, when amount of such expense is large, it may be spread over a period of time. If such expenses are incurred due to faulty planning or other abnormal factor, then they may be charged to Costing Profit and Loss Account.

Training Expenses: Training expenses are part of production, administration and selling & distribution overheads based on particular employee posted in the department. If such expenses are huge

due to high labour turnover, such expenses should be excluded from costs and charged to Costing Profit and Loss Account.

Packing Expenses: Cost of primary packing necessary for protecting the product or for convenient handling should become part of prime cost. The cost of packing incurred to facilitate the transportation of the product from the factory to the customer should become part of distribution cost. In case of special packing done at the request of the customer the cost of the same should be charged to specific work order or job. The cost of fancy packing to attract customers is an advertising expenditure. Hence it is to be treated as selling overhead.

Idle Time Wages: Normal idle time wages is treated as a part of cost of production. Thus in case of direct workers an allowance for normal idle time is built into labour cost rates. In the case of indirect works, normal time wages is spread over all the products or jobs through the process of absorption of factory overhead. Abnormal idle time cost is not included as a part of production cost and is shown as a separate item in the Costing Profit and Loss Account. So that normal cost are not disturbed.

Overtime Wages: If overtime is resorted to at the desire of the customer, then overtime premium is charged to concerned job directly. If overtime is required to cope with general production programme for meeting urgent orders, the overtime premium should be treated as overhead cost of particular department or cost center which works overtime. If overtime is worked on account of abnormal conditions such as flood, earthquake etc that should be charged to Costing Profit and Loss Account.

Normal Loss and Abnormal Loss: Treatment of normal and abnormal loss of materials arising during storage, which inflate the issue price. Normal loss can be charged to stores overheads and also can be treated as a separate item of overheads to be recovered as a percentage of material consumed. On the other hand, in the case of abnormal loss, it is charged to Costing Profit and Loss Account. If the loss is due to error in documentation it should be corrected through adjustment entries.

Idle Capacity Cost: Idle capacity is that part of the capacity of a plant, machine or equipment which cannot be effectively utilized in production. The idle capacity may arise due to lack of product demand, non-availability of raw material, shortage of skilled labour, shortage of power etc. Cost associated with idle capacity are mostly fixed in nature. These costs remain unabsorbed or unrecovered due to under utilization of plant and service capacity.

If the idle capacity cost is due to unavoidable reasons a supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilized.

If the idle capacity is due to avoidable reasons such as faulty planning, etc. the cost should be charged to Costing Profit and Loss Account.

If the idle capacity cost is due to seasonal factors then the cost should be charged to the cost of production by inflating overhead rates.

Pre-Production Costs: These are costs incurred during the period when a new factory is in the process of being established a new project is undertaken or a new product line or product is taken up but there is no established or formal production to which such costs may be charged. These costs are normally treated as deferred revenue expenditure and are charged to future production.

Research and Development Cost: These are costs incurred in the discovery of new ideas or processes by experiment or otherwise and for putting the results of such experiments on a commercial basis. Research cost defined as the cost of searching for new or improved product, new application of material or new improved methods, processes, systems or services.

Development cost is the cost of the process which begins with the implementation of the decision to use scientific or technical knowledge to produce a new or improved product etc. and ends with the commencement of formal production of that product by that method.

Cost of Small Tools: Tools purchased may be capitalized and depreciated over life if life is ascertainable. Revaluation method of depreciation may be used in respect of very small tools of short effective life. Depreciation may be charged to factory overheads, if tools use can be identified with the departments. It may be charged to cost of department on the basis of actual issues.

QUESTIONS

1. Explain absorption of overhead
2. What do you understand by overhead rates?
3. Briefly explain the different kinds of overhead absorption rates.
4. Explain the different methods of absorption of overhead.
5. What do you understand by machine hour rate? How it is computed?
6. Briefly explain the methods of treatment of selling and distribution overheads.
7. What do you mean by under absorption and over absorption of overhead? Brief explain the methods of treatment of under or over absorption of overheads.
8. Indicate the accounting treatment of overhead charges mentioned below :
(a) Idle time wages. (b) Packing expenses. (c) Research and development costs. (d) Cost of small tools.
(e) Overtime wages. (f) Administrative overhead.
9. Briefly explain the importance of machine hour rate as a basis for the absorption of factory overheads
10. Compute main hour rate from the following data :
Cost of machine Rs. 1,10,000
Installation charges Rs. 10,000
Estimated scrap value (after 15 years) Rs. 5,000
Rent and rates for the shop Rs. 200 P.M.
General lighting for the shop Rs. 300 P.M.
Insurance premium for the machine Rs. 960 P.a.
Repairs and maintenance Rs. 1000 P.a.
Power consumption 10 units per hour
Rate of power per 100 units Rs. 20
Estimated working hours per annum 2200 which include setting up time of 200 hours.
Shop supervisor's salary per month Rs. 600
The machine occupies $\frac{1}{4}$ of the total area of the shop. The shop supervisor is expected to devote $\frac{1}{5}$ th of his time for supervising the machine.
[Ans : Machine hour rate : Rs.7.95]
11. Calculate the machine hour rate from the following information :
Cost of the machine Rs. 19,200
Estimated scrap value Rs. 1,200
Average repairs and maintenance Rs. 150 p.m.
Standing charges allocated Rs. 50 p.m.
Effective working life of the machine 10,000 hours
Running time per month 166 hours
Power used by machine
5 units per hour at the rate of 19 paise per unit
[Ans : Machine hour rate = Rs. 3.95]
12. The machine shop of a manufacturing concern has 6 identical machines manned by 6 operators. The total cost of the machines is Rs. 8,00,000. The following information relates to six monthly period ended 30th September 2003.

Normal available hours per month	208
Absenteeism (without pay) hours per month	18
Leave (with pay) hours per month	20
Normal idle time hours per month	10
Average rate of wages per hour per operator	Rs. 2.50
Production bonus	15% on wages
Power and fuel consumption	Rs. 9,000
Supervision and indirect labour	Rs. 3,300
Electricity and lighting	Rs. 1,200
Repairs and maintenance (per annum)	3% of value of machine

Insurance per annum	Rs. 42,000
Depreciation (per annum)	10% of original cost
Allocated factory overheads per annum	Rs. 75,670

Calculate machine hour rate

[Ans : Machine hour rate Rs. 25]

13. Universal manufacturing Ltd. have 2 factories. Factory I employs 130 and Factory II employs 150 direct workers. Both factories work 40 hours per week, and 50 weeks a year.

Overhead Rate are No. I – 25 paise per hour

II – 20 paise per hour

Current overhead expenses No. – I Rs.70,000; No. II – Rs.50,000. Analyse these figures and state probable causes of any discrepancy.

[Ans : Factory I Under absorption of overhead expenses Rs. 5,000

Factory II Over absorption of overhead expenses Rs. 10,000]

14. During the year ended 31st March 2003 the factory overhead costs of three production departments of an organization are as under :

X Rs.48,950

Y Rs.89,200

Z Rs.64,500

The basis of apportionment of overhead is given below :

Department X – Rs.5 per machine hour for 10,000 hours

Y – 75% of Direct Labour Cost of Rs.1,20,000

Z – Rs.4 per piece for 15,000 pieces.

Calculate department-wise under or over absorption of overheads and present the data in a tabular form.

[Ans : Over absorption X – Rs.1050 ; Y – Rs.800; Under absorption Z – Rs.4500]

15. A machine is purchased for cash at Rs.92,000. Its working life is estimated to be 18,000 hours after which its scrap value is estimated at Rs.2,000. It is assumed from past experience that :

(1) The machine will work for 1,800 hours annually.

(2) The repair charges will be Rs. 10,800 during the whole period of life of the machine.

(3) The power consumption will be 5 units per hour at Rs. 2 per unit.

(4) Other annual standing charges are estimate to be :

(a) Rent of department (machine occupies 1/5th of the place) Rs. 7,800

(b) Light (12 points in the department; 2 points engaged in machine) Rs. 2,880

(c) Foreman's salary (1/4th of his time is occupied in the machine) Rs. 60,000

(d) Insurance premium (fire) for machine Rs. 360

(e) Cotton waste Rs. 600

Find out machine hour rate on the basis of the above data for allocation of the works expenses to all jobs for which the machine is used.

[Ans : Machine hour rate : Rs. 25.60]

16. Calculate the machine hour rate for machine Q from the following data :

Cost of the machine Rs. 51,000

Estimated life 20 years of 2400 hour each

Established repairs for life Rs. 12,000

Power consumption per hour 10 units

Rate for power 5 paise per unit

Insurance ½% per annum

Machine charges Rs. 30 per month

The machine is kept in a rented shed and there is one supervisor. The machine occupies 1/4th of his time for this machine. Rent for the shed is Rs. 400 per month. Supervisor's salary is Rs. 500 per month. Electricity charges for the Rent is Rs. 50 per month. Half the electricity charges are to be borne by this machine.

[Ans : Machiner hour rate Rs. 3.45; Standing charges per hour Rs. 1.51, Variable cost per hour Rs. 1.94]

17. From the following particulars, calculate the machine hour rate for a drilling machine :

	Rs.
Cost of the drilling Machine	42,000
Estimated scrap value	2,000
Estimated working life	10 years of 2000 hours each
Running time for 4 weekly period	150 hours
Estimated repairs for life	10,000
Standing charges allocated to this machine for 4 weekly period	300
Power consumption per hour	5 units 10 paise per unit

[Ans : Machine hour rate per hour Rs. 5]

18. The following is the budget of superb engineering works for the year 2003 :

	Rs.
Factory overheads	62,000
Direct labour cost	98,000
Direct labour hours	1,55,000
Machine hours	50,000

(a) From the above figures prepare the overhead application rate using the following methods :

(a) Direct Labour Hour (b) Direct Labour Cost (c) Machine hour

(b) Prepare a comparative statement of cost, showing the result of application of each of the above rates to Job No. 555 from the undermentioned data.

Direct material cost	Rs. 45
Direct labour : wages	Rs. 40
Direct labour : hours	40
Machine hours	30

[Ans : Overhead application rate : (a) Rs. 40 per labour hour (b) 63.27% (c) Rs. 1.24 per machine hour]

Comparative Statement Cost :

Direct labour hour method	Rs. 111
Direct labour cost method	Rs. 126.63
Machine hour method	Rs. 132.20

19. Calculate the machine hour rate for machine X from the following information :

Cost of the machine Rs.16,000
 Estimated scrap value Rs. 1,000
 Effective working life 10000 hours
 Running time per hour-weekly period 160 hours
 Average cost of repairs and maintenance charges per four-weekly period Rs.120
 Standing charges allocated to machine X per four-weekly period Rs.40
 Power used by the machine 4 units per hour at a cost of 5 paise per hour

[Ans : Machine-hour rate Rs. 2.55]

20. From the following information, compute the machine-hour rate in respect of a machine

Cost of the machine	Rs. 55,000
Estimated scrap value	Rs. 3,400
Effective working life	10000 hours
Repairs estimated over usual life of machine	Rs. 7,500
Standing charges of shop for four week period	Rs. 8,550
Hours worked in four weekly period	Rs. 1,200
Number of machine in shop	30
Powers used each machine, per hour	5 units
Cost of power per unit	5 paise.

21. Compute machine hour rate from the information given below :

Cost of machine Q	Rs. 1,35,000
Life of the machine	10 years
Estimated scrap value (after 10 years)	Rs. 19,800
Working hours	1,800
Insurance per annum	Rs. 450
Cotton wastes per annum	Rs. 750
Rent per dept. per annum	Rs. 9,750
Foreman's salary per annum	Rs. 75,000
Lighting for dept. (per annum)	Rs. 3,600
Repairs for entire life	Rs. 1,440

Machine Q occupies $\frac{1}{5}$ th of the area and foreman devotes $\frac{1}{4}$ th of his time to the machine. The machine has two light points out of the total 12 for lighting in the department.

[Ans : Machine hour rate Rs. 27.20]

22. A machine costing Rs. 20,000 is expected to run for 10 years at the end of which its scrap value is estimated to be Rs. 2000. Installation charges Rs. 200. Repairs for 10 years life is estimated to be Rs. 1800 and the machine is expected to run for 2190 hours in a year. Its power consumption would be 15 units per hour at Rs. 5 for per 100 units. The machine occupies $\frac{1}{4}$ th of the area of the department and has two points out of total ten for lighting. The foreman has to devote $\frac{1}{3}$ rd of his time to this machine. The rent for this department is Rs. 300 p.m. and charges for lighting 80 p.m. The foreman is paid a salary of Rs. 960 p.m. Find out the hourly rate, assuming insurance is @ 1% p.a. and expenses on oil etc. are Rs. 9 per month.

[Ans : Machine hour rate Rs. 4.059]

CHAPTER 20

Job, Batch and Process Costing

Meaning

Methods of Costing are broadly classified into (1) Specific Order Costing and (2) Operation Costing. The term Specific Order Costing refers to the basic costing method which is applicable where the work consists of separate contracts, jobs or batches. The specific order costing is further classified into Job Costing, Batch Costing and Contract Costing. Job Costing is that form of specific order costing which applies where industries which manufacture products or render services against specific orders such as civil contracts, construction works, automobile repair shop, printing press, machine tool manufacturing, ship building and furniture making etc.

1. DEFINITION OF JOB COSTING

The term Job Costing may be defines as “in job costing, costs are collected and accumulated according to jobs, contracts, products or work orders. Each job is treated as a separate entity for the purpose of costing. The material and labour costs are complied through the respective abstracts and overheads are charged on predetermined basis to arrive at the total cost.”

Features of Job Order Costing

Some of the important features of this method of costing are given below:

- (1) Works or production are undertaken against the order of customers.
- (2) Production is not as a continuous process because each job is accepted by work order basis not for stock or future sales.
- (3) Each job is treated as a separate entity for the purpose of costing.
- (4) There is no uniformity in the flow of production because of different production process.
- (5) Costs are collected and accumulated after the completion of each job or products in order to find out profit or loss on each job.
- (6) The jobs differ from each other requiring separate work in progress maintained for each job.

Objectives of Job Order Costing

The following are the important objectives of Job Costing :

- (1) Job costing provides accurate cost information for each job or product.
- (2) It enables management to reduce the cost by making comparison of each elements of actual costs with estimated ones.
- (3) It helps management to measure the operational efficiency and inefficiency for each job or works to take effective decision making.
- (4) This method enables management to providing proper valuation of work in progress.

Advantages of Job Order Costing

The following are the various advantages of Job order costing :

- (1) It helps management to identifying profitable and unprofitable jobs.
- (2) It provides required information for preparation of estimates while submitting quotations for similar jobs.
- (3) It facilitates effective cost control by evaluating operational efficiency of each job or works.
- (4) It helps management to fix selling price of each order or each job.
- (5) Spoilage and defective works can be easily identified with each job or person.
- (6) It facilitates the application cost-plus formula of pricing of large contracts.
- (7) It facilitates the introduction of budgetary control of overheads, since the overheads are charged on predetermined basis to arrive at the total costs.

Disadvantages

- (1) This method is relatively involve more labour intensive. Thus, it is expensive.
- (2) With increase in clerical work, there are chances for committing more errors and mistakes.
- (3) Job Costing is essentially historical costing. It does not provide for the control of cost unless it is combined with estimated or standard costing system.
- (4) It is difficult to make cost comparison among different jobs because each job has its own features.

Pre-requisites for Job Costing

In order to ensure the successful application of Job Costing method, it is essential to consider the following pre-requisites :

- (1) A sound production planning and controlling system.
- (2) An appropriate time booking and time keeping system to avoid idle time.
- (3) Maintenance of necessary records with regard to job tickets, work order, operation tickets, bills of materials and tools requirements etc.
- (4) Appropriate methods of overhead apportionment and absorption rate.
- (5) Effective designing and scheduling of production.

Job Costing Procedure

The procedure of job costing may be adopted for costing purposes is briefly given below :

(1) Customer's Enquiry: Production or job order is executed on the basis of enquiries received from the customers. The routine enquiries may be related to expected estimated costs to be incurred, quality to be maintained and duration for production planning etc.

(2) Quotation for the Job: As per the customer's enquiry and specifications of work or job, a responsible person is preparing the estimates or quotation and price is fixed for a specific job. And the same conveyed to the customer appropriately.

(3) Customer's Order: If the quotation is satisfactory to the customer, he may place an order.

(4) Production Order: As soon as an order is received, the Production Planning and Controlling Department will make out a production order. It is in the form of instructions issued to the foremen to execute the order and to control its physical progress. It contains all the information regarding the production. Accordingly production control department assign a production order number for each order or job.

(5) Cost Accumulation: The Cost Accountant is responsible to prepare a Job Cost Card on the basis of production order. It is also termed as "Job Cost Sheet." For each job the costs are collected and recorded under separate production order number. The sources of collection of costs are :

- (a) Direct material can be identified or obtained either from Bill of Materials or Requisition Slips or Invoices in the case of direct purchases.
- (b) Wages paid to direct labour is associated with a job and can be identified or recorded with the help of Time Sheet, Job Cards and Wage Analysis Sheet.
- (c) Direct expenses are identified on the basis of direct expenses vouchers.
- (d) Overheads are apportioned on some predetermined basis. It can be accumulated with the use of standing order numbers or cost account numbers.

(6) Completion of Jobs: After completion of a job, the final report is sent to the costing department with regard to charging of material, labour, and overheads are recorded on the job cost sheet. The actual cost recorded under each element of cost is ascertained to find out the total cost. Any deviations from the estimated costs are also noted to take the corrective actions.

(7) Profit or Loss on Job: It is determined by comparing the actual cost with the price obtained.

Illustration: 1

From the following details, you are required to calculate the cost of Job No.215 and find out the price to give a profit of 25% on total cost

		Rs.
	Materials	2000
Wages		
Dept.	A	- 30 hours @ Rs.3 per hour
	B	- 20 hours @ Rs.2 per hour
	C	- 10 hours @ Rs.5 per hour

Overhead expenses for these three departments were estimated as follows :

Variable Overheads

Dept.	A	–	Rs. 1,000 for 1,000 labour hours
	B	–	Rs. 6,000 for 3,000 labour hours
	C	–	Rs. 2,000 for 400 labour hours

Fixed Overheads

Estimated at Rs.10000 for 5000 normal working hours.

Solution:**Job Cost Sheet (Job. No.215)**

	Amounts Rs.	Amounts Rs.
Direct Materials		2000
Wages		
Dept.	A = 30 hrs x Rs. 3 = 90	
	B = 20 hrs x Rs. 2 = 40	
	C = 10 hrs x Rs. 5 = <u>50</u>	180
Variable Overheads		
Dept.	A = 30 x $\frac{\text{Rs. 1,000}}{1,000 \text{ hrs}} = 30$	
Dept.	B = 20 x $\frac{\text{Rs. 6,000}}{3,000 \text{ hrs}} = 40$	
Dept.	A = 10 x $\frac{\text{Rs. 2,000}}{400 \text{ hrs}} = \underline{50}$	120
Fixed Overheads		
	60 hrs x $\frac{\text{Rs. 10,000}}{5,000 \text{ hrs}} = \frac{120}{2,420}$	
Total Cost		
Profit 25% on total cost	$\left[\frac{25}{100} \times 2,420 \right]$	= 605
Selling Price		<u>Rs. 3,025</u>

Illustration: 2

The information given below has been taken from the records of an engineering works in respect of Job. No. 111 and Job. No. 222.

	Job. No.111 Rs.	Job. No.222 Rs.
Materials Supplied	5,000	3,000
Wages Paid	1,100	800
Direct Expenses	400	200
Material transfer from 222 to 111	300	300
Materials return to stores	—	200

You are required to find out the cost of each of Job and calculate profit or loss if any assuming that Job No. 222 is completed and invoiced to the customer at Rs. 4000/-.

Solution:**Job. No. 111**

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials	5,000	By Balance c/d	6,800
To Wages	1,100		
To Direct Expenses	400		
To Material transferred From Job. No. 222	300		
	6,800		6,800
To Balance b/d	6,800		

Job. No. 222

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials	3,000	By Materials transferred to Job. No. 111	300
To Wages	800		
To Direct Expenses	200	By Materials return to stores	200
To P & L A/c (Profit transferred)	500	By Sales	4,000
	4,500		4,500

Illustration: 3

The accounts of the RR Engineering Company Ltd. show the following cost figures for 2003 :

	Rs.
Materials consumed	3,50,000
Direct manual and machine labour wages	2,70,000
Works overhead expenses	8,10,000
General overhead expenses	56,000

Show the work cost and the total cost of manufacture, the percentages that the works overheads bear to the direct manual and machine labour cost and the percentage that the general overheads bear to the works cost.

What price should the company quote to manufacture a refrigerator which is estimated to require on expenditure of Rs. 7,200 in materials and Rs. 6,000 in wages so that it will yield a profit of 20% on the selling price?

Solution:**Job Cost Sheet**

<i>Expenses</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Materials consumed	3,50,000	
Direct labour cost	2,70,000	
Direct expenses	Nil	
Prime cost (1)		6,20,000
<i>Add : Factory or work overhead</i>		81,000
Works cost (2)		7,01,000
<i>Add : General overhead expenses</i>		56,080
Total cost of production (3)		7,57,080

Percentage of works overhead on Direct Manual & Machine

$$\text{Labour Cost} = \frac{81,000}{2,70,000} \times 100 = 30\%$$

Percentage of general overhead on works cost

$$= \frac{56,080}{7,01,000} \times 100 = 8\%$$

Statement showing the quotation price for the refrigerator.

<i>Expenses</i>	<i>Amounts Rs.</i>	<i>Amounts Rs.</i>
Materials	7,200	
Wages	6,000	
Direct Expenses	—	
Prime Cost (1)		13,200
<i>Add : Works overheads</i>		
30% on wages $\left[6,000 \times \frac{30}{100} \right]$		1,800
Factory or works Cost (2)		15,000
<i>Add : General overheads</i>		
8% on works cost $\left[15,000 \times \frac{30}{100} \right]$		1,200
Total cost of production		16,200
Profit 20% on selling price i.e., 25% on total cost		4,050
Sales or quotation price		20,250

Illustration: 4

The following information for the year ended 31st December, 2003 is obtained from the cost books of a factory:

	<i>Completed Job</i> Rs.	<i>Work in Progress</i> Rs.
Raw materials supplied from stores	90,000	30,000
Chargeable expenses	10,000	4,000
Wages	1,00,000	40,000
Materials transferred to work-in-progress	2,000	2,000
Materials returned to stores	1,000	—

Factory overhead is 90% of wages and administration overhead 25% of factory cost.

The value of the executed contract during 2003 was Rs. 4,10,000.

You are required to prepare consolidated completed job account showing the profit and loss and consolidated work-in-progress account.

Solution:**Consolidated Completed Job Account**

<i>Expenses</i>	<i>Amount</i> Rs.	<i>Amount</i> Rs.
Raw materials supplied from stores	90,000	
<i>Less</i> : Materials transferred to WIP	2,000	
<i>Less</i> : Materials returned to stores	1,000	87,000
Wages		1,00,000
Chargeable Expenses		10,000
Prime Cost (1)		1,97,000
<i>Add</i> : Factory Overhead 90% of wages $\left[1,00,000 \times \frac{90}{100} \right]$		90,000
Works or Factory Cost (2)		2,87,000
<i>Add</i> : Administrative overhead 25% of factory cost $\left[2,87,000 \times \frac{25}{100} \right]$		71,750
Total cost of production (3)		3,58,750
Profit		51,250
Sales		4,10,000

Consolidated work-in-progress Account

<i>Expenses</i>	<i>Amount</i> Rs.	<i>Amount</i> Rs.
Raw materials supplied	30,000	
<i>Add</i> : Material transferred from completed jobs	2,000	32,000
Wages		40,000
Chargeable expenses		4,000
Prime cost		76,000
Factory overhead 90% of wages		36,000
Works or factory cost		1,12,000

BATCH COSTING

Meaning

In Batch Costing, a lot of similar units which comprise the batch may be used as a cost unit for ascertainment of cost. Separate Cost Sheet is maintained for each batch by assigning a batch number. Cost per unit of product is determined by dividing the total cost of a batch by the number of units of that batch. Batch costing is used in number drug industries, ready made garment industries, electronic components manufacture, TV sets, radio etc.

Determination of Economic Batch Quantity (EBQ)

Determination of economic batch lot is the important work in batch costing. The two types of costs involved in batch costing are (1) Set up cost and (2) Carrying cost.

If the batch size is increased, set up cost per unit will come down and the carrying cost will increase. If the batch size is reduced, set up cost per unit will increase and the carrying cost will come down. Economic Batch Quantity will balance these two opposing costs. EBQ is calculated by using the following formula :

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where :

- D = Annual Production or Demand in Units
 S = Setup Cost per batch
 C = Annual Holding or Carrying Cost per unit

Difference between Job Costing and Batch Costing

<i>Job Costing</i>	<i>Batch Costing</i>
(1) Costs are collected and accumulated according to Jobs, Contracts or Work Order.	(1) Lot of similar units which comprise the batch may be used as a cost unit for ascertainment of cost.
(2) Each job is treated as a separate entity for the purpose of costing.	(2) Separate cost sheet is maintained for each batch by assigning a batch number.
(3) The materials and labour costs are compiled through the respective abstracts and overheads are charged on predetermined basis.	(3) Separate cost sheet is maintained for each batch by assigning a batch manner.
(4) Costs are found out at the stage of completion of the job.	(4) Cost per unit of product is determined by dividing the total cost of a batch by the number of units of that batch.
(5) Job costing is used in Printing, Furniture making, Ship Building etc.	(5) Batch costing is used in drug industries, ready-made garments, T.V. sets, Radio's and Electronic Components Manufacture.

Illustration: 5

Following information relates to the manufacturing of a component X – 111 in a cost centre :

- Cost of materials 6 paise per component
 Operator's wages 72 paise an hour
 Machine hour Rs. 1.50

Setting up time of the machine 2 hours and 20 minutes
 Manufacturing time 10 minutes per component

Prepare cost sheets showing both production and setting up costs—total and per unit when a batch consists of 1,000 components.

Solution:**Cost Sheet for a Batch of 1000 Components**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Setting up Costs :		
Operator's wages for 2 hrs and 20 mts @ 75 Paise an hour]		1.68
Machine overheads for 2 hrs and 20 mts @ Rs.1.50 an hour]		3.50
Total Setting up costs		
	0.005	5.18
Add : Production Costs :		
Material cost for 1,000 units @ 6 paise per unit	0.060	60.00
Operator's wages for 10,000 Mts (100 x 10) @ 72 Paise an hour]	0.120	120
Machine Overheads for 10,000 mts @ Rs.1.50 an hour]	0.250	250
Total Production Costs	0.430	430
Total Costs (Setting up Costs + Production Costs)	0.435	435.18

Illustration: 6

From the following information, you are required to calculate Economic Batch Quantity :

Annual demand for the product = 40,000 units
 Setup cost per batch = Rs. 750
 Carrying cost per unit annum = Rs. 15

Solution:

Calculation Economic Batch Quantity :

$$\text{Economic Batch Quantity} = \sqrt{\frac{2DS}{C}}$$

Where :

D = Annual Demand in Units
 S = Set up Cost per batch
 C = Carrying Cost per unit per annum

$$\begin{aligned} \text{Economic Batch Quantity} &= \sqrt{\frac{2 \times 40,000 \times 750}{15}} \\ &= 2,000 \text{ units} \end{aligned}$$

Illustration: 7

A Ltd. is committed to supply 24,000 bearings per annum to B Ltd. on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 324.

- (1) What should be the optimum run size for bearing manufacture?
- (2) What would be the interval between two consecutive optimum runs?
- (3) Find out the minimum inventory cost per annum.

Solution:

(i) **Economic Batch or run size :**

$$E B Q = \sqrt{\frac{2DS}{C}}$$

Where

- D = Annual Demand or production in units
 S = Setup cost per batch
 C = Annual carrying or holding cost per unit

$$\begin{aligned} E B Q &= \sqrt{\frac{2 \times 24,000 \times 324}{12}} \\ &= 3,600 \text{ units} \end{aligned}$$

Alternative Solution :

The Economic batch size figure can also be obtained by taking monthly figure as under :

$$\begin{aligned} &= \sqrt{\frac{2 \times 2000 \text{ units} \times \text{Rs. } 324}{0.10}} \\ &= 3,600 \text{ units} \end{aligned}$$

(ii) **Number of set up per annum :**

$$\begin{aligned} &= \frac{\text{Annual production}}{\text{Economic Batch Quantity}} \\ &= \frac{24,000}{3,600} = 6 \frac{2}{3} \text{ or } \frac{20}{3} \end{aligned}$$

$$\begin{aligned} \text{Interval between two consecutive optimum runs} &= \frac{12}{\frac{20}{3}} = \frac{12}{20} \times 3 \\ &= 1.8 \text{ months.} \end{aligned}$$

(iii) **Minimum Inventory Cost Per Year :**

$$\begin{aligned} &= \left[\frac{24,000}{3,600} \times 324 \right] + \left[\frac{3,600}{2} \times 12 \right] = \text{Rs. } 2,160 + \text{Rs. } 2,160 \\ &= \text{Rs. } 4,320 \end{aligned}$$

PROCESS COSTING

Meaning

Process Costing is a method of costing. It is employed where each similar units of production involved in different series of process from conversion of raw materials into finished output. Thus, unit cost is determined on the basis of accumulated costs of each operation or at each stage of manufacturing a product. Charles T. Horngren defines process costing as “a method of costing deals with the mass production of the like units that usually pass the continuous fashion through a number of operations called process costing.”

The application of process costing where industries adopting costing procedure for continuous or mass production. Textiles, chemical works, cement industries, food processing industries etc. are the few examples of industries where process costing is applied.

Characterics of Process Costing

- (1) Continuous or mass production where products which passes through distinct process or operations.
- (2) Each process is deemed as a separate operations or production centres.
- (3) Products produced are completely homogenous and standardized.
- (4) Output and cost of one process are transferred to the next process till the finished product completed.
- (5) Cost of raw materials, labour and overheads are collected for each process.
- (6) The cost of a finished unit is determined by accumulated of all costs incurred in all the process divided by the number of units produced.
- (7) The cost of normal and abnormal losses usually incurred at different stages of production is added to finished goods.
- (8) The interconnected processes make the final output of by-product or joint products possible.

Difference between Job Costing and Process Costing

<i>Job Costing</i>	<i>Process Costing</i>
(1) Production is against specific order from the customers.	(1) Production is a continuous process based on future demand.
(2) Variety of products are produced according to specifications.	(2) Homogenous products are produced in large scale.
(3) Output and costs are not involved in any transactions from one job to another.	(3) Output and costs are transferred from one process to another process.
(4) Cost control is more difficult because each job is different from other.	(4) Effective cost control is possible because production is standardized.
(5) Cost ascertainment and determination of unit cost can be possible only when job is completed.	(5) Costs are collected and accumulated at the end of the accounting period.
(6) There is no question of work in progress at the beginning or end of the period.	(6) Work in progress is always there because production is continuous.

Advantages

The main advantages of process costing are :

- (1) Determination of the cost of process and unit cost is possible at short intervals.
- (2) Effective cost control is possible.
- (3) Computation of average cost is easier because the products produced are homogenous.
- (4) It ensures correct valuation of opening and closing stock of work in progress in each process.
- (5) It is simple to operate and involve less expenditure.

Disadvantages

- (1) Computation of average cost does not give the true picture because costs are obtained on historical basis.
- (2) Operational weakness and inefficiencies on processes can be concealed.
- (3) It becomes more difficult to apportionment of joint costs, when more than one type of products manufactured.
- (4) Valuation of work in progress is done on estimated basis, it leads to inaccuracies in total costs.
- (5) It is difficult to measure the performance of individual workers and supervisors.

Illustration: 8

Following figures show the cost of A product passes through three processes. In March 1000 units were produced. Prepare the process accounts and find out per unit of each process.

	Process I Rs.	Process II Rs.	Process III Rs.
Raw materials	50,000	30,000	20,000
Wages	30,000	25,000	25,000
Direct Expenses	7,000	3,000	5,000

Overhead expenses were Rs. 12,000 and it should be apportioned on the basis of wages.

Solution:**Process I Account**

Particulars	Units	Amounts Rs.	Particulars	Units	Amounts Rs.
To Raw Materials	1,000	50,000	By Process II A/c (Output transferred @ Rs.91.50 per unit)	1,000	91,500
To Wages		30,000			
To Direct Expenses		7,000			
To Overheads		4,500			
$\left[\frac{6}{16} \times 12,000 \right]$		4,500			
	1,000	91,500		1,000	91,500

Process II Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Process II A/c (Transferred from Process I)	1,000	91,500	By Process III A/c (Output transferred @ Rs.153.25 per unit)	1,000	1,53,250
To Raw Materials		30,000			
To Wages		25,000			
To Direct Expenses		3,000			
To Overheads					
$\left[\frac{5}{16} \times 12,000 \right]$		3,750			
	1,000	1,53,250		1,000	1,53,250

Process III Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Process III A/c (Transferred from Process II)	1,000	1,53,250	By Finished Stock (Output transferred @ Rs.207 per unit)	1,000	2,07,000
To Raw Materials		20,000			
To Wages		25,000			
To Direct Expenses		5,000			
To Overheads					
$\left[\frac{5}{16} \times 12,000 \right]$		3,750			
	1,000	2,07,000		1,000	2,07,000

Process Losses

Process Losses may be defined as the loss of material occur at different stages of manufacturing process. The following are the types of losses unavoidable during the course of processing operations such as :

- (1) Normal Process Loss
- (2) Abnormal Process Loss
- (3) Abnormal Process Gain
- (4) Spoilage
- (5) Defectives

(1) **Normal Process Loss:** The cost of normal process loss in practice is absorbed by good units produced under the process. This is known as Normal Process Loss or Normal Wastage. For example, evaporation, scrap, stamping process etc. The amount realized by the sale of normal process loss units should be credited to process account.

(2) **Abnormal Process Loss:** The cost of an abnormal process loss unit is equal to the cost of good unit. The total cost of abnormal process loss is credited to process account from which it arises. This is

known as Abnormal Process Loss. Such loss may be caused by breakdown of machinery, false production planning, lack of effective supervision, substandard materials etc., Cost of abnormal process loss is not treated as cost of the product. In fact, the total cost of abnormal process loss is debited to Costing Profit and Loss Account.

Computation of Abnormal Loss:

$$\text{Value of Abnormal Loss} = \frac{\text{Normal Cost of Normal Output}}{\text{Normal Output}} \times \text{Units of Abnormal Loss}$$

Where :

$$\text{Quantity of Abnormal Loss} = \text{Normal Output} - \text{Actual Output}$$

$$\text{Normal Output} = \text{Input} - \text{Normal Loss}$$

If actual output is less than normal output to balance represents Units of Abnormal Loss.

(3) Abnormal Process Gain: Abnormal Process Gain may be defined as unexpected gain in production under normal conditions. The process account under which abnormal gain arises is debited with abnormal gain. The cost of abnormal gain is computed on the basis of normal production.

(4) Spoilage: Normal Spoilage (i.e., which is inherent in the operation) costs are included in costs either by charging the loss due to spoilage to the production order or by charging it to production overhead so that it is spread over all the products. Any value realized from the sale of spoilage is credited to production order or production overhead account as the case may be. The cost of abnormal spoilage is charged to Costing Profit and Loss Account. When spoiled work is the result of rigid specification, the cost of spoiled work is absorbed by good production while the cost of disposal is charged to production overhead.

(5) Defectives: Defectives that are considered inherent in the process and are identified as normal can be recovered by using the following method.

Charged to goods products

Charged to general overheads

Charged to departmental overheads

If defectives are abnormal, they are to be debited to Costing Profit and Loss Account.

Illustration: 9

A product passes through three processes X, Y and Z to its manufacture. From the following details, ascertain the cost of the product at the end of each stages of production.

	Process X Rs.	Process Y Rs.	Process Z Rs.
Raw Materials	25,000	30,000	20,000
Wages	15,000	20,000	10,000
Manufacturing Expenses	5,000	8,000	7,000
Output in Units	10,000	11,200	13,000
Opening Stock (units in Previous Process)]	—	7,000	5,000
Closing Stock (Units in Previous Process)]	—	5,000	3,000

Solution:**Process X Account**

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Raw Materials	10,000	25,000	By Process Y (@ Rs.4.5 per unit transferred to Process Y)	10,000	45,000
To Wages		15,000			
To Manufacturing Expenses]		5,000			
	10,000	45,000		10,000	45,000

Process Y Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Opening Stock (@ Rs.4.5 per unit)]	7,000	31,500	By Wastage	800	—
To Process X	10,000	45,000	By Process Z Production [1,34,500 - 22,500]		
To Raw Materials		30,000	11,200	11,200	1,12,000
To Wages		20,000	= Rs. 10 per unit		
To Manufacturing Expenses]		8,000	By Closing Stock]	5,000	22,500
	17,000	1,34,500	(@ Rs. 4.5 per unit)		
				17,000	1,34,500

Process Z Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Opening Stock (@ Rs. 10 per unit)]	5,000	50,000	By Wastage	200	—
To Process Y	11,200	1,12,000	By Closing Stock]	3,000	30,000
To Raw Materials		20,000	(@ Rs. 10 per unit)		
To Wages		10,000	By production @ Rs. 13]	13,000	1,69,000
To Manufacturing Expenses]		7,000	per unit		
	16,200	1,99,000		16,200	1,99,000

Illustration: 10

In Process A, 1,000 units were introduced at a cost of Rs. 20,000, the other expenditure incurred in the process were materials Rs. 10,000 and wages Rs. 5,000. 10% is the normal loss during production and possess a scrap value of Rs. 3 each. The output of process A was only 800 units. Find out the value of Abnormal Loss.

Solution:**Process X Account**

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Units Introduced	1,000	20,000	By Normal loss 10%	100	300
To Materials		10,000	By Abnormal loss	100	3,855.55
To Wages		5,000	By Next Process (or)		
			Cost of Output	800	30,844.45
	1,000	35,000		1,000	35,000

Working Notes:**(1) Calculation of Cost per Unit**

	<i>Units</i>	<i>Amounts</i>
Cost of inputs introduced	1,000	35,000
Less : Normal unit wastage sold @ Rs. 3 per unit	100	300
Total Cost of 900 units	900	34,700

$$\text{Cost per unit} = \frac{34,700}{900} = \text{Rs. } 38.55$$

$$\text{Value of 800 units} = 800 \times \text{Rs. } 38.55 = \text{Rs. } 30,840$$

(2) Calculation of Abnormal Loss

$$\begin{aligned} \text{Value of Abnormal Loss} &= \frac{\text{Normal Cost of Normal Production}}{\text{Normal Output}} \times \text{Abnormal Loss (units)} \\ &= \frac{34,700}{900} \times 100 = \text{Rs. } 3,855.55 \end{aligned}$$

Illustration: 11

A batch of 1,000 units was produced in a process at a cost of Rs. 1,850. The normal process loss of 10% of production. It is ascertained that the actual process loss was of 150 units. The scrap is normally sold to a contractor at Re. 0.50 per unit. You are required to prepare (1) Process Account and (2) Abnormal Loss Account.

Solution:**Process Account**

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Production	1,000	1,850	By Normal Loss (10%)	100	50
			By Abnormal Loss	50	100
			By Finished Goods	850	1,700
			(@ Rs.2 per unit)		
	1,000	1,850		1,000	1,850

Abnormal Process Loss Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Process A/c	50	100	By Scrap Value (@ Re.0.50 per unit)	50	25
			By Cost Profit and Loss A/c		75
	50	100		50	100

Working Notes

Calculation of Abnormal Loss

$$\begin{aligned} \text{Value of Abnormal Loss} &= \frac{\text{Normal Cost of Normal Production}}{\text{Normal Output}} \times \text{Abnormal Loss in Units} \\ &= \frac{1,850 - 50}{900} \times 50 \\ &= \frac{1,800}{900} \times 50 = \text{Rs. } 100 \end{aligned}$$

$$\text{Abnormal Process Loss} = \text{Rs. } 100$$

Illustration: 12

In process Y, 75 units of a commodity were transferred from process X at a cost of Rs. 1,310. The labour and overhead expenses incurred by the process were Rs.190. 20% of the units entered are normally lost and sold @ Rs. 4 per unit. The output of the process was 70 units. Prepare process Y Account and Abnormal Gain Account.

Solution:**Process Y Account**

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Process X A/c	75	1,310	By Normal Loss A/c	15	60
To Labour and Overhead Expenses			(20%, 15 units sold @ Rs. per unit)		
To Abnormal Gain A/c			By Finished Output		
	85	1,740		85	1,740

Abnormal Gain Account

<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Amounts Rs.</i>
To Normal Loss A/c (Loss of Income)	10	40	By Process Y A/c	10	240
To Costing P & L A/c	—	200			
	10	240		10	240

Working Notes**(1) Normal Output :**

Units Introduced	=	75
Less : Normal loss in units	=	<u>15</u>
Normal Output	=	60 units
Less : Actual Output	=	<u>70</u> units
Abnormal Gain	=	<u>10</u> units

(2) Value of Abnormal Gain :

$$= \frac{\text{Normal Cost of Normal Output}}{\text{Normal Output}} \times \text{Units of Abnormal Gains}$$

$$= \frac{\text{Rs. 1,440}}{60} \times 10 = \text{Rs. 240}$$

Illustration: 13

Product A is obtained after it passes through three distinct processes. You are required to prepare Process accounts from the following information:

	<i>Total</i> Rs.	<i>X</i> Rs.	<i>Process</i>	
			<i>Y</i> Rs.	<i>Z</i> Rs.
Material	15,084	5,200	3,960	5,924
Direct Wages	18,000	4,000	6,000	8,000
Production Overheads	18,000			

1,000 Units @ Rs. 6 Per Unit were introduced in Process X. Production overhead to be distributed as 100% on Direct Wages.

<i>Actual Output</i>	<i>Unit</i> Rs.	<i>Normal Loss</i>	<i>Value of</i> <i>Scrap per unit</i>
Process X	950	5%	4
Process Y	840	10%	8
Process Z	750	15%	10

Solution:**Process X Account**

	<i>Units</i>	<i>Amount</i> Rs.		<i>Units</i>	<i>Amount</i> Rs.
Material Introduced @ Rs. 6 per unit	1,000	6,000	Normal Loss Transferred Process Y @ Rs. 20 per unit	50	200
Material		5,200		950	19,000
Direct Wages		4,000			
Production Overheads		4,000			
	1,000	19,200		1,000	19,200

Process Y Account

	Units	Amount Rs.		Units	Amount Rs.
Transferred from Process X	950	19,000	Normal Loss	95	760
Material			Abnormal Loss	15	600
Direct Wages			Transferred to next Process@ Rs. 40 pre unit	840	19,000
Production Overheads					
	950	34,960		950	34,960

Process Z Account

	Units	Amount Rs.		Units	Amount Rs.
Transferred from Process Y	840	33,600	Normal Loss	126	1,260
Material			Transferred to next Process@ Rs. 40 pre unit	750	57,000
Direct Wages					
Production Overheads					
Abnormal Gain @ Rs.76 per unit]	36	2,736			
	876	58,260		876	58,260

Abnormal Loss Account

	Rs.		Rs.
To Process Y	600	By Cash (sale of Scrap of Abnormal Loss units)	120
		By Costing Profit And Loss A/c	480
	600		600

Abnormal Gain Account

	Rs.		Rs.
To Process Z A/c	360	By Process Z A/c	2,736
To Costing Profit & Loss Account	2,376		
	2,736		2,736

Working Note

Process Y:

(a) Normal Loss

$$950 \times \frac{10}{100} = 95 \text{ Units}$$

Scrap Value $95 \times 8 = \text{Rs. } 760$

(b) Abnormal Loss	Units	
	Normal Production	950 – 95
	Actual Production	855
		<u>840</u>
	Abnormal Loss	<u>15</u>

(c) Cost of Normal Production. $34,960 - 760 = 34,200$

Cost of Normal Production per unit	$\frac{34,200}{845}$	= Rs. 40 per unit
Cost of Abnormal Loss	40×15	= 600

Abnormal Loss has been credited with Rs.120 being the amount realised from the sale of scrap and Abnormal Loss.

Process Z:

(a) Normal Process. 15% of 840 units.

$$\frac{840 \times 15}{100} = 126 \text{ units}$$

Sale of scrap = $126 \times \text{Rs. } 10 = \text{Rs. } 1,260$.

(b) Abnormal Gain.	Units
Actual Production	750
Estimated Production	<u>714</u>
	<u>36</u>

The Cost of Abnormal Gain has been calculated in the usual way.

Abnormal Gain A/c has been debited with Rs.360 being less amount, recovered on the sale of loss of units which were 90 units instead of normal 126 units.

i.e., $36 \times 10 = \text{Rs. } 360$.

QUESTIONS

1. Define Job Costing.
2. What are the important features of Job Order Costing?
3. What are the advantages and disadvantages of Job Costing?
4. Explain briefly the objectives of Job Order Costing.
5. Describe the procedure for ascertaining Job Order Cost.
6. What are the main objectives of Job Costing?
7. What do you understand by Batch Costing?
8. What are the difference between Job Costing and Batch Costing?
9. Describe the determination of Economic Batch Quantity.
10. What is Process Costing? What are its Characteristics.
11. What are the merits and demerits of process costing?
12. Write Short notes on :
(a) Normal Process Loss. (b) Abnormal Process Loss. (c) Abnormal Gain.
13. What do you understand by Process Losses?
14. Discuss the accounting treatment of the following in cost accounts :
(a) Spoilage and Defectives. (b) Abnormal Process Loss and Abnormal Process Gain.

PRACTICAL PROBLEMS

1. From the following information relating to the manufacturing of a product, you are required to calculate annual cost of each batch and state the optimum number of batches to minimize the total cost. The demand per annum of a product is 48,000 units. It is produced in batches and the largest size of a single batch is 8,000 units. The setup cost per batch is Rs. 1,500. The annual inventory carrying cost is Rs. 2.25 per unit. Assume average inventory as 50% of the number of units made in each batch Selecting 4, 6, 8, 12 and 24 batches per annum.

[Ans : Economic Batch Quantity 8,000 units; Optimum number is 6 batches of 8,000 units each per annum]

2. 200 Tonnes of raw material are used for producing a commodity which passes through two processes. The costs are as follows :

	Process I Rs.	Process II Rs.
Materials	2,000	—
Labour	1,000	500
Work Expenses	500	300

10% of the material is wasted in the process. The wastage has been normal. The scrap realizes Rs. 50. Show process No. I Account.

[Ans : Output 180 units @ Rs. 19.17 per unit for Rs. 3,450]

3. Compute the Economic Batch Quantity for a Company using batch costing with the following information:

Annual demand for the components 400 units
 Setting up and order processing costs Rs. 50
 Cost of manufacturing one unit Rs. 100
 Rate of interest per annum 10%

[Ans : EBQ : 200 units]

4. 100 units are introduced into a process at a cost of Rs. 4,800 and an expenditure of Rs. 2,400 is incurred. From past experience, it is ascertained that wastage normally arises to the extent of 15% of the units introduced, the waste product having a scrap value of Rs. 10 per unit. The actual output is 80 units. Calculate the value of abnormal loss.

[Ans : Abnormal loss 5 units of Rs. 414.70]

5. In a factory the product passes through two process, A and B. A loss of 5% is allowed in process A and 2 % in process B, nothing being realized by disposal of wastage.

During April 2003, 10,000 units of material costing Rs. 6 per unit were introduced in process A. The other costs are as follows :

	Process A Rs.	Process B Rs.
Materials	—	6,140
Labour	10,000	6,000
Overheads	6,000	4,600

The output was 9,300 units from process A, 9,200 units were produced by process B, which were transferred to the warehouse.

8,000 units of the finished product were sold @ Rs. 15 per unit, the selling and distribution expenses were Rs. 2 per unit.

Prepare necessary Process Account :

[Ans : (1) Process A Account :
 Abnormal Loss 200 units of Rs. 1,600
 Normal Output 9,300 units of Rs. 74,400
 (2) Process B Account :
 Abnormal Gain 86 units of Rs. 860
 Finished Output 9,200 units of Rs. 92,000.]

6. A Product passes through three processes A, B and C. The normal wastage of each process is as follows:
 Process A – 3% ; B – 5 % ; C – 8 %

Wastage of each process is realized for Rs. 75,238 and Rs. 728 respectively. 10,000 units were introduced to process A at Re. 1 per unit. The other expenses were as follows :

	Process A	Process B	Process C
Sundry Materials	1,000	1,500	500
Labour	5,000	8,000	6,500
Direct Expenses	1,050	1,188	2,009
Actual output	9,500 units	9,100 units	8,100 units

Prepare process accounts, assuming that there were no opening or closing stock

[Ans : (1) Process A Account : Abnormal wastage 200 units of Rs. 350

Normal production 9,500 units of Rs. 16,625

(2) Process B Account : Production 9,100 units of Rs. 27,300

(3) Process C Account : Abnormal loss 272 units of Rs. 1,156

Finished output 8,100 units of Rs. 34,425]

7. The Karnataka Products Ltd., Mysore, manufacture and sell their chemical produced by consecutive process. The product of the three processes are dealt with as under :

	Process I	Process II	Process III
Raw materials used (Units in tons) }	2,800 @ Rs. 40 Per ton	320 @ Rs. 64 Per ton	2,520 @ Rs. 28 Per ton
Manufacturing wages & Expenses }	Rs. 20,608	Rs. 12,560	Rs. 11,580
Transferred to next process	66 $\frac{2}{3}$ %	60%	—
Transferred to warehouse for sale	33 % $\frac{1}{3}$	41%	100 %

In each process, 4 % of the total weight put in is lost and 10% is scrap, which from process I realises Rs. 6 per ton, from process II, Rs. 10 per ton and from process III Rs. 12 per ton. Prepare Process Accounts showing the cost per ton of each product.

[Ans : Cost per ton : Rs. 52.23; Rs. 66.43; Rs. 46.08]

8. The estimated material cost of a job is Rs. 5,000 and direct labour cost is likely to be Rs. 1,000. In machine shop it will require by machine No. 9 for 20 hours and machine No. 7 for 6 hours. Machine hour rate for machine No. 9 and machine No. 7 are respectively Rs. 10 and Rs. 15. Considering only machine shop cost the direct wages in all other shops last year amounted to Rs. 80,000 as against Rs. 48,000 factory overhead. Last year factory cost of all jobs amounted to Rs. 2,50,000 as against Rs. 37,500 office expenses. Prepare a quotation which guarantees 20% profit on selling price.

9. A batch of 800 units was introduced in process at Rs. 30 per unit. 700 units were completed and transferred to the finished goods stores. The normal process loss was 20% of input and the scrap is normally sold at the market rate of Rs. 10 per unit. The labour and overhead expenditure amounted to Rs. 41,600. You are required to show the process account.

[Ans : Abnormal gain – 60 units, value of Rs. 6,000; Cost of output – 700 units at Rs. 100 per unit = Rs. 7,000.]

10. A product passes through 3 distinct processes to completion during march 2003. 500 Units were produced. The Cost of books show the following information

Particulars	X Rs.	Y Rs.	Z Rs.
Materials	3,000	1,500	1,000
Labour	2,500	2,000	1,500
Direct Expenses	500	2,160	950

The Indirect Expenses for the period were Rs. 1,400/-. The by-product of process Y were sold for Rs. 145/-. Residue of process Z was sold for Rs. 166. Prepare the account in respect of the process showing its cost and cost of production of finished product per unit.

[Ans: Transfers to Process B A/c Rs. 6,000; Transfer to Process C A/c Rs. 11,515; Finished Stock A/c Rs. 16,154]

11. Product X is obtained after it passes through three distinct processes. You are required to prepare process Accounts from the following information :

	Total Rs.	I Rs.	Process II Rs.	III Rs.
Materials	15,084	5,200	3,960	5,924
Direct Wages	18,000	4,000	6,000	8,000
Production Overhead	18,000			

1,000 Units @ Rs. 6 per unit were introduced in process I production overhead are to be distributed at 100% on direct wages.

	Actual Out Units	Normal Loss Scrap per unit	Value of
Process I	950	5%	Rs.4
Process II	840	10%	Rs.8
Process III	750	15%	Rs.10

[Ans: Transfer to Process II A/c 19,000; Transfer to Process III A/c Rs. 33,600; Process III A/c – Normal Loss Rs. 1,260; Finished Stock Rs. 5,700]

12. From the following details, for the last process are given:

	Units	Rs.
Transfer to the last process at cost from the first process	4,000	9,000
Transfer to finished stock from the last process	3,240	-
Direct Wages	2,000	
Direct Materials used	3,000	

The factory overhead in process is absorbed @ 400% of direct materials. Allowance for Normal Loss is 20% of Units worked. The Scrap Value is Rs. 5 per Unit.

You are required to prepare :

- (a) Last Process Account
- (b) Normal Wastage Account
- (c) Abnormal Effectives Account.

[Ans: Last Process A/c – Normal Loss 800 Units Rs. 4,000; Finished Stock 3,240 Units Rs. 22,275; Normal Wastage 760 Units Rs. 3,800; Abnormal Effectives 40 Units Rs. 200]

13. Make out the necessary Accounts from the following details:

	Process A Rs.	Process B Rs.
Materials	30,000	3,000
Labour	10,000	12,000
Overheads	7,000	8,600
Inputs (Units)	20,000	17,500
Normal Loss	10%	4%
Scrap Value of Wastage Per Unit	1	2

There was no Opening or Closing Stock or Work in Progress. Final output from process B was 17,000 Units.

[Ans: Process A – Abnormal Loss 500 Units Rs.1,250 transferred to Process B – Abnormal Gain 200 Units Rs. 785; Finished Goods Cost Rs.66,735]

14. A Product passes through three Process to Completion. In January 2003, the cost of production was as given below :

	Process		
	I Rs.	II Rs.	III Rs.
Direct Material	2,000	3,020	3,462
Wages	3,000	4,226	5,000
Production Overhead	1,500	2,000	2,500

1,000 Units were issued to Process I @ Rs.5 each

	I 10%	II 5%	III 10%	
Normal Loss				
Wastage realised	Rs. 3 per Unit		Rs. 5 per Unit	Rs. 6 per Unit
Actual Production	920		870	800

Prepare necessary accounts.

[Ans: Process I Abnormal Effective Units 20 Valued Rs. 260; Process II Abnormal Wastage Units 4 Valued Rs. 96; Process III Abnormal Effective Units 17 Valued Rs. 680]

15. Kumar & Co. Ltd. Used Job Costing. The following data is obtained from its books for the year ended 31st Dec, 2003.

	Rs.
Direct Materials	1,80,000
Direct Wages	1,50,000
Profit	1,21,800
Selling and Distribution Overheads	1,05,000
Administrative Overheads	84,000
Factory Overheads	90,000

- (a) Prepare a Job Cost Sheet indicating Prime Cost, Works Cost, Production Cost, Cost of Sales and Sales Value.
- (b) In 2004 the Company receives an order for a number of jobs. Estimated Direct Material Cost is Rs.2,40,000 and Direct Labour Cost Rs.1,50,000. What should be the price for these jobs if the Company intends to earn the same rate of Profit on Sales assuming that Selling and distribution overheads have gone up by 15%? The factory recovers factory overheads as a percentage of Direct Wages and Administration and Selling Overheads as a percentage of works costs.

[Ans: Estimated Cost of Sales Rs. 7,14,000; Profit Rs. 1,42,800]

16. Component A is made entirely in Cost Centre X, materials Cost 16 Paise per component takes 10 minutes to produce. The machine operator is paid Rs. 4 per hour and the machine hour rate is Rs. 1.50. The setting of the machine to produce A takes 2 hours 30 minutes.

On the basis of this information, Prepare Cost Sheets showing the production and setting up Cost, both in total and per component, assuming that a batch of (a) 100 Components and (b) 1,000 Components is produced.

[Ans: Cost per batch of 100 Components of A – Cost Per Unit Rs. 1,214; Cost of batch Rs. 121,410; Cost per batch of 1,000 Components of A – Cost Per Unit Rs. 1,091; Cost of batch – Rs. 1,07,667]



CHAPTER 21

Joint Product and By-Product

Introduction

Generally in many industries two or more products are produced from a common feature of production process. These products may be grouped into joint products or by-products, based on the value of product, profitability of the product, objectives and policies of the concern. Joint products and by-products are equally important because of major difficulty to identify the cost of inputs separately and specifically. When cost incurred after the point of separation are known as “post split off” or “subsequent costs.” It is therefore, equal importance should be given to further processing after the point of separation.

1. JOINT PRODUCTS

When two or more products are produced simultaneously from the use of a single raw material which is equally important. Such a product can be a joint product which is more important if produced from the same raw material. This product is also called as Main Product. On the other hand, if the products are not of the same importance called as “By-Products.” For example, crude oil is the main product which can be processed in to petrol, kerosene, oil tar etc. as by-products.

Features of Joint Products

The following are the important features of joint products :

- (1) Joint products are produced from the same raw materials.
- (2) They are produced from the common features of manufacturing process.
- (3) Joint products are of equal importance and value.
- (4) They may require further processing after their split off or point of separation.

Objectives of Joint Product Costing

The following are the important objectives of joint product costing :

- (1) To facilitate product costing of inventory valuation and income determination.
- (2) To ascertain the profitability of each product.

- (3) To facilitate to make or buy decisions.
- (4) To provide information to fix the prices of product.
- (5) To evaluate the change of product mix and output variations.
- (6) To determine cost per unit, cost allocation and cost ascertainment.
- (7) To ensure effective cost control.

Methods of Apportionment of Joint Products

The following are the important methods commonly used for apportionment of joint costs upto the point of separation.

- (1) Average Unit Cost Method
- (2) Physical Unit Method
- (3) Survey Method
- (4) Contribution Margin Method
- (5) Standard Cost Method
- (6) Market Value Method
 - (a) Market Value at Point of Separation
 - (b) Market Value After Further Processing
 - (c) Net realizable Value or Reserve Cost Method

(1) Average Unit Cost Method: Under this method, average cost per unit of the finished product is calculated by the total joint costs up to the point of separation is divided by the total production of all the products or outputs. This method is very simple and conveniently applicable where the resultant products can be expressed in common units.

(2) Physical Unit Method: Under this method, the joint costs are allocated or apportioned to joint products on the basis of relative physical units of output of each joint product till split-off occurs. These physical units refer to weight or measure such as pounds, tonnes, gallons, bales, volume etc. This method is suitable where the joint products will be measurable in the same units. This method cannot be applied when joint products consist of different types of units like liquids and solids.

(3) Survey Method: Survey Method is also termed as "Points Value Method." In this method, joint costs are allocated on the basis of percentage or points value is assigned to each products according to their relative importance. This method is also taken into various relevant factors such as volume, mixtures, selling price, technical engineering and marketing processes. The ratio of joint costs can be calculated by physical quantities of each products are multiplied with the weightage points.

(4) Contribution Margin Method: This method is also called as "Gross Margin Method." According to this method joint costs are allocated or apportioned as fixed cost and variable cost incurred at the point of separation. Joint fixed costs are apportioned on the basis of contribution of each product whereas variable portion of joint costs are apportioned according to the volume of units produced.

(5) Standard Cost Method: Under this method, joint costs are apportioned on the basis of standard costs. For this, standard costs are determined in advance for all joint products based on past experience, technical aspects, operational efficiency and cost factors of each products etc.

(6) Market Value Method: This method is also termed as “Relative Sales Value Method.” According to this method, the number of units of each product manufactured is multiplied by the product’s selling price to obtain the sales value of production. The portion of total joint costs allocated to each product is equal to the ratio of the sales value of each product’s total market value. Here, there are various kinds of market value methods :

- (a) Market Value at the Separation Point
- (b) Market Value After Further Processing
- (c) Net Realizable Value

(a) Market Value at Separation Point: Under this method, the market value of the joint products at the split off point is ascertained on the basis of dividing joint cost. Weightage is also given to the quantities of each product.

(b) Market Value After Further Processing: In this method, joint cost are apportioned according to the ratio of final selling price of each product.

(c) Net Realizable Value: This method is also called as “Reverse Cost Method.” Under this method, the estimated profit, selling and distribution expenses and post separation costs are reduced from the sales value of each joint products. A ratio is established on the basis of which the total costs before separation point is apportioned. Subsequent costs are added to arrive at product costs.

2. BY-PRODUCTS

The term by-product is also known as “Minor Product.” It refers to any product of comparatively less value that is incidentally manufactured along with the main products. In other words, if the products produced are not as of equal importance, then the products of significantly low value are known as “by-products.” Accordingly, they are jointly produced with other main products and remain inseparable up to the point of split off or point of separation.

Accounting Treatment or Method of Valuation of By-products

The object of valuation of by-products cost accounting is to assign a portion of the total costs to each by-products. This is important to calculate the unit product cost and prepare the profit and loss account and balance sheet. Following are the important methods employed in this connection :

(1) Non-Cost Methods or Sales Value Methods:

- (a) Other Income Method.
- (b) Adding Sales Value to Total Cost Method.
- (c) Crediting to Sales Value Less Selling and Distribution Expenses Method.
- (d) Expenses Cost Method.

(2) Cost Methods:

- (a) Replacement Cost Method or Opportunity Cost Method
- (b) Standard Cost Method
- (c) Apportionment on Suitable Basis

(1) Non-Cost Method

This method is also known as “Sales Value Method.” While in valuation of the by-products only sales value of by-products is taken in to account in accounting treatment of by-products they use any one of the following non-cost methods :

(a) **Other Income Method:** Under this method, when the sales value of the by-products is very low or negligible, it is treated as other income and same is credited to the profit and loss account.

(b) **Adding Sales Value to Total Cost Method:** Under this method all the cost of joint products deducted from the combined sales proceeds of both joint products and main products.

(c) **Crediting to Sales Value Less Selling and Distribution Expenses:** Under this method, costs incurred relating to selling and distribution expenses of by-products are deducted from the sales value of by-product and the net sales value credited to the process account.

(d) **Reverse Cost Method:** In this method, cost of by-product is determined by sales of the by-product deducted from the estimated profit and all costs incurred on by-products after split off point. This method also known as “crediting sales value less profit.”

(2) Cost Methods

Cost methods are useful to determine the cost of by-products when the apportionment of the portion of joint costs incurred to by-products. The following are the important methods included under this categories.

(a) **Replacement Cost Method:** This method is also called as “Opportunity Cost Method.” In this method, by-products are determined where by-products are used as raw material in some other process. Here the by-products are value at the opportunity lost of purchasing or replacing them. The opportunity cost of by-product refers to the cost which could have been incurred had the by-product being used as material could have been purchased from the market. The process account is credited with the value of by-product so ascertained.

(b) **Standard Cost Method:** In this method, a standard cost is fixed for each by-product and the process account is credited with this standard cost.

(c) **Apportionment on Suitable Basis:** Under this method, if the value of by products is considerably significant, the actual cost of by-product is ascertained by apportioning the joint costs up to the point of physical separation by way of suitable basis used for costing of joint products.

Inter-Process Profits

In usual practice of certain firms, the output of one process is transferred to the subsequent process at current market price or cost plus agreed percentage of profit. The object is to show a margin of profit or loss on each process to performing the relative efficiency of each process. The difference between the cost and the transfer price is known as Inter-Process Profit. On accounting complication of this technique is the fact that work in progress and stock figures at the end of the period will include a profit element. For balance sheet purposes, inter process profits cannot be included in stocks because a firm cannot make a profit by trading with itself. Financial accounting requires stock to be valued at the lower cost or realizable value. The unrealized profit, therefore, must be calculated and written back.

The cost of closing stock and realized profit can be ascertained by applying the following formula :

$$\text{Cost of Closing Stock} = \frac{\text{Cost of Process}}{\text{Total Cost of Process}} \times \text{Closing Stock}$$

$$\text{Realized Profit} = \text{Profits shown in process and finished stock A/c} + \text{Unrealized profit in opening stock} - \text{unrealized profit in closing stock}$$

Equivalent Units

When opening and closing stocks of WIP exist, unit costs cannot be computed by simply dividing the total cost by total number of units still in process. We must convert the work in progress in to finished elements called “equivalent unit” so that the unit cost can be obtained. For example, 300 units 60% complete are equal to 180 equivalent units. It consists of balance of work done on opening work in progress, current production done fully and part of work done on closing work in progress. Once credit side entries are valued the equivalent units are ignored.

Steps Involved for Calculation of Equivalent Units

The following procedure to be followed for calculation of equivalent units :

- (1) Calculate the number of equivalent units after taking the percentage of degree of completion in respect of opening stock of work in progress.
- (2) To (1) add the units introduced deducting the closing work in progress.
- (3) Convert the equivalent units of closing work in progress and add to the above.
- (4) Find out net process costs element wise ie materials, labour and overheads.
- (5) Calculate the cost per unit of equivalent production of each element of cost separately.
- (6) Find out the cost of finished goods transferred to the next process and stock of work in progress.

The above procedures are to be considered for preparation of the following three statements :

- (i) Statement of Equivalent Production.
- (ii) Statement of Cost.
- (iii) Statement of Evaluation (i.e., Apportionment of Process Costs).

Illustration: 1

From the following informations, find the profit made by each product, apportioning joint costs on a sales value basis :

	A	B
	Rs.	Rs.
Sales	7,60,000	8,40,000
Selling Expenses	1,00,000	4,00,000
Joint Costs :		
Materials		Rs. 6,24,000
Process Costs		Rs. 2,76,000

Solution:

Joint cost to be apportioned

$$\text{Rs. } 6,24,000 + \text{Rs. } 2,76,000 = \text{Rs. } 9,00,000$$

	Product A	Product B
Sales	7,60,000	8,40,000
Selling Expenses	1,00,000	4,00,000
Effective sales value	6,60,000	4,40,000

Joint cost apportioned :	}		
(ratio of 3 : 2)		5,40,000	3,60,000
Profit		1,20,000	80,000

Illustration: 2

A canning merchant supplies you the following production data during the year 2002 :

Grades	Units Produced
A	5,000
B	8,000
C	10,000

The Pre-separation cost incurred was Rs. 2,07,000. The joint cost is apportioned on technical evaluation based on the proportion of 5 : 3 : 2 to three grades respectively. Apportion the joint cost.

Solution:**Apportion of Joint Cost On Survey Method**

Items (1)	Units (2)	Points Attached (3)	Equivalent Units $2 \times 3 = 4$	Cost Per Equivalent $4 / 2 = 5$	Apportioned Cost $4 \times 5 = 6$	Cost Per Unit $6 / 2 = 7$
Grade A	5,000	5	25,000	3	75,000	15
Grade B	8,000	3	24,000	3	72,000	9
Grade C	10,000	2	20,000	3	60,000	6
	23,000		69,000		2,07,000	

Illustration: 3

A Pharmaceutical company purchases a raw material, which is then processed to yield three chemicals Anarol, Estyl and Betryl. In October, 2003 the Pharmaceutical Company purchased 10,000 gallons of the raw materials at a cost of Rs.12,50,000 and company incurred additional joint conversion costs of Rs.7,50,000. October, 2003 sales and production information are as follows :

	Gallons Produced	Price at Split off (Per Gallon)	Further Processing cost Per Gallon	Eventual Sales Price
Anarol	2,000	Rs. 350	-	-
Estyl	3,000	Rs. 240	-	-
Betryl	5,000	Rs. 200	Rs. 30	Rs. 360

Anarol and Estyl are sold to other pharmaceutical companies at the split off point. Betryl can be sold at the split-off point or processed further and packaged for sale as an asthma medication.

Required :

- Allocate the joint cost to three products using the Physical Units Method, the Sales Value at Split-off Method and the Net Realizable Value Method.
- Suppose that half of October, 2003 production of Estyl could be purified and mixed with all off the Anarol to produce a veterinary grade anesthetic. All further processing costs amount to Rs.2,25,000. The selling price of the veterinary grade anarol is Rs.650 per gallon. Should the pharmaceutical company further process the anarol into anesthetic? Assume, the resultant quantity of veterinary grade anarol produced is Rs.2000 gallons only.

[CA Inter, 2001]

Solution:

(i) Total Joint Cost to be allocated = Rs. 12,50,000 + Rs. 7,50,000
 = Rs. 20,00,000

Physical Unit Method

Product	Gallons Produced	Proportion X Joint Cost	= Joint Cost Allocation
Anarol	2000	$\frac{2000}{10000} = 0.20 \times \text{Rs. } 20,00,000$	= Rs. 4,00,000
Estyl	3000	$\frac{3000}{10000} = 0.30 \times \text{Rs. } 20,00,000$	= Rs. 6,00,000
Betryl	5000	$\frac{5000}{10000} = 0.50 \times \text{Rs. } 20,00,000$	= Rs. 10,00,000
	10000		Rs. 20,00,000

Sales Value at Split-off Method

Product	Gallons Produced	Price at Split off	Revenue at Split off	% of Revenue	Joint Cost	Joint cost = Allocation Rs.
Anarol	2,000	Rs. 350	7,00,000	0.2893	$0.2893 \times 20,00,000 = 5,78,600$	
Estyl	3,000	Rs. 240	7,20,000	0.2975	$0.2975 \times 20,00,000 = 5,95,000$	
Betryl	5,000	Rs. 200	10,00,000	0.4132	$0.4132 \times 20,00,000 = 8,26,400$	
	10,000		24,20,000			20,00,000

Net Realizable Value Method (Sales less further processing)

Product	Qty	NRV	% of Revenue	Joint cost = Joint cost allocation
Anarol	2,000	7,00,000	0.228	$0.228 \times 20,00,000 = \text{Rs. } 4,56,026$
Estyl	3,000	7,20,000	0.2345	$0.2345 \times 20,00,000 = \text{Rs. } 4,69,055$
Betryl	5,000	16,50,000	0.5375	$0.5375 \times 20,00,000 = \text{Rs. } 10,74,919$
		30,70,000		Rs. 20,00,000

(ii) Joint costs are irrelevant to this decision

Instead, further processing costs and the opportunity cost of the lost contribution margin on the Estyl diverted to Anarol purification must be considered.

Added Revenues

(Rs.650 – Rs.350) x 2000 Gallons = Rs. 6,00,000

Less : Further processing of Anarol Mixture = (Rs. 2,25,000)

Less : Lost contribution margin on Estyl
 (1500 Gallons & Rs. 240) } = (Rs. 3,60,000)

Increased Net Income = Rs. 15,000

Alternatively

Existing Income	Rs.	Rs.
Estyl = 1500 gallon x Rs.240	= 3,60,000	
Anarol = 2000 gallon x Rs.350	= 7,00,000	10,60,000
	<hr/>	
Proposed Income		
Veterinary Grade = 2000 gallon x Rs.650	= 13,00,000	
Less : Processing Cost	= 2,25,000	10,75,000
Increased Income	=	<hr/> <hr/> 15,000

Alternative

Joint cost of 2,000 gallons of Anarol and 1,500 gallons of Estyle at the point of split off comes out to be :
 = (Rs. 5,78,600 + Rs. 2,97,500) = Rs. 8,76,100.

After adding Rs. 2,25,000 of further processing cost we get 2,000 gallons of output of veterinary grade Anarol.

Total revenue earned on 2,000 gallons of veterinary grade Anarol is Rs. 13,00,000. Hence the profit come to Rs. 1,98,900.

Total profit earned if 2,000 gallons of Anarol and 1,500 gallons of Estyle were sold at the point of split off (Rs. 10,60,000 – Rs. 8,76,100) = Rs. 1,83,900. Since the profit on making veterinary grade of Anarol increases by Rs.15,000, therefore this proposition should be accepted.

Illustration: 4

In a chemical manufacturing company, three products A, B and C emerges at a single split off stage in department P, product A is further processed in department Q, product B in department R and product C in department S. There is no loss in further processing of any of the three products. The cost data for a month are as follows :

	Rs.
Cost of raw materials introduced in department P	12,68,800
Direct Wages Department	Rs.
P	3,84,000
Q	96,000
R	64,000
S	36,000

Factory overheads of Rs. 4,64,000 are to be apportioned to the departments on direct wages basis.

During the month under reference, the company sold all three products after processing them further as under :

Products	A	B	C
Output sold Kgs	44,000	40,000	20,000
Selling price per Kg. Rs.	32	24	16

There are no opening or closing stocks. If these products were sold at the split off stage, that is, without further processing, the selling prices would have been Rs.20, Rs.22 and Rs.10 each per Kg respectively for A, B and C.

Required :

- (i) Prepare a statement showing the apportionment of joint costs to joint products.
- (ii) Present a statement showing product wise and total profit for the month under reference as per the company's current processing policy.

(iii) What processing decision should have been taken to improve the profitability of the company.

(iv) Calculate the product wise and total profit arising from your recommendation in (iii) above.

[CA Inter, 2002]

Solution:

Department Wise Costs

	P	Q	R	S
Raw materials (Rs.)	12,68,800	-	-	-
Wages (Rs.)	3,84,000	96,000	64,000	36,000
Overheads (Rs.)	3,07,200	76,800	51,200	28,800
	19,60,000	1,72,800	1,15,200	64,800

(i) Products	A	B	C	Total
Output (Units)	44,000	40,000	20,000	
Selling price at split off (Rs.)	20	22	10	
Sales value at split off (Rs.)	8,80,000	8,80,000	2,00,000	19,60,000
Joint Cost Apportioned	8,80,000	8,80,000	2,00,000	19,60,000

(ii) Present Profit

	A	B	C	
Output (Units)	44,000	40,000	20,000	
Selling price (Rs.)	32	24	16	
Sales (Rs.)	14,08,000	9,60,000	3,20,000	
Joint Costs (Rs.)	8,80,000	8,80,000	2,00,000	
Further Costs (Rs.)	1,72,800	1,15,200	64,800	
Total (Rs.)	10,52,800	9,95,200	2,64,800	
Profit / Loss (Rs.)	3,55,200	(35,200)	55,200	3,75,200
Incremental Sales (Rs.)	5,28,000	80,000	1,20,000	
Further Costs (Rs.)	1,72,800	1,15,200	64,800	
Increment Net Profit (Rs.)	3,55,200	(35,200)	55,200	

(iii) Decision	Process	Sell at split off	Process	Total (Rs.)
Profit	3,55,200	No change in Profitability	55,200	4,10,400

Working Notes :

(1) **Factory Overheads**

$$P = \frac{3,84,000}{5,80,000} \times 4,64,000 = \text{Rs. } 3,07,200$$

$$Q = \frac{96,000}{5,80,000} \times 4,64,000 = \text{Rs. } 76,800$$

$$R = \frac{64,000}{5,80,000} \times 4,64,000 = \text{Rs. } 51,200$$

$$S = \frac{36,000}{5,80,000} \times 4,64,000 = \text{Rs. } 28,800$$

(2) Incremental Sales = Sales – Joint Costs

A	=	14,08,000	–	8,80,000	=	Rs. 5,28,000
B	=	9,60,000	–	8,80,000	=	Rs. 80,000
C	=	3,20,000	–	2,00,000	=	Rs. 1,20,000

Illustration: 5

The following information is given in respect of process No.3 for the month of Jan. 2003

Opening Stock — 2000 units made-up of

Direct Materials – I	Rs. 12,350
Direct Materials – II	Rs. 13,200
Direct Labour	Rs. 17,500
Overheads	Rs. 11,000

Transferred from process No.2 : 20,000 units @ Rs. 6 per unit

Transferred to process No.4 : 17,000 units

Expenditure Incurred in process No. 3 :

Direct Materials	Rs. 30,000
Direct Labour	Rs. 60,000
Overheads	Rs. 60,000

Additional Information

- (1) Scrap : 1,000 units – Direct Materials 100%, Direct Labour 60%, Overheads 40%
- (2) Normal Loss 10% of production
- (3) Closing stock : 4,000 Units – Degree of completion :

Direct Materials	80%
Direct Labour	60%
Overheads	40%

Prepare process No. 3 Account using Average Price Method, along with necessary supporting statements.

[CA Inter, 2003]

Solution:

Process 3 :			
Opening WIP	=	2,000	units
Received from Process 2	=	20,000	units
Total	=	<u>22,000</u>	units
Less : Closing WIP	=	<u>4,000</u>	units
Production	=	<u>18,000</u>	units

(1) Statement of Equivalent Units

Details	Units	Mat. I	Mat. II	Labour	Overheads
To Process 4 :	17,000	100% 17,000	100% 17000	100 % 17000	100% 17000
Closing WIP	4,000	100% 4000	80% 3200	60% 2400	40% 1600
Normal Loss	1,800	-	-	-	-
Total	22,800	21,000	20,200	19,400	18,600
Abnormal gain	800	800	800	800	800
Total	22,000	20,200	19,400	18,600	17,800

(2) Statement of Cost per Equivalent Unit

Details	Mat. I Rs.	Mat. II Rs.	Labour Rs.	Overheads Rs.
Opening Balance	12,350	13,200	17,500	11,000
Current Costs	1,20,000	30,000	60,000	60,000
Total Costs	1,32,350	43,200	77,500	71,000
Scrap Credit 1800 @ 4 =	7,200	-	-	-
Net Costs	1,25,150	43,200	77,500	71,000
Cost per equivalent units	6.1955	2.2268	4.1667	3.9888

(3) Statement of Cost of Credit Side Entries

Details	Element Units	Equivalent Units Rs.	Cost / Equ. Rs.	Cost
To Process 4	Material I	17,000	6.1955	1,05,322
	Material II	17,000	2.2268	37,855
	Labour	17,000	4.1667	70,834
	Overheads	17,000	3.9888	67,810
				2,81,821
Abnormal Gain	Material I	800	6.1955	4,956
	Material II	800	2.2268	1,781
	Labour	800	4.1667	3,333
	Overheads	800	3.9888	3,191
				13,261
Closing WIP	Material I	4,000	6.1955	24,782
	Material II	3,300	2.2268	7,126
	Labour	2,400	4.1667	10,000
	Overheads	1,600	3.9888	6,382
				48,290

(4) Process 3 Account

Details	Units	Amount	Details	Units	Amount
To Opening WIP	2,000	54,050	By Normal Loss	1,800	7,200
To Process 2	20,000	1,20,000	By Process 4	17,000	2,81,821
To Material II		30,000	By Closing WIP	4,000	48,290
To Labour		60,000			
To Overheads		60,000			
To Abnormal Gain	800	13,261			
	22,800	3,37,311		22,800	3,37,311

Note :

Normal loss is 10% of production. Production may be the units that come up to the inspection stage. In that case opening stock plus receipts minus closing stock of WIP will represent production. It works out to 18,000 units and hence normal loss has been taken as 1,800 units.

Illustration: 6

In manufacturing the main product A company processes the incidental waste into two by products A and B. From the following data relating to the product you are required to prepare a comparative profit and loss statement showing the individual cost and other details. The total cost up to separation period was Rs. 3,10,400.

	Main Product	By-Product	By-Product
Sales	8,00,000	64,000	96,000
Cost after separation	80,000	12,800	14,400
Estimated net profit	}	20%	20%
Percentage to sales value			
Estimated selling expenses as percentage to sales value			
	20%	10%	15%

Reverse Cost Method to be followed for separation of joint costs.

[CA Inter, 2000]

Solution:**Comparative Profit and Loss Account**

Particulars	Main Product Rs.	By-Product Rs.	By-Product Rs.
Joint cost upto separation point	3,10,400	-	-
Less : Cost allocated to by-products	80,000	32,000	48,000
	2,30,400		
Cost after separation	80,000	12,800	14,400
Selling Expenses	1,60,000	6,400	14,400
	4,70,400	51,200	76,800
Net Profit	3,29,600	12,800	19,200
Sales	8,00,000	64,000	96,000

Cost allocated to by-product is calculated as under

Particulars	By-Product		Total Rs.
	A	B	
Sales (Rs.)	64,000	96,000	
Less : Estimated Net Profit	12,800	19,200	
Estimated Selling Expenses	6,400	14,400	
Cost After Separation	12,800	48,000	
	32,000	48,000	80,000

Illustration: 7

Input 7,600 units, output 6,000 units ; Closing work in progress 1,600 units

	<i>Degree of Completion</i>	<i>Process costs</i>
Materials	80%	14,560
Labour	70%	21,360
Overhead	70%	14,240

Find out equivalent production assuming that there is opening work in progress and process loss.

Solution:**Statement of Equivalent Production**

<i>Particulars</i>	<i>Total Units</i>	<i>Equivalent Units</i>		
		<i>Materials</i>	<i>Labour</i>	<i>Overhead</i>
Completed	6,000	6,000	6,000	6,000
Work in progress	1,600	1,280	1,120	1,120
	7,600	7,280	7,120	7,120

Illustration: 8

ABC Ltd. Operates a simple chemical process to convert a single material into 4 + 4 + 2 three separate items, referred to here as X, Y and Z. All three products are separated simultaneously at a single split off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2002-03 the selling prices of the items and the total amounts sold were :

X	=	186 tons sold for Rs. 1,500 per ton
Y	=	527 tons sold for Rs. 1,125 per ton
Z	=	736 tons sold for Rs. 750 per ton

The total joint manufacturing costs for the year were Rs. 6,25,000. An additional Rs. 3,10,000 was spent to finish product Z.

There were no opening inventories of X, Y, or Z. At the end of the year, the following inventories of complete units were on hand :

X	=	180 tons
Y	=	60 tons
Z	=	25 tons

There was no opening or closing work in progress.

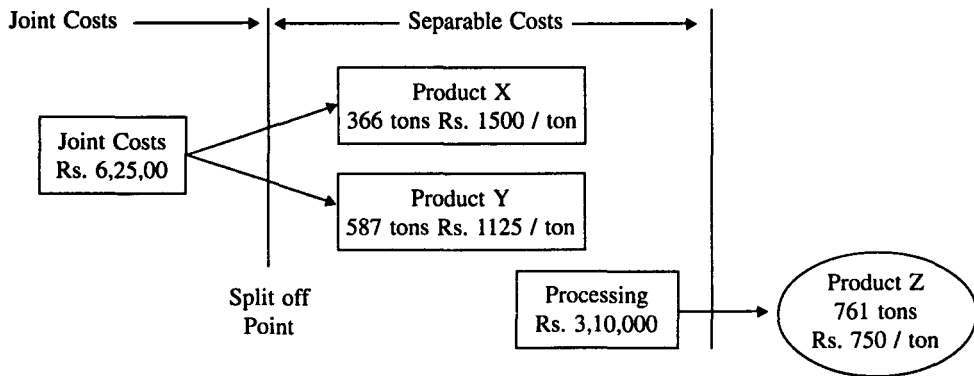
Required

- (i) Compute the cost of inventories of X, Y and Z for Balance Sheet purposes and cost of goods sold for income statement purpose as of March 31, 2003, using :
 - (a) Net Realizable Value (NRV) method of joint cost allocation.
 - (b) Constant Gross – Margin Percentage NRV Method of joint cost allocation.
- (ii) Compare the gross margin percentages for X, Y and Z using two methods given in requirement(i).

[CA Inter, 2002]

Solution:

	<i>Sold</i>	+	<i>Closing Inventories</i>	=	<i>Total Production</i>
X	186	+	180	=	366
Y	527	+	60	=	587
Z	736	+	25	=	761



(i) (a) Net Realizable Value Method

<i>Details</i>	<i>X Rs.</i>	<i>Y ~ Rs.</i>	<i>Z Rs.</i>	<i>Total Rs.</i>
Final Sales Value	5,49,000 (366 x 1,500)	6,60,375 (578 x 1,125)	5,70,750 (761 x 750)	17,80,125
Less : Separable Cost	-	-	3,10,000	3,10,000
NVR at split off point	5,49,000	6,60,375	2,60,750	14,70,125
Weighting =	<u>5,49,000</u> 14,70,125 = 37.34%	<u>6,60,375</u> 14,70,125 = 44.92%	<u>2,60,750</u> 14,70,125 = 17.74%	

Joint Cost Allocated :

$$\begin{aligned}
 X &= 6,25,000 \times \frac{37.34}{100} = \text{Rs. } 2,33,375 \\
 Y &= 6,25,000 \times \frac{44.92}{100} = \text{Rs. } 2,80,750 \\
 Z &= 6,25,000 \times \frac{17.74}{100} = \text{Rs. } 1,10,875
 \end{aligned}$$

Ending Inventory (%) :

	<i>X</i>	<i>Y</i>	<i>Z</i>
Ending Inventory (tons)	180	60	25
Total Production	366	587	761
Closing Inventory (%)	49.18%	10.22%	3.29%

$$\left\{ \frac{180}{366} \times 100 \right\} \quad \left\{ \frac{60}{587} \times 100 \right\} \quad \left\{ \frac{25}{761} \times 100 \right\}$$

Income Statement :

X Y Z	Rs.	Rs.	Rs.	Rs.
Total Revenues	2,79,000 (186 x 1,500)	5,92,875 (527 x 1,125)	5,52,000 (736 x 750)	14,23,875
Less : Cost of Goods Sold				
Joint Cost Allocated	2,33,375	2,80,750	1,10,875	6,25,000
Add : Separable Cost	-	-	3,10,000	3,10,000
Cost of goods available for sale	2,33,375	2,80,750	4,20,875	9,35,000
Less : Closing Inventory	1,14,774	28,693	13,847	1,57,314
[X = 49.18% Y = 3.29% Z = 10.22%]				
Cost of Goods Sold	1,18,601	2,52,057	4,07,028	77,686
Gross Margin	1,60,399	3,40,818	1,44,972	6,46,189
Gross Margin (%)	57.49%	57.49%	26.26%	45.38%

2 (a) (i) (b)

Constant Gross Margin (%) NRV Method

Final Sales Value of Product (5,49,000 + 6,60,375 + 5,70,750)	=	Rs. 17,80,125
Less : Joint & Separable Costs (Rs. 6,25,000 + Rs. 3,10,000)	=	9,35,000
Gross Margin	=	8,45,125
Gross Margin (%)	$\frac{8,45,125}{17,80,125} \times 100$	= 47.4756 %

Details	X Rs.	Y Rs.	Z Rs.	Total Rs.
Final Sales Value of total product	5,49,000	6,60,375	5,70,750	17,80,125
Less : Gross Margin using overall Gross Margin of Sales (50%)	2,60,641	3,13,517	2,70,967	8,45,125
Less : Separable cost	2,88,359	3,46,858	2,99,783	9,35,000
Joint Cost Allocated	-	-	3,10,000	3,10,000
	2,88,359	3,46,858	(10217)	6,25,000

The negative joint cost allocation to product Z illustrates one 'unusual' feature of the constant gross margin % NRV method.

Income Statement

Details	X Rs.	Y Rs.	Z Rs.	Total Rs.
Revenues	2,79,000	5,92,875	5,52,000	14,23,875
Cost of Goods Sold :				
Joint Cost Allocated	2,88,359	3,46,858	(10217)	6,25,000
Separable Cost	-	-	3,10,000	3,10,000
Cost of Goods Available for sale	2,88,359	3,46,858	2,99,783	9,35,000

Less : Closing Inventory	1,41,815 (49.18%)	35,449 (10.22%)	9,863 (3.29%)	1,87,127
Gross Margin [Revenues – Cost of goods sold]	1,32,456	2,81,466	2,62,080	6,76,002
Gross Margin (%)	47.4753 %	47.48%	47.48%	47.48%

2 (a) (ii)

The negative joint cost allocation to product Z illustrate one 'unusual' feature of the Constant Gross Margin % NRV method.

Method	Product		
	X	Y	Z
	Gross Margin (%)		
NRV Method	57.49%	57.49%	26.26%
Constant Gross Margin (%) NRV Method	47.48%	47.48%	47.48%

QUESTIONS

- What do you understand by Joint Product?
- Explain the important features of Joint Product.
- What are the objectives of Joint Product Costing?
- Explain the different methods of apportionment of Joint Product.
- What is mean by By-Products?
- What are the important methods of valuation of By-Products?
- What do you understand by Inter-Process Profits?
- Explain Equivalent Units.
- Write short notes on :
 - Joint Products
 - By-Products
 - Net Realizable Value
 - Physical Unit Method
 - Inter-Process Profits
 - Equivalent Units.
- Choose the Correct Answer :
 - The main product is usually produced in greater quantities than the _____
 - Joint Product
 - By-Products
 - Work in Progress
 - Finished Products
 - Joint Cost are allocated according to sales value of individual products under _____
 - Market Value Method
 - Average Unit Cost Method
 - Survey Method
 - Physical Unit Method
 - Under the Market Value Method, Joint Costs are allocated according to _____ of individual products
 - Cost Price
 - Market price or cost price whichever is less
 - Sales Value
 - Cost and Demand Price
 - Under the Other Income Method of accounting of by-products, the sales value of the by-products is _____
 - Credited to Profit and Loss Account
 - Credited to Process Account
 - Credited to Process Account
 - Credited to By-Product Account
 - On accounting treatment of by-products, the sales value of the by-products is credited to profit and loss account under _____
 - Other Income Method
 - Replacement Cost Method
 - Standard Price Method
 - Cost Method
 - Under the Average Unit Cost Method of apportionment of joint costs, the cost per unit of each product is the _____
 - Constant
 - Different
 - Same
 - Semi-Variable
 - _____ are-of limited sales value produced simultaneously with the products of a greater value
 - Joint Products
 - By-Products
 - Semi-Finished Products
 - Finished Products

- (8) The stage of production at which separate products are identified is known as _____
 - (a) Split Off Point
 - (b) Break-Even Point
 - (c) Point of Separation
 - (d) A and C
- (9) _____ relate to process and incurred after split off point
 - (a) Subsequent Costs
 - (b) Joint Costs
 - (c) By-Product Costs
 - (d) Marginal Costs
- (10) The concept of equivalent production is used in case of processes which have _____ at the end of a period
 - (a) Completed Units
 - (b) Incompleted Units
 - (c) Joint Products
 - (d) By-Products
- (11) If a company obtains two salable products from the refining of one ore, the refining process must be accounted for as a (an)
 - (a) Mixed Cost Process
 - (b) Joint Process
 - (c) Extractive Process
 - (d) Reduction Process
- (12) Which of the following components of production are allocable as Joint Costs when a single manufacturing process produces several salable products?
 - (a) Material, Labour and Overheads
 - (b) Materials and Labour only
 - (c) Labour and Overhead only
 - (d) Overheads and Materials only
- (13) Joint Products costs generally are allocated using
 - (a) Relative Sales Value at Split-off
 - (b) Additional Costs after Split-off
 - (c) Relative Profitability
 - (d) Direct Labour Hours

[Ans : (1) b- By-Products (2) a - Market Value Method (3) c - Sales value (4) a - Credited to Profit and Loss A/c (5) a - Other Income Method (6) c - Same (7) b - By-Products (8) d - a and c (9) a - Subsequent Costs (10) b - In completed Units (11) b - Joint Process (12) a - Materials, Labour and Overheads (13) a - Relative Sales Value at Split-off]

PRACTICAL PROBLEMS

(1) A by-product A is derived from the manufacture of the main product AB. The by-product is further processed for sale. From the following data prepare an account showing the cost per kilogram of products AB and A.

Particulars	Joint Expenses	Separate Expenses	
	Rs.	AB Rs.	A Rs.
Materials	40,000	24,000	2,000
Labour	28,000	20,000	8,000
Overheads	10,000	6,000	2,400

The quantities produced during the period under consideration were :

AB 800Kg and A 200Kg. The selling price of A is Rs. 480 per Kg on which the profit earned is estimated at 30% of the selling price.

(2) Hindustan Company producing article X also produces a By-Product Y which is processed into finished product. The joint cost of manufacture is given below :

	Rs.
Materials	10,000
Labour	6,000
Overheads	4,000
	20,000

Subsequent Costs

	X	Y
	Rs.	Rs.
Materials	6,000	3,000
Labour	2,800	2,000
Overheads	1,200	1,000
	10,000	6,000
Selling Price	Rs. 32,000	Rs. 16,000

Estimated Profits on Selling Prices are 25% of X and 20% for Y.

Assume that selling and distribution cost are in proportion of sales prices. Show how would you apportion joint cost of manufacturing and prepare a statement showing cost of production of X and Y.

[Ans : X Rs.23,466; Y Rs.12,534]

- (3) In a manufacturing concern, production 'A' yields by-products 'B' and 'C.' The joint expenses of manufacturing are :
Materials Rs.17,000, Labour Rs.18,000, Overheads Rs.15,000. Subsequent expenses are as follows :

	<i>Materials</i> Rs.	<i>Labour</i> Rs.	<i>Overhead</i> Rs.
A	5,000	3,800	3,000
B	2,400	3,200	1,800
C	2,800	4,000	2,100

Selling Price : A – Rs.60,000 ; B – Rs.40,000 ; C – Rs.30,000 ; Profit on Selling Price A – 40%; B – 30%; C – 25%. Show how you would apportion the joint expenses and ascertain profit of each product.

[Ans : Joint Cost : A – Rs. 20,324; B – Rs. 18,014; C – Rs. 11,662
Profit : A – Rs. 24,000; B – Rs. 12,000; C – Rs. 7500]

[MBA Madras, 2001]

- (4) In a chemical factory as a result of a certain process two products, X and Y, are produced in the ratio of 3 :1. The total cost per 1,000 gallons of product is Rs. 2,000. Product X is marketed at Rs.5 per gallon while product Y sells at Rs.10 per gallon after going through a refining process. The details of this process are as follows for each gallon of unrefined product Y :

Output of refined Y = 200 gallons
Processing Cost = Rs. 600
By-Product Z = 20 gallons
Selling Price of Z = Rs. 5 per gallons
Apportion the joint cost on a suitable basis

[Ans : Product X – Rs.1430 ; Y – Rs.570]

[MBA Bharathiar, 2002]

- (5) In the course of manufacture of the main product P, by-product A and B also emerge. The joint expenses of manufacturing amount to Rs. 1,19,550. All the three products are processed further after separation and sold as per details given below:

	<i>Main Product</i> P	<i>By-Product</i> A B	
Sales (Rs.)	90,000	60,000	40,000
Cost incurred after separation (Rs.)	6,000	5,000	4,000
Profit as % on sales	25	20	15

Total fixed selling expenses are 10% of total cost of sales which are apportioned to the three products in the ratio of 20 : 40 : 40.

- (i) Prepare a statement showing the apportionment of joint costs to the main product and the two by-products.
(ii) If the by-product A is not subjected to further processing and is sold at the point of separation for which there is a market at Rs. 58,500 without incurring any selling expenses, would you advise its disposal at this stage? Show the workings.

[Ans : Expenses P – Rs. 58,510 ; A – Rs. 37,200 ; B – Rs. 24,020 ; Total Profit Rs. 44,000]

- (6) Two Products P and Q are obtained in a crude form and require further processing at a cost of Rs. 5 for P and Rs. 4 for Q per unit before sale. Assuming a net margin of 25% on cost, their sale prices are fixed at Rs. 13.75 and Rs. 8.75 per unit respectively. During the period, the joint cost was Rs. 88,000 and the output were P – 8,000 units and Q – 6,000 units. Ascertain the joint cost per unit.

[Ans : Joint Cost per unit P – Rs. 8; Q – Rs. 4]

- (7) A factory produces three products, P, Q and R which originate from a joint process. The Joint processing costs amount to Rs. 1,20,000. The output P, Q and R is 25,000, 15,000 and 10,000 units respectively. The market value of the split-off point is P Rs. 10; Q Rs. 12 and R Rs.20. Apportion the joint costs amongst the products on (a) Sales price basis and (b) Sales value basis.

[Ans: Joint cost of sales price basis P Rs. 28,571; Q Rs. 34,286 and R Rs. 57,143.
Joint Cost of Sales value basis P Rs. 2,50,000; Q Rs. 1,80,000 and R Rs. 2,00,000]

(8) A factory producing articles A yields P and Q as its by-products. The joint costs of manufacture are—Materials Rs. 40,000; labour Rs. 4,000; overheads Rs. 16,000.

Subsequent costs are as under

Particulars	A Rs.	P Rs.	Q Rs.
Materials	3,000	2,600	2,000
Labour	400	300	200
Overheads	1,600	1,100	800
	5,000	4,000	3,000
Selling prices are estimated profit on Selling price	60,000	48,000	40,000
	30%	25%	25%

Show how you would apportion the joint costs of manufacture and prepare accounts showing cost of production in respect of A, P and Q.

[Ans : Cost of production A Rs. 28,125; P Rs. 24,000 and Q Rs. 19,975]

(9) Joint products X,Y,Z,W are produced at a total manufacturing cost of Rs. 1,20,000. Quantities produced are :

X	20,000 units
Y	15,000 units
Z	10,000 units
W	15,000 units

Product X sell for Rs. 50; Y for Rs. 54, Z for Rs. 54 and W for Rs. 56. You are required to prepare the joint cost in the best possible manner.

[Ans: Total sales value Rs. 31,90,000; Apportionment of Joint Cost X Rs. 3,76,176; Y Rs. 3,04,702; Z Rs. 2,03,135 and W Rs. 3,15,987]

(10) From the following information, find the profit made by each product apportionment joint costs on sales-value basis:

Joint Cost :

	Rs.	
Direct material	1,26,000	
Power	25,000	
Petrol, Oil, Lubricants	5,000	
Labour	7,500	
Other charges	4,100	
	<i>Product</i> X	<i>Product</i> Y
Selling Cost	Rs. 20,000	Rs. 80,000
Sales	1,52,000	1,68,000

[Ans : Apportionment of joint cost and profit cost of product X Rs. 99,610; Y Rs. 1,67,990 Profit X Rs. 52,390; Y Rs. 10]

(11) Calculate the estimated cost of production of by product X and Y at the point of separation from the main products.

	<i>By-product</i> X	<i>By-product</i> Y
Selling price per unit	Rs. 12	Rs. 24
Cost per unit after separation from the main product	Rs. 3	Rs. 5
Units produced	500	200

Selling expenses amount to 25% of total works cost i.e., including both pre-separation and post separation work cost.

Selling prices are arrived at by adding 20% total cost i.e., the sum of work cost and selling expenses.

[Ans : Estimated cost at the point of separation By-product X Rs. 2,500; By-product Y Rs. 2,200]

(12) A factory is engaged in the production of a chemical A and in the course of its manufacture a by-product B, is produced, which after a separate process has a commercial value. For the month of January 2003 the following are the summarised cost data.

	<i>Joint expenses</i>	<i>Separate expenses</i>	
	Rs.	A	B
Materials	19,200	7,360	780
Labour	11,700	7,680	2,642
Overheads	3,450	1,500	544

The output for the month was 142 tonnes of A and 49 tonnes of B and the selling price of B averaged Rs. 280 per tonne. Assuming that the profit of B is estimated at 50% of the selling price, prepare account showing the cost of A per tonne.

[Ans: Cost of A chemical A/c Rs. 50,980; By product Y Rs. 6,860; 49 tonnes at Rs. 140 per ton]



CHAPTER 22

Contract Costing

Meaning

Contract Costing is a special type of job costing where the unit of cost is a single contract. Contract itself is a cost centre and is executed under the customer's specifications. Contract Costing is defined by the I C M A Terminology as "that form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long duration. The work is usually of constructional nature."

Contract Costing is also termed as "Terminal Costing." The principles of job costing are applicable to contract costing and is used by such concerns of builders, public works contractors, constructional and mechanical engineering firms and ship builders etc. who undertake work on a contract basis.

SPECIAL FEATURES OF CONTRACT COSTING

The following are the special features of Contract Costing:

- (1) The cost unit is a specific contract.
- (2) Each contract takes a long time to complete.
- (3) The work being of a constructional nature, the same is executed at customer's site, as per his specifications.
- (4) Bulk of the materials purchased and delivered direct to the contract site or obtained from the central stores through the requisition slips.
- (5) Generally specific portions of the contract are given to sub-contractors.
- (6) Most of costs which are normally treated as indirect can be identified specifically with a particular contract and are charged to it as direct costs.
- (7) Overheads constitute only a very small proportion of the cost of the contract. However, indirect costs consist mainly of administrative cost of the central office.

- (8) Scale of operations and cost control becomes difficult due to theft of materials, labour time utilization, pilferages etc.
- (9) The pay roll is prepared either at the site or at a central administrative office.

Recording Cost on Contract or Costing Procedure

In contract costing, costs are allocated, collected and accumulated according to the contract works. Each contract is treated as a separate entity in which each contract account may be maintained separately or in general ledger itself for the purpose of costing and cost control. The following are the costing procedure for different costs relating to the important expenses :

(1) Materials:

(A) Contract Account is debited with the following transactions relating to materials :

- (1) Bulk of materials are purchased for a specific contract from suppliers.
- (2) Materials obtained from contractor's central stores through the requisition slips.
- (3) Materials transferred from one contract to another contract.
- (4) Value of materials remaining unutilized on site during the accounting year.

(B) Contract Account is credited with the following transactions relating to materials :

- (1) Materials returned under Materials Return Note.
- (2) Sale of materials at site on account of some extraneous reasons.
- (3) Materials transferred to other contracts.
- (4) Materials stolen or destroyed by fire.
- (5) On completion, if a part of materials received from the stores are returned.

(C) Any profit or loss on materials account is transferred to the Profit and Loss Account :

- (1) Sale price is different from the cost price.
- (2) Resulting from the sale of materials at site.
- (3) Resulting from the materials stolen or destroyed by fire.

(2) Labour : In the case of contract costing, all labours engaged at site and the salaries and wages paid to the labour and workers are treated as direct labour cost is debited to Contract Account.

(3) Direct Expenses : Most of the expenses like electricity, insurance telephone, postage, sub-contracts, Architect's fees etc. can also be treated as direct cost is debited to Contract Account.

(4) Overhead Cost : In the case of contract costing overheads incurred only an insignificant part of the total cost of contract account. The nature office and administrative expenses of a particular contract may be apportioned on suitable basis.

(5) Plant and Machinery : For use of plant and machinery in a particular contract, the treatment of plant costs in any of the two ways :

- (a) Where a plant has been specially purchased for a particular contract and will be exhausted at site Contract Account should be debited with the cost of the plant. On completion of the contract the residual or written down value as shown by the Plant Ledger will be credited to the Contract Account.

- (b) When the plant and machinery are required to the contract site only for a shorter period, the contract account should be debited with the notional amount of depreciation based on some estimates be charged to Contract Account.

(6) Sub-Contracts : Sub-Contracts refer to some portions of the specified work connected with the main contract, to be done by the sub-contractor. For example, the work of painting, special flooring, steel work etc. may be given to the sub-contractors. Usually sub-contract has been undertaken on cost-plus basis and the cost of such sub-contract should be treated as a direct charge and is debited to Contract Account.

(7) Work Certified : In the case of the small contracts which are completed within the shorter period, the contractor pays the contract price on the completion of the contract. In the case of contracts of long duration, the contract agreement provides interim payment to the contractor. It is done on the basis of certificates issued by the contractee's Surveyor, Architect or Engineer. At the same time Contractee usually does not pay to the full value of the work certified. A portion of amount say 20% or 30% thereof shall be retained by the Contractee. The money so retained is called as "Retention Money." This retention money is intended to ensure that the contractor to complete the work as scheduled and according to specifications. Money retained could also be used for imposing penalties for faulty or delayed work. This amount will be settled on completion of the contract.

(8) Work Uncertified : If the progress of a work is unsatisfactory or the work has not reached the stipulated stage, though certain work is completed, such work does not qualify for a certificate by the Contractee's Architect or Surveyor is termed as "Work Uncertified." It is valued at cost and credited to Contract Account and debited to Work in Progress Account.

(9) Work in Progress : Work in progress includes the amount of work certified and the amount of work uncertified. The work in progress account will appear on the asset side of the balance sheet. The amount of cash received from the contractee and reserve for contingencies will be deducted out of this amount.

Treatment of Profits or Loss on Contracts A/c.

The accounting treatment of profits or loss of contracts in the following stages :

- (A) Profit or Loss on incomplete contracts
- (B) Profits or Loss on completed contracts

(A) Profit or Loss on Incomplete Contracts

To determine the profits to be taken to Profit and Loss Account, in the case of incomplete contracts, the following situations may arise :

(i) Completion of Contract is Less than 25% : In this case no profit should be taken to Profit and Loss Account.

(ii) Completion of Contract is upto 25% or more but Less than 50% : In this case one-third of the notional profit, reduced in the ratio of cash received to work certified, should be transferred to Profit and Loss Account. It can be expressed as :

$$\frac{1}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

(iii) Completion of Contract is upto 50% or more but Less than 90% : In this case two-third of the notional profit reduced by proportion of cash received to work certified is transferred to Profit and Loss Account. The equation is

$$\frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

(iv) **Completion of Contract is upto 90% or more than 90%, i.e., it is nearing completion :** In this case the profit to be taken to Profit and Loss Account is determined by determining the estimated profit and using any one of the following formula :

$$\begin{aligned} (a) \text{ Estimated Profit} & \times \frac{\text{Work Certified}}{\text{Contract Price}} \\ (b) \text{ Estimated Profit} & \times \frac{\text{Work Certified}}{\text{Contract Price}} \times \frac{\text{Cash Received}}{\text{Work Certified}} \\ & \text{(or)} \\ \text{Estimated Profit} & \times \frac{\text{Cash Received}}{\text{Contract Price}} \\ (c) \text{ Estimated Profit} & \times \frac{\text{Cost of Work to Date}}{\text{Estimated Total Cost}} \\ (d) \text{ Estimated Profit} & = \frac{\text{Cost of Work to Date}}{\text{Estimated Total Cost}} \times \frac{\text{Cash Received}}{\text{Work Certified}} \\ (e) \text{ Normal Profit} & = \frac{\text{Work Certified}}{\text{Contract Price}} \end{aligned}$$

Escalation Clause : This clause is often provided in contracts as safeguard against any likely changes in price or utilization of material and labour. Such a clause in a contract would provide that in the event of a specified contingency happening, the contract price would be suitably enhanced by an agreed formula or factor. This clause is particularly necessary where the prices of a certain raw material are likely to rise, where labour rates are anticipated to increase, or where the quantity of material and labour hours cannot be assessed properly or estimated unless the job has progressed sufficiently.

Cost-Plus Contract : These contracts provide for the payment by the contractee of the actual cost of manufacturing plus a stipulated profit. The profit to be added to the cost may be a fixed amount or it may be a stipulated percentage of cost. These contracts are generally entered into when at the time of undertaking of a work, it is not possible to estimate its cost with reasonable accuracy due to unstable condition of material, labour etc. or when the work is spread over a long period of time and prices of materials, rates of labour etc. are liable to fluctuate.

(B) Profits or Loss on Completed Contracts

When a contract is completed, the overall profit or loss on the contract is transferred to the Profit and Loss Account.

Illustration: 1

The following are the expenses on a contract which commences on 1st Jan. 2003

Materials purchased	1,00,000
Materials on hand	5,000
Direct wages	1,50,000
Plant issued	50,000
Direct expenses	80,000

The contract price was Rs. 15,00,000 and the same was duly received when the contract was completed in August 2003. Charge indirect expenses at 15% on wages, provide Rs. 10,000 for depreciation on plant and prepare the contract account and the contractee's account.

Solution:

Contract Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Materials Purchased	1,00,000	By Materials on hand	5,000
To Direct Wages	1,50,000	By Plant on hand	
To Direct Expenses	80,000	(Rs.50,000 – 10,000)	40,000
To Indirect Expenses } (15% on wages)	22,500	By Contractor's A/c	
To Depreciation on Plant	10,000	(Contract Price)	15,00,000
To Profit & Loss A/c	11,82,500		
	15,45,000		15,45,000

Contractee's Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Contract A/c	15,00,000	By Bank	15,00,000
	15,00,000		15,00,000

Illustration: 2

How much profit, if any, you would allow to be considered in the following case?

Contract cost	Rs. 2,80,000
Contract value	Rs. 5,00,000
Cash received	Rs. 2,70,000
Uncertified work	Rs. 30,000

Deduction from bills by way of security deposit is 10%.

[MBA : Madras, 2001]

Solution:

Cash Received = 100 – 10% = 90% of work certified

Work Certified = Cash Received x $\frac{100}{90}$

$$= 2,70,000 \times \frac{100}{90} = \text{Rs. } 3,00,000$$

Value of work certified	=	Rs.3,00,000
Notional Profit	=	Work in progress – Contract cost
	=	(3,00,000 + 30,000) – 2,80,000
	=	Rs.50,000

Calculation of % of Work Certified

$$= \frac{3,00,000}{5,00,000} \times 100 = 60\%$$

60% of work certified is more than 50% of the contract value.

∴ Profit to be considered for crediting to P & L A/c

$$= \text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= 50,000 \times \frac{2}{3} \times \frac{90}{100} = \text{Rs. } 30,000$$

Alternatively

$$\text{Profit to be taken} = \text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= \text{Rs. } 50,000 \times \frac{2}{3} \times \frac{2,70,000}{3,00,000}$$

$$= \text{Rs. } 30,000$$

Illustration: 3

The following is the ledger balance of Himalayan Construction Company engaged on the execution of ABC Apartments for the year ending 31st March 2003.

Direct Wages	1,25,000
Bank Balances	66,500
Rates and Taxes	7,500
Direct Expenses incurred	2,500
General overhead allocated	6,000
Fuel and power expenses	62,500
Materials issued to contract	7,00,000
Furniture	30,000
Plant and Machinery (60% at site)	12,50,000
Land and Building	11,50,000

The ABC Apartments was commenced on 1st April 2002. Himalayan paid up capital of Rs. 25,00,000. The contract price was Rs. 30,00,000. Cash received on account of contract up to 31st March 2003 was Rs. 9,00,000 (being 90% of the work certified). Work completed but not certified was estimated at Rs. 50,000. As on 31st March 2003 materials at site was estimated at Rs. 15,000. Machinery at site costing Rs. 1,00,000 was returned to stores and wages outstanding were Rs. 2,500. Plant and machinery at site is to be depreciated at 5%.

Prepare the Contract Account and Balance sheet.

Solution:

Himalayan Construction Ltd.
Contract Account
(for the year ended 31st March 2003)

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials	7,00,000	By Materials at site	15,000
To Direct wages	1,25,000	By Machine returned	
To Wages outstanding	2,500	(Rs. 1,00,000 – 5 % of	95,000
To Plant & Machinery as site (60%)	7,50,000	1,00,000)	
To Fuel and Power	62,500	By Plant and Machinery at site (Rs. 6,50,000 – 5%	6,17,500
To Direct expenses	2,500	of Rs. 6,50,000)	
To General overhead	6,000	By Work in Progress :	
To Rates & Taxes	7,500	Rs. 9,00,000 x $\frac{100}{90}$	
To Notional profit c/d	1,21,500	= 10,00,000	
		Uncertified 50,000	10,50,000
	17,77,500		17,77,500
To Profit and Loss A/c		By National Profit b/d	1,21,500
$\left[1,21,500 \times \frac{1}{3} \times \frac{90}{100} \right]$	36,450		
To Work in Progress (Reserve)	85,050		
	1,21,500		1,21,500

Balance Sheet

Liabilities	Amount Rs.	Assets	Amount Rs.
Share Capital	25,00,000	Land and Building	11,50,000
Profit and Loss A/c	36,450	Plant and Machinery at site	6,17,500
Wages Outstanding	2,500	Plant and Machinery (store)	5,95,000
		Furniture	30,000
		Bank Balances	66,500
		Work in Progress:	
		Work Certified 10,00,000	
		Work Uncertified 50,000	
		10,50,000	
		Less : Cash Received 9,00,000	
		1,50,000	
		Less : Reserve 85,050	64,950
		Materials at site	15,000
	25,38,950		25,38,950

Illustration: 4

M/s. Sidhu Associates commenced the work on a particular contract on 1st April 2003. They close their books of accounts for the year on 31st December of each year. The following information is available from their costing records on 31st Dec. 2003. .

	Rs.
Materials sent to site	43,000
Foremen's Salary	12,620
Wages paid	1,00,220

A machine costing Rs. 30,000 remained in use on site for 1/5th of year. Its working life was estimated at 5 years and scrap value at Rs. 2,000.

A supervisor is paid Rs. 2,000 per month and had devoted one-half of his time on the contract.

All other expenses were Rs. 14,000. The materials on site were Rs. 2,500. The contract price was Rs. 4,00,000. On 31st December 2003, 2/3rd of the contract was completed; however, the Architect gave certificate only for Rs. 2,00,000, on which 80% was paid. Prepare Contract Account.

Solution:**Contract Account**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Materials	43,000.00	By Plant	28,880.00
To Direct	1,00,220.00	By Material in hand	2,500.00
To Foremen's Salary	12,620.00	By Work in progress	2,13,143.20
To Plant	30,000.00	(Balance figure)	
To Supervisor	9,000.00		
To Other Expenses	14,000.00		
To Profit & Loss A/c	35,683.20		
	2,44,523.20		2,44,523.20

Working Notes :

(1) Plant A/c :	Rs.
Plant	30,000
Less : Scrap Value	2,000
	28,000

$$\text{Depreciation} = \frac{28,000}{5} \times \frac{1}{5} = \text{Rs. } 1,120$$

$$\text{Net Plant Value} = 30,000 - 1,120 = \text{Rs. } 28,880$$

(2) Calculation of Profit :	Rs.
Expenditure till 31. 12. 2003	2,08,840
Less : Materials and Plant	31,380
	1,77,460
Less : Cost of uncertified work	44,365
	1,33,095
Less : Work Certified	2,00,000
Profit up to date	66,905

Profit on 80%

$$= \frac{66,905}{1} \times \frac{2}{3} \times \frac{80}{100} = \text{Rs. } 35,683.20$$

Cost of Uncertified Work : As the 2/3rd of the work was completed for a cost of Rs. 1,77,460 therefore the estimate for the total cost would be Rs. 2,66,190. Architect's certificate represents ½ of the contract price and therefore cover expenditure of ½ of Rs. 2,66,190, i.e., Rs. 1,33,095. Hence, the cost of work uncertified Rs. 1,77,460 – Rs. 1,33,095 = Rs. 44,365.

Illustration: 5

William Construction Company Ltd. obtained a contract for the erection of a multi-story building. Building operations started in July 2002. The contract price was Rs. 9,00,000. On 30th June 2003, the end of the financial year, the cash received on account was Rs. 3,60,000 being 80% of the amount on the surveyor's certificate.

The following additional information is given below :

	Rs.
Materials issued to contract	1,80,000
Materials on hand 30. 6. 2003	7,500
Wages	2,46,600
Plant purchased specially for contract and to be depreciated at 10% per annum]	30,000
Direct expenses incurred	12,900
General overhead allocated to contract	7,600
Work finished but not yet certified : cost	15,000

You are required to prepare the contract account and statement showing the profit on the contract to 30th June 2003, indicating what proportion of the profit the company would be justified in taking to the credit of the profit and loss account, and to show what entries in respect of the contract would appear in the balance sheet.

Solution:

William Construction Co Ltd.,
Contract A/c for the year ended 30th June 2003

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials	1,80,000	By Plant at site	27,000
To Plant	30,000	By Material in hand	7,500
To Wages	2,46,600	By Cost of Contract c/d	4,42,600
To Direct Wages	12,900		
To Overheads	7,600		
	4,77,100		4,77,100
To Cost of Contract b/d	4,42,600	By Work in Progress:	
To Profit & Loss A/c	11,946	Work Certified	4,50,000
To Work in Progress (Reserve)	10,454	Work Uncertified	15,000
	4,65,000		4,65,000

Statement showing computation of Profit taken to Profit and Loss A/c :

Profit made to date		Rs. 22,400
Profit taken to P & L A/c	}	
$\left[22,400 \times \frac{2}{3} \times \frac{80}{100} \right]$	}	
Since half the contract is complete 2/3rd profit as reduced on cash basis may safely be taken to P & L A/c		Rs. 11,946
Profit taken back to WIP being Reserved carried forward	}	Rs. 10,454

Extract from the Balance Sheet as on 31st June 2003 :

Assets	Rs.	Rs.
Plant at site : cost	30,000	
<i>Less</i> : Depreciation provided	3,000	27,000
Current Assets :		
Work in progress : Work Certified	4,50,000	
Work Uncertified	15,000	
	4,65,000	
<i>Less</i> : Balance of profit not taken to P & L A/c	10,454	
	4,54,546	
<i>Less</i> : Cash received from contractee's	3,60,000	
	93,546	
<i>Add</i> : Materials at site	7,500	1,02,046

Illustration: 6

Paramount Engineers are engaged in construction and erection of a bridge under a long-term contract. The cost incurred up to 31. 03. 2003 was as under :

<i>Fabrication</i>	<i>Rs. in lakhs</i>
Direct Materials	280
Direct Labour	100
Overheads	60
	440
Erection cost to date	110
	550

The contract price is Rs. 11 crores and the cash received on account till 31.03.2003 was Rs. 6 crores.

A technical estimate of the contract indicates the following degree of completion of work :

Fabrication – Direct Materials – 70%, Direct labour and overheads 60%; Erection – 40%.

You are required to estimate the profit that could be taken to profit and loss account against this partly completed contract as at 31.03.2003.

Solution:

Estimated Cost and Profit on Completion of the Contract

<i>Particulars</i>	<i>Cost incurred up to 31.3.03 Rs. in lakhs</i>	<i>Completion %</i>	<i>Estimated cost on completion of 100% Rs. lakhs</i>
Direct Materials	280.00	70%	400.00
Direct Labour	100.00	60%	166.67
Overheads	60.00	60%	100.00
Erection	110.00	40%	275.00
Total	550.00		941.67
Contract Price	—		1,100.00
Profit on completion (1,100 – 941.67)			158.33

Profit on cost of Rs.941.67 lakhs is Rs.158.33 lakhs. Therefore, profit on cost to date of Rs.550 lakhs.

$$= \frac{550 \times 158.33}{941.67} = \text{Rs. } 92.48 \text{ lakhs}$$

Work Certified = Cost + Profit
 = Rs. 550 + Rs. 92.48 = Rs. 642.48 lakhs

Degree of completion of contract is :

$$= \frac{642.48 \times 100}{1,100} = 58.41 \%$$

The contract is more than half complete.

Profit to be taken to Profit and Loss Account of the year is :

$$= \frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= \frac{2 \times 92.48 \times 600}{3 \times 642.48} = \text{Rs. } 57.58 \text{ lakhs.}$$

Illustration: 7

The following information relates to a building contract for Rs. 1,00,00,000

	<i>2002 Rs.</i>	<i>2003 Rs.</i>
Materials issued	30,00,000	8,40,000
Direct Wages	2,20,000	10,50,000
Indirect Expenses	60,000	14,000
Work Certified	75,00,000	1,00,00,000
Work Uncertified	80,000	-
Materials at site	50,000	70,000
Plant issued	1,40,000	20,000
Cash received from contractor	60,00,000	10,00,000

The value of plant at the end of 2002 and 2003 was Rs. 70,000 and Rs. 50,000 respectively.

Solution:**Contract Account for 2002**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To materials issued	30,00,000	By Materials at site	50,000
To Direct wages	23,00,000	By Plant at site	70,000
To Direct Expenses	2,20,000	By work in progress :	
To Indirect Expenses	60,000	Work certified	75,00,000
		Work uncertified	80,000
			75,80,000
To Plant Issued	1,40,000		
To profit c/d	19,80,000		
	77,00,000		77,00,000
To profit & Loss A/c	10,56,000	By profit b/d	19,80,000
To work in progress	9,24,000		
	19,80,000		19,80,000

Profit taken to profit & Loss A/c :

$$= \text{Total profit} \times \frac{2}{3} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= \text{Rs. } 19,80,000 \times \frac{2}{3} \times \frac{50,00,000}{75,00,000} = \text{Rs. } 10,56,000$$

Contractee's Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
2002 To Balance c/d	60,00,000	2002 By cash	60,00,000
	60,00,000		60,00,000
2003 To Contract A/c	1,00,00,000	2003 By Balance b/d	60,00,000
	1,00,00,000	By cash	40,00,000
			1,00,00,000

Contract Account for 2003

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To materials at site b/d	50,000	By Material at site	70,000
To Plant at site b/d	70,000	By Plant at site	50,000
To work in progress: (75,80,000-9,24,000)	66,56,000	By Contract A/c	1,00,00,000
To Materials issued	8,40,000		
To Direct wages	10,50,000		
To Direct Expenses	1,00,000		
To Indirect Expenses	14,000		
To Plant Issued	20,000		
To Profit & Loss A/c	13,20,000		
	1,01,20,000		1,01,20,000

Illustration: 8

The following figures were in respect of contract No: 999 of L & T Construction Ltd. for the year 2003:

	<i>Rs.</i>
Materials purchased and delivered to work site	4,50,000
Materials issued from site stores	45,000
Materials returned to stores	5,000
Site wages	1,50,000
Site office expenses	20,000
Plant transferred to site	50,000
Plant returned from site	15,000
Consulting and design fees	13,000
Sub contract work	52,000

Central Office Overhead @ 10% Site Wages

The year end figures were in respect of Contract No. 999 of L & T Construction Ltd.

	<i>Rs.</i>
Plant at site	18,000
Material at site	10,000
Prepayments	2,000
Accruals	3,000
Cost of work done but not certified	35,000
Value of work certified by Architect	8,63,000

On account payment received by L & T Construction Ltd. less 10% retention money; prepare : (a) Contract Account (b) Profit and Loss on Contract Account and (c) Customer's Account.

I. Contract Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Materials purchased and delivered to work at site	4,50,000	By Materials at site	10,000
To Materials issued	45,000	By Materials returned to stores	5,000
To Site wages	1,50,000	By cost of contract c/d	7,48,000
To Site office expenses	20,000		
<i>Add : Accruals :</i>	3,000		
	23,000		
<i>Less : Prepayments</i>	2,000		
	21,000		
To Plant	50,000		
<i>Less : Returned</i>	15,000		
	35,000		
<i>Less : Plant at site</i>	18,000		
	17,000		
Depreciation on plant	17,000		
To Consulting & Design fees	13,000		
To Sub-contract work	52,000		
To Central office overhead 10% of site wages]	15,000		
	7,63,000		7,63,000

II. Profit and Loss on Contract Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Cost of Contract b/d	7,48,000	By contractee A/c Value of work certified	8,63,000
To P & L A/c Profit taken	90,000	By cost of work not certified	35,000
To Profit in Reserve	60,000		
	8,98,000		8,98,000

Note: In the absence of total contract value, it has been presumed that the work has been reasonably advanced. Hence the following formula is to be applied in order to arrive at the profit to be taken to P & L A/c :

$$2/3 \times \text{National Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

Notional Profit

		<i>Rs.</i>
Value of work certified		8,63,000
Cost of contract	Rs. 7,48,000	
Less : Cost of work not certified	Rs. 35,000	7,13,000
Notional Profit		1,50,000

$$\begin{aligned} \text{Cash Received} &= \text{Rs. } 8,63,000 - 10\% \text{ retention money} \\ &= \text{Rs. } 8,63,000 - 86,300 = \text{Rs. } 7,76,700 \end{aligned}$$

$$\begin{aligned} \text{Profit to be taken to P \& L A/c} &= \frac{2}{3} \times 1,50,000 \times \frac{7,76,700}{8,63,000} \\ &= \text{Rs. } 90,000 \end{aligned}$$

III. Contractee Accountant

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To contract A/c	8,63,000	By Cash A/c	7,76,700
	8,63,000	By Balance c/d	86,300
To Balance b/d	86,300		8,63,000

QUESTIONS

1. What do you understand by Contract Costing?
2. Explain the essential features of Contract Costing?
3. Explain the important costing procedure of Contract Costing?
4. Write short notes on :
 - (a) Sub-Contracts

- (b) Work Certified
- (c) Cost-Plus Contract
- (d) Escalation Clause
- (e) Work Uncertified

5. Explain and determine the profit to be taken to profit and loss account in case of incomplete contract.

Choose the correct answer :

1. Contract costing is a basic method of
 - (a) Historical costing
 - (b) Specific order costing
 - (c) Process costing
 - (d) Standard costing
2. Contract costing usually applicable in
 - (a) Constructional Works
 - (b) Textile Mills
 - (c) Cement Industries
 - (d) Chemical Industries
3. In contract costing, determination of work in progress include :
 - (a) Work Certified
 - (b) Work Uncertified
 - (c) Retention Money
 - (d) Both a and b
4. Work Certified is valued at
 - (a) Cost price
 - (b) Market price
 - (c) Cost or market price whichever is less
 - (d) Estimate price
5. The degree of completion of work is determined by comparing the work certified with
 - (a) Contract price
 - (b) Work in progress
 - (c) Cash received on contract
 - (d) Retention money
6. In contract costing credit is taken only for a part of the profit on
 - (a) Completed contract
 - (b) In complete contract
 - (c) Cost-plus contract
 - (d) Work Certified
7. Escalation Clause in a contract to protect the interest of
 - (a) Contractor
 - (b) Contractee
 - (c) Surveyor
 - (d) Contractee's Architect
8. In contract costing payment of cash to the contractor is made on the basis of
 - (a) Uncertified work
 - (b) Certified work
 - (c) Work in progress
 - (d) Estimated value
9. Materials returned under material return note credited to
 - (a) Contract account
 - (b) Work in progress account
 - (c) Plant and machinery account
 - (d) Profit and loss A/c
10. Cash received on contract is credited to
 - (a) Contract Account
 - (b) Plant Account
 - (c) Work in Progress Account
 - (d) Contractee's Account

[Ans : (1) b – Specific order costing (2) a – Constructional works (3) d – Both a and b (4) a – Cost price (5) a – Contract price (6) b – Incomplete Contract (7) b – Contractee Account (8) b – Certified Work (9) a – Contract Account (10) d – Contractee's account.]

PRACTICAL PROBLEMS

(1) Kishore undertook a contract for the construction of houses on 1st Jan. 2003. The contract price was Rs. 22,50,000. The following details are available for 2003

Materials purchased	3,60,000
Materials issued from stores	45,000
Labour	1,35,000
Plant installed at site	1,80,000
Direct expenses	90,000
Establishment charges	22,500
Materials returned to stores	22,500
Materials on hand at the end	9,000
Plant in hand at the end	1,35,000
Wages outstanding	27,000
Direct expenses outstanding	36,000
Work uncertified	2,25,000
Cash received (80% of work certified)	9,00,000

Prepare the Contract Account. Show the relevant items in the balance sheet.

[Ans : Profit taken Rs. 3,31,200 ; WIP Rs. 1,60,200 ; Asset side Rs. 3,26,700]

(2) A Contractor's firms, having undertaken construction work at a contract price of Rs. 2,50,000, began the execution of the work on 1st July 2003. The following are the particulars of the contract up to 31st December 2003 :

Machinery installed at site	15,000
Materials sent to site	85,349
Labour at site	74,375
Chargeable expenses	3,167
Overhead allocated	4,126
Materials returned from site	550
Work certified by the Architect	1,95,000
Cash received	1,50,000
Cost of work not yet certified	4,500
Materials on hand 31.12.2003	1,883
Wages occurred due on 31.12.2003	2,690
Value of machinery as on 31.12.2003	11,000

Draw up the contract account showing therein the profit that should be taken to the credit of the profit and loss account for the year ended 31st December 2003. Give reasons for your treatment of the profit on the uncompleted contract.

[Ans : Gross profit Rs. 28,226 ; Amount credited to profit and loss A/c Rs. 14,475]

(3) M/s Kishore and Company commence work on a particular contract on 1st April 1997. They close their books of accounts for the year on 31st December each year. The following information is available from their closing records on 31.12.2003 :

Materials sent to site	50,000
Foreman's salary	12,000
Wages paid	1,00,000

A machine costing Rs.32,000 remained in use on site for 1/5th of the year. Its working life was estimated at 5 years and scrap value at Rs. 2000. A supervisor is paid Rs. 2000 per month and had devoted one-half of his time on the contract. All other expenses were Rs.15,000. The material on site was Rs.9000. The contract price was Rs.4,00,000 on 31st December, 2/3rd of the contract was completed. However, the Architect gave certificate only for Rs. 2,00,000 on which 75% was paid .

Prepare the Contract Account in the Company's book.

[Ans : Notional profit Rs. 66,350, WIP Rs. 33,175]

(4) A Contractor obtained a contract for Rs. 6,00,000 on 1st January 2003. The expenses incurred during the year ended 31st December, 2003 were as under :

Materials	1,80,000
Wages paid	1,60,000
Wages occurred	10,000
Other expenses	25,000

The plant specially installed for the contract worth Rs. 45,000 was returned to the stores subject to the depreciation of 20% materials on 31st December 2003, were valued at Rs. 24,000.

Upto 31st December, the contractor had received Rs.3,60,000 in cash representing 80% of the Work Certified. Work uncertified was estimated at Rs.4000. Prepare the Contract Account, showing the profit for the year. Also how the value of work in progress would appear in the Balance Sheet as on 31st December 2003.

[Ans : Profit to P & L A/c Rs. 50,133.33; Profit to reserve Rs. 43,866.67]

(5) Write up a contact account from the following particulars :

Direct materials	39,600
Wages	26,400
Special plant	17,600
Stores issued	7,040
Loose tools	3,300
Cost of Tractor :	
Running materials	2,200
Wages of driver	3,520
Other direct charges	2,640

The contract was completed in 13 weeks at the end of which period the plant was returned subject to a depreciation of 15% on the original cost. The values of loose tools and stores returned were Rs. 2,200 and Rs. 890 respectively. The value of the tractor was Rs. 20,000 and a depreciation was to be charged to this contract at the rate of 15% per annum. You are required to provide administration expenses at the rate of 10% on the total works cost.

[Ans : Administration cost Rs. 8,500; works cost Rs. 85,000]

(6) Gupta & Co. Ltd. commenced the work on a particular contract on 1st April 2003. They close their books of accounts for the year on 31st December each year. The following information is available from their costing records on 31st December 2003.

	Rs.
Material sent to site	5,00,000
Furemen's Salary	1,20,000
Wages paid	10,00,000

A machine costing Rs. 3,20,000 remained in use on site for 1/5th of the year. Its working life was estimated at 5 years and scrap value at Rs. 20,000. The supervisor is paid Rs. 20,000 per month and had devoted one-half of his time on the contract.

All other expenses were Rs. 1,50,000. The materials on site were Rs. 90,000. The contract price was Rs. 40,000. On 31st December 2003, 2/3 of the contract was completed; however the Architect gave certificate only for Rs. 20,00,000 on which 75% was paid. Prepare the contract Account.

[Ans: Contract A/c: National profit Rs. 6,63,500; Estimated total cost of contract Rs. 26,73,000; Cost of work certified Rs. 4,45,500]

(7) Pandey & Co. Ltd. undertook a contract for erecting a sewerage treatment plant for a city for a total value of Rs. 2.4 crores. It was expected that the contract would be completed by 31st March 2003. You are required to prepare a contract account for the year ending 31st March 2002 from the following particulars :

	Rs.
(a) Materials	30 lakhs
(b) Wages	60 lakhs
(c) Overheads	12 lakhs
(d) Special plant	20 lakhs

(e) Depreciation @ 10% to be provided on plant.

(f) Materials laying at site on 31.12.2002 Rs. 4 lakhs

(g) Work certified was to the extent of Rs. 1.6 crores and 80% of the same was received in cash.

(h) 5% of the value of material issued and 6% of wages may be taken to have been incurred for the portion of the work completed but not yet certified.

(i) Overheads are charged as a percentage of direct wages.

(j) Ignore depreciation on plant for use on uncertified portion of the work.

(k) Ascertain the amount to be transferred to Profit & Loss A/c on the basis of realized profit.

[Ans: Work uncertified Rs. 58,02,000; Amount transferred to P&L A/c Rs. 35,10,400; National Profit Rs. 65,82,000]

(8) Gupta & Co. Ltd. Civil Engineering Contractor propose to tender for the construction of a Seminar Hall in a Educational Institution and estimate their direct costs as Rs. 15,00,000.

	Rs.
Direct Materials	6,00,000
Direct Labour (2100 man days of various categories)	6,30,000
Cost of transport of men and materials to work site	1,70,000
Other direct expenses	1,00,000

Existing commitments of modern construction for the year necessitate an overhead expense of Rs. 85,05,000 against execution of works, the direct labour cost of which amount to 56,70,000. Assuming that whole of the overhead expense is variable (for the sake of simplicity and tendering calculate the estimated value of tendering duly providing for (a) necessary overheads (b) Interest at 5% on the average of capital outlay and (c) 10% margin.

[Ans: Price to be quoted Rs. 27,56,740]

(9) From the following information of Nigma & Co. Ltd. prepare the contract account for 2003. Also show what part of the Profit on the contract should be taken credit of 2003?. The contract price for Rs. 80,00,000.

	Rs.
Materials issued from stores	15,00,000
Wages paid	22,00,000
General charges	80,000
Plant installed at Site on 1 st July 2003	4,00,000
Materials on hand at close	80,000
Wages accrued due	80,000
Work certified	40,00,000
Work compiled but not certified	1,20,000
Cash received	30,00,000

Materials transferred to other contracts	80,000
Materials received from other contracts	20,000

Depreciation on plant is to be provided at 10% P.A.

[Ans: National profit Rs. 3,80,000; Work uncertified Rs. 1,20,000; Transfer to P&L A/c Rs. 1,90,000]

(10) The following is the information relating to contract No. 555

	Rs.
Contract price	6,00,000
Wages	1,64,000
General Expenses	8,600
Raw materials	1,20,000
Plant	20,000

As on date, cash received was Rs. 2,40,000 being 80% of work certified. The value of materials remaining was Rs. 10,000. Depreciate plant by 10%. Prepare contract Account showing profit to be credited to Profit and Loss A/c.

[Ans: National profit c/d Rs.. 3,00,000; Transfer to P&L A/c Rs. 8,213]



CHAPTER 23

Uniform Costing

Meaning

Uniform Costing is not a distinct method of costing. In fact when several undertakings start using the same costing principles and or practices, they are said to be following uniform costing. The basic idea behind uniform costing is that the different firms in an industry should adopt a common method of coding and apply uniformly the same principles and techniques for better cost comparison and common good.

Objectives

- (1) Facilitates cost control and cost reduction.
- (2) Fixing of common sales price among the different units.
- (3) Improving performance of inefficient units by adopting uniform principle and practices.
- (4) Facilitates inter-firm comparison of cost of production.
- (5) Establishment of common standard for the operations of different units.
- (6) Formulation of common policies, methods and procedures for the participating units.
- (7) Ensures reasonable price to customers and profits to producers.
- (8) Facilitates exchange of ideas and sharing experience to improve the overall performance of common units.
- (9) Avoidance of monopolistic trade practice among member units.
- (10) To ensures steady demand and supply of finished goods for participating units.

Essential Requisites for Installation of Uniform Costing

The following are the essential requisites to be considered for the installation of uniform costing system :

- (1) The firms in the industry should be willing to share / furnish relevant data / informations.
- (2) A spirit of co-operation and mutual trust should prevail among the participating firms.

- (3) Mutual exchange of ideas, methods used, special achievements made, research and know-how etc. should be frequent.
- (4) Bigger firms should take the lead towards sharing their experience and know-how with the smaller firms to enable the latter to improve their performance.
- (5) Uniformity must be established with regard to several points before the introduction of uniform costing in an industry. Uniformity should be with regard to the following points.
 - (a) Size of various units covered by uniform costing.
 - (b) Production methods.
 - (c) Accounting methods, principles and procedures used.

Advantages of Uniform Costing

The following are the important advantages of Uniform Costing :

- (1) Uniform Costing facilitates cost comparison among different units which helps to measure the performance of individual units.
- (2) Adopting uniform costing technique ensures the efficiency of productivity.
- (3) Effective cost control and cost reduction is possible.
- (4) It helps to improve the performance of un profitable activities or operations.
- (5) Effective co-operation and co-ordination among the employees and employer is possible.
- (6) It helps to the Government for fixing the sales price, granting subsidy and formulating policies etc.
- (7) It ensures the fixing of minimum wage or fair wage structure in all common units.
- (8) Unhealthy or monopolistic competition can be eliminated.
- (9) It helps to the management in exercising decisions regarding make or buy, exporting and key factors of common units.
- (10) It encourages smaller firms to improve their productivity at lowest cost.

Limitations of Uniform Costing

- (1) It may not be possible to adopt uniform standard methods and procedures of costing in different firms because of different circumstances in which they operate.
- (2) Disclosure of cost information is the essential requirement. Many firms do not wish to share such information with their competitors.
- (3) Small firms believe that uniform costing is only meant for big and medium sized firms because the small firms cannot afford it.
- (4) It induces monopolistic trend because due to which prices may be increased artificially and supplies withheld.

Inter-Firm Comparison

Inter-Firm Comparison is the technique of evaluating the performance, efficiencies, costs and profits of firms in an industry.

Essential Requisites of Inter-Firm Comparison

The following are the essential requisites of inter-firm comparison to be considered to achieve the objectives of the concern :

- (1) There must be a center for inter-firm comparison.
- (2) Firms should become members of that center.
- (3) The nature of information to be collected should be decided upon.
- (4) The method of collection and presentation of information should be laid down.

Advantages of Inter-Firm Comparison

- (1) It is a yardstick of performance. It helps to evaluating the over all performance of the concern.
- (2) It facilitates cost control and cost reduction among participating industries.
- (3) It creates cost consciousness among the personnel.
- (4) Inter-firm comparison helps to reveal the efficiency and inefficiency of performance. The inefficiency operations is analysed and immediate actions can be taken.
- (5) It helps to the management in formulating policies and production planning.
- (6) It is a guide to the experts in the field of research and development in future.
- (7) It provides necessary information to the management of participating units to make proper decisions.

Disadvantages

- (1) Lack of suitable base for inter firm comparison.
- (2) Participating firms are not willing to disclose their true facts and figures.
- (3) Lack of confidence and good faith among common units, lead to difficult in measure the operational efficiency.
- (4) For small concerns, inter-firm comparison is expensive.
- (5) Shortage of expert personnel.

QUESTIONS

1. What do you understand by uniform costing?
2. Define Uniform Costing. Explain its objectives.
3. Explain the essential requisites for installation of Uniform Costing.
4. What are the advantages and disadvantages of Uniform Costing?
5. What do you understand by inter-firm comparison?
6. Explain the advantages and disadvantages of inter-firm comparison.

CHAPTER 24

Activity-Based Costing (ABC)

Meaning

Activity-Based Costing (ABC) is that costing in which costs begin with tracing of activities and then to producing the product. In other words, it is the process of costing system which focuses on activities performed to produce products. This system assumes that activities are responsible for the incurrence of costs and products creates the demand for activities. Costs are charged to products based on individual product's use of each activity.

ABC aims at identifying as many costs as possible to be subsequently accounted as direct cost of production. Any cost that is traced to a particular product via its consumption of activity becomes direct of the product. For instance, in conventional costing system, cost of setup and adjustment time is considered as factory overhead and subsequently assigned to different products on the basis of direct labour hours. But in Activity-Based Costing, setup and adjustment time is determined for each product and its costs are directly charged to each product. Thus, by emphasizing activities, ABC tries to ascertain the factors that cause each major activity, cost of such activities and the relationship between activities and products produced.

According to professor Vipul "Activity-Based Costing had its genesis in the increasing importance of indirect costs in the manufacturing operations. The direct processing costs which are easier to handle are being relegated to the background with each passing day due to automation. In this changing scenario where indirect costs far outweigh the direct processing costs in many a situation, one cannot be content with rough and ready methods of yester years in dealing with indirect costs."

Different Stages in Activity-Based Costing

There are different activities in ABC costing. The following are the important stages of Activity-Based Costing :

- (1) Identify the different activities within the organisation.
- (2) Relate the overhead cost to the activities.
- (3) Support activities are then spread across the primary activities.

- (4) Determine the activity cost drivers.
- (5) Calculate the activity cost drivers rate, i.e., the quantity of cost driver used by each product.

ABC and Cost Drivers

In Activity-Based Costing, activities are identified and classified into different categories that have relationship with the different stages or parts of the production process. The factors that influence the cost of a particular activity are known as "Cost Drivers." A Cost Driver is literally the factors, forces or events that determine the cost of activities. The process of activity-based costing is based on the assumption that cost behaviour is influenced by cost drives. It should be understood that direct costs do not need cost drivers because direct costs are themselves cost drivers. They can be traced by direct relationship with the different parts of product.

However, all other factory, office and administrative overheads need cost drives.

Examples of Cost Drivers

In order to trace overhead costs to manufacturing a product, suitable Cost Drivers should be identified. The following are the few examples of Cost Drivers in Activity-Based Costing :

<i>Cost Drivers</i>	<i>Activity</i>
(1) Number of receiving order	Ordering
(2) Number of deliveries	Delivery
(3) Number of Purchase orders	Order Taking
(4) Kilometres travelled per delivery	Deliveries
(5) Number of customers' visits	Customer Visit
(6) Number placing orders for purchase	Placing Orders
(7) Number of returning or empty bottles	Bottles Returns
(8) Number Material handling hours	Product Handling
(9) Amount of labour cost incurred	Labour Transactions
(10) Number of inspections	Inspection
(11) Number of physical delivery and receipt of goods]	Delivery

Classification of Activities

In the first stage of the Activity-Based Costing activities are identified and classified into different categories or segments of the production process. The grouping of activities is preferably done using the different levels at which activities are performed. Broadly, activities are classified into :

- (1) Unit Level Activities
- (2) Batch Level Activities
- (3) Product Level Activities
- (4) Facility Level Activities

(1) Unit Level Activities : Unit Level Activities are those activities which are performed each time a single product or unit is produced. These activities are repetitive in nature. For example, direct labour hours, machine hours, powers etc. are the activities used for each time for producing a single unit. Direct materials and direct labour activities are also unit level activities, although they do not overhead costs. Cost of unit level activity vary with the number of units produced.

(2) Batch Level Activity : These activities which are performed each time a batch of products or group of identical products are produced. All the units of a particular batch are uniform in nature and in size. The cost of batch level activities vary with the number of batches are ascertained. Machine setups, inspections, production scheduling, materials handling are examples of batch level activities which are related to batches.

(3) Product Level Activities : These activities which are performed to support the production of each different type of product. Maintenance of equipment, engineering charges, testing routines, maintaining bills of materials etc. are the few examples of product level activities.

(4) Facility Level Activities : Facility Level Activities are those which are needed to sustain a factory's general manufacturing process. These activities are common to a variety of products and are most difficult to link to product specific activities. Factory management, maintenance, security, plant depreciation are the few examples of facility level activities.

Difference Between Activity-Based Costing and Conventional Costing

<i>Activity-Based Costing</i>	<i>Conventional Costing (or) Traditional Costing</i>
(1) It begins with identifying activities and then to producing the products	(1) It begins with identifying cost and then to producing the products
(2) It mainly focuses on activities performed to produce products	(2) It emphasises mainly on ascertainment of costs after they have been incurred
(3) Cost Drivers used for identifying the factors that influence the cost of particular activity	(3) Cost unit is used for allocation and accumulation of costs
(4) Overhead costs are assigned to Cost Centre or Cost Pools	(4) Overhead costs are assigned to production departments or service departments
(5) Overhead costs are assigned to products using Cost Drivers Rates	(5) Overheads allocated on the basis of departmental overhead allocation rate
(6) Variable overhead is appropriately identified to individual products	(6) Costs may be allocated or assigned either on actual cost incurred or on standard cost basis
(7) In ABC many activity based on Cost Pools or Cost Centres are created	(7) Overheads are pooled and collected department wise
(8) There is no need to allocate and re-distribution of overhead of service departments to production departments	(8) The process of allocation and re-distribution of the costs of the service departments to production department is essential to find out total cost of production
(9) It assumes that fixed overhead costs vary in proportion to changes in the volume of output.	(9) It assumes that fixed overheads do not vary with changes in the volume of output.

Advantages of Activity-Based Costing

ABC system is a very valuable tool of control. It offers a number of advantages to the management and the following are the main advantages :

- (1) It brings accuracy and reliability of the costing data in determination of the cost of the products.
- (2) It facilitates cause and effect relationship to exercise effective cost control.
- (3) It provides necessary cost information to the management to take decisions on any matter, relating to the business.
- (4) It is much helpful in fixing the cost and selling price of a product.
- (5) It facilitates overhead costs allocate directly to the specific product.
- (6) It enables to manage the activities rather than costs.
- (7) It helps to remove all types of wastages and inefficiencies.
- (8) It provides valuable information to evaluate on the relative efficiencies of various plants and machinery.
- (9) Cost Driver Rates will help in significant impact on the development of new products or modification of existing products.

Essentials Factors of a Good Activity-Based Costing System

The success of the Activity-Based Costing system depends on the following factors :

- (1) Objectives of costing system and level of competition.
- (2) Number of products manufactured.
- (3) Product diversity and the business.
- (4) Adaptation of cost management measures, standardization and technical aspects.
- (5) Degree of sophistication and suitability to the firm.
- (6) Determination of single or combined Cost Driver.
- (7) Determination number of Activity Centre, Cost Pools and Cost Drivers.
- (8) Determination of total overhead costs and economy.
- (9) Evaluation of trade off between measurement of costs and cost of errors.
- (10) Elasticity and adoptive to the changing circumstances.

Illustration: 1

Indian pottery company is noted for a full line of quality products. The company operates one of the plants in Mumbai. That plant produces two types of products: Indian design A, and contemporary B, Rajan the president of the company, recently decided to change from a volume-based costing system to an activity-based costing system. Before making the change company wide he wanted to assess the effect on the product cost of the Mumbai plant. This plant was chosen because it produces only two types of products, most other plants produced at least a dozen. To assess the effect of the change, the following data have been gathered :

Products	Quantity	Prime Cost	Machine Hours	Material Moves	Setups
Indian A	2,00,000	7,00,000	50,000	7,00,000	100
Contemporary B	50,000	1,50,000	12,500	1,00,000	50
Total Value (Rs.)	—	8,50,000	2,50,000	3,00,000	15,000

Rs. 2,50,000 is the cost of maintenance of machine.

Under the current system, the cost of maintenance, material handling and setups are assigned to the products on the basis of machine hours.

Required

- Compute the unit cost of each product using the current unit-based approach.
- Compute the unit cost of each product using an activity-based costing approach.

Solution:

- Total overhead is Rs. 10,00,000. The plant wide rate is Rs. 16 per machine hour (Rs. 10,00,000 ÷ 6,25,000)

Overhead is assigned as follows :

$$\begin{aligned} \text{Indian A} &= \text{Rs. } 16 \times 50,000 = \text{Rs. } 8,00,000 \\ \text{Contemporary B} &= \text{Rs. } 16 \times 12,500 = \text{Rs. } 2,00,000 \end{aligned}$$

The unit costs for the two products are as follows :

$$\begin{aligned} \text{Indian} &= \frac{\text{Rs. } 8,00,000 + 7,00,000}{2,00,000} = \text{Rs. } 7.50 \\ \text{Contemporary} &= \frac{\text{Rs. } 2,00,000 + 1,50,000}{50,000} = \text{Rs. } 7.00 \end{aligned}$$

- In the activity-based approach, the consumption ratios are different for all three overhead activities, so overhead pools are formed for each activity. The overhead rates for each of these pools are as follows :

$$\begin{aligned} \text{Maintenance} &= \frac{\text{Rs. } 2,50,000}{62,500} = \text{Rs. } 4 \text{ per hour} \\ \text{Material handling} &= \frac{\text{Rs. } 3,00,000}{8,00,000} = \text{Rs. } 0.375 \text{ per move} \\ \text{Setup} &= \frac{\text{Rs. } 4,50,000}{150} = \text{Rs. } 3,000 \text{ per setup} \end{aligned}$$

Overhead is assigned as follows :

Indian A :		Rs.
Maintenance	= Rs. 4 x 50,000	= 2,00,000
Material handling	= Rs. 0.375 x 7,00,000	= 2,62,500
Setup Cost	= Rs. 3000 x 100	= 3,00,000
	Total Overhead	= <u>7,62,500</u>

Contemporary B :			Rs.
Maintenance	=	Rs. 4 x 12,500	= 50,000
Material handling	=	Rs. 0.375 x 1,00,000	= 37,500
Setup Costs	=	Rs. 3000 x 50	= 1,50,000
		Total Overhead	= <u>2,37,500</u>

This produces the following unit costs

Indian A :			Rs.
Prime Cost	=	7,00,000	
Add : Total Overhead Costs	=	7,62,500	
Total Costs	=	<u>14,62,500</u>	
Units Produced	=	<u>2,00,000</u> units	

$$\text{Unit Cost} = \frac{\text{Rs. } 14,62,500}{2,00,000} = \text{Rs. } 7.31 \text{ per unit}$$

Contemporary B :			Rs.
Prime Cost	=	1,50,000	
Add : Total Overhead Costs	=	2,37,500	
Total Costs	=	<u>3,87,500</u>	
Units Produced	=	50,000 units	

$$\text{Unit Cost} = \frac{\text{Rs. } 3,87,500}{50,000} = \text{Rs. } 7.75 \text{ per unit}$$

Illustration: 2

Family store wants information about the profitability of individual product lines : Soft drinks, Fresh Produce and Packaged food. Family store provides the following data for the year 2002-03 for each product line :

<i>Particulars</i>	<i>Soft Drinks</i>	<i>Fresh Produce</i>	<i>Packaged Food</i>
Revenues	Rs. 7,93,500	Rs. 21,00,600	Rs. 12,09,900
Cost of goods sold	Rs. 6,00,000	Rs. 15,00,000	Rs. 9,00,000
Cost of bottles returned	Rs. 10,000	Rs. 0	Rs. 0
Number of purchase orders placed	360	840	360
Number of deliveries Received	300	2,190	660
Hours of shelf-stocking Time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2002-2003

Activity	Description of Activity	Total Cost	Cost – allocation Base
Bottles returns	Returning of empty-bottles to store	Rs. 12,000	Direct tracing to soft-drink line
Ordering	Placing of orders for purchases	Rs. 1,56,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	Rs. 2,52,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and On-going restocking	Rs. 1,72,800	8,640 hours of shelf-stocking time
Customer support	Assistance provided to customers including check-out	Rs. 3,07,200	15,36,000 items sold

Required

- (1) Family store currently allocates support cost (all costs other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. Calculate the operating income and operating income as a % of revenues for each product line.
- (2) If family store allocate support costs (all costs other than cost of goods sold) to product lines using an Activity-Based Costing System, calculate the operating income as a % of revenues for each product line.
- (3) Comment on your answers in requirement (1) and (2)

[CA, May, 2003]

Solution:

- (i) **Calculation of Operating Income and Operating Income as a % of revenues for each product line :**

Particulars	Soft Drinks Rs.	Fresh Produce Rs.	Packaged Foods Rs.	Total Rs.
Revenues	7,93,500	21,00,000	12,09,900	41,04,000
Cost of Goods Sold	6,00,000	15,00,000	9,00,000	30,00,000
Store Support Cost (30%)	1,80,000	4,50,000	2,70,000	9,00,000
Total Cost	7,80,000	19,50,000	11,70,000	39,00,000
Operating Income	13,500	1,50,600	39,900	2,04,000
Operating Income as % of revenue	1.70%	7.17%	3.30%	4.97%

- (ii) **The activity rates are as follows :**

Activity	Cost Hierarchy	Total Cost Rs.	Qty. of Cost Allocation Base	Overhead Allocation Rate
Ordering	Batch Level	1,56,000	÷ 1,560 Purchase Orders	= Rs. 100 per order
Delivery	Batch Level	2,52,000	÷ 3,150 delivers	= Rs. 80 per delivery
Shelf Stocking	Output Unit Level	1,72,800	÷ 8,640 hours	= Rs. 20 per hour
Customer Support	Output Unit Level	3,07,200	÷ 15,36,000 items sold	= Rs. 0.20 per items sold

Cost Allocation Statement Under Activity-Based Costing System

Particulars	Soft Drinks Rs.	Fresh Produce Rs.	Packaged Foods Rs.	Total Rs.
Revenues (1)	7,93,500	21,00,000	12,09,900	41,04,000
Cost of goods sold	6,00,000	15,00,000	9,00,000	30,00,000
Bottle – Return cost	12,000	—	—	12,000
Ordering cost } @ Rs. 100 }	36,000 (360 x 100)	84,000 (840 x 100)	36,000 (360 x 100)	1,56,000
Delivery cost } @ Rs. 80 }	24,000 (300 x 80)	1,75,000 (2,190 x 80)	52,800 (660 x 80)	2,52,000
Shelf stock cost } @ Rs. 20 }	10,800 (540 x 20)	1,08,000 (5,400 x 20)	54,000 (2700 x 20)	1,72,800
Customer support cost } @ Rs. 0.20 }	25,200 (1,26,000 x 0.20)	2,20,800 (11,04,000 x 0.20)	61,200 (3,06,000 x 0.20)	3,07,200
Total Cost (2)	7,08,000	20,88,000	11,04,000	39,00,000
Operating Income } (1) – (2) }	85,500	12,600	1,05,900	2,04,000
Operating Income as % } of Revenue }	10.78%	0.60%	8.75%	4.97%

(iii) Managers believe the Activity-Based Cost (ABC) system is more credible than the previous costing system. The ABC system distinguishes the different type of activities at Family store more precisely. It also tracks more precisely how individual product lines use resources.

Soft drink consume less resources than either fresh produce or packaged food. Soft drinks have fewer deliveries and require less Shelf-Stocking time.

Managers of Family Stores can use ABC information to guide their decisions, such as how to allocate a planned increase in floor space. Pricing decisions can also be made in a more informed way with ABC information.

Illustration: 3

Alpha Limited has decided to analyse the profitability of its few new customers. It buys bottled water at Rs.90 per case and sells to retail customers at a list price of Rs.108 per case. The data pertaining to five customers are :

Particulars	A	B	C	D	E
Case Sold	4,680	19,688	1,36,800	71,550	8,775
List selling price	Rs. 108	Rs. 108	Rs. 108	Rs. 108	Rs. 108
Actual selling price	Rs. 108	Rs. 106.20	Rs. 99	Rs. 104.40	Rs. 97.20
Number of purchase Orders	15	25	30	25	30
Number of customer Visits	2	3	6	2	3
Number of Deliveries	10	30	60	40	20
Kilometers traveled Per delivery	20	6	5	10	30
Number of expedited Deliveries	0	0	0	0	1

Its five activities and their cost drivers are :

Activity	Cost Driver Rate
Order taking	Rs. 750 per purchase order
Customer visits	Rs. 600 per customer visit
Deliveries	Rs. 5.75 per delivery k.m. travelled
Product handling	Rs. 3.75 per case sold
Expedited deliveries	Rs. 2,250 per expedited delivery

Required

- Compute the customer level operating income of each of five retail customers now being examined (A,B,C,D, and E); comment on the results.
- What insights are gained by reporting both the list selling price and the actual selling price for each customer?
- What factors Alpha Ltd. should consider in deciding whether to drop one or more of five customers?

[CA, Nov. 2003]

Solution:

Particulars	A	B	C	D	E
Revenues at List Price	5,05,440	21,26,304	1,47,74,000	77,27,400	9,47,700
Less : Discount	Nil	35,438	12,31,200	2,57,580	94,770
Revenues at Actual Price	5,05,440	20,90,866	1,35,43,200	74,69,820	8,52,930
Less : Cost of Goods sold at Rs. 90 per unit	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750
Gross Margin (A)	84,240	3,18,946	12,31,200	10,30,320	63,180
Customer Level Operating Cost					
Order taking @ Rs. 750	11,250 (750 x 15)	18,750 (750 x 25)	22,500 (750 x 30)	18,750 (750 x 25)	22,500 (750 x 30)
Customer Visits @ Rs. 600	1,200	1,800	3,600	1,200	1,800
Delivery Vehicles (Rs. 5.75 per Km)	1,150	1,035	1,725	2,300	3,450
Product handling Rs. 3.75 per case	17,550	73,830	5,13,000	2,68,313	32,906
Expected runs (Rs. 2250 per run)	—	—	—	—	—
Total Costs (B)	31,150	95,415	5,40,825	2,90,563	62,906
Customer Level Operating Income (A) – (B)	53,090	2,23,531	6,90,375	7,39,757	274

- Customer D is the most profitable customer, despite having only 52.30% of the unit volume of customer C. A major exploitation is that customer C receives at Rs.9 discount per case while customer D receives only at Rs.3.60 discount per case.

Customer E is less profitable, in comparison with the small customer A being profitable. Customer E received a discount of Rs.10.80 per case, make more frequent orders, requires more customer visits and requires more delivery kms, in comparison with customer A.

- Separate reporting of both the listed selling price and the actual selling price enables Alpha Ltd. to examine which customer receives different discount documents and how sales people may differ in the discounts they grant. There is a size pattern in the discount across the 5 customers, except for customer E.

<i>Sales Volume</i>	<i>Discount Per Case</i>		
C (1,36,800 Cases)	12,31,200	÷	1,36,800 = Rs. 9
D (71,550 Cases)	2,57,580	÷	71,550 = Rs. 3.60
B (19,688 Cases)	35,438	÷	19,688 = Rs. 1.80
E (8,775 Cases)	94,770	÷	8,775 = Rs. 10.80
A (4,680 Cases)	4,680	÷	4,680 = Rs. 0

The reasons for the Rs. 10.80 discount for customer E should be explored.

(iii) Dropping customers should be the last resort taken by Alpha Ltd. Factors to be considered include :

What is the expected future profitability of each customer? Are the currently unprofitable (E) or low profitable (A) customers likely to be highly profitable in the future?

What costs are avoidable if one or more customers are dropped?

Can the relationship with “problem” customers be restructured so that there is a ‘win win’ situation?

QUESTIONS

1. What do you understand by Activity-Based Costing?
2. What is meant by Cost Driver? Explain role of Cost Driver in tracing costs to products.
3. Explain the stages in applying ABC in manufacturing company.
4. Explain the difference between Activity-Based Costing and Traditional Costing System?
5. What are the advantages of Activity-Based Costing?
6. What are the classification of activities? Explain it briefly.
7. What are the factors to be considered while adopting ABC?

□ □ □

CHAPTER 25

Reconciliation of Cost and Financial Accounts

Meaning

In business concern where Non-integrated Accounting System is followed, cost and financial accounts are maintained separately, the difference between the end result of these two are required to be reconciled. Reconciliation of cost and financial accounts mean tallying the profit or loss revealed by both set of accounts. The chief aim is to find out the reasons for the difference between the results shown by Cost Accounts and Financial Accounts.

Reasons for the Difference

The various reasons which create difference between cost and financial profit or loss shown by the two set of books may be listed under the following heads :

- (1) Items shown only in Financial Accounts
- (2) Items shown only in Cost Accounts
- (3) Absorption of Overheads
- (4) Methods of Stock Valuation
- (5) Abnormal Loss and Gains

(1) Items shown only in Financial Accounts : Some items of income and expenses which are included only in financial accounts but are not shown in cost accounts and vice versa. The following items are shown in financial accounts but not in cost accounts :

(A) Income:

- (1) Profit on sale of fixed assets
- (2) Interest received on investment
- (3) Dividend received on investment
- (4) Rent, brokerage and commission received

- (5) Premium on issue of shares
- (6) Transfer fees received.

(B) Expenditure:

- (1) Loss on sale of fixed assets, e.g., Plant, Machinery, Building etc.
- (2) Interest paid
- (3) Discount paid
- (4) Dividend paid
- (5) Losses due to scrapping of plant and machinery
- (6) Penalties and fines
- (7) Expenses of shares' transfer fees
- (8) Preliminary expenses written off
- (9) Damages payable at law.

(2) Items shown only in Cost Accounts : There are some items which are recorded only in Cost Accounts but are not included in financial accounts, notional interest on capital, notional rent of premises owned, salary to proprietor etc. are not recorded in financial account because the amount is not actually spent or paid. These expenses reduced the profit in cost account while in financial account it may be the reverse effect.

(3) Absorption of Overheads : In financial accounts actual amount of expenses paid are recorded while in cost accounts overheads are charged at predetermined rates. If overhead charged are not equal to the amount of overhead incurred the under or over absorption of overhead leads to difference in profits of two accounts.

(4) Methods of Stock Valuation : The term stock refers to opening or closing stock of raw materials, work in progress and finished goods. In financial accounts stocks are valued at cost price or market price whichever is lower. In Cost Account; stock of raw materials can be valued on the basis of FIFO, LIFO and Simple Average Method etc., and work in progress may be valued at Prime Cost or Work Cost. Finished stocks are generally valued on the basis of cost of production. Thus, the adoption of different method of valuation of stock leads to difference in profits of two sets of accounts.

(5) Abnormal Losses and Gains : Different items of abnormal wastages, losses or gains which are included in financial accounts but are not recorded in cost accounts. Thus, the figures of abnormal losses and gains may affect the results in financial accounts alone.

Importance of Reconciliation

Reconciliation of cost and financial account is necessary for the following reasons :

- (1) To ensure arithmetical accuracy of both set of accounts for effective cost ascertainment and cost control.
- (2) To identify the reasons for different results in two sets of accounts.
- (3) To evaluate the reasons for variations for effective internal control.
- (4) To enable the smooth co-operation and co-ordination between the activities of cost and financial accounting departments.
- (5) To ensure the standardization of policies relating to stock valuation, depreciation and absorption of overheads.

Methods of Reconciliation

For reconciling the profit or loss as disclosed by the financial accounting with that shown by the cost accounting, a Reconciliation Statement or Memorandum of Reconciliation Account is prepared.

The following steps have to be taken for preparation of Reconciliation Statement :

- (1) Ascertain the extent of difference between the profit or loss disclosed by two set of book of accounts.
- (2) Take the base profit or loss as per any set of books (either cost or financial) of accounts as the starting point.
- (3) Prepare a statement by making suitable adjustment of items either added or subtracted included in one set of accounts but not in the other set.
- (4) In other words, balances as per cost account has been taken as the starting point, then balance as per financial account is to be adjusted according to the transaction recorded in the financial accounts and vice versa.

The following table will help to prepare the reconciliation of cost and financial accounts :

Treatment of Causes for Differences

S. No.	Reasons For Differences	Suitable Adjustments	
		Base is Costing Profit or Financial Loss (+) or (-)	Base is Financial Profit or Costing Loss (+) or (-)
1.	Over absorption of overhead in Cost Account	Add (+)	Less (-)
2.	Over valuation of closing stock in Financial Account	Add (+)	Less (-)
3.	Over valuation of opening stock in Cost Account	Add (+)	Less (-)
4.	Excess provision for depreciation of building plant & machinery etc., charged in Cost Account	Add (+)	Less (-)
5.	Items of expenses charged in Cost Account but not in Financial Accounts (Example Notional interest on Capital, Notional rent on Premises)	Add (+)	Less (-)
6.	Items of income recorded in Financial Account but not in Cost Account		
7.	Under absorption of overhead in Financial Account	Less (-)	Add (+)
8.	Over valuation of opening stock in Financial Account	Less (-)	Add (+)
9.	Over valuation of closing stock in Cost Account	Less (-)	Add (+)
10.	Item of income tax, dividend paid, preliminary expenses written off, goodwill written off, under writing commission and debenture discount written off and any appropriation of profit included in Financial Account only.	Less (-)	Add (+)

Types of Problems

You are required to prepare a reconciliation of cost and financial account from the following situations :

- (1) When profit or loss of financial and cost account are given
- (2) When profit or loss of financial account is given

- (3) When profit or loss of cost account is given
- (4) When profit and loss account and additional information are given.

Illustration: 1

The financial books of a company show a net profit of Rs.1,27,560 for the year ending 31st Dec. 2003. The Cost Account shows a net profit of Rs.1,33,520 for the same corresponding period. The following facts are brought to light:

	Rs.
Factory overhead under recovered in costing A/c	11,400
Administration overhead over recovered in costing A/c	8,500
Depreciation charged in financial accounts	7,320
Depreciation recovered in cost A/c	7,900
Interest received but not included in cost A/c	900
Income Tax debited in financial A/c	1,200
Bank interest credited financial A/c	460
Stores adjustment credited in financial A/c	840
Rent charged in financial A/c	1,720
Dividend paid recorded in financial A/c	2,400
Loss of obsolescence charged in financial A/c	520

(MBA, Madras, 2001)

Solution:**Reconciliation Statement**

Particulars	Rs.	Rs.
Profits as per Cost Accounts		1,33,520
Add :		
Administration overhead over recovered in Cost Account	8,500	
Depreciation over recovered in Cost Account (7900 – 7320)	580	
Interest received but not included in Cost A/c	900	
Bank interest credited in Financial A/c	460	
Stores adjustments credited in Financial A/c	840	11,280
		1,44,800
Less :		
Factory overhead under recovered in Cost A/c	11,400	
Income Tax received but not included in Cost A/c	1,200	
Rent charged in Financial A/c	1,720	
Dividend paid charged in Financial A/c	2,400	
Loss of obsolescence charged in Financial A/c	520	17,240
Profit as per Financial Accounts		1,27,560

Illustration: 2

AVS Ltd., made a Net Profit of Rs. 5,71,000 during the year 2003 as per the their financial system. Whereas their cost accounts disclosed a profit of Rs. 7,77,200. On reconciliation, the following differences were noticed :

- (1) Directors fees charged in financial account, but not in cost account Rs. 13,000.
- (2) Bank interest credited in financial account, but not in cost account Rs. 600.

- (3) Income Tax charged in financial account, but not in cost account Rs. 1,66,000.
- (4) Bad and doubtful debts written off Rs. 11,400 in financial accounts.
- (5) Overheads charged in costing books Rs. 1,70,000 but actual were Rs. 1,66,400.
- (6) Loss on sale of old machinery Rs.20,000 charged in financial accounts.

(MBA, Madurai, 2001)

Solution:**Reconciliation Statement**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Profits as per Financial Account		5,71,000
<i>Add :</i> Director fees charged in financial account but not in Cost account	13,000	
Income Tax charged in financial account but not in Cost Account	1,66,000	
Bad and doubtful debts written off	11,400	
Loss on sale of old machinery	20,000	2,10,400
		7,81,400
<i>Less :</i> Bank interest credited in financial account but not in Cost Account	600	
Overheads over absorbed in Cost A/c (170000 – 166400)	3,600	4,200
Profit as per Cost Accounts		7,77,200

Illustration: 3

Harish Ltd., has furnished you the following informations from the financial books for the year ended 30th June, 2003 :

Profit and Loss Account (ended 30th June)

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Purchases	1,26,050	By Sales (25000 units at Rs. 15)	3,75,000
Direct wages	52,500	Rent Received	1,300
Factory Overheads	60,650	Profit on sale of investment	11,700
Office & Administrative Overheads } Overheads	26,700	Closing Stock	20,400
Depreciation	5,500		
Selling Expenses	35,500		
Net Profit	1,01,500		
	4,08,400		4,08,400

The cost sheet shows the costing profit of Rs. 98,850 and closing stock of Rs. 21,400. The factory overheads are absorbed at 100% of direct wages and Office and Administrative overheads are charged at Re. 1 per unit. Selling expenses are charged at 10% of Gross of sales. Depreciation in cost account absorbed was Rs. 4,000. You are required to prepare :

- (1) A statement showing as per cost account for the year ended 30th June, 2003.
- (2) Statement showing the reconciliation of profit disclosed in cost accounts with the profit shown in the financial accounts.

(CA, Inter, 2001)

Solution:**Profit as per Cost Accounts**

<i>Particulars</i>	<i>Amount</i>
Purchases	1,26,050
<i>Add</i> : Direct Wages	52,500
Prime Cost	1,78,550
<i>Add</i> : Factory overhead at 100% on direct wages	52,500
	2,31,050
<i>Add</i> : Depreciation	4,000
Factory cost or Works cost	2,35,050
<i>Add</i> : Office & Administrative overhead at Re. 1 Per unit (25,000 units at Re. 1)	25,000
Cost of Production	2,60,050
<i>Less</i> : Closing stock of finished goods	21,400
Cost of goods sold	2,38,650
<i>Add</i> : Selling expenses at 10% of Rs. 3,75,000	37,500
Cost of Sales	2,76,150
Costing Profit	98,850
Sales	3,75,000

Reconciliation Statement

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Profits as Financial Account		1,01,500
<i>Add</i> : Over valuation of closing stock in Cost A/c	1,000	
Under absorption of Factory overhead in Cost A/c	8,150	
Under absorption of Office & Admi. Overhead in Cost A/c	1,700	
Depreciation under absorbed in Cost A/c	1,500	12,350
		1,13,850
<i>Less</i> : Over absorption of selling expenses in Cost A/c	2,000	
Rent received charged in Financial A/c	1,300	
Profit on sale of investment charged in Financial A/c	11,700	15,000
Profit as per Cost A/c		98,850

Illustration: 4

The financial books of a company reveal the following data for the year ended 31st March, 2003 :

Opening Stock :

	Rs.
Finished goods 875 units	74,375
Work in progress	32,000

1. 4. 02 to 31. 3. 03 :

Raw materials consumed	7,80,000
Direct Labour	4,50,000
Factory Overheads	3,00,000
Goodwill Written off	1,00,000
Administrative Overheads	2,95,000
Dividend Paid	85,000

Bad Debts	12,000
Selling and Distribution Overheads	61,000
Interest Received	45,000
Rent Received	18,000
Sales 14,500 units	20,80,000

Closing Stock :

Finished Goods 375 units	41,250
Work in progress	38,667

The work records provide as under

- Factory overheads are absorbed at 60% of direct wages
- Administrative overheads are recovered at 20% of factory cost
- Selling and distribution overheads are charged at Rs.4 per unit sold
- Opening stock of finished goods is valued at Rs.104 per unit
- The company values work-in-progress at factory cost for both Financial and Cost Profit Reporting.

Required

- (i) Prepare statement for the year ended 31st March, 2003 to show :
 - The profit as per financial records
 - The profit as per cost records.
- (ii) Present a statement reconciling the profit as per costing records with the profit as per Financial Records.

*(CA Inter, 2001)***Solution:****Calculation of Financial Profit****Financial Profit and Loss Account**

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Opening Stock :		By Sales	20,80,000
Finished goods	74,375	By Closing Stock :	
Work in progress	32,000	Finished Goods	41,250
To Raw materials	7,80,000	Work in Progress	38,667
To Direct Labour	4,50,000	By Rent Received	18,000
To Factory Overheads	3,00,000	By Interest Received	45,000
To Goodwill Written off	1,00,000		
To Admn. Overheads	2,95,000		
To Selling and Distribution Overheads]	61,000		
To Dividend Paid	85,000		
To Bad Debt	12,000		
To Profit	33,542		
	22,22,917		22,22,917

Statement of Cost of Production

	Units
Sales	14,500
<i>Add :</i> Closing Stock	375
Total	14,875
<i>Less :</i> Opening Stock	875
Production	14,000
	<i>Rs.</i>
Raw Materials	7,80,000
Direct Labour	4,50,000
Factory overhead 60% Direct Wages	2,70,000
Factory Cost	15,00,000
<i>Add :</i> Opening work in progress	32,000
Total	15,32,000
<i>Less :</i> Closing work in progress	38,667
Factory Cost of goods produced	14,93,333
<i>Add :</i> Administrative Overhead 20% on Factory Cost	2,98,667
Production Cost	17,92,000

$$\begin{aligned}
 \text{Per Unit} &= \frac{\text{Total Cost of Production}}{\text{No. of Units Produced}} \\
 &= \frac{17,92,000}{14,000} = \text{Rs. 128.}
 \end{aligned}$$

Statement of Costing Profit :

	Rs.
Opening Stock 875 units @ Rs.104	= 91,000
Production 14,000 units @ Rs.128	= 17,92,000
Total	18,83,000
<i>Less :</i> Closing Stock 375 units @ Rs. 128	= 48,000
Production Cost goods sold	18,35,000
<i>Add :</i> Selling & Distribution overhead 14,500 units @ Rs.4 per unit]	= 58,000
Cost of Sales	= 18,93,000
Sales Revenue	= 20,80,000
Costing Profit	= 1,87,000

Reconciliation of Financial Accounts and Cost Accounts

Particulars	Amount Rs.	Amount Rs.
Profits as per Cost Account		1,87,000
<i>Add :</i> Administrative overheads over recovery	3,667	
Closing stock overhead	16,625	
Interest recovered	45,000	
Rent	18,000	83,292
		2,70,292
<i>Less :</i> Factory overhead under recovery	30,000	
Selling & Distribution overhead under recovery	3,000	
Closing stock over valued	6,750	
Goodwill written off	1,00,000	
Dividend	85,000	
Bad Debts	12,000	2,36,750
Profit as per Financial Accounts		33,542

Working Notes

Reconciliation of Financial Accounts & Cost Accounts

Particulars	Financial Accounts Rs.	Cost Accounts Rs.	Difference Rs.	Remarks Rs.	Add / Deduct
Factory Overheads	30,00,000	2,70,000	30,000	Under recovery	Deduct
Administrative Overheads } Selling and Distribution Overheads }	2,95,000	2,98,667	3,667	Over recovery	Add
Opening Stock	61,000	58,000	3,000	Under recovery	Deduct
Closing Stock	74,375	91,000	16,625	Over valuation	Add
	41,250	48,000	6,750	Over valuation	Deduct

Illustration: 5

A manufacturing company disclosed a Net Loss of Rs. 5,72,000 as per their Cost Accounts for the year ended March 31, 2003. The Financial Accounts however disclosed a Net Loss of Rs. 8,84,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the set of Books.

	Rs.
(i) Factory Overheads Over-absorbed	16,000
(ii) Administration Overheads under absorbed	24,000
(iii) Depreciation charged in Financial Accounts	2,20,000
(iv) Depreciation charged in Cost Accounts	2,45,000
(v) Interest on Investments not included in Cost Accounts	64,000
(vi) Income Tax Provided	1,54,000
(vii) Interest on loan funds in Financial Accounts	2,63,000
(viii) Transfer fees (Credits in financial books)	16,000
(ix) Stores adjustment (Credit in financial books)	8,000

Prepare a Memorandum Reconciliation Method.

[CA Inter, 2002]

Solution:

Memorandum Reconciliation Account

<i>Particulars</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Amount Rs.</i>
To Net Loss as per costing books	5,72,000	By Factory Overheads over absorbed in cost Accounts	16,000
To Administration overheads	24,000	By Interest on Investment not included in cost accounts	64,000
Under recovered in cost accounts		By Depreciation over charged in Cost Accounts	25,000
To Income Tax not provided in Cost Accounts	1,54,000	By Transfer fees in financial books	16,000
To Interest on loan fund not included in Cost Accounts	2,63,000	By Net loss as per financial books	8,84,000
	10,13,000		10,13,000

Alternatively:

Memorandum Reconciliation Account

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Net Loss as per Financial Books		8,84,000
<i>Add :</i> Factory overheads over absorbed in Cost Accounts	16,000	
Interest on Investment not included in Cost Accounts	64,000	
Depreciation over charged in Cost Accounts	25,000	
Transfer fees in financial books	16,000	
Stores Adjustment in financial books	8,000	1,29,000
		10,13,000
<i>Less :</i> Administration overheads under recovered in Cost Accounts	24,000	
Income Tax not provided in Cost Accounts	1,54,000	
Interest on loan fund not included in Cost Accounts	2,63,000	4,41,000
Net Loss as per Cost Accounts		5,72,000

Illustration: 6

A manufacturing company disclosed a Net Loss of Rs. 347000 as per their cost accounts for the year ended March 31, 2003. The financial accounts however disclosed a Net Loss of Rs. 5,10,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the set of accounts.

	<i>Rs.</i>
(i) Factory Overheads Under absorbed	40,000
(ii) Administration Overheads over absorbed	60,000
(iii) Depreciation charged in Financial Accounts	3,25,000
(iv) Depreciation Charged in Cost Accounts	2,75,000
(v) Interest on Investment not included in Cost Accounts	96,000
(vi) Income Tax Provided	54,000
(vii) Interest on loan funds in Financial Accounts	2,45,000
(viii) Transfer fees (Credit in financial books)	24,000
(ix) Stores adjustments (Credit in financial books)	14,000
(x) Dividend received	32,000

Prepare a Memorandum Reconciliation Account.

Solution:**Memorandum Reconciliation Account**

<i>Particulars</i>	<i>Amounts Rs.</i>	<i>Particulars</i>	<i>Amounts Rs.</i>
To Net Loss as per cost books	3,47,000	By Administration overheads over absorbed in Cost Accounts	60,000
To Factory overheads under absorbed in Cost Accounts	40,000	By Interest on Investments not included in Cost Accounts	96,000
To Depreciation under charged in Cost Accounts	50,000	By Transfer fees in Financial books	24,000
To Income Tax not provided in Cost Accounts	54,000	By Stores Adjustments (Credit in financial books)	14,000
To Interest on loan Funds in Financial Accounts	2,45,000	By Dividend received in Financial books	32,000
		By Net loss as per financial books	5,10,000
	7,36,000		7,36,000

QUESTIONS

1. What do you understand by Reconciliation of Cost and Financial Accounts?
2. Briefly explain the reasons for the difference between profit or loss as per cost accounts and financial accounts.
3. What are the important Reconciliation Statements?
4. Explain briefly the methods of preparation of reconciliation statement of cost and financial profit.
5. List out the different items of incomes and expenses which are included in financial account but ignored in cost account.

PRACTICAL PROBLEMS

(1) The profit as per the cost accounts is Rs. 1,50,000. The following details are ascertained on a comparison of the cost and financial accounts :

	<i>Cost Accounts Rs.</i>	<i>Financial Accounts Rs.</i>
(a) Opening Stock :		
Materials	10,000	15,000
Finished goods	18,000	16,000
(b) Closing Stock :		
Materials	12,000	13,000
Finished goods	20,000	17,000
(c) Interest charged but not paid Rs. 10,000		
(d) Write off : Preliminary expenses Rs. 500 ; Goodwill Rs. 1,500		
(e) Dividend on ICICI received Rs. 1,000		
(f) Indirect expenses charged in the financial accounts Rs. 80,000 but Rs. 75,000 recovered in the Cost Account. You are required to prepare a Reconciliation Statement.		

[Ans : Financial Profits Rs. 1,49,500]

- (2) From the following particulars, you are required to prepare a Reconciliation Statement :

	<i>Rs.</i>
Net Loss as per cost accounts	3,44,800
Net loss as per financial accounts	4,32,890
Works overhead under recovered in cost accounts	6,240
Depreciation over charged in Cost Account	2,600
Interest on investment	17,500
Administration overhead over recovered in Cost Account	2,600
Goodwill written off	92,000
Stores adjustment (or) in financial A/c	950
Depreciation of stock charged in financial A/c	13,500

- (3) The following transactions have been extracted from the books of M/s Nancy & Co Ltd. :

	Rs.
Sales (20,000 units)	2,50,000
Materials	1,00,000
Wages	50,000
Factory Overheads	45,000
Office and Administration Overheads	26,000
Selling and Distribution Overheads	18,000
Finished goods (1230 units) 31.12.2003	15,000
Work in progress	3,000
Wages	2,000
Factory Overheads	2,000
Goodwill Written off	20,000
Interest on Capital	2,000

In Costing Books Factory overhead is charged at 100% on Wages, Administration overhead at 10% of factory cost and selling and distribution at the rate of Re.1 per unit sold. Prepare a statement reconciling the profit as per cost and financial accounts.

[Ans : Profit as per cost A/c Rs. 30,000; profit as per financial A/c Rs. 11,000]

- (4) From the following figures prepare a reconciliation statement :

	Rs.
Net loss as per financial records	2,16,045
Net loss as per costing records	1,72,400
Works overhead under recovered in costing	3,120
Administration overhead recovered in excess	1,700
Depreciation charged in financial records	11,200
Depreciation recovered in costing	12,500
Interest received but not included in costing	8,000
Obsolescence loss charged in financial records	5,700
Income tax provided in financial books	40,300
Bank interest credited in financial books	750
Stores adjustments (Credit in financial books)	475
Depreciation of stock charged in financial books	6,750

- (5) From the following particulars, you are required to prepare a statement of reconciliation:

	Rs.
Statement of reconciliation	72,000
Opening Stock of finished goods	1,44,000
Purchase of Materials	4,32,000
Closing Stock of Materials	1,08,000
Closing Stock of finished goods	36,000
Wages	1,80,000
Actual works expenses	1,13,575
Actual office expenses	92,975
Profit as per costing books	1,78,272
Profit as per financial books	1,78,082

Works expenses are recovered at 20% on prime cost and office expenses at 80% on works on cost in cost books.

[M.Com., Madras, 2001]

- (6) The following figures are available from financial accounts for the year ended 31st March 2003:

	Rs.
Direct Materials Consumption	2,50,000
Direct Wages	1,00,000
Factory Overheads	3,80,000
Administration Overheads	2,50,000
Selling and Distribution Overheads	4,80,000
Bad Debts	20,000

Preliminary expenses (Written off)	10,000
Legal Charges	5,000
Dividend Received	50,000
Interest on Deposit Received	10,000
Sales (1,20,000 units)	7,00,000
Closing Stock :	
Finished Stock (40,000 units)	1,20,000
Work in progress	80,000

The Cost Account reveal

Direct Material Consumption Rs. 2,80,000
Factory Overhead recovered at 20% on Prime Cost
Administration Overhead at Rs. 3 per unit of production
Selling and Distribution Overheads at Rs. 4 per unit sold

Prepare

- (1) Statement of Cost and Profit
- (2) Financial Profit and Loss Account
- (3) Statement reconciling the profits disclosed by the Costing Profit and Loss Account and Financial Profit and Loss Account

[Ans : Net loss of Cost A/c Rs. 4,22,000; Net loss of Financial A/c Rs. 5,35,000]

- (7) The net profit of the James & Co. Ltd. appeared at Rs. 11,57,550 as per the financial records for the year ending 31st December 2003. The cost books however, showed a net profit of Rs. 17,24,000 for the same period. A scrutiny of the figures from both set of account revealed the following facts :

	Rs.
Work Overhead under-recovered in costs	31,200
Administration overhead over recovered	17,000
Depreciation charged in financial accounts	1,12,000
Interest on investments not included in costs	80,000
Loss due to obsolescence charged in accounts	57,000
Income tax provided in financial accounts	4,03,000
Bank interest and transfer fees in financial books	2,500
Stores adjustments (credit in financial books)	4,750
Loss due to depreciation in stock value (charged in financial accounts)	

You are required to prepare a statement reconciling both the figures of net profits.

- (8) From the following figures prepare a reconciliation statement :

	Rs.
Net profit as per financial records	12,87,550
Net profit as per costing records	17,24,000
Works overhead under recovered in costing	31,200
Administrative overhead recovered in excess	17,000
Depreciation charged in financial records	1,12,000
Depreciation recovered in costing	1,25,000
Interest received but not included in costing	80,000
Obsolescences loss charged in financial records	57,000
Income tax provided in financial books	4,03,000
Bank interest credited in financial books	7,500
Stores adjustments (credit in financial books)	4,750
Depreciation of stock charged in financial books	67,500

- (9) Compare the figure of profit as revealed by cost and the financial books and locate the difference if any.

	Rs.
Opening stock of raw materials	25,000
Opening stock of finished goods	75,000
Purchase of raw materials	1,75,000
Wages	75,000
Factory lighting	1,500
Factory rent	12,000
Power and fuel	1,250

Indirect wages	15,000
Plant and Machinery's depreciation	25,000
Oil, waste etc.	1,000
Work Manager's salary	1,500
Office rent	9,000
Office lighting	300
Miscellaneous factory expenses	625
Depreciation of office appliances	1,000
Salaries of office staff	18,000
Miscellaneous office expenses	640
Closing stock of finished goods	25,000
Closing stock of raw materials	37,500

Factory overhead is charged at 25% on prime cost and office and administrative expenses at 50% of factory overheads. The selling price was fixed by adding 20% on the total cost of manufacture and finished articles sold. Prepare also a statement showing cost of Manufacture.

[Ans: Cost of Manufacture Rs. 3,24,315; profit as per cost book Rs. 2,44,400; profit as per financial books Rs. 2,09,600]

- (10) The following figures have been extracted from the cost record of manufacturing unit:

	Rs.
Stores: Opening balance	30,000
Purchases	1,60,000
Transfer from work-in-progress	80,000
Issues to work-in-progress	1,60,000
Issues to repairs and Maintenance	20,000
Deficiencies found in Stock taking	6,000
Work in Progress: opening balance	60,000
Direct wages applied	60,000
Overheads applied	2,40,000
Closing balance	40,000

Finished products: Entire output is sold at a profit of 10% on actual cost from work in progress. Other wages incurred Rs. 70,000; Overhead incurred Rs. 2,50,000. Items not included in cost records; Income from investment Rs. 10,000, Loss on sale of capital assets Rs. 20,000.

Draw stores Control Account, work in progress Control Account, Costing Profit & Loss A/c; Profit and Loss A/c and Reconciliation Statement.

[Ans: Stores control A/c Rs. 84,000; work in progress Rs. 40,000; costing profit Rs. 4,000; financial profit Rs. 30,000]

- (11) The following figures are available from financial accounts for the year ending 31st March 2003:

	Rs.
Direct materials consumed	2,00,000
Direct wages	1,00,000
Factory overheads	75,000
Administrative overheads	2,25,000
Selling and distribution overheads	2,40,000
Bad Debts	30,000
Preliminary expenses written off	40,000
Legal charges	20,000
Interest on Bank deposit received	20,000
Sales (1,20,000 units)	18,00,000
Closing stock (30,000 units)	1,60,000

The cost accounts reveal the following :

Direct materials consumed 2,20,000; Direct wages Rs. 80,000; Factory overheads at 20% on prime cost. Administration overheads at Rs. 2 per unit produced and selling overheads at Rs. 2 per unit sold.

- Prepare : (a) Statement showing cost and profit
 (b) Financial profit and loss account
 (c) Reconciliation statement

[Ans: Costing profit Rs. 10,32,000; Financial profit Rs. 11,00,000].

CHAPTER 26

Marginal Costing and Cost Volume Profit Analysis

Meaning

Marginal Cost: The term Marginal Cost refers to the amount at any given volume of output by which the aggregate costs are charged if the volume of output is changed by one unit. Accordingly, it means that the added or additional cost of an extra unit of output.

Marginal cost may also be defined as the “cost of producing one additional unit of product.” Thus, the concept marginal cost indicates wherever there is a change in the volume of output, certainly there will be some change in the total cost. It is concerned with the changes in variable costs. Fixed cost is treated as a period cost and is transferred to Profit and Loss Account.

Marginal Costing: Marginal Costing may be defined as “the ascertainment by differentiating between fixed cost and variable cost, of marginal cost and of the effect on profit of changes in volume or type of output.” With marginal costing procedure costs are separated into fixed and variable cost.

According to J. Batty, Marginal costing is “a technique of cost accounting pays special attention to the behaviour of costs with changes in the volume of output.” This definition lays emphasis on the ascertainment of marginal costs and also the effect of changes in volume or type of output on the company’s profit.

FEATURES OF MARGINAL COSTING

- (1) All elements of costs are classified into fixed and variable costs.
- (2) Marginal costing is a technique of cost control and decision making.
- (3) Variable costs are charged as the cost of production.
- (4) Valuation of stock of work in progress and finished goods is done on the basis of variable costs.
- (5) Profit is calculated by deducting the fixed cost from the contribution, i.e., excess of selling price over marginal cost of sales.
- (6) Profitability of various levels of activity is determined by cost volume profit analysis.

Absorption Costing

Absorption costing is also termed as Full Costing or Total Costing or Conventional Costing. It is a technique of cost ascertainment. Under this method both fixed and variable costs are charged to product or process or operation. Accordingly, the cost of the product is determined after considering both fixed and variable costs.

Absorption Costing Vs Marginal Costing : The following are the important differences between Absorption Costing and Marginal Costing :

- (1) Under Absorption Costing all fixed and variable costs are recovered from production while under Marginal Costing only variable costs are charged to production.
- (2) Under Absorption Costing valuation of stock of work in progress and finished goods is done on the basis of total costs of both fixed cost and variable cost. While in Marginal Costing valuation of stock of work in progress and finished goods at total variable cost only.
- (3) Absorption Costing focuses its attention on long-term decision making while under Marginal Costing guidance for short-term decision making.
- (4) Absorption Costing lays emphasis on production, operation or process while Marginal Costing focuses on selling and pricing aspects.

Differential Costing

Differential Costing is also termed as Relevant Costing or Incremental Analysis. Differential Costing is a technique useful for cost control and decision making.

According to ICMA London differential costing "is a technique based on preparation of adhoc information in which only cost and income differences between two alternatives / courses of actions are taken into consideration."

Marginal Costing and Differential Costing : The following are the differences between Marginal Costing and Differential Costing :

- (1) Differential Costing can be made in the case of both Absorption Costing as well as Marginal Costing
- (2) While Marginal Costing excludes the entire fixed cost, some of the fixed costs may be taken into account as being relevant for the purpose of Differential Cost Analysis.
- (3) Marginal Costing may be embodied in the accounting system whereas Differential Cost are worked separately as analysis statements.
- (4) In Marginal costing, margin of contribution and contribution ratios are the main yardstick for the performance evaluation and for decision making. In Differential Cost Analysis, differential costs are compared with the incremental or decremental revenues as the case may be.

Advantages of Marginal Costing (or)

Important Decision Making Areas of Marginal Costing

The following are the important decision making areas where marginal costing technique is used :

- (1) Pricing decisions in special circumstances :
 - (a) Pricing in periods of recession;
 - (b) Use of differential selling prices.

- (2) Acceptance of offer and submission of tenders.
- (3) Make or buy decisions.
- (4) Shutdown or continue decisions or alternative use of production facilities.
- (5) Retain or replace a machine.
- (6) Decisions as to whether to sell in the export market or in the home market.
- (7) Change Vs status quo.
- (8) Whether to expand or contract.
- (9) Product mix decisions like for example :
 - (a) Selection of optimal product mix;
 - (b) Product substitution;
 - (c) Product discontinuance.
- (10) Break-Even Analysis.

Limitations of Marginal Costing

- (1) It may be very difficult to segregation of all costs into fixed and variable costs.
- (2) Marginal Costing technique cannot be suitable for all type of industries. For example, it is difficult to apply in ship-building, contract industries etc.
- (3) The elimination of fixed overheads leads to difficulty in determination of selling price.
- (4) It assumes that the fixed costs are controllable, but in the long run all costs are variable.
- (5) Marginal Costing does not provide any standard for the evaluation of performance which is provided by standard costing and budgetary control.
- (6) With the development of advanced technology fixed expenses are proportionally increased. Therefore, the exclusion of fixed cost is less effective.
- (7) Under marginal costing elimination of fixed costs results in the under valuation of stock of work in progress and finished goods. It will reflect in true profit.
- (8) Marginal Costing focuses its attention on sales aspect. Accordingly, contribution and profits are determined on the basis of sales volume. It does not consider other functional aspects.
- (9) Under Marginal Costing semi variable and semi fixed costs cannot be segregated accurately.

COST VOLUME PROFIT ANALYSIS

Cost Volume Profit Analysis (C V P) is a systematic method of examining the relationship between changes in the volume of output and changes in total sales revenue, expenses (costs) and net profit. In other words, it is the analysis of the relationship existing amongst costs, sales revenues, output and the resultant profit.

To know the cost, volume and profit relationship, a study of the following is essential :

- (1) Marginal Cost Formula
- (2) Break-Even Analysis

- (3) Profit Volume Ratio (or) P/V Ratio
- (4) Profit Graph
- (5) Key Factors and
- (6) Sales Mix

Objectives of Cost Volume Profit Analysis

The following are the important objectives of cost volume profit analysis :

- (1) Cost volume is a powerful tool for decision making.
- (2) It makes use of the principles of Marginal Costing.
- (3) It enables the management to establish what will happen to the financial results if a specified level of activity or volume fluctuates.
- (4) It helps in the determination of break-even point and the level of output required to earn a desired profit.
- (5) The P/V ratio serves as a measure of efficiency of each product, factory, sales area etc. and thus helps the management to choose a most profitable line of business.
- (6) It helps us to forecast the level of sales required to maintain a given amount of profit at different levels of prices.

Marginal Cost Equation

The Following are the main important equations of Marginal Cost :

$$\text{Sales} = \text{Variable Cost} + \text{Fixed Expenses} \pm \text{Profit / Loss}$$

(or)

$$\text{Sales} - \text{Variable Cost} = \text{Fixed Cost} \pm \text{Profit or Loss}$$

(or)

$$\text{Sales} - \text{Variable Cost} = \text{Contribution}$$

$$\text{Contribution} = \text{Fixed Cost} + \text{Profit}$$

The above equation brings the fact that in order to earn profit the contribution must be more than fixed expenses. To avoid any loss, the contribution must be equal to fixed cost.

Contribution

The term Contribution refers to the difference between Sales and Marginal Cost of Sales. It also termed as "Gross Margin." Contribution enables to meet fixed costs and profit. Thus, contribution will first covered fixed cost and then the balance amount is added to Net profit. Contribution can be represented as :

$$\text{Contribution} = \text{Sales} - \text{Marginal Cost}$$

$$\text{Contribution} = \text{Sales} - \text{Variable Cost}$$

$$\text{Contribution} = \text{Fixed Expenses} + \text{Profit}$$

$$\text{Contribution} - \text{Fixed Expenses} = \text{Profit}$$

$$\text{Sales} - \text{Variable Cost} = \text{Fixed Cost} + \text{Profit}$$

(or)

$$C = S - V. C$$

$$C = F. C + P$$

$$S - V. C = F. C + P$$

$$C - F. C = P$$

Where :

C = Contribution

S = Sales

F = Fixed Cost

P = Profit

V = Variable Cost

Illustration: 1

From the following information, calculate the amount of profit using marginal cost technique :

Fixed cost Rs. 3,00,000

Variable cost per unit Rs. 5

Selling price per unit Rs. 10

Output level 1,00,000 units

Solution:

Contribution	=	Selling Price – Marginal Cost
	=	(1,00,000 x 10) – (1,00,000 x 5)
	=	10,00,000 – 5,00,000
	=	Rs.5,00,000
Contribution	=	Fixed Cost + Profit
Rs. 5,00,000	=	3,00,000 + Profit
Profit	=	Contribution – Fixed Cost
Profit	=	Rs. 5,00,000 – Rs. 3,00,000
	=	Rs. 2,00,000

Break-Even Analysis:

Break-Even Analysis is also called Cost Volume Profit Analysis. The term Break-Even Analysis is used to measure inter relationship between costs, volume and profit at various level of activity. A concern is said to break-even when its total sales are equal to its total costs. It is a point of no profit no loss. This is a point where contribution is equal to fixed cost. In other words, the break-even point where income is equal to expenditure (or) total sales equal to total cost.

The break-even point can be calculated by the following formula :

Break-Even Point in Units

(1) Break-Even Point in Units	=	$\frac{\text{Total Fixed Cost}}{\text{Contribution per unit}}$
(or) B E P (in units)	=	$\frac{F}{C}$
(2) Break-Even Point in Units	=	$\frac{\text{Total Fixed Cost}}{\text{Selling Price – Variable Cost}} \div \frac{\text{Per unit}}{\text{Per unit}}$

Break-Even Point in Sales Volume

$$\begin{aligned}
 (1) \text{ Break-Even Sales} &= \frac{\text{Fixed Cost} \times \text{Sales}}{\text{Sales} - \text{Variable Cost}} \\
 &\text{(or)} \\
 &= \frac{F \times S}{S - V}
 \end{aligned}$$

$$\begin{aligned}
 (2) \text{ Break-Even Sales} &= \frac{\text{Fixed Cost}}{1 - \frac{\text{Variable Cost}}{\text{Sales}}} \\
 &\text{(or)} \\
 &= \frac{F}{1 - \frac{V}{S}}
 \end{aligned}$$

$$\begin{aligned}
 (3) \text{ Break-Even Sales} &= \frac{\text{Fixed Cost}}{\text{P / V Ratio}} \\
 \text{Profit Volume Ratio (P / V ratio)} &= \frac{\text{Contribution}}{\text{Sales}} \times 100
 \end{aligned}$$

Illustration: 2

From the following particulars find out break-even point :

- Fixed Expenses Rs. 1,00,000
- Selling price Per unit Rs. 20
- Variable cost per unit Rs. 15

Solution:

$$\begin{aligned}
 \text{Break-Even Point in Units} &= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} \\
 \text{Contribution per unit} &= \text{Selling Price per unit} - \text{Variable Cost per unit} \\
 &= \text{Rs. 20} - \text{Rs. 15} = \text{Rs. 5} \\
 \text{B E P (in units)} &= \frac{\text{Rs. 1,00,000}}{5} \\
 &= 20,000 \text{ units} \\
 \text{B E P in Sales} &= 20,000 \times \text{Rs. 20} = \text{Rs. 4,00,000}
 \end{aligned}$$

Profit Volume Ratio (P / V Ratio)

Profit Volume Ratio is also called as Contribution Sales Ratio (or) Marginal Income Ratio (or) Variable Profit Ratio. It is used to measure the relationship of contribution, the relative profitability of different products, processes or departments.

The following formula for calculating the P / V ratio is given below :

$$(1) P / V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \quad (\text{or}) \quad \frac{C}{S} \times 100$$

$$(2) P / V \text{ Ratio} = \frac{\text{Sales} - \text{Variable Cost}}{\text{Sales}} \times 100 \quad (\text{or}) \quad \frac{S - V}{S} \times 100$$

$$(3) P / V \text{ Ratio} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales}} \times 100 \quad (\text{or}) \quad \frac{F + P}{S} \times 100$$

When we find out the P / V Ratio, Break-Even Point can be calculated by the following formula :

$$(a) \text{ B E P (Sales volume)} = \frac{\text{Fixed Cost}}{P / V \text{ Ratio}}$$

$$(b) \text{ Fixed Cost} = \text{B E P} \times P / V \text{ Ratio}$$

(c) Sales required in units to maintain a desired profit :

$$= \frac{\text{Fixed Cost} + \text{Desired Profit}}{P / V \text{ Ratio}}$$

$$(\text{or}) = \frac{F + P}{P / V \text{ Ratio}}$$

$$(\text{or}) = \frac{\text{Required Contribution}}{\text{New Contribution per unit}}$$

$$(d) \text{ Contribution} = \text{Sales} \times P / V \text{ Ratio}$$

$$(e) \text{ Variable Cost} = \text{Sales} (1 - P / V \text{ Ratio})$$

Illustration: 3

From the following information calculate :

- (1) P / V Ratio
- (2) Break-Even Point
- (3) If the selling price is reduced to Rs. 80, calculate New Break-Even Point :

Total sales	Rs. 5,00,000
Selling price per unit	Rs. 100
Variable cost per unit	Rs. 60
Fixed cost	Rs. 1,20,000

Solution:

$$(1) P / V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\begin{aligned} \text{Contribution} &= \text{Sales} - \text{Variable Cost} \\ \text{Total Sales} &= \text{Rs. 5,00,000} \\ \text{Selling price per unit} &= \text{Rs. 100} \end{aligned}$$

$$\begin{aligned} \text{Sales in units} &= \frac{5,00,000}{100} = 5000 \text{ units} \\ \text{Contribution} &= \text{Rs. } 5,00,000 - (5000 \times 60) \\ &= \text{Rs. } 5,00,000 - \text{Rs. } 3,00,000 = \text{Rs. } 2,00,000 \\ \text{P / V Ratio} &= \frac{\text{Rs. } 2,00,000}{\text{Rs. } 5,00,000} \times 100 = 40\% \end{aligned}$$

$$\begin{aligned} (2) \text{ Break-Even Point in sales} &= \frac{\text{Fixed Cost}}{\text{P / V Ratio}} \\ &= \frac{\text{Rs. } 1,20,000}{40\%} = \frac{1,20,000}{40} \\ &= \frac{1,20,000}{40} \times 100 \\ &= \text{Rs. } 3,00,000 \end{aligned}$$

(3) If the Selling price is reduced to Rs. 80 :

$$\begin{aligned} \text{Sales} &= \frac{5,00,000}{100} \times 80 \\ &= \text{Rs. } 4,00,000 \\ \text{Break-Even Point (in units)} &= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} \\ &\quad \text{(or)} \\ &= \frac{\text{Fixed Cost}}{\text{Selling Price} - \text{Variable Cost}} \\ &= \frac{\text{Rs. } 1,20,000}{80 - 50} = \frac{1,20,000}{30} = 4,000 \text{ units} \\ \text{Break-Even Point in Sales} &= 4,000 \text{ units} \times \text{Rs. } 80 \\ &= \text{Rs. } 3,20,000 \end{aligned}$$

Illustration: 4

Sales Rs. 2,00,000
 Profit Rs. 20,000
 Variable Cost 60%

You are required to calculate :

- (1) P / V Ratio
- (2) Fixed Cost
- (3) Sales volume to earn a profit of Rs. 50,000

Solution:

$$\begin{aligned} \text{Sales} &= \text{Rs. } 2,00,000 \\ \text{Variable Cost} &= 60\% \\ \text{Variable Cost} &= \frac{60}{100} \times 2,00,000 \end{aligned}$$

$$\begin{aligned}
 &= \text{Rs. } 1,20,000 \\
 \text{(1) P / V Ratio} &= \frac{\text{Sales} - \text{Variable Cost}}{\text{Sales}} \times 100 \\
 &= \frac{2,00,000 - 1,20,000}{2,00,000} \times 100 \\
 &= \frac{80,000}{2,00,000} \times 100 = 40\% \\
 \text{(2) Contribution} &= \text{Fixed Cost} + \text{Profit} \\
 &\quad \text{(or)} \\
 \text{Contribution} &= \text{Sales} - \text{Variable Cost} \\
 &= \text{Rs. } 2,00,000 - \text{Rs. } 1,20,000 = \text{Rs. } 80,000 \\
 \text{Contribution} &= \text{Fixed Cost} + \text{Profit} \\
 80,000 &= \text{Fixed Cost} + \text{Rs. } 20,000 \\
 \text{Fixed Cost} &= \text{Rs. } 80,000 - \text{Rs. } 20,000 = \text{Rs. } 60,000
 \end{aligned}$$

(3) Sales volume to earn a profit of Rs. 50,000

$$\begin{aligned}
 \text{Sales} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P / V Ratio}} \\
 &= \frac{\text{Rs. } 60,000 + \text{Rs. } 50,000}{40\%} \\
 &= \frac{\text{Rs. } 1,10,000}{\frac{40}{100}} = \frac{\text{Rs. } 1,10,000}{40} \times 100 \\
 &= \text{Rs. } 2,75,000
 \end{aligned}$$

Illustration: 5

From the following particulars, calculate :

- P / V Ratio
- Profit when sales are Rs. 40,000, and
- New break-even point if selling price is reduced by 10%
 Fixed cost = Rs. 8,000
 Break-even point = Rs. 20,000
 Variable cost = Rs. 60 per unit

Solution:

$$\begin{aligned}
 \text{(a) Break-Even Point} &= \frac{\text{Fixed Cost}}{\text{P / V Ratio}} \\
 \therefore \text{P / V Ratio} &= \frac{\text{Fixed Cost}}{\text{Break-Even Point}} \\
 &= \frac{8,000}{20,000} \times 100 = 40\%
 \end{aligned}$$

(b) Profit when sales are Rs. 40,000

$$\begin{aligned} \text{Profit} &= \text{Sales} \times P / V \text{ Ratio} - \text{Fixed Cost} \\ &= \text{Rs. } 40,000 \times 40\% - \text{Rs. } 8,000 \\ &= \text{Rs. } 16,000 - \text{Rs. } 8,000 = \text{Rs. } 8,000 \end{aligned}$$

(c) New break-even point if the selling price is reduced by 10%. If the selling price is Rs. 100, now it is reduced by 10%, i.e., it will be Rs. 90 (100 – 10)

$$\begin{aligned} \text{Variable Cost} &= \text{Rs. } 60 \text{ Per unit} \\ \text{New P / V Ratio} &= \frac{\text{Selling Price} - \text{Variable Cost}}{\text{Selling Price}} \times 100 \\ &= \frac{90 - 60}{90} \times 100 = 33.33\% \\ \text{New Break-Even Point} &= \frac{\text{Fixed Cost}}{\text{New P / V Ratio}} \\ &= \frac{8,000}{33.33\%} = \text{Rs. } 24,002.40 \\ \text{New Break-Even Point} &= \text{Rs. } 24,002.40 \end{aligned}$$

Illustration: 6

MNP Ltd. produces a chocolate almond bar. Each bar sells for Rs. 20. The variable cost for each bar (sugar, chocolate, almonds, wrapper, labour) total Rs. 12.50. The total fixed cost are Rs. 30,00,000. During the year, 10,00,000 bars were sold. The CEO of MNP Ltd. not fully satisfied with the profit performance of chocolate bar, was considering the following options to increase the profitability :

- (I) Increase advertising
- (II) Improve the quality of ingredients and, simultaneously, increase the selling price
- (III) Increase the selling price
- (IV) Combination of three.

Required

- (1) The sales manager is confident that an advertising campaign could double sales volume. If the company CEO's goal is to increase this year's profits by 50% over last year's, what is the maximum amount that can be spent on advertising.
- (2) Assume that the company improves the quality of its ingredients, thus increasing variable cost to Rs.15. Answer the following questions :
 - (a) How much the selling price be increased to maintain the same break-even point?
 - (b) What will be the new price, if the company wants to increase the old contribution margin ratio by 50%?
- (3) The company has decided to increase its selling price to Rs. 25. The sales volume drops from 10,00,000 to 8,00,000 bars. Was the decision to increase the price a good one? Compute the sales volume that would be needed at the new price for the company to earn the same profit at last year.
- (4) The sales manager is convinced that by improving the quality of ingredients (increasing variable cost to Rs. 15) and by advertising the improved quality (advertisement amount would be increased by Rs. 50,00,000), sales volume could be doubled. He has also indicated that a price increase would not affect the

ability to double sales volume as long as the price increase is not more than 20% of the current selling price. Compute the selling price that would be needed to achieve the goal of increasing profits by 50%. Is the sales manager's plan feasible? What selling price would you choose? Why?

(CA, PE, 2002)

Solution:

Contribution Analysis of operating result of a most recent year :

Selling price	Rs. 20.00
Less : Variable Cost	Rs. 12.50
Contribution	Rs. 7.50
For 10,00,000 units x 7.50	= Rs. 75,00,000
Less : Fixed Cost	= Rs. 30,00,000
Profit	= Rs. 45,00,000
(1) Desired Profit	= Rs. 45,00,000 x Rs. 1.50
	= Rs. 67,50,000
Contribution (Rs.7.50 x 20,00,000 bars)	= Rs. 1,50,00,000
Less : Desired Operating Profits	= Rs. 67,50,000
	= Rs. 82,50,000
Less : Fixed Cost (other than Incremental Advertising)]	= Rs. 30,00,000
Maximum amount that can be spent on Advertisement]	= Rs. 52,50,000
(2) (a) Variable cost increased to	= Rs. 15 per bar
Break-Even Point (Most recent year)	= $\frac{\text{Fixed Cost}}{\text{Selling Price} - \text{Variable Cost}}$
	= $\frac{30,00,000}{20 - 12.50} = \frac{30,00,000}{7.50}$
	= 4,00,000 bars

Let S = Desired Selling Price

4,00,000	= $\frac{3,00,000}{\text{Sales} - \text{Variable Cost}}$
4,00,000	= $\frac{30,00,000}{S - \text{Rs.15}}$
S	= $\frac{30,00,000}{4,00,000} = 7.50 + 15 = \text{Rs. 22.50}$
∴ S	= Rs. 22.50
Selling Price, increased by	= $\frac{2.50}{20} \times 100 = 12.50\%$

2. (b) New Price, if Co. wants to increase old contribution margin ratio by 50%

$$\text{Old contribution margin ratio} = \frac{7.50}{20} \times 100 = 37.50\%$$

$$\text{Desired to increase at } 56.25\% = (37.50 + 50\% \text{ of } 37.50)$$

$$\therefore \text{Variable Cost / Sales} = 43.75\%$$

$$\begin{aligned} \text{Hence new Selling Price} &= \frac{\text{Rs. } 15}{0.4375} \\ &= \text{Rs. } 34.2857 \end{aligned}$$

$$\begin{aligned} (3) \text{ New Selling Price} &= \text{Rs. } 25 \\ \text{New sales Volume} &= 8,00,000 \text{ bars} \\ \text{Contribution} &= \text{Sales} - \text{Variable Cost Per unit} \\ &= \text{Rs. } 25 - 12.50 = \text{Rs. } 12.50 \\ \text{Contribution} &= 8,00,000 \times 12.50 \\ &= \text{Rs. } 1,00,00,000 \\ \text{Less : Fixed Cost} &= \text{Rs. } 30,00,000 \\ \text{Operating profit} &= \text{Rs. } 70,00,000 \end{aligned}$$

The decision seems to be good one as operating profit has increased from Rs. 45 lakhs to Rs. 70 lakhs:

$$\begin{aligned} \text{Desired Sales Qty.} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Selling Price} - \text{Variable Cost}} \\ &= \frac{\text{Rs. } 30,00,000 + \text{Rs. } 45,00,000}{12 - 12.50} \end{aligned}$$

$$\begin{aligned} &= 6,00,000 \text{ bars.} \\ (4) \text{ Variable cost per bar} &= \text{Rs. } 15 \\ \text{Fixed cost increased due to advertising} &= \text{From Rs. } 30 \text{ lakhs to Rs. } 80 \text{ lakhs} \\ \text{Let desired selling price be} &= S \\ \text{Then desired Selling price needed to achieve profit goals of Rs. } 67,50,000 \end{aligned}$$

$$\begin{aligned} 20,00,000 \text{ bars} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{S - \text{Variable Cost Per bar}} \\ 20,00,000 &= \frac{\text{Rs. } 80 \text{ lakhs} + \text{Rs. } 67.5 \text{ lakhs}}{S - \text{Rs. } 15} \\ S &= \frac{\text{Rs. } 147.5 \text{ lakhs}}{20,00,000} = \text{Rs. } 7.375 + 15 \\ &= \text{Rs. } 22.375 \\ \therefore S &= \text{Rs. } 22.375 \end{aligned}$$

Yes, Sales manager's plan seems feasible

$$\text{As price increase of} = \frac{2.375}{20} \times 100 = 11.875\% \text{ is required}$$

to achieve desired profit
but the caveat is :

- (1) Is market so big?
- (2) Will competitors not follow aggressive strategy when it hurts them?

The choice of selling price of Rs. 22.375 depends on the assessment of above two factors.

Illustration: 7

A Company manufactures a single product with a capacity of 1,50,000 units per annum. The summarized profitability statement for the year is as under:

	Rs.	Rs.
Sales : 1,00,000 units @ Rs.15 per unit		15,00,000
Less : Cost of Sales :		
Direct Materials	3,00,000	
Direct Labour	2,00,000	
Production overhead :		
Variable	60,000	
Fixed	3,00,000	
Administration Overhead (Fixed)	1,50,000	
Selling and Distribution Overheads :		
Variable	90,000	
Fixed	<u>1,50,000</u>	<u>12,50,000</u>
Profit		<u>2,50,000</u>

You are required to evaluate the following options:

- (1) What will be the amount of sales required to earn a target profit of 25% on sales, if the packing is improved at a cost of Re.1 per unit?
- (2) There is an offer from a large retailer for purchasing 30,000 units per annum, subject to providing a packing with a different brand name at a cost of Rs. 2 per unit. However, in this case there will be no selling and distribution expenses. Also this will not, in any way, affect the company's existing business. What be the break-even price for this additional offer.?
- (3) If an expenditure of Rs. 3,00,000 is made on advertising the sales would increase from the present level of 1,00,000 units to 1,20,000 units at a price of Rs. 18 per unit, will that expenditure be justified?
- (4) If the selling price is reduced by Rs. 2 per unit, there will be 100% capacity utilization. Will the reduction in selling price be justified?

(C A Inter, May 2001)

Solution:

	Method I (Per unit Rs.)	Method II (in total Rs.)
Selling price	<u>15.00</u>	<u>15,00,000</u>
Less : Variable Cost :		
Direct materials	3.00	3,00,000
Direct Labour	2.00	2,00,000
Production Overheads	0.60	60,000
Selling Overheads	0.90	<u>90,000</u>
Total variable Cost	<u>6.50</u>	<u>6,50,000</u>
Contribution (Sales-Variable Cost)	<u><u>8.50</u></u>	<u><u>8,50,000</u></u>

Evaluation of Options

(1) Option I :

	<i>Method I</i> (Per unit Rs.)	<i>Method II</i> (in total Rs.)
Present Marginal Cost (V. C.)	6.50	6,50,000
Add : Additional Cost of Packing	1.00	1,00,000
Revised Contribution (Sales – Variable Cost)]	<hr style="width: 100%; border: 0.5px solid black;"/>	<hr style="width: 100%; border: 0.5px solid black;"/>
	7.50	7,50,000

$$P / V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7,50,000}{15,00,000} = 50\% \qquad \qquad \qquad 50\%$$

Let the proposed sales be equal to X

$$\begin{aligned} \text{Sales } X &= \frac{(\text{Fixed Cost} + 25\% \text{ of } X)}{50\%} \\ \text{Sales} &= \frac{6,00,000 + 0.25 X}{50\%} = \frac{6,00,000 + 0.25 \times 100}{50} \\ &= \text{Rs. } 24,00,000 \end{aligned}$$

Alternative Solution:

Let the number of units to be sold = X

The equation is :

$$\begin{aligned} \text{Sales} &= \text{Variable Cost} + \text{Fixed Cost} + \text{Profit} \\ 15 x &= 7.50 x + \text{Rs. } 6,00,000 + 3.75 x \end{aligned}$$

Transposing and solving we get

$$\begin{aligned} 3.75 x &= \text{Rs. } 6,00,000 \\ X &= \frac{6,00,000}{3.75} = 1,60,000 \text{ units} \\ \therefore \text{Sales in units} &= 1,60,000 \text{ units} \\ \text{Sales in volume} &= 1,60,000 \times 15 = \text{Rs. } 24,00,000 \end{aligned}$$

(2) Option II :

Present Marginal Cost	=	Rs. 6.50
Less : Variable selling Cost	=	Rs. 0.90
Net cost per unit	=	Rs. 5.60
Add : Special packing Cost	=	Rs. 2.00
Total Variable Cost per unit	=	Rs. 7.60
Total Variable Cost for 30,000 units	=	30,000 x 7.60
	=	Rs. 2,28,000

There is no impact of this transactions on fixed cost. Hence the price should atleast cover Rs. 2,28,000. Therefore, unit price to break-even is Rs. 760.

(3) Option III :

Revised Contribution when selling price is Rs. 18

∴ Contribution	=	Selling Cost – Variable Cost
	=	Rs. 18 – Rs. 6.50 = Rs. 11.50
Quantum of sales	=	1,20,000 units
Total contribution 1,20,000 x 11.50	=	Rs. 13,80,000
Less : Fixed Cost : Present	6,00,000	} =
Additional	3,00,000	
		Rs. 9,00,000
Profit	=	<u>Rs. 4,80,000</u>

As the profit increases, the proposal is justified.

(4) Option IV :

Revised price Rs. 15 – 2	Rs. 13.00
Less : Marginal Cost	<u>Rs. 6.50</u>
Contribution (selling costing—V.C.)	<u>Rs. 6.50</u>
Total contribution at 1,50,000 units (1,50,000 x Rs. 6.50)	Rs. 9,75,000
Less: Fixed Cost	<u>Rs. 60,00,000</u>
Profit (contribution – Fixed Cost)	<u>Rs. 3,75,000</u>
As per problem normal profit is	Rs. 2,50,000
Revised profit is	Rs. 3,75,000

Since the profit is increased by (Rs. 3,75,000 – Rs. 2,50,000) Rs. 1,25,000 the proposal is acceptable.

Illustration: 8

Fill in the blanks for each of the following independent situation :

	A	B	C	D	E
Selling Price per unit	—	Rs. 50	Rs. 20	—	Rs. 30
Variable Cost as % of Selling Price	60	—	75	75	—
No. of units sold	10,000	4,000	—	6,000	5,000
Marginal contribution	Rs. 20,000	Rs. 80,000	—	Rs. 25,000	Rs. 50,000
Fixed costs	Rs. 12,000	—	Rs. 1,20,000	Rs. 10,000	—
Profit / Loss	—	20,000	Rs. 30,000	—	Rs.15,000

Solution:

(A) Profit	=	Contribution – Fixed costs
	=	Rs. 20,000 – 12,000 = 8,000
Contribution	=	20,000
P / V Ratio	=	(100 – 60) = 40%
Sales	=	$\frac{\text{Contribution}}{\text{P / V Ratio}} = \frac{20,000}{40\%} = \text{Rs. } 50,000$
Units Sold	=	10,000
Selling Price	=	$\frac{\text{Sales volume}}{\text{Units}} = \frac{50000}{10000} = \text{Rs. } 5$

(B) Sales 4000 units X Price Rs.50 = Rs. 2,00,000
 Contribution (S – V.C. = Rs. 2,00,000 – Rs. 1,20,000) = Rs. 80,000

Variable Cost (60% of sales, i.e., $2,00,000 \times \frac{60}{100}$) = Rs. 1,20,000

Fixed Cost (contribution – Profit) Rs. 80,000 – Rs. 20,000 = Rs. 60,000

(C) Contribution (Fixed cost + Profit) Rs. 1,20,000 + Rs. 30,000 = Rs. 1,50,000
 Contribution per unit 25% of Rs. 20 = Rs. 5

No. of units = $\frac{\text{Contribution}}{\text{Contribution per unit}} = \frac{1,50,000}{5} = 30,000 \text{ units.}$

(D) Profit (Contribution – Fixed Cost) 25,000 – 10,000 = Rs. 15,000

P / V Ratio = (100 – 75) = 25%

Sales = $\frac{\text{Contribution}}{\text{P / V Ratio}} = \frac{25,000}{25\%} = \frac{25,000}{25} \times 100$
 = Rs.1,00,000

No. of units = 6,000 Units

Price per unit = $\frac{\text{Contribution}}{\text{No. of Units}} = \frac{1,00,000}{6,000} = \text{Rs. } 16.67$

(E) Sales 5,000 units x Rs. 30 = Rs. 1,50,000

Variable cost (Sales – Contribution) Rs. 1,50,000 – 50,000 = 1,00,000

Variable cost as % of selling price = $\frac{1,00,000}{1,50,000} \times 100 = 66.67\%$

Fixed Cost (Contribution – Profit) = Rs. 50,000 – Rs. 15,000 = Rs. 35,000

Margin of Safety : The term Margin of safety refers to the excess of actual sales over the break-even sales. It is known as the Margin of Safety. Margin of safety can also be expressed as a percentage of sales. Margin of safety can be improved by :

- (a) Increasing the selling price
- (b) Reducing the variable cost
- (c) Selecting a product mix of larger P/V ratio items
- (d) Reducing fixed costs
- (e) Increasing the output

Margin of Safety can be calculated by the following formula :

(1) Margin of Safety = Total Sales – Break-Even Sales

(2) Margin of Safety = $\frac{\text{Profit}}{\text{P / V Ratio}}$

(3) Margin of Safety = $\frac{\text{Profit}}{\text{Contribution}} \times \text{Sales}$

(4) Profit = Margin of Safety x P / V ratio

(5) Margin of Safety expressed as percentage:

$$\begin{aligned} \text{Margin of Safety} &= \frac{\text{Margin of Safety}}{\text{Total Sales}} \times 100 \\ &\text{(or)} \\ &= \frac{\text{Actual Sales} - \text{Break-Even Sales}}{\text{Total Sales}} \times 100 \end{aligned}$$

Illustration: 9

From the following particulars, calculate Margin of safety :

Fixed cost	Rs. 1,00,000
Variable cost	Rs. 1,50,000
Total Sales	Rs. 3,00,000

Solution:

$$\begin{aligned} \text{Margin of Safety} &= \frac{\text{Profit}}{\text{P / V Ratio}} \\ &\text{(or)} \\ &= \frac{\text{Actual Sales} - \text{Break-Even Sales}}{\text{Sales} - \text{Variable Cost}} \times 100 \\ \text{P / V Ratio} &= \frac{3,00,000 - 1,50,000}{3,00,000} \times 100 = \frac{1,50,000}{3,00,000} \times 100 \\ &= 50\% \\ \text{P / V Ratio} &= 50\% \\ \text{Break-Even Sales} &= \frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{\text{Rs. 1,00,000}}{50\%} \\ &= \frac{1,00,000}{50} \times 100 = \text{Rs. 2,00,000} \\ \text{Margin of Safety} &= \text{Actual Sales} - \text{Break-Even Sales} \\ &= \text{Rs. 3,00,000} - \text{Rs. 2,00,000} = \text{Rs. 1,00,000} \end{aligned}$$

Alternatively :

$$\begin{aligned} \text{Contribution} &= \text{Sales} - \text{Variable Cost} \\ &= \text{Rs. 3,00,000} - 1,50,000 = \text{Rs. 1,50,000} \\ \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\ &= \text{Rs. 1,50,000} - 1,00,000 = \text{Rs. 50,000} \\ \text{Margin of Safety} &= \frac{\text{Profit}}{\text{P / V Ratio}} = \frac{50,000}{50\%} \\ &= \frac{50,000}{50} \times 100 = \text{Rs. 1,00,000} \end{aligned}$$

Margin of Safety expressed in percentage of sales :

$$\begin{aligned}
 &= \frac{\text{Margin of Safety}}{\text{Actual Sales}} \times 100 \\
 &= \frac{\text{Rs.1,00,000}}{\text{Rs.3,00,000}} \times 100 \\
 &= 33.33\%
 \end{aligned}$$

Illustration: 10

A company manufactures a product, currently utilizing 80% capacity with a turnover of Rs. 8,00,000 at Rs.25 per unit. The cost data are as under :

Material Cost Rs. 7.50 per unit, Labour Cost Rs. 6.25 per unit. Semi-Variable Cost (including variable cost of Rs. 3.75 per unit) Rs. 1,80,000.

Fixed Cost Rs. 90,000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

Calculate:

- (1) Activity level at Break-Even Point.
- (2) Number of units to be sold to earn a net income of 8% of sales.
- (3) Activity level needed to earn a profit of Rs. 95,000.
- (4) What should be the selling price per unit, if break-even point is to be brought down to 40% activity level?

(C A. Inter, Nov. 2000)

Solution:

Working Notes :

(a) Variable cost per unit :

	Rs.
Material cost per unit	= 7.50
Labour cost per unit	= 6.25
Semi Variable cost per unit	= 3.75
Variable Cost per unit	= 17.50

(b) Contribution per unit :

Contribution per unit	= Selling price per unit – Variable cost per unit
	= Rs. 25 – Rs. 17.50
	= Rs. 7.50 per unit.

(c) Fixed cost in Semi Variable Cost :

Total semi variable cost	= Rs. 1,80,000
Less : Variable cost @ Rs. 3.75 per unit (Rs. 3.75 x 32000 units)	= Rs. 1,20,000
Fixed cost in semi-variable cost	= Rs. 60,000

(d) Total Fixed cost upto 80% level :

Fixed cost upto 80%	= Rs. 90,000
Add : Fixed cost in Semi variable cost	= Rs. 60,000
Total Fixed cost upto 80% level	= Rs. 1,50,000

(e) Total Fixed cost above 80% level :

Fixed cost upto 80% Level	=	Rs. 90,000
Add : Fixed cost in Semi-variable cost	=	Rs. 60,000
Add : Additional Fixed cost	=	Rs. 20,000
Total Fixed cost above 80% level	=	<u>Rs. 1,70,000</u>

(f) No. of units produced at 80% level :

Total Turnover	=	Rs. 8,00,000
Per unit	=	Rs. 25
No. of units produced	=	$\frac{8,00,000}{25} = 32,000$ units

(g) No. of units produced at 100% level :

No. of units produced at 80% level	=	32,000 units
No. of units produced at 100% level	=	$\frac{32,000}{80} = 40,000$ units

(h) Profit at 80% level of activity :

Profit	=	Sales units x Contribution per unit – Fixed Cost
	=	(32,000 x Rs. 7.5) – Rs. 1,50,000
	=	Rs. 2,40,000 – Rs. 1,50,000 = Rs. 90,000
Percentage to sales	=	$\frac{Rs. 90,000}{8,00,000} = 11.25\%$

(i) So upto desired profit Rs. 90,000

	=	11.25% of sales
Fixed Cost	=	Rs. 1,50,000

(1) Activity level at B E P :

$$\begin{aligned} \text{Activity level at B E P} &= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} \\ &= \frac{Rs. 1,50,000}{Rs. 7.5} = 20,000 \text{ units} \\ \text{Activity level} &= \frac{20,000}{40,000} \times 100 = 50\% \text{ level} \end{aligned}$$

(2) Number of units to be sold to earn a net income of 8% of sales :

Suppose Sales Unit = X

Equation :

$$\begin{aligned} \text{Sales} &= \text{Variable Cost} + \text{Fixed Cost} + \text{Profit} \\ 25 X &= 17.5 X + 1,50,000 + 2X \\ &(\text{or}) \\ 25 X &= 19.5 X + 1,50,000 \\ 25 X - 19.5 X &= 1,50,000 \end{aligned}$$

$$5.5 X = 1,50,000$$

$$X = \frac{1,50,000}{5.5} = 27,273 \text{ units}$$

(3) Activity level needed to earn a profit of Rs. 95,000 :

The profit amount can be achieved at over 80% level, hence fixed cost will be Rs. 1,70,000

$$\text{Sales} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}}$$

$$= \frac{1,70,000 + 95,000}{7.5} = 35,333 \text{ units}$$

$$\text{Activity Level} = \frac{\text{Sales}}{\text{No. of units produced at 100\% level}} \times 100$$

$$= \frac{35,333}{40,000} \times 100$$

$$= 88.33\%$$

(4) Selling price per unit required to bring down B E P to 40% activity level :

$$40\% \text{ Activity level} = 40\% \text{ of } 40,000$$

$$= 40,000 \times \frac{40}{100} = 16,000 \text{ units}$$

Selling price to Break-Even at the level

$$= \frac{\text{Fixed Cost} + \text{Variable cost per unit}}{\text{Sales}}$$

$$= \frac{1,50,000}{16000} + \text{Rs. } 17.50$$

$$= \text{Rs. } 9.375 + \text{Rs. } 17.50 = \text{Rs. } 26.875$$

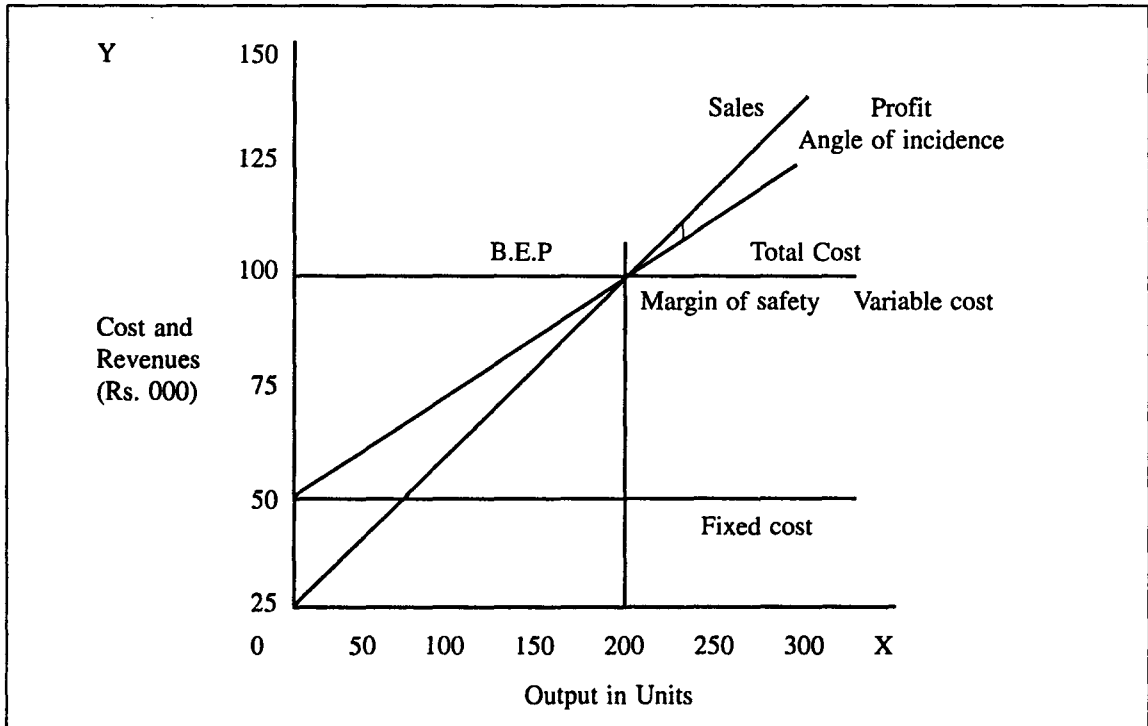
$$= \text{Rs. } 26.875$$

Selling price per unit required to bring down B E P to 40% activity level

I. Break-Even Chart

A break-even chart is a graphical presentation which indicates the relationship between cost, sales and profit. The chart depicts fixed costs, variable cost, break-even point, profit or loss, margin of safety and the angle of incidence. Such a chart not only indicates break-even point but also shows the estimated cost and estimated profit or loss at various level of activity. Break-even point is an important stage in the break-even chart which represents no profit no loss.

The following Break-Even Chart can explain more above the inter relationship between the costs, volume and profit :



From the above break-even chart, we can understand the following points :

- (1) Cost and sales revenue are represented on vertical axis, i.e., Y-axis.
- (2) Volume of production or output in units are plotted on horizontal axis, i.e., X-axis.
- (3) Fixed cost line is drawn parallel to X-axis.
- (4) Variable costs are drawn above the fixed cost line at different level of activity. The variable cost line is joined to fixed cost line at zero level of activity.
- (5) The sales line is plotted from the zero level, it represents sales revenue.
- (6) The point of intersection of total cost line and sales line is called the break-even point which means no profit no loss.
- (7) The margin of safety is the distance between the break-even point and total output produced.
- (8) The area below the break-even point represents the loss area as the total sales and less than the total cost.
- (9) The area above the break-even point represents profit area as the total sales more than the cost.
- (10) The sales line intersects the total cost line represents the angle of incidence. The large angle of incidence indicates a high rate of profit and vice versa.

II. Cash Break-Even Point

In cash break-even chart, only cash fixed costs are considered. Non-cash items like depreciation etc. are excluded from the fixed costs for computation of break-even point. Cash Break-Even Chart depicts the level of output or sales at which the sales revenue will be equal to total cash outflow. It is computed as under :

$$\text{Cash Break-Even Point} = \frac{\text{Cash Fixed Costs}}{\text{Contribution per unit}}$$

Illustration: 11

From the following information calculate the Cash Break-Even Point :

Selling price per unit	Rs.	60
Variable cost per unit	Rs.	40
Fixed cost	Rs.	2,00,000
Depreciation included in fixed cost	Rs.	50,000

Solution:

$$\begin{aligned} \text{Cash Fixed Cost} &= \text{Rs. } 2,00,000 - \text{Rs. } 50,000 = \text{Rs. } 1,50,000 \\ &= 60 - 40 = \text{Rs. } 20 \end{aligned}$$

$$\begin{aligned} \text{Cash Break-Even point in units} &= \frac{\text{Cash Fixed Cost}}{\text{Contribution per unit}} \\ &= \frac{1,50,000}{20} = 7,500 \text{ units} \end{aligned}$$

Advantages of Break-Even Chart

- (1) It enables to determine the profit or loss at different levels of activities.
- (2) It is useful to measure the relationship between cost volume and profit.
- (3) It helps to determine the break-even units, i.e., output and sales volume.
- (4) It helps to measure the profitability of various products.
- (5) It facilitates most profitable product mix to be adopted.
- (6) It assists future planning and forecasting.
- (7) It enables to determine total cost, fixed cost and variable cost at different levels of activity.
- (8) This chart is very useful for effective cost control.

Limitations of Break-Even Chart

- (1) It is based on number of assumptions which may not hold good.
- (2) Break-even charts are rarely of value in a multi-product situation.
- (3) A break-even chart does not take into consideration semi-variable cost, valuation of opening stock and closing stock.
- (4) Determination of selling price is based on many factors which will affect the constant selling price.
- (5) Capital employed, Government policy, Market environment etc. are the important aspects for managerial decisions. These aspects are not considered in break-even chart.

Angle of Incidence

The angle formed by the sales line and the total cost line at the break-even point is known as Angle of Incidence. The angle of incidence is used to measure the profit earning capacity of a firm. A large angle of incidence indicates a high rate of profit and on the other hand a small angle of incidence means that a low rate of profit.

Relationship between Angle of Incidence, Break-Even Sales and Margin of Safety Sales

- (1) When the Break-even sales are very low, with large angle of incidence, it indicates that the firm is enjoying business stability and in that case margin of safety sales will also be high.
- (2) When the break-even sales are low, but not very low with moderate angle of incidence, in that case though the business is stable, the profit earning rate is not very high as in the earlier case.
- (3) Contrary to the above when the break-even sales are high, the angle of incidence will be narrow with much lower margin of safety sales.

QUESTIONS

1. What do you understand by Marginal Costing?
2. Define Marginal Costing Briefly explain the features of marginal costing.
3. What are the differences between Absorption costing and Marginal costing?
4. What is meant by Differential costing?
5. Compare and contrast Marginal costing and Differential costing.
6. What are the important decision making areas of Marginal costing?
7. Briefly explain the advantages and limitations of Marginal costing.
8. What do you understand by Cost Volume Profit Analysis?
9. Briefly explain the objectives of cost volume profit analysis.
10. Explain Marginal cost equation.
11. What is Contribution? How it is computed?
12. What do you understand by Break-Even Analysis?
13. Write short notes on :
 - (a) Profit Volume ratio. (b) Margin of Safety. (c) Break-Even chart. (d) Angle of Incidence.
14. Briefly explain the advantages and limitations of Break-Even Chart
15. Briefly explain the relationship between Angle of Incidence, Break-Even Sales and Margin of Safety.
16. From the following particulars, you are required to find out (a) Contribution (b) Break-even point in units (c) Margin of safety and (d) Profit

Total Fixed cost	Rs. 4,500
Total Variable cost	Rs. 7,500
Total Sales	Rs. 15,000
Units sold	5,000 units

Also calculate the volume of sales to earn profit of Rs. 6,000

[Ans : (a) Contribution Rs. 7,500 (b) Break-even point in units Rs. 3,000 units (c) Margin of Safety Rs. 6,000 (d) Profit Rs. 3,000]
17. From the following data, calculate :
 - (a) P / V Ratio.
 - (b) Profit when sales are Rs. 40,000.
 - (c) New break-even point if selling price is reduced by 20%.

Fixed Expenses Rs. 8,000.
Break-Even point Rs. 10,000.

[Ans : (a) Profit volume ratio 40%. (b) Profit when sales are Rs. 40,000 is Rs. 8,000.
(c) New break-even point if selling price is reduced by 20% is Rs. 32,000.]
18. From the following particulars you are required to calculate (a) P / V ratio and (b) Break-even point :

Present sales	Rs. 2,00,000
Variable cost	Rs. 1,20,000
Fixed expenses	Rs. 40,000

Ascertain the effect of 10% reduction of selling price on (a) P / V ratio and (b) Break-Even Point.
Also calculate the sales required to maintain the profit at the present level.

[Ans : (a) P / V Ratio 40% ; New P / V Ratio = 33%.
(a) Break-even point Rs. 1,00,000; New BEP = Rs. 1,20,000.

- (b) Sales required to maintain the profit at the present level.
Present profit Rs. 20000. Required Sales Rs. 1,81,820.]
19. The following are the cost information in relation to the manufacture of a product :
- Selling price – Rs. 10 per unit
 - Trade discount – 5% of selling price
 - Material cost – Rs. 3 per unit
 - Labour – Rs. 2 per unit
 - Overheads :**
 - Fixed Rs. 10,000
 - Variable 100% of labour cost
- Calculate :
- (a) B E P.
(b) Profit if sales are 15% above break-even volume.
[Ans : BEP – 4,000 units; Profits Rs. 1,500, Volume 4,600 units.]
20. Sales Price – Rs. 20 unit
- Variable manufacturing cost – Rs. 11 per unit.
 - Variable selling cost – Rs. 3 per unit.
 - Fixed factory overheads – Rs. 5,40,000 per year.
 - Fixed selling costs – Rs. 2,52,000 per unit.
- Calculate :**
- (a) BEP Volume and Value.
(b) Sales required to earn a profit of Rs. 60,000.
(c) Sales required to earn a profit of 10% of sales.
[Ans : (a) BEP Volume – 1,32,000 units; Value – Rs. 26,40,000.
(b) Sales – 1,42,000 units; Value – Rs. 28,40,000.
(d) Sales – 1,98,000 units; Value – Rs. 39,60,000.
(11,88,000; 3,96,000).]
21. From the following data, find out how many units should be sold to earn a net profit of 10% on sales.
- Selling price per unit Rs. 20
 - Variable cost per unit Rs. 14
 - Fixed cost (total) Rs. 7,92,000
- [Ans: Sales in Units 1,98,000]
22. A company estimates that next year it will earn a profit of Rs. 50,000. The budgeted fixed costs and sales are Rs. 2,50,000 and Rs. 9,93,000 respectively. Find out the break-even point for the company.
[Ans: B.E.P in sales. Rs. 8,27,500]
23. Plant I produces a product which costs Rs. 3 per unit when produced in quantities of 10,000 Units and Rs. 2.50 per Unit when produced in quantities of 20,000 units. You are asked to estimate total fixed costs.
[Ans: Fixed cost Rs. 10,000]
24. The following are the budgeted data of a company.
- | | Rs. |
|----------------|----------|
| Sales | 6,00,000 |
| Variable costs | 3,00,000 |
| Fixed costs | 1,80,000 |
- Find out the break-even point at
- (i) the budgeted data
(ii) assuming 20% increase in variable cost.
[Ans: Break-even point Rs. 3,60,000; New Break-even point at 20% increase in variable costs Rs. 4,50,000]
25. Calculate No. of Units to be sold to earn a profit of Rs. 60,000 a year
- | Sale price | Rs. 20 per unit |
|-----------------------------|-----------------------|
| Variable manufacturing cost | Rs. 11 per unit |
| Variable selling price | Rs. 3 per unit |
| Fixed factory overhead | Rs. 5,40,000 per year |
| Fixed selling costs | Rs. 2,52,000 per year |
- [Ans: No. of Units to be sold is 1,42,000 units]
26. Present production and sales : 8,000 units
- Selling price per unit Rs. 20
 - Direct labour Rs. 2.50
 - Variable overhead Rs 100% of direct labour cost
 - Direct materials Rs. 5
 - Fixed costs Rs. 40,000

Find out;

- (a) P/V Ratio
- (b) Sales required to break-even point and
- (c) Margin of safety

[Ans: P/V ratio 50% ; BEP Rs 80,000; Margin of safety Rs 80,000]

27. The P/V ratio of Gupta & Co. is 60% during 2003. Sales were Rs 1,50,000 and the fixed cost Rs 15,000. Calculate :
- (a) Total variable expenses
 - (b) Total contribution
 - (c) Profit and
 - (d) Profit if sales are increased to Rs. 2,25,000
- [Ans: a) Total variable cost Rs. 60,000; b) Total contribution Rs. 90,000
c) Profit Rs. 75,000; d) Profit Rs. 1,20,000]
28. The projected capacity of a plant, when sold, would return Rs. 70,000 in sales income to the company. The variable costs for this production volume were determined to be Rs. 30,000. The fixed costs are Rs. 20,000. Determine the following :
- (1) the break-even point of the business
 - (2) the profit or loss to the business on sales of Rs. 49,000; Rs. 28,000
 - (3) the amount of sales that will enable the business to earn a net profit of Rs. 28,000
- [Ans: (1) break-even point Rs. 35,000;
(2) if sales of Rs. 49,000 the profit is Rs. 8,000; if sales of Rs. 28,000 the loss is Rs. 4,000
(3) the amount of sales Rs. 80,500]
29. From the following data, find out the break-even point; P/V ratio, and margin of safety ratio.

Fixed costs	6,00,000	30%
Variable costs	12,00,000	60%
Net profit	2,00,000	10%
Sales	20,00,000	100%

[Ans: P/V ratio 40%; BEP Rs 15,00,000; Margin of safety Ratio 25%]

30. A company budgets for a production of 1,50,000 units. The variable cost per unit is Rs. 14 and fixed cost is Rs. 2 per unit. The company fixes its selling price to fetch a profit of 15% on cost.
- (a) What is the break-even point?
 - (b) What is the profit-volume ratio?
 - (c) If it reduces its selling price by 5%, how the revised selling price affect the break-even point and the profit-volume ratio?
 - (d) If a profit increase of 10% is desired more than the budget, what should be the sales at the reduced prices?
- [Ans: (a) Break-even point (in Rs.) Rs. 12,54,549 (b) P/V ratio 23.91%
(c) New break-even point in units 86,207 units new P/V ratio 19.90% (d) Sales for desired profit Rs. 34,96,000]
31. The following information regarding the operations of 2003 has been made available from the records of the AAA corporation.

Sales	Rs. 1,00,000
Direct materials used	40,000
Direct labour	15,000
Fixed manufacturing overheads	20,000
Fixed selling and administrative expenses	10,000
Gross profit	20,000
Net loss	5,000

There are no opening or closing inventories. It is required to calculate :

- (1) Variable selling and administrative expenses
- (2) Contribution Margin in rupees
- (3) Variable factory overhead
- (4) Break even point in rupee sales
- (5) Factory cost of goods sold

[Ans: Variable factory overheads Rs. 5,000; variable selling & administrative expenses Rs. 15,000; Contribution Margin Rs. 25,000; Break-even point Rs. 1,20,000; Factory cost of goods sold Rs. 80,000]

CHAPTER 27

Budgeting and Budgetary Control

Introduction

Budgeting has come to be accepted as an efficient method of short-term planning and control. It is employed, no doubt, in large business houses, but even the small businesses are using it at least in some informal manner. Through the budgets, a business wants to know clearly as to what it proposes to do during an accounting period or a part thereof. The technique of budgeting is an important application of Management Accounting. Probably, the greatest aid to good management that has ever been devised is the use of budgets and budgetary control. It is a versatile tool and has helped managers cope with many problems including inflation.

DEFINITION OF BUDGET

The Chartered Institute of Management Accountants, England, defines a 'budget' as under:

“ A financial and/or quantitative statement, prepared and approved prior to define period of time, of the policy to be persued during that period for the purpose of attaining a given objective.”

According to Brown and Howard of Management Accountant “a budget is a predetermined statement of managerial policy during the given period which provides a standard for comparison with the results actually achieved.”

Essentials of a Budget

An analysis of the above said definitions reveal the following essentials of a budget:

- (1) It is prepared for a definite future period.
- (2) It is a statement prepared prior to a defined period of time.
- (3) The Budget is monetary and / or quantitative statement of policy.
- (4) The Budget is a predetermined statement and its purpose is to attain a given objective.

A budget, therefore, be taken as a document which is closely related to both the managerial as well as accounting functions of an organization.

Forecast Vs Budget

Forecast is mainly concerned with an assessment of probable future events. Budget is a planned result that an enterprise aims to attain. Forecasting precedes preparation of a budget as it is an important part of the budgeting process. It is said that the budgetary process is more a test of forecasting skill than anything else. A budget is both a mechanism for profit planning and technique of operating cost control. In order to establish a budget it is essential to forecast various important variables like sales, selling prices, availability of materials, prices of materials, wage rates etc.

Difference between Forecast and Budget

Both budgets and forecasts refer to the anticipated actions and events. But still there are wide differences between budgets and forecasts as given below:

<i>Forecasts</i>	<i>Budgets</i>
(1) Forecasts is mainly concerned with anticipated or probable events	(1) Budget is related to planned events
(2) Forecasts may cover for longer period or years	(2) Budget is planned or prepared for a shorter period
(3) Forecast is only a tentative estimate	(3) Budget is a target fixed for a period.
(4) Forecast results in planning	(4) Result of planning is budgeting
(5) The function of forecast ends with the forecast of likely events	(5) The process of budget starts where forecast ends and converts it into a budget
(6) Forecast usually covers a specific business function	(6) Budget is prepared for the business as a whole
(7) Forecasting does not act as a tool of controlling measurement.	(7) Purpose of budget is not merely a planning device but also a controlling tool.

BUDGETARY CONTROL

Budgetary Control is the process of establishment of budgets relating to various activities and comparing the budgeted figures with the actual performance for arriving at deviations, if any. Accordingly, there cannot be budgetary control without budgets. Budgetary Control is a system which uses budgets as a means of planning and controlling.

According to I.C.M.A. England Budgetary control is defined by Terminology as the establishment of budgets relating to the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with the budgeted results, either to secure by individual actions the objectives of that policy or to provide a basis for its revision.

Brown and Howard defines budgetary control is “a system of controlling costs which includes the preparation of budgets, co-ordinating the department and establishing responsibilities, comparing actual performance with the budgeted and acting upon results to achieve maximum profitability.”

The above definitions reveal the following essentials of budgetary control:

- (1) Establishment of objectives for each function and section of the organization.
- (2) Comparison of actual performance with budget.
- (3) Ascertainment of the causes for such deviations of actual from the budgeted performance.
- (4) Taking suitable corrective action from different available alternatives to achieve the desired objectives.

Objectives of Budgetary Control

Budgetary Control is planned to assist the management for policy formulation, planning, controlling and co-ordinating the general objectives of budgetary control and can be stated in the following ways:

- (1) **Planning:** A budget is a plan of action. Budgeting ensures a detailed plan of action for a business over a period of time.
- (2) **Co-ordination:** Budgetary control co-ordinates the various activities of the entity or organization and secure co-operation of all concerned towards the common goal.
- (3) **Control:** Control is necessary to ensure that plans and objectives are being achieved. Control follows planning and co-ordination. No control performance is possible without predetermined standards. Thus, budgetary control makes control possible by continuous measures against predetermined targets. If there is any variation between the budgeted performance and the actual performance, the same is subject to analysis and corrective action.

Scope and Techniques of Standard Costing and Budgetary Control

Scope:

- (1) Budgets are prepared for different functions of business such as production, sales etc. Actual results are compared with the budgets and control is exercised.
Standards on the other hand are complied by classifying, recording and allocation of the expenses to cost units. Actual costs are compared with standard costs.
- (2) Budgets have a wide range of coverage of the entire organization. Each operation or process is divided into number of elements and standards are set for each such element.
- (3) Budgetary control is concerned with origin of expenditure at functional levels.
Standard costing is concerned with the requirements of each element of cost.
- (4) Budget is a projection of financial accounts whereas standard costing projects the cost accounts.

Technique:

- (1) Budgetary control is exercised by putting budgets and actuals side by side.
Variances are not normally revealed in the accounts. Standard costing variances are revealed through accounts.
- (2) Budgetary control system can be operated in parts. For example, Advertisement Budgets, Research and Development Budgets, etc. Standard costing is not put into operation in parts.
- (3) Budgetary control of expenses is broad in nature whereas standard costing system is a far more technically improved system by means of which the variances are analysed in detail.

Requisites for Effective Budgetary Control

The following are the requisites for effective budgetary control :

- (1) Clear cut objectives and goals should be well defined.
- (2) The ultimate objective of realising maximum benefits should always be kept uppermost.
- (3) There should be a budget manual which contains all details regarding plan and procedures for its execution. It should also specify the time table for budget preparation for approval, details about responsibility, cost centers etc.
- (4) Budget committee should be set up for budget preparation and efficient execution of the plan.
- (5) A budget should always be related to a specified time period.

- (6) Support of top management is necessary in order to get the full support and co-operation of the system of budgetary control.
- (7) To make budgetary control successful, there should be a proper delegation of authority and responsibility.
- (8) Adequate accounting system is essential to make the budgeting successful.
- (9) The employees should be properly educated about the benefits of budgeting system.
- (10) The budgeting system should not cost more to operate than it is worth.
- (11) Key factor or limiting factor, if any, should consider before preparation of budget.
- (12) For budgetary control to be effective, proper periodic reporting system should be introduced.

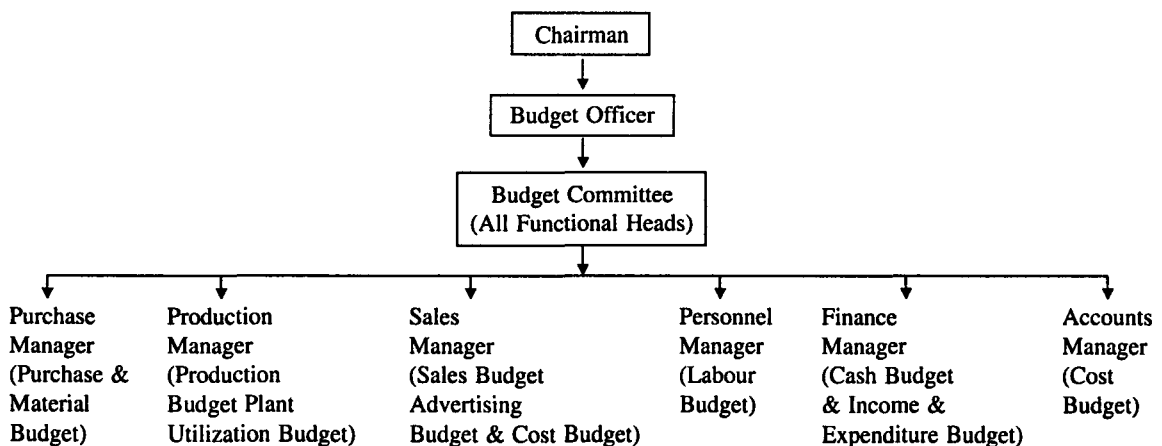
Organization for Budgetary Control

In order to introduce budgetary control system, the following are essential to be considered for a sound and efficient organization. The important aspects to be considered are :

1. Organisation Chart
2. Budget Center
3. Budget Officer
4. Budget Committee
5. Budget Manual
6. Budget Period
7. Key Factor

(1) **Organisation Chart:** For the purpose of effective budgetary control, it is imperative on the part of each entity to have definite “plan of organization.” This plan of organization is embodied in the organization chart. The organization chart explaining clearly the position of each executive’s authority and responsibility of the firm. All the functional heads are entrusted with the responsibility of ensuring proper implementation of their respective departmental budgets. An organization chart for budgetary control is given showing clearly the type of budgets to be prepared by the functional heads.

Organization Chart



From the above chart we can observe that the chairman of the company is the overall in charge of the functions of the Budgeted Committee. A Budget Officer is the convener of the budget committee, who helps in co-ordination. The Purchase Manager, Production Manager, Sales Manager, Personnel Manager, Finance Manager and Account Manager are made responsible to prepare their budgets.

(2) Budget Center: A Budget Center is defined by the terminology as “a section of the organization of an undertaking defined for the purpose of budgetary control.” For effective budgetary control budget centre or departments should be established for each of which budget will be set with the help of the head of the department concerned.

(3) Budget Officer: Budget Officer is usually some senior member of the accounting staff who controls the budgetary process. He does not prepare the budget himself, but facilitates and co-ordinates the budgeting activity. He assists the individual departmental heads and the budget committee, and ensures that their decisions are communicated to the appropriate people.

(4) Budget Committee: Budget Committee comprising of the Managing Director, the Production Manager, Sales Manager and Accountant. The main objectives of this committee is to agree on all departmental budgets, normal standard hours and allocations. In small concerns, the Budget Officer may co-ordinate the work for preparation and implementation of budgets. In large-scale concern a budget committee is setup for preparation of budgets and execution of budgetary control.

(5) Budget Manual: A Budget Manual has been defined as “a document which set out the responsibilities of persons engaged in the routine of and the forms and records required for budgetary control.” It contains all details regarding the plan and procedures for its execution. It also specifies the time table for budget preparation to approval, details about responsibility, cost centers, constitution and organization of budget committee, duties and responsibilities of budget officer.

(6) Budget Period: A budget is always related to specified time period. The budget period is the length of time for which a budget is prepared and employed. The period may depend upon the type of budget. There is no specific period as such. However, for the sake of convenience, the budget period may be fixed depending upon the following factors:

- (a) Types of Business
- (b) Types of Budget
- (c) Nature of the demand of the product
- (d) Length of trade cycle
- (e) Economic factors
- (f) Availability of accounting period
- (g) Availability of finance
- (h) Control operation

Key Factor

Key Factor is also called as “Limiting Factor” or Governing Factor. While preparing the budget, it is necessary to consider key factor for successful budgetary control. The influence of the Key Factor which dominates the business operations in order to ensure that the functional budgets are reasonably capable of fulfilment. The Key Factors include.

- (1) Raw materials may be in short supply.
- (2) Non-availability of skilled labours.

- (3) Government restrictions.
- (4) Limited sales due to insufficient sales promotion.
- (5) Shortage of power.
- (6) Underutilization of plant capacity.
- (7) Shortage of efficient executives.
- (8) Management policies regarding lack of capital.
- (9) Insufficient research into new product development.
- (10) Insufficiency due to shortage of space.

Advantages of Budgetary Control

The advantages of budgetary control may be summarized as follows :

- (1) It facilitates reduction of cost.
- (2) Budgetary control guides the management in planning and formulation of policies.
- (3) Budgetary control facilitates effective co-ordination of activities of the various departments and functions by setting their limits and goals.
- (4) It ensures maximization of profits through cost control and optimum utilization of resources.
- (5) It evaluates for the continuous review of performance of different budget centers.
- (6) It helps to the management efficient and economic production control.
- (7) It facilitates corrective actions, whenever there is inefficiencies and weaknesses comparing actual performance with budget.
- (8) It guides management in research and development.
- (9) It ensures economy in working.
- (10) It helps to adopt the principles of standard costing.

Limitations of Budgetary Control

Budgetary Control is an effective tool for management control. However, it has certain important limitations which are identified below:

- (1) The budget plan is based on estimates and forecasting. Forecasting cannot be considered to be an exact science. If the budget plans are made on the basis of inaccurate forecasts then the budget programme may not be accurate and ineffective.
- (2) For reasons of uncertainty about future, and changing circumstances which may develop later on, budget may prove short or excess of actual requirements.
- (3) Effective implementation of budgetary control depends upon willingness, co-operation and understanding among people reasonable for execution. Lack of co-operation leads to inefficient performance.
- (4) The system does not substitute for management. It is mere like a management tool.
- (5) Budgeting may be cumbersome and time consuming process.

Types of Budgets

As budgets serve different purposes, different types of budgets have been developed. The following are the different classification of budgets developed on the basis of time, functions, and flexibility or capacity.

(A) *Classification on the basis of Time :*

1. Long-Term Budgets
2. Short-Term Budgets
3. Current Budgets

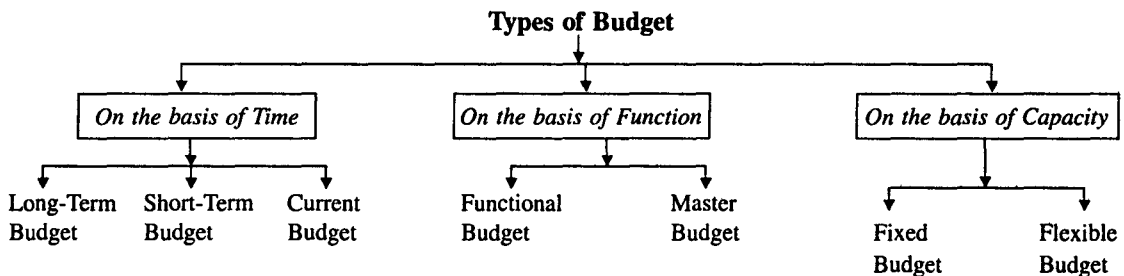
(B) *Classification according to Functions :*

1. Functional or Subsidiary Budgets
2. Master Budgets

(C) *Classification on the basis of Capacity :*

1. Fixed Budgets
2. Flexible Budgets

The following chart can explain this more:



(A) Classification on the Basis of Time

1. Long-Term Budgets: Long-term budgets are prepared for a longer period varies between five to ten years. It is usually developed by the top level management. These budgets summarise the general plan of operations and its expected consequences. Long-Term Budgets are prepared for important activities like composition of its capital expenditure, new product development and research, long-term finance etc.

2. Short-Term Budgets: These budgets are usually prepared for a period of one year. Sometimes they may be prepared for shorter period as for quarterly or half yearly. The scope of budgeting activity may vary considerably among different organization.

3. Current Budgets: Current budgets are prepared for the current operations of the business. The planning period of a budget generally in months or weeks. As per ICMA London, "Current budget is a budget which is established for use over a short period of time and related to current conditions."

(B) Classification on the Basis of Function

1. Functional Budget: The functional budget is one which relates to any of the functions of an organization. The number of functional budgets depend upon the size and nature of business. The following are the commonly used:

- (1) Sales Budget
- (2) Purchase Budget
- (3) Production Budget
- (4) Selling and Distribution Cost Budget
- (5) Labour Cost Budget
- (6) Cash Budget
- (7) Capital Expenditure Budget

2. Master Budget: The Master Budget is a summary budget. This budget encompasses all the functional activities into one harmonious unit. The ICMA England defines a Master Budget as the summary budget incorporating its functional budgets, which is finally approved, adopted and employed.

(C) Classification on the Basis of Capacity

1. Fixed Budget: A fixed budget is designed to remain unchanged irrespective of the level of activity actually attained.

2. Flexible Budget: A flexible budget is a budget which is designed to change in accordance with the various level of activity actually attained. The flexible budget also called as Variable Budget or Sliding Scale Budget, takes both fixed, variable and semi fixed manufacturing costs into account.

Control Ratios

Ratios are used by the management to determine whether performance of its activities is going on as per estimates or not. If the ratio is 100 % or more, the performance is considered as favourable and if the ratio is less than 100% the performance is considered as unsatisfactory. The following are the ratios generally calculated for performance evaluation.

1. Capacity Ratio: This ratio indicates the extent to which budgeted hours of activity is actually utilised.

$$\text{Capacity Ratio} = \frac{\text{Actual Hours Worked Production}}{\text{Budget Hours}} \times 100$$

2. Activity Ratio: This ratio is used to measure the level of activity attained during the budget period.

$$\text{Activity Ratio} = \frac{\text{Standard Hours for Actual Production}}{\text{Budgeted Hours}} \times 100$$

3. Efficiency Ratio: This ratio shows the level of efficiency attained during the budget period

$$\text{Efficiency Ratio} = \frac{\text{Standard Hours for Actual Production}}{\text{Actual Hours Worked}} \times 100$$

4. Calendar Ratio: This ratio is used to measure the proportion of actual working days to budgeted working days in a budget period.

$$\text{Calendar Ratio} = \frac{\text{Number of Actual Working Days in a Period}}{\text{Budgeted Working Days for the Period}} \times 100$$

Illustration: 1

A company produces two articles A and B. Each unit takes 4 hours for A and 10 hours for B as production time respectively. The budgeted production for April, 2003 is 400 units of A and 800 units for B. The actual production at the end of the months was 320 units of A and 850 units of B. Actual hours spent on this production was 200. Find out the Capacity, Activity, and Efficiency Ratios for April 2003.

Also find out the Calendar Ratio if the actual working days during the month be 28 corresponding to 26 days in the budget.

Solution:

Standard Budgeted Hours :

$$\begin{array}{rcl} \text{A} - 400 \div 4 & = & 100 \text{ hours} \\ \text{B} - 800 \div 10 & = & 80 \text{ hours} \\ & & \underline{180 \text{ hours}} \end{array}$$

Standard Hours for Actual Production :

$$\begin{array}{rcl} \text{A} - 320 \div 4 & = & 80 \text{ hours} \\ \text{B} - 850 \div 10 & = & 85 \text{ hours} \\ & & \underline{165 \text{ hours}} \end{array}$$

$$\begin{aligned} (1) \text{ Capacity Ratio} &= \frac{\text{Actual Hours worked}}{\text{Budgeted Hours}} \times 100 \\ &= \frac{200}{180} \times 100 \\ &= 111.1\% \end{aligned}$$

$$\begin{aligned} (2) \text{ Activity Ratio} &= \frac{\text{Standard Hours for Actual Production}}{\text{Budgeted Standard Hours}} \times 100 \\ &= \frac{165}{180} \times 100 \\ &= 91.66\% \end{aligned}$$

$$\begin{aligned} (3) \text{ Efficiency Ratio} &= \frac{\text{Standard Hours for Actual Production}}{\text{Actual Hours Worked}} \times 100 \\ &= \frac{165}{200} \times 100 \\ &= 82.5\% \end{aligned}$$

$$\begin{aligned} (4) \text{ Calendar Ratio} &= \frac{\text{Number of Actual Working Days in a Period}}{\text{Number of Working Days in a Budget Period}} \times 100 \\ &= \frac{28}{26} \times 100 \\ &= 107.69\% \end{aligned}$$

Illustration: 2

From the given below information you are required to calculate Capacity Ratio, Activity Ratio and Efficiency Ratio:

Actual Hours worked	3,600
Budgeted Hours	4,000

Standard Hours for Actual Production	5,600 (Actual Production converted into Standard Hours)
Budgeted Standard Hours	6,000

(Budgeted Production Converted into Standard Hours)

Solution:

$$\begin{aligned}
 (1) \text{ Capacity Ratio} &= \frac{\text{Actual Hours Worked}}{\text{Budgeted Hours}} \times 100 \\
 &= \frac{3,600}{4,000} \times 100 \\
 &= 90\% \\
 (2) \text{ Activity Ratio} &= \frac{\text{Standard Hours for Actual Production}}{\text{Budgeted Standard Hours}} \times 100 \\
 &= \frac{5,600}{6,000} \times 100 \\
 &= 93.33\% \\
 (3) \text{ Efficiency Ratio} &= \frac{\text{Standard Hours for Actual Production}}{\text{Actual Hours Worked}} \times 100 \\
 &= \frac{5,600}{3,600} \times 100 \\
 &= 155.55\%
 \end{aligned}$$

Illustration: 3

Product A takes 4 hours to make and B requires 8 hours. In a month 27 effective days of 8 hours a day. 500 units of A and 300 units, of Y were produced. The company employ 25 workers in the production department. The budgeted hours are 60,000 for the year. Calculate Capacity Ratio, Activity Ratio and Effective Ratio.

Solution:

Standard Hours for Actual Production	
Product A : 500 x 4	= 2,000 hours
Product B : 300 x 8	= 2,400 hours
Std. Hours for Actual Production	= 4,400 hours
Budgeted Hours for the month	= $\frac{60,000}{12}$
	= 5,000 hours
Actual Hours Worked = 25 x 27 x 8	= 5,400 hours

$$\begin{aligned}
 (1) \text{ Capacity Ratio} &= \frac{\text{Actual Hours Worked}}{\text{Budgeted Hours}} \times 100 \\
 &= \frac{5,400}{5,000} \times 100 \\
 &= 108 \% \\
 (2) \text{ Activity Ratio} &= \frac{\text{Standard Hour for Actual Production}}{\text{Budgeted Hours}} \times 100 \\
 &= \frac{4,400}{5,000} \times 100 \\
 &= 88 \% \\
 (3) \text{ Efficiency Ratio} &= \frac{\text{Standard Hours for Actual Production}}{\text{Actual Hours Worked}} \times 100 \\
 &= \frac{4,400}{5,400} \times 100 \\
 &= 81.48 \%
 \end{aligned}$$

Illustration: 4

A Manufacturing company submits the following figures:

Budgeted Production 44 units

Actual Production 40 units

Standard Hours Per unit 8

Actual work Hours 500

You are required to calculate (a) Capacity Ratio (b) Activity Ratio and (c) Efficiency Ratio.

Solution:

$$\begin{aligned}
 \text{Standard hours for actual period} &= \text{Standard hours per unit} \times \text{Actual Production} \\
 &= 8 \times 40 = 320 \text{ hours} \\
 \text{Budgeted hours} &= \text{Standard hour per unit} \times \text{Budgeted Production} \\
 &= 8 \times 44 = 352 \text{ hours} \\
 (1) \text{ Capacity Ratio} &= \frac{\text{Actual Hours worked}}{\text{Budgeted Hours}} \times 100 \\
 &= \frac{500}{352} \times 100 \\
 &= 142.04\% \\
 (2) \text{ Activity Ratio} &= \frac{\text{Standard hours for actual production}}{\text{Budgeted Hours}} \times 100 \\
 &= \frac{320}{352} \times 100 \\
 &= 90.90\% \\
 (3) \text{ Efficiency Ratio} &= \frac{\text{Standard hours for actual Production}}{\text{Actual Hours worked}} \times 100 \\
 &= \frac{320}{500} \times 100 \\
 &= 64 \%
 \end{aligned}$$

Performance of Budgeting

Performance of Budget has been defined as a “budget based on functions, activities and projects.”

Performance of Budgeting may be described as “the budgeting system in which input costs are related to the performance, i.e., end results.”

According to National Institute of Bank Management, Performance Budgeting is, “the Process of analyzing, identifying, simplifying and crystallizing specific performance objectives of a job to be achieved over a period, in the framework of the organizational objectives, the purpose and objectives of the job.”

From the above definitions, it is clear that budgetary performance involves the following:

- (1) Establishment of well defined centers of responsibilities:
- (2) Establishment for each responsibility centre — a programme of target performance is — physical units.
- (3) Forecasting the amount of expenditure required to meet the physical plan laid down.
- (4) Comparison of the actual performance with the budgets, i.e., evaluation of performance.
- (5) Undertaking periodic review of the programme with a view to make modifications as required.

SOME IMPORTANT BUDGETS

Sales Budget

Sales Budget is one of the important functional budget. Sales estimate is the commencement of budgeting may be made in quantitative terms. Sales budget is primarily concerned with forecasting of what products will be sold in what quantities and at what prices during the budget period. Sales budget is prepared by the sales executives taking into account number of relevant and influencing factors such as :

- (1) Analysis of past sales (Product wise, Territory wise, Quote wise).
- (2) Key Factors.
- (3) Market Conditions.
- (4) Production Capacity.
- (5) Government Restrictions.
- (6) Competitor’s Strength and Weakness.
- (7) Advertisement, Publicity and Sales Promotion.
- (8) Pricing Policy.
- (9) Consumer Behaviour.
- (10) Nature of Business.
- (11) Types of Product.
- (12) Company Objectives.

- (13) Salesmen's Report.
- (14) Marketing Research's Reports.
- (15) Product Life Cycle.

Illustration: 5

Thomas Engineering Co. Ltd. Manufactures two articles X and Y. Its sales department has three divisions : West, South and East. Preliminary sales budgets for the year ending 31st December 2003, based on the assessments of the divisional executives:

Product X : West 40,000 units : South 1,00,000 units and East 20,000 units

Product Y : West 60,000 units : South 8,00,000 units and East Nil

Sales Price X Rs. 2 and Y Rs. 3 in all areas.

Arrangements are made for the extensive advertising of product X and Y and it is estimated that West division sales will increase by 20,000 units. Arrangements are also made to advertise and distribute product Y in the Eastern area in the second half of 2003 when sales are expected to be 1,00,000 units.

Since the estimated sales of the South division represented an unsatisfactory target, it is agreed to increase both the estimates by 10 %.

Prepare a sales budget for the year to 31st December 2003.

Solution:**Sales Budget for the year 2003**

Division	Product X			Product Y			Total Rs.
	Qty.	Price Rs.	Value Rs.	Qty. Rs.	Price Rs.	Value Rs.	
West	60,000	2	1,20,000	80,000	3	2,40,000	3,60,000
South	1,10,000	2	2,20,000	88,000	3	2,64,000	4,84,000
East	20,000	2	40,000	1,00,000	3	3,00,000	3,40,000
Total	1,90,000		3,80,000	2,68,000		8,04,000	11,84,000

Illustration: 6

Two articles A and B are manufactured in a department. Sales for the year 2003 were planned as follows :

Product	1st Quarter Units	2nd Quarter Units	3rd Quarter Units	4th Quarter Units
Product A	5,000	6,000	6,500	7,500
Product B	2,500	2,250	2,000	1,900

Selling price were Rs. 10 per unit for A and Rs. 20 per unit for B respectively. Average sales return are 10 % of sales and the discounts and bad debts amount to 2 % of the total sales.

Prepare Sales Budget for the year 2003.

Sales Budget for the Year 2003

Particulars	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			Total		
	Qty. Units	Price Rs.	Value Rs.	Qty. Units	Price Rs.	Value Rs.	Qty. Units	Price Rs.	Value Rs.	Qty. Units	Price Rs.	Value Rs.	Qty. Units	Price Rs.	Value Rs.
Product A	5,000	10	50,000	6,000	10	60,000	6,500	10	65,000	7,500	10	75,000	25,000	10	2,50,000
Product B	2,500	20	50,000	2,250	20	45,000	2,000	20	40,000	1,900	20	38,000	8,650	20	1,73,000
Total (1)	7,500	-	1,00,000	8,250	-	1,05,000	8,500	-	1,05,000	9,400	-	1,13,000	33,650	-	4,23,000
Less :															
Sales Return at 10% on Sales															
Discount	-	-	10,000	-	-	10,500	-	-	10,500	-	-	11,300	-	-	42,300
Bad Debts at 2% on Sales	-	-	2,000	-	-	2,100	-	-	2,100	-	-	2,260	-	-	8460
Total (2)	-	-	12,000	-	-	12,600	-	-	12,600	-	-	13,560	-	-	50,760
Net Sales (1) - (2)	-	-	88,000	-	-	92,400	-	-	92,400	-	-	92,400	-	-	3,72,240

Illustration: 7

Natarajan Ltd. has four sales territories A, B, C, D. Each salesman is expected to sell the following number of units during the First Quarter of 2003. Assume the Average Selling Price to be Rs. 10:

Month	Territory			
	A Units	B Units	C Units	D Units
April	500	750	1,250	1,750
May	1,000	900	1,400	2,000
June	1,250	1,000	1,500	2,250

Solution:**Sales Budget, First Quarter 2003**

Territory	April			May			June			Quarter	
	Qty. unit	Price Rs.	Value Rs.	Qty. unit	Price Rs.	Value Rs.	Qty. unit	Price Rs.	Value Rs.	Qty. unit	Value Rs.
A	500	10	5,000	1,000	10	10,000	1,250	10	12,500	2,750	27,500
B	750	10	7,500	900	10	9,000	1,000	10	10,000	2,650	26,500
C	1,250	10	12,500	1,400	10	14,000	1,500	10	15,000	4,150	41,500
D	1,750	10	17,500	2,000	10	20,000	2,250	10	22,500	6,000	60,000
Total	4,250		42,500	5,300		53,000	6,000		60,000	15,550	1,55,500

Production Budget

Production budget is usually prepared on the basis of sales budget. But it also takes into account the stock levels desired to be maintained. The estimated output of business firm during a budget period will be forecast in production budget. The production budget determines the level of activity of the produce business and facilities planning of production so as to maximum efficiency. The production budget is prepared by the chief executives of the production department. While preparing the production budget, the factors like estimated sales, availability of raw materials, plant capacity, availability of labour, budgeted stock requirements etc. are carefully considered.

Cost of Production Budget

After Preparation of production budget, this budget is prepared. Production Cost Budgets show the cost of the production determined in the production budget. Cost of Production Budget is grouped in to Material Cost Budget, Labour Cost Budget and Overhead Cost Budget. Because it breaks up the cost of each product into three main elements material, labour and overheads. Overheads may be further subdivided in to fixed, variable and semi-fixed overheads. Therefore separate budgets required for each item.

Illustration: 8

From the following particulars prepare a production budget of product P and Q of Nancy sales Corporation for the First Quarter of 2003:

Particulars	Product P	Product Q	Product R
Sales (in units) :			
January	20,000	15,000	5,000
February	15,000	20,000	5,000
March	25,000	25,000	5,000
Selling Price Per unit (Rs.)	5	10	20

Particulars	Product P	Product Q	Product R
Tarqets for 1 st Quarter 2003 :			
Sales Quantity increase	10 %	10 %	10 %
Sales Price increase	Nil	10 %	20 %
Stock Position 1 st Jan. 2003 :			
Stock position and Jan. 2003 Sales	50 %	50 %	50 %
Stock Position 31 st Mar. 2003 :	10,000	20,000	5,000
Stock Position end Jan. & Feb.			
Percentage of subsequent month sales	50 %	50 %	50 %

Solution:**Production Budget (Units) of Product P and Q for the First Quarter of 2003**

Product	Particulars	April	May	June	Total
P	Expected Sales	22,000	16,500	27,500	66,000
	Add : Closing stock	8,250	13,750	10,000	10,000
		30,250	30,250	37,500	76,000
	Less : Opening stock	11,000	8,250	13,750	10,000
	Budgeted Production (in units)	19,250	22,000	23,750	66,000
Q	Expected sales	16,500	22,000	27,500	66,000
	Add : Closing stock	11,000	13,750	20,000	20,000
		27,500	35,750	47,500	86,000
	Less : Opening stock	13,750	17,875	23,750	13,750
	Budgeted Production (to be Produced)	13,750	17,875	23,750	72,250

Illustration: 9

From the following particular, you are required to prepare production budget of

Mrs. V. G. P. Ltd. a manufacturing organization that has three products X, Y and Z

Product	Estimated Stock at the beginning of the budget period	Estimated Stock at the end of the budget Period	Estimated Sales as Per sales budget
X	5,000 units	6,400 units	21,600 units
Y	4,000 units	3,850 units	19,200 units
Z	6,000 units	7,800 units	23,100 units

Solution:

Particulars	X (Units)	Y (Units)	Z (Units)
Expected Sales during the period	21,600	19,200	23,100
Add : Closing stock at the end of budget period	6,400	3,850	7,800
	28,000	23,050	30,900
Less : Opening stock at the beginning of the budget period	5,000	4,000	6,000
Budgeted Production	23,000	19,050	24,900

Illustration: 10

Production cost of a factory for a year is as follows :

Direct wages Rs. 40,000
 Direct materials Rs. 60,000
 Production overhead fixed Rs. 20,000
 Production overhead variable Rs. 30,000

During the forthcoming year, it is expected that

- The average rate for direct labour remuneration will be far from Rs. 3 per hour to Rs. 2 per hour
- Production efficiency will remain unchanged
- Direct labour hours will increase by $33\frac{1}{3}\%$

The purchase price per unit of direct materials and of the other materials and services which comprise overheads will remain unchanged.

Draw up a budget and a factory overhead rate, the overhead being absorbed on a direct wage basis.

Solution:**Cost of Production Budget**

<i>Particulars</i>	<i>Rs.</i>	<i>Amount Rs.</i>
Direct Materials		60,000
Direct wages $\left[\text{Rs. } 40,000 \times \frac{2}{3} \times \frac{4}{3} \right]$		35,556
Prime Cost		95,556
Add : Production Overhead :		
Fixed	Rs. 20,000	
Variable	Rs. 30,000	50,000
Factory cost (or) Cost of production		1,45,556

Illustration: 11

Prepare a Production Budget for each month and Production Cost budget for the six months period ending 31st Dec. 2003 from the following data of product "X":

- The units to be sold for different months are as follows:

July, 2003	-	1,100
August	-	1,100
September	-	1,700
October	-	1,900
November	-	2,500
December 2003	-	2,300
January 2004	-	2,000

- There will be no work in progress at the end of any month.
- Finished units equal to half the sales for the next month will be in stock at the end of each month (including June 2003).
- Budgeted production and production cost for the year ending 31st December 2003 are as follows :

Production (Units)	22,000
Direct Material Per unit	Rs. 10.00

Direct wages Per unit	Rs. 4.00	
Total factory overhead apportioned to product	88,000	(ICWA; Inter)

Solution:**(A) Production Budget (from July to December)**

Particulars	July	August	Sept.	Oct.	Nov.	Dec.	Total
Estimated Sales	1,100	1,100	1,700	1,900	2,500	2,300	10,600
Add : Closing Stock of finished goods (half of next months sales)	550	850	950	1,250	1,150	1,000	1,000
	1,650	1,950	2,650	3,150	3,650	3,300	11,600
Less : Opening Stock of finished goods	550	550	850	950	1,250	1,150	550
Budgeted Production	1,100	1,400	1,800	2,200	2,400	2,150	11,050

Working Notes :

Estimated Production = Expected Sales + Desired Closing Stock – Estimated Opening Stock.

This is the closing stock June 2003 = 50 % of sale of July 2003.

(B) Production Cost Budget (from July to Dec.)

Particulars	Amount (11,050 Units)	Amount (Per Unit)
Direct Material cost (at Rs. 10 per unit) }	1,10,500	10
Direct Wages (at Rs. 4 per unit) }	44,200	4
Factory Overhead 88,000		
22,000 x 11,050	44,200	4
Total Cost of Production	1,98,900	18

Assumed to be variable. If it is fixed, 50 % of Rs. 88,000 (Rs. 44,000) is to be charged.

Material Purchase Budget

The different level of material stock are based on planned out. Once the production budget is prepared, it is necessary to considered the requirement of materials to carryout the production activities. Material Purchase Budget is concerned with purchase and requirement of direct materials to be made during the budget period. While preparing the materials purchase budget, the following factors to be considered carefully:

- (1) Estimated sales and production.
- (2) Requirement of materials during budget period.
- (3) Expected changes in the prices of raw materials.
- (4) Different stock levels, EOQ etc.
- (5) Availability of raw materials, i.e., seasonal or otherwise.
- (6) Availability of financial resources.

- (7) Price trend in the market.
- (8) Company's stock policy etc.

Illustration: 12

Draw up a material purchase budget from the following information :

Estimated sales of a product is 30,000 units. Two kinds of raw materials A and B are required for manufacturing the product. Each unit of the product requires 3 units of A and 4 units of B. The estimated opening balance in the beginning of the next year : finished goods 5,000 units; A, 6,000 units; B, 10,000 units. The desirable closing balance at the end of the next year : finished product, 8,000 units; A, 10,000 units; B 12,000 units.

Solution:

$$\begin{aligned}
 \text{Estimated Production} &= \text{Expected Sales} + \text{Desired Closing Stock of Finished Goods} \\
 &\quad - \text{Estimated Opening Stock of Finished Goods} \\
 &= 30,000 + 8,000 - 5,000 \\
 &= 33,000 \text{ units}
 \end{aligned}$$

Material Purchase Budget for the year

<i>Particulars</i>	<i>Material A Units</i>	<i>Material B Units</i>
Material Required to meet Production Target		
Material A – 33,000 x 3	99,000	1,32,000
Material B – 33,000 x 4		
<i>Add</i> : Desired closing stock at the end of next year	10,000	12,000
	1,09,000	1,44,000
<i>Less</i> : Expected stock at the commencement of next year (opening balance)	6,000	10,000
Quantity of Materials to be purchased	1,03,000	1,34,000

Cash Budget

This budget represent the anticipated receipts and payment of cash during the budget period. The cash budget also called as Functional Budget. Cash budget is the most important of all the functional budget because, cash is required for the purpose to meeting its current cash obligations. If at any time, a concern fails to meet its obligations, it will be technically insolvent. Therefore, this budget is prepared on the basis of detailed cash receipts and cash payments. The estimated Cash Receipts include:

- (1) Cash Sales
- (2) Credit Sales
- (3) Collection from Sundry Debtors
- (4) Bills Receivable
- (5) Interest Received
- (6) Income from Sale of Investment
- (7) Commission Received
- (8) Dividend Received

(9) Income from Non-Trading Operations etc.

The estimated Cash Payments include the following :

- (1) Cash Purchase
- (2) Payment to Creditors
- (3) Payment of Wages
- (4) Payments relate to Production Expenses
- (5) Payments relate to Office and Administrative Expenses
- (6) Payments relate to Selling and Distribution Expenses
- (7) Any other payments relate to Revenue and Capital Expenditure
- (8) Income Tax Payable, Dividend Payable etc.

Illustration: 13

A company is expecting to have Rs. 25,000 cash in hand on 1st April 2003 and it requires you to prepare an estimate of cash position in respect of three months from April to June 2003, from the information given below :

	<i>Sales Rs.</i>	<i>Purchase Rs.</i>	<i>Wages Rs.</i>	<i>Expenses Rs.</i>
February	70,000	40,000	8,000	6,000
March	80,000	50,000	8,000	7,000
April	92,000	52,000	9,000	7,000
May	1,00,000	60,000	10,000	8,000
June	1,20,000	55,000	12,000	9,000

Additional Information :

- (a) Period of credit allowed by suppliers — two months.
- (b) 25 % of sale is for cash and the period of credit allowed to customer for credit sale one month.
- (c) Delay in payment of wages and expenses one month.
- (d) Income Tax Rs. 25,000 is to be paid in June 2003.

Solution:**Cash Budget**

<i>Particulars</i>	<i>April Rs.</i>	<i>May Rs.</i>	<i>June Rs.</i>	<i>Total Rs.</i>
Opening balance of cash	25,000	53,000	81,000	1,59,000
Cash Receipts :				
Cash Sales	23,000	25,000	30,000	78,000
Debtors	60,000	69,000	75,000	2,04,000
Total Cash Receipts – (1)	1,08,000	1,47,000	1,86,000	4,41,000
Cash Payments :				
Creditors	40,000	50,000	52,000	1,42,000
Wages	8,000	9,000	10,000	27,000
Expenses	7,000	7,000	8,000	22,000
Income tax	—	—	25,000	25,000
Total Payment – (2)	55,000	66,000	95,000	2,16,000
Closing Balance of Cash (1-2)	53,000	81,000	91,000	2,25,000

Illustration: 14

Prasad & Co. wishes to prepare cash budget from January. Prepare a cash budget for the first six months from the following estimated revenue and expenses:

Month	Total Sales Rs.	Materials Rs.	Wages Rs.	Production Overheads Rs.	Selling and Distribution Overheads Rs.
January	10,000	10,000	2,000	1,600	400
February	11,000	7,000	2,200	1,650	450
March	14,000	7,000	2,300	1,700	450
April	18,000	11,000	2,300	1,750	500
May	15,000	10,000	2,000	1,600	450
June	20,000	12,500	2,500	1,800	600

Additional Information

- Cash balance on 1st January was Rs. 5,000. A new machinery is to be installed at Rs. 10,000 on credit, to be repaid by two equal installments in March and April.
- Sales commission @ 5 % on total sales is to be paid within a month of following actual sales.
- Rs. 5,000 being the amount of 2nd call may be received in March. Share Premium amounting to Rs. 1,000 is also obtainable with the 2nd call.
- Period of credit allowed by suppliers – 2 months.
- Period of credit allowed to customers – 1 month.
- Delay in payment of overheads – 1 month.
- Delay in payment of wages – ½ month.
- Assume cash sales to be 50 % of total sales.

Solution:**Cash Budget from January to June**

Particulars	January Rs.	February Rs.	March Rs.	April Rs.	May Rs.	June Rs.
Opening Balance	5,000	9,000	14,900	13,500	12,350	16,550
Estimated Cash						
Receipts:						
Cash Sales	5,000	5,500	7,000	9,000	7,500	10,000
Credit Sales	–	5,000	5,500	7,000	9,000	7,500
Second Call	–	–	5,000	–	–	–
Share Premium	–	–	1,000	–	–	–
Total Cash						
Receipts (A) }	10,000	19,500	33,400	29,500	28,850	34,050
Estimated Cash						
Payments:						
Materials	–	–	10,000	7,000	7,000	11,000
Wages	1,000	2,100	2,250	2,300	2,150	2,250
Production Overheads }	–	1,600	1,650	1,700	1,750	1,600

Selling & Distribution Overheads	-	400	450	450	500	450
Sales Commission	-	500	550	700	900	750
Purchase of Machinery	-	-	5,000	5,000	-	-
Total Cash						
Payment (B)	1,000	4,600	19,900	17,150	12,300	16,050
Closing Balance (A - B)	9,000	14,900	13,500	12,350	16,550	18,000

Illustration: 15

From the following data, forecast the cash position at the end of April, May and June 2003.

Month	Sales Rs.	Purchases Rs.	Wages Rs.	Miscellaneous Rs.
February	60,000	42,000	5,000	3,500
March	65,000	50,000	6,000	4,000
April	40,000	52,000	4,000	3,000
May	58,000	53,000	5,000	6,000
June	44,000	40,000	4,000	3,000

Additional Information

1. Sales : 10 % realized in the month of sales ; balance realised equally in two subsequent months.
2. Purchases: These are paid in the month following the month of supply.
3. Wages : 10 % Paid in arrears following month.
4. Miscellaneous expenses : Paid a month in arrears.
5. Rent : Rs. 500 Per month paid Quarterly in advance due in April.
6. Income Tax : First installment of advance tax Rs. 15,000 due on or before 15th June.
7. Income from Investment : Rs. 3,000 received quarterly in April, July etc.
8. Cash in hand : Rs. 3,000 on 1st April 2003.

Solution:**Cash Budget for the month of April, May and June**

Particulars	April Rs.	May Rs.	June Rs.
Opening Balance of Cash	3,000	7,550	700
Add : Cash Receipts :			
Cash Sales	4,000	5,800	4,400
Receipts from Debtors (Credit Sales)			
Collection in 1st month	29,250	18,000	19,800
Collection in 2nd month	27,000	29,250	18,000
Income from Investment	3,000	-	-
Total Cash Receipts (1)	66,250	60,600	42,900
Less : Cash Payments :			
Creditors for Purchases	50,000	52,000	53,000

Wages; Current (90%)	3,600	4,500	3,600
Arrears (10%)	600	400	500
Rent	500	—	—
Miscellaneous Expenses	4,000	3,000	6,000
Income Tax	—	—	15,000
Total Payments (2)	58,700	59,900	78,100
Closing Balance of Cash (1- 2)	7,550	700	(-)35,200

Working Notes

- (1) Out of total sales, 10 % are cash sales. Balance 90 % are credit sales. In any given month 50 % of credit sale of the previous two months are collected (See W.N.)
- (2) In any given month, 90 % of the wages of the same month and 10 % of previous month's wages are paid.

(3) Working Notes for collections of cash from Debtors and Sales

Particulars	February Rs.	March Rs.	April Rs.	May Rs.	June Rs.
Total Sales	60,000	65,000	40,000	58,000	44,000
Less : Cash Sales (10%)	6,000	6,500	4,000	5,800	4,400
Credit Sales	54,000	58,500	36,000	52,200	39,600
Collection in 1st month after Credit Sales	-	27,000	29,250	18,000	19,800
Collection in 2 nd month after Credit Sales	-	-	27,000	29,250	18,000
Total Credit			56,250	47,250	37,800

Master Budget

When the functional budgets have been completed, the budget committee will prepare a Master Budget for the target of the concern. Accordingly a budget which is prepared incorporating the summaries of all functional budgets. It comprises of budgeted profit and loss account, budgeted balance sheet, budgeted production, sales and costs. The ICMA England defines a Master Budget as "the summary budget incorporating its functional budgets, which is finally approved, adopted and employed." The Master Budget represents the activities of a business during a profit plan. This budget is also helpful in co-ordinating activities of various functional departments.

Illustration: 16

Pushpack & Co., a glass manufacturing company requires you to calculate and present the budget for the next year from the following information :

Toughened Glass	Rs. 2,00,000
Bent Toughened Glass	Rs. 3,00,000
Direct Material Cost	60% of Sales
Direct Wages	10 workers @ Rs. 100 per month

Factory Overheads

Indirect Labour:	
Work Manager	Rs. 300 Per month
Foreman	Rs. 200 Per month
Stores and Spares	2% on Sales
Depreciation on Machinery	Rs. 6,000
Light and Power	Rs. 2,000
Repairs and Maintenance	Rs. 4,000
Other Sundries	10% on direct Wages

Administration, Selling and Distribution expenses Rs. 7,000 per year.

Solution:**Master Budget for the year ending.....**

<i>Particulars</i>	<i>Amount</i>	<i>Amount</i>
Sales (as per Sales Budget):		
Toughened glass		2,00,000
Bent Toughened glass		3,00,000
		5,00,000
<i>Less</i> : Cost of Production:		
(as per cost of Production Budget)		
Direct Materials	3,00,000	
Direct Wages	12,000	
Prime Cost	3,12,000	
<i>Add</i> : Factory Overhead:		
Variable:		
Stores and Spares	Rs. 10,000	
Light and Power	Rs. 2,000	
Repairs and Maintenance	Rs. 4,000	16,000
Fixed:		
Work Manager's Salary	Rs. 3,600	
Foremen Salary	Rs. 2,400	
Depreciation	Rs. 6,000	
Sundries	Rs. 1,200	13,200
Work's Cost		3,41,200
Gross Profit		1,58,800
<i>Less</i> : Administration, Selling & Distribution Overheads		7,000
Net Profit		1,51,800

Fixed Budget

A budget is drawn for a particular level of activity is called fixed budget. According to ICWA London "Fixed budget is a budget which is designed to remain unchanged irrespective of the level of activity actually attained." Fixed budget is usually prepared before the beginning of the financial year. This type of budget is not going to highlight the cost variances due to the difference in the levels of activity. Fixed Budgets are suitable under static conditions.

Flexible Budget

Flexible Budget is also called Variable or Sliding Scale budget, “takes both the fixed and manufacturing costs into account. Flexible budget is the opposite of static budget showing the expected cost at a single level of activity. According to ICMA, England defined Flexible Budget is a budget which is designed to change in accordance with the level of activity actually attained.”

According to the principles that guide the preparation of the flexible budget a series of fixed budgets are drawn for different levels of activity. A flexible budget often shows the budgeted expenses against each item of cost corresponding to the different levels of activity. This budget has come into use for solving the problems caused by the application of the fixed budget.

Advantages of Flexible Budget

- (1) In flexible budget, all possible volume of output or level of activity can be covered.
- (2) Overhead costs are analysed into fixed variable and semi-variable costs.
- (3) Expenditure can be forecasted at different levels of activity.
- (4) It facilitates at all times related factor can be compared, which are essential for intelligent decision making.
- (5) A flexible budget can be prepared with standard costing or without standard costing depending upon What the Company opts for.
- (6) Flexible budget facilitates ascertainment of costs at different levels of activity, price fixation, placing tenders and Quotations.
- (7) It helps in assessing the performance of all departmental heads as the same can be judged by terms of the level of activity attained by the business.

Distinction between Fixed Budget and Flexible Budget

<i>Fixed Budget</i>	<i>Flexible Budget</i>
1. It does not change with the volume of activity.	1. It can be recast on the basis of volume of cost.
2. All costs are related to one level of activity only.	2. Costs are analysed by behaviour and variable costs are allowed as per activity attained.
3. If budget and actual activity levels vary, cost ascertainment does not provide a correct picture.	3. Flexible budgeting helps in fixation of selling price at different levels of activity.
4. Ascertainment of costs is not possible in fixed cost.	4. Costs can be easily ascertained at different levels of activity.
5. It has a limited application for cost control.	5. It has more application and can be used as a tool for effective cost control.
6. It is rigid budget and drawn on the assumption that conditions would remain constant.	6. It is designed to change according to changed conditions.
7. Comparison of actual and budgeted performance cannot be done correctly because the volume of production differs.	7. Comparisons are realistic according to the change in the level of activity.
8. Costs are not classified according to their variability, i.e., fixed, variable and semi-variable.	8. Costs are classified according to the nature of their variability.

Method of Preparing Flexible Budget

The following methods are used in preparing a flexible budget:

- (1) Multi-Activity Method.
- (2) Ratio Method.
- (3) Charting Method.

(1) Multi-Activity Method: This method involves preparing a budget in response to different level of activity. The different level of activity or capacity levels are shown in Horizontal Columns, and the budgeted figures against such levels are placed in the Vertical Columns. The expenses involved in production as per budget are grouped as fixed, variable and semi variable.

(2) Ratio Method: According to this method, the budget is prepared first showing the expected normal level of activity and the estimated variable cost per unit at the side expected level of activity in addition to the fixed cost as estimated. Therefore, the expenses as per budget, allowed for a particular level of activity attained, will be calculated on the basis of the following formula : Budgeted fixed cost + (Variable cost per unit of activity x Actual unit of activity)

(3) Charting Method: Under this method total expenses required for any level of activity, are estimated having classified into three categories, viz., Variable, Semi Variable and Fixed. These figures are plotted on a graph. The expenses are plotted on the Y-axis and the level of activity are plotted on X-axis. The graph will thus, help in ascertaining the quantum of budgeted expenses corresponding to the level of activity attained with the help of this chart.

Zero Base Budgeting (ZBB)

Zero Base Budgeting is a new technique of budgeting. It is designed to meet the needs of the management in order to ensure the operational efficiency and effective utilization of the allocated resources of a concern. This technique was originally developed by Peter A. Phyhrr, Manager of Texas Instrument during 1969. This concept is widely used in USA for controlling their state expenditure when Mr. Jimmy Carter was the president of the USA. At present the technique has for its global recognition for many countries have implemented in real terms.

According to Peter A. Phyhrr ZBB is defined as an "Operative Planning and Budgeting Process" which requires each Manager to justify his entire budget in detail from Scratch (hence zero base) and shifts the burden of proof to each Manager to justify why we should spend any money at all."

In zero-base budgeting, a manager at all levels have to justify the importance of activity and to allocate the resources on priority basis.

Important Aspects of ZBB

Zero Base Budgeting involves the following important aspects :

- (1) It emphasises on all requisites of budgets.
- (2) Evaluation on the basis of decision packages and systematic analysis, i.e., in view of cost benefit analysis.
- (3) Planning the activities, promotes operational efficiency and monitors the performance to achieve the objectives.

Steps Involved in ZBB

The following are the steps involved in Zero Base Budgeting :

- (1) No Previous year performance of inefficiencies are to be taken as adjustments in subsequent year.
- (2) Identification of activities in decision packages.
- (3) Determination of budgeting objectives to be attained.
- (4) Extent to which Zero Base Budgeting is to be applied.
- (5) Evaluation of current and proposed expenditure and placing them in order of priority.
- (6) Assignment of task and allotment of sources on the basis of cost benefit comparison.
- (7) Review process of each activity examined afresh.
- (8) Weightage should be given for alternative course of actions.

Advantages of ZBB

- (1) Utilization of resources at a maximum level.
- (2) It serves as a tool of management in formulating production planning.
- (3) It facilitates effective cost control.
- (4) It helps to identify the uneconomical activities.
- (5) It ensures the proper allocation of scarce resources on priority basis.
- (6) It helps to measure the operational inefficiencies and to take the corrective actions.
- (7) It ensures the principles of Management by Objectives.
- (8) It facilitates Co-operation and Co-ordination among all levels of management.
- (9) It ensures each activity is thoroughly examined on the basis of cost benefit analysis.

Illustration: 17

The expenses budgeted for production of 10,000 units in a factory are furnished below :

	<i>Per unit</i> <i>Rs.</i>
Materials	70
Labour	25
Variable factory overheads	20
Fixed factory overhead (Rs. 1,00,000)	10
Variable expenses (Direct)	5
Selling expenses (10 % Fixed)	13
Distribution expenses (20 % Fixed)	7
Administrative expenses (Rs. 50,000)	<u>5</u>
Total cost of sale per unit	<u>155</u>

You are required to prepare a budget for the production of 8,000 units.

Solution:**Flexible Budget**

Particulars	Output 10,000 units		Output 8,000 units	
	Per unit	Amount	Per unit	Amount
Variable Expenses :				
Material cost	70	7,00,000	70	5,60,000
Labour cost	25	2,50,000	25	2,00,000
Direct expenses (variable)	5	50,000	5	40,000
Prime cost	100	10,00,000	100	8,00,000
Add : Factory overheads :				
Variable overheads	20	2,00,000	20	1,60,000
Fixed overheads	10	1,00,000	12.50	1,00,000
Works cost	130	13,00,000	132.50	10,60,000
Add : Administrative expenses				
Fixed (Assumed)	5	50,000	6.25	50,000
Cost of production	135	13,50,000	138.75	11,10,000
Add : Selling Expenses				
Fixed – 10 % of Rs. 13	1.30	13,000	1.63	13,000
Variable – 90 % of Rs. 13	11.70	1,17,000	11.70	93,600
Add : Distribution Expenses:				
Fixed – 20 % of Rs.7	1.40	14,000	1.75	14,000
Variable – 80 % of Rs.7	5.60	56,000	5.60	44,800
Total Cost of Sales	155	15,50,000	159.43	12,75,400

Illustration: 18

Prepare a flexible budget for overheads on the basis of the following data. Ascertain the overhead rates at 50 %, 60 % and 70 % capacity.

	At 60 % capacity Rs.
Variable overheads :	
Indirect Material	3,000
Indirect Labour	9,000
Semi-variable overheads :	
Electricity (40 % fixed 60 % Variable)	15,000
Repairs (80 % fixed 20 % Variable)	1,500
Fixed Overheads :	
Depreciation	8,250
Insurance	2,250
Salaries	7,500
Total overheads	46,500
Estimated direct labour hours	93,000

Solution:**Flexible Budget**

<i>Particulars</i>	<i>50 % Capacity</i>	<i>60 % Capacity</i>	<i>70 % Capacity</i>
Variable overheads :			
Indirect material	2,500	3,000	3,500
Indirect labour	7,500	9,000	10,500
Semi-variable overheads :			
Electricity	13,500	15,000	16,500
Repairs and Maintenance	1,450	1,500	1,550
Fixed overheads :			
Depreciation	8,250	8,250	8,250
Insurance	2,250	2,250	2,250
Sales	7,500	7,500	7,500
Total Overheads	42,950	46,500	50,050
Estimated direct labour hours	77,500	93,000	1,08,500
Overhead Rate	Re. 0.55	Re. 0.50	Re. 0.46

Working Notes :

(1) **Electricity:** Rs. 15,000 is the cost of electricity at 60 % capacity, of which 40% are fixed overheads, i.e., Rs. 6,000 and variable is Rs. 9,000 :

$$\text{For 60 \% capacity variable overheads} = \text{Rs. 9,000}$$

$$\text{For 50 \% capacity variable overheads} = \frac{9,000}{60} \times 50 = \text{Rs. 7,500}$$

$$\text{Therefore electricity cost at 50 \% capacity} = 6,000 + 7,500 = \text{Rs. 13,500}$$

$$\text{For 70 \% capacity, variable overheads} = \frac{9,000}{60} \times 70 = \text{Rs. 10,500}$$

$$\text{Therefore electricity cost at 70 \%} = \text{Rs. 10,500} + \text{Rs. 6,000} = \text{Rs. 16,500}$$

(2) **Repairs and Maintenance:** Rs. 1,500 is the cost of repairs and maintenance at 60 % capacity, of which 80% is fixed overhead, i.e., Rs. 1,200 and variable is Rs. 300 :

$$\text{For 60 \% capacity variable overhead} = \text{Rs. 300}$$

$$\text{For 50 \% capacity variable overhead} = \frac{300}{60} \times 50 = \text{Rs. 250}$$

$$\text{Therefore the total cost of repairs and maintenance at 50 \%} \\ = \text{Rs. 1,200} + \text{Rs. 250} = \text{Rs. 1,450}$$

$$\text{For 70 \% capacity, the variable overhead} = \frac{300}{60} \times 70 = \text{Rs. 350}$$

$$\text{Therefore the total cost of repairs and maintenance} \\ = \text{Rs. 1,200} + \text{Rs. 350} = \text{Rs. 1,550}$$

Illustration: 19

With the following data for a 60 % activity prepare a budget for production at 80 % and 100 % capacity

Production at 60 % capacity 300 units
 Materials Rs. 100 per unit
 Labour Rs. 40 per unit
 Expenses Rs. 10 per unit
 Factory expenses Rs. 40,000 (40 % fixed)
 Administrative expenses Rs. 30,000 (60 % fixed)

Solution:**Flexible Budget**

<i>Particulars</i>	<i>60 % Capacity 300 units</i>	<i>80 % Capacity 400 units</i>	<i>100 % Capacity 500 units</i>
Direct cost :			
Material Rs. 100 per unit	30,000	40,000	50,000
Labour Rs. 40 per unit	12,000	16,000	20,000
Expenses Rs. 10 per unit	3,000	4,000	5,000
Total Direct Costs	45,000	60,000	75,000
<i>Add : Variable Factory Expenses (Rs. 40 per unit)</i>	12,000	16,000	20,000
<i>Variable Administrative Expenses (Rs. 20 per unit)</i>	6,000	8,000	10,000
<i>Fixed Factory Expenses (40 % of Rs. 40,000)</i>	16,000	16,000	16,000
<i>Fixed Administrative Expen. (60 % of Rs. 30,000)</i>	18,000	18,000	18,000
Total	97,000	1,18,000	1,39,000

Illustration: 20

The Cost Sheet of a Company based on a budgeted volume of sales of 3,00,000 units per Quarter is as under :

	<i>Rs. Per unit</i>
Direct materials	5.00
Direct wages	2.00
Factory overheads (50 % fixed)	6.00
Selling and Administrative overheads (variable)	3.00
Selling Price	18.00

When the budget was discussed it was felt that the company would be able to achieve only a volume of 2,50,000 units of production and sales per Quarter. The Company therefore decided that an aggressive sales promotion campaign should be launched to achieve the following improved operations :

Proposal I :

- (a) Sell 4,00,000 units per quarter by sending Rs. 2,00,000 on special advertising
- (b) The factory fixed costs will increase by Rs.4,00,000 per Quarter

Proposal II :

- (a) Sell 5,00,000 units per Quarter subject to the following conditions
- (b) An overall price reduction of Rs. 2 per unit is allowed on all sales
- (c) Variable Selling and Administration costs will increase by 5 %
- (d) Direct Material costs will be reduced by 1 % due to purchase price discounts
- (b) The fixed factory costs will increase by Rs. 2,00,000 more

You are required to prepare a Flexible Budget at 2,50,000 units, 4,00,000 units and 5,00,000 units of output per quarter and calculate the profit at each of the above levels of output.

Solution:**Flexible Budget**

<i>Particulars</i>	<i>2,50,000 units Rs.</i>	<i>4,00,000 units Rs.</i>	<i>5,00,000 units Rs.</i>
Sales Revenue	45,00,000	72,00,000	8,00,000
Variable Costs :			
Direct Materials @ Rs.5	12,50,000	20,00,000	24,75,000
Factory Labour @ Rs. 2	5,00,000	8,00,000	10,00,000
Factory Overheads @ Rs. 3	7,50,000	12,00,000	15,00,000
Sales and Administrative Overheads (? variable) @ Rs. 3	2,50,000	4,00,000	5,25,000
Total Variable Cost	27,50,000	44,00,000	55,00,000
Contribution (Sales – Total Variable cost)	17,50,000	28,00,000	25,00,000
Fixed Costs :			
Factory Overhead	9,00,000	9,00,000	9,00,000
Sales and Administrative Overhead (Fixed)]	6,00,000	6,00,000	6,00,000
Increase in fixed cost	–	4,00,000	6,00,000
Advertisement	–	2,00,000	–
Total Fixed Cost	15,00,000	21,00,000	21,00,000
Profit (Contribution – Fixed cost)	2,50,000	7,00,000	4,00,000

Illustration: 21

The Managing Director of your company has been given the following statement showing the result for August 2003.

Month ending 31st August 2003

	<i>Master Budget</i>	<i>Actual</i>	<i>Variance</i>
Units produced and sold	10,000 units	9,000 units	1000 units
Sales	Rs. 40,000	Rs. 35,000	Rs. (5,000) Adverse
Direct materials	Rs. 10,000	Rs. 9,200	Rs. 800
Direct wages	15,000	13,100	1,900
Variable overhead	5,000	4,700	300
Fixed overhead	5,000	4,900	100
Total cost	35,000	31,900	3,100
Net profit	5,000	3,100	(1,900) Adverse

The standard cost of the product are as follows :

	<i>Per unit Rs.</i>
Direct material (1kg @ Re. 1 per kg)	1.00
Direct Wages (1 hour @ Rs. 1.50)	1.50
Variable overhead (1hour @ Re. 0.50)	0.50

Actual results for the month showed that 9,800 kg of material were used and 8,800 labour hours were recorded.

- Required :** (a) Prepare a flexible budget for the month and compare with actual results
(b) Calculate the variances which have arisen.

Solution:

Statement showing Flexible Budget and its Comparison with Actual

Particulars	Master Budget For 10,000 Units Rs.	Flexible Budget		Actual for 9,000 Units Rs.	Variance Rs.
		Per Unit Rs.	For 9,000 Rs.		
Sales	40,000	4.00	36,000	35,000	1,000 (A)
<i>Less : Variable cost:</i>					
Direct materials	10,000	1.00	9,000	9,200	200 (A)
Direct wages	15,000	1.50	13,500	13,100	400 (F)
Variable overheads	5,000	0.50	4,500	4,700	200 (A)
Total Variable Costs	30,000	3.00	27,000	27,000	—
Contribution (Sales – Total variable cost) }	10,000	1.00	9,000	8,000	1000 (A)
<i>Less : Fixed overheads</i>	5,000	0.50	5,000	4,900	100 (F)
Net profit	5,000	0.50	4,000	3,100	900 (A)

Illustration: 22

A company operates at 50 % of capacity utilization. At this level of operation, the sales value is Rs. 9,00,000. At 100 % capacity utilization the following costs and relationships will apply :

- Factory Overheads Rs. 1,80,000 (50 % Variable)
- Factory Cost 60 % of sales
- Selling Costs (75 Variable), i.e., 20 % of sales

The company anticipates that its sales will increase up to 75 % of capacity utilization. The company also receives a special order from a government department. This order will occupy 15 % of capacity utilization of the plant. The prime cost in this order is Rs. 1,35,000 and the variable selling cost will only be 2 % of the sales value offered. Besides, the cost of processing the order is Rs. 8,000. The sales price offered is Rs. 1,45,000.

- Required :** (1) Present a statement of profitability at 50 % and 75 % level of activity.
(2) Evaluate the government order and state whether it is acceptable or not.

Solution:

Flexible Budget

Particulars	50 % Capacity Rs.	75 % Capacity Rs.
Sales	9,00,000	13,50,000
Prime cost 50 % of sales 75 % of sales	4,50,000	6,75,000
Factory overheads :		
Variable Cost	45,000	67,500
Fixed Cost	90,000	90,000
Factory Cost (Prime cost + Factory overheads)	5,85,000	8,32,500
Selling Cost : Variable Cost	1,35,000	2,02,500
Fixed Cost	90,000	90,000
Total Cost (Factory Cost + Selling Cost)	8,10,000	11,25,000
Profit (Sales – Total Cost)	90,000	2,25,000

Working Notes:

Sales at 50%	= Rs. 9,00,000
Sales at 100%	= Rs. 18,00,000

Profitability at 100% Capacity

	Rs.	
Sales	<u>18,00,000</u>	
Prime Cost (10,80,000 – 1,80,000)	9,00,000	= 50% of sales
Factory Overhead	<u>1,80,000</u>	Given
Factory Cost	10,80,000	= 60% of sales
Selling Cost	<u>3,60,000</u>	= 20% of sales
Total Cost	14,40,000	
Profit (Sales – Total Cost)	<u>3,60,000</u>	
(18,00,000 – 1,44,00,000)		

Evaluation of Government order (15 % Capacity)

	Rs.
Sales	<u>1,45,000</u>
Prime Cost	1,35,000
Factory overhead (Variable cost)	13,500
Selling cost variable @ 2 %	2,900
Processing cost	<u>8,000</u>
Total Cost	<u>1,59,400</u>
Loss (Sales – Total cost)	<u>1,440</u>
1,45,000 – 1,59,400	

Hence not acceptable.

QUESTIONS

1. What do you mean by a budget?
2. What are the essentials of a budget?
3. What are the differences between budgets and forecasts?
4. What do you understand by budgetary control?
Explain briefly the characteristics of a good budget.
5. What are the objectives of Budgetary Control?
6. What are the scope and techniques of Standard Costing and Budgetary control?
7. Describe essential requisites for effective budgetary control.
8. What do you understand by organization for budgetary control?
9. Write short notes on :
(a) Budget Centre. (b) Budget Officer. (c) Budget Committee. (d) Budget Manual. (e) Budget Period. (f) Key Factor.
(g) Performance of Budgeting.
10. What are the advantages of budgetary control?
11. What are the limitations of budgetary control?
12. Briefly explain the different types of budgets.
13. What you understand by control ratios?
14. What is sales budget? What are the factors considered in developing the sales budget?
15. Write short notes on :
(a) Production Budget. (b) Cost of Production Budget. (c) Materials Budget.
16. What do you understand by Cash Budget? Discuss the procedure for preparing the cost budget.
17. What do you understand by Master Budget?
18. What do you understand by Fixed Budget and Flexible Budget? What are the advantages of Flexible Budget?
19. What are the differences between fixed budget and flexible budget?
20. Describe the different methods of preparing Flexible Budget.

EXERCISES

(1) XYZ Ltd. has prepared the budget for the production of a lakh units of the only commodity manufactured by them for a costing period as under :

Raw Material	2.52 Per unit
Direct Labour	0.75 Per unit
Direct Expenses	0.10 Per unit
Works overheads (60 % Fixed)	2.50 Per unit
Administration overhead (80 % Fixed)	0.40 Per unit
Selling overheads (50 % Fixed)	0.20 Per unit

The actual production during the period was only 60,000 units. Calculate the revised budget cost per unit.

(ICWA, Inter)

[Ans : Cost of Sales Rs. 4,65,000; Per unit @ Rs. 7.75]

(2) The expenses budgeted for production of 10,000 units in a factory are furnished below :

	Rs. Per unit
Materials	70
Labour	25
Variable overheads	20
Fixed overheads (Rs. 1,00,000)	10
Variable expenses (direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20 % fixed)	7
Administration expenses (Rs. 50,000)	5
	5
Total cost of sales per unit (to make and sell)	155

Prepare a budget for the product of

(a) 8,000 units and (b) 6,000 units

Assume that administration expenses are rigid for all levels of production.

[Ans : Total Cost Rs. 12,75,400 for 8,000 units ; Rs. 10,00,800 for 6,000 units]

(3) The income and expenditure forecasts for months of March to August, 2003 are given as follows:

Months	Sales (credit)	Purchases (Credit)	Wages	Manufacturing Expenses	Office Expenses	Selling Expenses
March	60,000	36,000	9,000	3,500	2,000	4,000
April	62,000	38,000	8,000	3,750	1,500	5,000
May	64,000	33,000	10,000	4,000	2,500	4,500
June	58,000	35,000	8,500	3,750	2,000	3,500
July	56,000	39,000	9,500	5,000	1,000	3,500
August	60,000	34,000	8,000	5,200	1,500	4,500

Additional Information

You are given the following further information :

- Plant costing Rs. 16,000 is due for delivery in July payable 10 % on delivery and the balance after 3 months.
- Advance tax of Rs. 8,000 is payable in March and June each.
- Creditors allow 2 months credit and debtors are paying one month late. Opening balance of cash Rs. 8,000 lag or one month in expenses.

[Ans : Balance : May Rs. 15,750; June Rs. 12,750; July Rs. 18,400]

(4) From the following average figures of previous quarters, prepare a manufacturing overhead budgeted for the quarter ending on March 31, 2003. The budget output during this quarter is 6,000 units:

Fixed overheads Rs. 60,000

Variable overheads Rs. 30,000 (Varying @ Rs. 5 per unit)

Semi variable overheads 30,000 (40 % fixed and 60 % varying @ Rs. 3 per unit)

[Ans : 1,68,000]

(5) Calculate (a) Efficiency Ratio (b) Activity Ratio and (c) Capacity Ratio from the following figures :

Budgeted Production	176 units
Actual Production	150 units

Standard hour per unit 20
 Actual working hours 1,200

[Ans : (a) Efficiency Ratio = 125%; (b) Activity Ratio = 85. 23%; (c) Capacity Ratio = 68. 18%]

(6) A department of Tan India Company attains sale of Rs. 6,00,000 at 80% on its normal capacity and its expenses are give below :

<i>Particulars</i>	<i>Rs.</i>
Administration Costs :	
Office salaries	90,000
General expenses	2% on sales
Depreciation	Rs. 7,500
Rate and Taxes	Rs. 8,750
Distribution Costs :	
Wages	Rs. 15,000
Rent	1% of sales
Other expenses	4% of sales
Selling Cost :	
Salaries	8% of sales
Traveling expenses	2% of sales
Sales office	1% of sales
General expenses	1% of sales

Draw up flexible administration, selling and distribution costs budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity.

(7) The following expresses relate to a cost center operating at 80% of normal capacity (sales are in 12,00,000). Draw up flexible administration, selling and distribution costs budget operating at 90%, 100% and 110% of normal capacity.

<i>Administration costs</i>	<i>Rs.</i>
Office Salaries	30,000
General Expenses	1.5% of sales
Depreciation	15,000
Rates and taxes	17,500
<i>Selling Costs</i>	<i>Rs.</i>
Salaries	4% of sales
Traveling Expenses	1.5% of sales
Sales Office	1% of sales
General Expenses	1% of Sales

<i>Distribution Costs</i>	<i>Rs.</i>
Wages	30,000
Rent	5% of sales
Other expenses	2% of sales

[Ans: Total costs : 80% of capacity Rs. 6,000; 90% of Capacity Rs. 67,500; 100% of capacity Rs. 75,000; 110% of capacity Rs. 82,500.]

(8) PQR Company Ltd. has given the following particulars, you are required to prepare a cash Budget for the three months ending 1st Dec. 2003.

<i>Months</i>	<i>Sales</i>	<i>Materials</i>	<i>Wages</i>	<i>Overheads</i>
August	20,000	10,200	3,800	1,900
September	21,000	10,000	3,800	210
October	23,000	9,800	4,000	2,300
November	25,000	10,000	4,200	2,400
December	30,000	10,800	4,500	2,500

(i) Credit Terms are :

Sales / Debtors – 10% sales are on cash basis: 50% of the credit sales are collected next month and the balance in the following month

Creditors	-	Materials 2 month
	-	Wages 1/5 month
	-	Overheads ½ month

- (ii) Cash balance on 1st October 2003 is expected to be Rs. 8,000
 (iii) A machinery will be miscalled in August, 2003 at a cost of Rs. 1,00,000. The monthly installment of Rs. 5,000 payable from October onwards.
 (iv) Dividend at 10% on preference share capital of Rs. 3,00,000 will be paid on 1st December 2003.
 (v) Advance to be received for sales of vehicle Rs. 20,000 in December.
 (vi) Income tax (advance) to be paid in December Rs. 5,000

[Ans: October closing balance Rs. 7,390; November closing balance Rs. 8,180; December Bank overdraft Rs. 3,910]

- (9) With the following data for a 60% capacity, prepare a budget for production at 80% and 100% activity.
- Production at 60% activity 600 units materials Rs. 100 per unit (100% variable)
 - Materials Rs. 40 per unit (100% variable)
 - Labours Rs. 40 per unit (100% variable)
 - Direct Expenses Rs. 10 per unit (Rs. 6 per unit fixed)
 - Factory expenses Rs. 40,000 (40% fixed)
 - Administrative expenses Rs. 30,000 (60% fixed)

[Ans: Total Costs : 60% Capacity Rs. 1,60,000

80% capacity Rs. 2,00,800

100% capacity Rs. 2,41,600]

- (10) A factory is currently to 50% capacity and produces 10,000 units estimate the profits of the company when it works at 60% and 80% capacity and offer your critical comments.

At 60% working raw materials cost increases by 2% and selling price falls by 2% at the 80% working, raw material cost increases by 5% and selling price falls by 5%.

A 50% capacity working the product costs Rs. 180 per unit and is sold at Rs. 200 per unit. The unit cost of Rs. 180 is made up as follows :

Materials	Rs. 100
Labour	Rs. 30
Factory Overhead	Rs. 30 (40% fixed)
Administrative Overhead	Rs. 20 (50% fixed)

[Ans: Rs. 2,00,000; Rs. 2,12,000; Rs. 2,12,000]

- (11) PQR Ltd. manufactures two products X and Y. Product X takes 6 hours to make while product Y takes 12 hours. In a month of 25 days of 8 hours each, 1,200 units of X and 750 units of Y were produced. The firm employs 75 men in the department responsible for producing these two products. The budget hours are 1,86,000 per annum. You are required to calculate a Activity Ratio, Capacity Ratio and Efficiency ratio.

[Ans: Activity ratio 104.5%; Capacity Ratio 96.8% Efficiency Ratio 108%]

- (12) Glass manufacturing company requires you to calculate and present the budget for the next year from the following information :

Sales :

Toughened glass Rs. 3,00,000

Bent Toughened glass Rs. 5,00,000

Direct Material cost 60% of sales

Direct wages 20 workers @ Rs. 150 P.M.

Factory Overheads

Indirect Labour – Works Manager Rs. 500 per month, Foreman Rs. 400 per month.

Stores and spares 2 ½% on sales

Depreciation machinery Rs. 12,600

Light and power Rs. 5,000

Repairs etc. Rs. 8,000

Other sundries 10% on Daily wages

Administration selling and distribution expenses Rs. 14,000 per annum

[Ans: Sales budget – sales revenues Rs. 7,86,000; production cost budget Rs. 5,76,000; expected profit as budgeted Rs. 2,10,000]

CHAPTER 28

Standard Costing and Variance Analysis

Introduction

The success of a business enterprise depends to a greater extent upon how efficiently and effectively it has controlled its cost. In a broader sense the cost figure may be ascertained and recorded in the form of Historical costing and Predetermined costing. The term Historical costing refers to ascertainment and recording of actual costs incurred after completion of production. .

One of the important objectives of cost accounting is effective cost ascertainment and cost control. Historical Costing is not an effective method of exercising cost control because it is not applied according to a planned course of action. And also it does not provide any yardstick that can be used for evaluating actual performance. Based on the limitations of historical costing it is essential to know before production begins what the cost should be so that exact reasons for failure to achieve the target can be identified and the responsibility be fixed. For such an approach to the identification of reasons to evaluate the performance, suitable measures may be suggested and taken to correct the deficiencies.

MEANING OF STANDARD COST AND STANDARD COSTING

Standard Cost

The word “Standard” means a “Yardstick” or “Bench Mark.” The term “Standard Costs” refers to Pre-determined costs. Brown and Howard define Standard Cost as a Pre-determined Cost which determines what each product or service should cost under given circumstances. This definition states that standard costs represent planned cost of a product.

Standard Cost as defined by the Institute of Cost and Management Accountant, London “is the Pre-determined Cost based on technical estimate for materials, labour and overhead for a selected period of time and for a prescribed set of working conditions.”

Standard Costing

Standard Costing is a concept of accounting for determination of standard for each element of costs. These predetermined costs are compared with actual costs to find out the deviations known as “Variances.” Identification and analysis of causes for such variances and remedial measures should be taken in order to overcome the reasons for Variances.

Chartered Institute of Management Accountants England defines Standard Costing as “the Preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence.”

From the above definition, the technique of Standard Costing may be summarized as follows :

- (1) Determination of appropriate standards for each element of cost.
- (2) Ascertainment of information about actuals and use of Standard Costs.
- (3) Comparison of actual costs with Standard Costs, the differences known as Variances.
- (4) Analysis of Variances to find out the causes of Variances.
- (5) Reporting to the responsible authority for taking remedial measures.

Difference between Estimated Costs and Standard Costs

Although, Pre-determination is the essence of both Standard Costing and Estimated Costing, the two differ from each other in the following respects:

<i>Standard Costing</i>	<i>Estimated Costing</i>
(1) It is used on the basis of scientific.	(1) It is used on the basis of statistical facts and figures.
(2) It emphasises “what the cost should be.”	(2) It emphasises “what the cost will be.”
(3) It is used to evaluate actual performance and it serves as an effective tool of cost.	(3) It is used to cost ascertainment for fixing sales price.
(4) It is applied to any industry engaged in mass production.	(4) It is applicable to concern engaged in construction work.
(5) It is a part of accounting system and standard costing variances are recorded in the books of accounts.	(5) It is not a part of accounting system because it is based on statistical facts and figures.

Compare and Contrast between Standard Costing and Budgetary Control :

Relationship : The following are certain basic principles common to both Standard Costing and Budgetary Control :

- (1) Determination of standards for each element of costs in advance.
- (2) For both of them measurement of actual performance is targeted.
- (3) Comparison of actual costs with standard cost to find out deviations.
- (4) Analysis of variances to find out the causes.
- (5) Give the periodic report to take corrective measures.

Differences : Though Standard Costing and Budgetary Controls are aims at the maximum efficiencies and Marginal Cost, yet there are some basic differences between the two from the objectives of using the two costs.

<i>Budgetary Control</i>	<i>Standard Costing</i>
(1) Budgets are projections of financial accounts.	(1) Standard Costing is a projection of cost accounts.
(2) As a statement of both income and expenses it forms part of budgetary control.	(2) Standard costing is not used for the purpose of forecasting.
(3) Budgets are estimated costs. They are "what the cost will be."	(3) Standard Cost are the "Norms" or "what cost should be."
(4) Budget can be operated with standards.	(4) Standard Costing cannot be used without budgets
(5) In budgetary control variances are not revealed through the accounts.	(5) Under standard costing variances are revealed through different accounts.
(6) Budgets are prepared on the basis of historical facts and figures.	(6) Standard cost are planned and prepared on the basis of technical estimates.

Advantages of Standard Costing

The following are the important advantages of standard costing :

- (1) It guides the management to evaluate the production performance.
- (2) It helps the management in fixing standards.
- (3) Standard costing is useful in formulating production planning and price policies.
- (4) It guides as a measuring rod for determination of variances.
- (5) It facilitates eliminating inefficiencies by taking corrective measures.
- (6) It acts as an effective tool of cost control.
- (7) It helps the management in taking important decisions.
- (8) It facilitates the principle of "Management by Exception."
- (9) Effective cost reporting system is possible.

Limitations of Standard Costing

Besides all the benefits derived from this system, it has a number of limitations which are given below :

- (1) Standard costing is expensive and a small concern may not meet the cost.
- (2) Due to lack of technical aspects, it is difficult to establish standards.
- (3) Standard costing cannot be applied in the case of a concern where non-standardised products are produced.
- (4) Fixing of responsibility is difficult. Responsibility cannot be fixed in the case of uncontrollable variances.
- (5) Frequent revision is required while insufficient staff is incapable of operating this system.
- (6) Adverse psychological effects and frequent technological changes will not be suitable for standard costing system.

Determination of Standard Costs

The following preliminary steps must be taken before determination of standard cost :

- (1) Establishment of Cost Centres.

- (2) Classification and Codification of Accounts.
- (3) Types of Standards to be applied.
 - (a) Ideal Standard
 - (b) Basic Standard
 - (c) Current Standard
 - (d) Expected Standard
 - (e) Normal Standard
- (4) Organization for Standard Costing.
- (5) Setting of Standards.

(1) **Establishment of Cost Centres:** It is the first step required before setting of Standards. According to CIMA, London Cost Centre is “a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control.” Cost centre is necessary for the determination of standard costs for each product and comparison of actual cost with the predetermined standards to ascertain the deviations to take corrective measures.

(2) **Classification and Codification of Accounts:** Classification of Accounts and Codification of different items of expenses and incomes help quick ascertainment and analysis of cost information.

(3) **Types of Standards to be Applied:** Determination of the type of standard to be used is one of the important steps before setting up of standard cost. The different types of standards are given below :

- (a) Ideal Standard
 - (b) Basic Standard
 - (c) Current Standard
 - (d) Expected Standard
 - (e) Normal Standard
- (a) **Ideal Standard:** The term “Ideal Standard” refers to the standard which can be attained under the most favourable conditions possible. In other words, ideal standard is based on high degree of efficiency. It assumes that there is no wastage, no machine breakdown, no power failure, no labour ideal time in the production process. In practice it is difficult to attain this ideal standard.
- (b) **Basic Standard:** This standard is otherwise known as Bogey Standard. Basic Standard which is established for use is unaltered over a long period of time. In other words this standard is fixed in relation to a base year and is not changed in response to changes in material costs, labour costs and other expenses as the case may be. The application of this standard has no practical importance from cost control and cost ascertainment point of view.
- (c) **Current Standard:** The term “Current Standard” refers to “a standard established for use over a short period of time related to current conditions which reflects the performance that should be attained during the period.” These standards are more suitable and realistic for control purposes.

- (d) **Expected Standard:** Expected Standard may be defined as “the standard which may be anticipated to be attained during a future specified budget period.” These standards set targets which can be achieved in a normal situation. As such it is more realistic than the Ideal Standard.
- (e) **Normal Standard:** This standard resents an average standard in past which, it is anticipated, can be attained over a future period of time, preferably long enough to cover one trade cycle. The usefulness of such standards is very limited for the purpose of cost control.

(4) Organization for Standard Costing: The success of the standard costing system depends upon the reliability of standards. Hence the responsibility for setting standard is vested with the Standard Committee. It consists of

- (a) Purchase Manager
- (b) Production Manager
- (c) Personnel Manager
- (d) Time and Motion Study Engineers
- (e) Marketing Manager and Cost Accountant

(5) Setting of Standard: The Standard Committee is responsible for setting standards for each element of costs as given below :

- I. Direct Material
- II. Direct Labour
- III. Overheads
 - (a) Fixed Overheads
 - (b) Variable Overheads

I. Standard for Direct Material Cost

The following are the standard involved in direct materials cost:

- (i) Material Quantity or Usage Standard.
- (ii) Material Price Standard.

(i) Material Usage Standard: Material Usage Standard is prepared on the basis of material specifications and quality of materials required to manufacture a product. While setting of standards proper allowance should be provided for normal losses due to unavoidable occurrence of evaporation, breakage etc.

(ii) Material Price Standard: Material Price Standard is calculated by the Cost Accountant and the Purchase Manager for each type of materials. When this type of standard is used, it is essential to consider the important factors such as market conditions, forecasting relating to the trends of prices, discounts etc.

II. Standard for Direct Labour Cost

The following standards are established:

- (i) Fixation of Standard Labour Time
- (ii) Fixation of Standard Rate

(i) **Fixation of Standard Labour Time:** Labour Standard time is fixed and it depends upon the nature of cost unit, nature of operations performed, Time and Motion Study etc. While determining the standard time normal ideal time is allowed for fatigue and other contingencies.

(ii) **Fixation of Standard Rates:** The standard rate fixed for each job will be determined on the basis of methods of wage payment such as Time Wage System, Piece Wage System, Differential Piece Rate System and Premium Plan etc.

III. Setting Standards for Overheads

The following problems are involved while setting standards for overheads :

- (1) Determination of standard overhead cost
- (2) Estimating the production level of activity to be measured in terms of common base like machine hours, units of production and labour hours.

Setting of overhead standards is divided into fixed overhead, variable overhead and semi-variable overhead. The determination of overhead rate may be calculated as follows :

$$\begin{aligned} \text{(a) Standard Overhead Rate} &= \frac{\text{Standard overhead for the budget period}}{\text{Standard Production for the budget period}} \\ \text{(b) Standard Variable Overhead Rate} &= \frac{\text{Standard overhead for the budget period}}{\text{Standard Production for the budget period}} \end{aligned}$$

Standard Hour: Usually production is expressed in terms of units, dozen, kgs, pound, litres etc. When productions are of different types, all products cannot be expressed in one unit. Under such circumstances, it is essential to have a common unit for all the products. Time factor is common to all the operation. ICMA, London, defines a Standard Time as a "hypothetical unit pre-established to represent the amount of work which should be performed in one hour at standard performance."

Standard Cost Card: After fixing the Standards for direct material, direct labour and overhead cost, they are recorded in a Standard Cost Card. This Standard cost is presented for each unit cost of a product. The total Standard Cost of manufacturing a product can be obtained by aggregating the different Standard Cost Cards of different processes. These Cost Cards are useful to the firm in production planning and pricing policies.

VARIANCE ANALYSIS

Standard Costing guides as a measuring rod to the management for determination of "Variances" in order to evaluate the production performance. The term "Variances" may be defined as the difference between Standard Cost and actual cost for each element of cost incurred during a particular period. The term "Variance Analysis" may be defined as the process of analyzing variance by subdividing the total variance in such a way that management can assign responsibility for off-Standard Performance.

The variance may be favourable variance or unfavourable variance. When the actual performance is better than the Standard, it resents "Favourable Variance." Similarly, where actual performance is below the standard it is called as "Unfavourable Variance."

Variance analysis helps to fix the responsibility so that management can ascertain —

- (a) The amount of the variance
- (b) The reasons for the difference between the actual performance and budgeted performance

- (c) The person responsible for poor performance
- (d) Remedial actions to be taken

Types of Variances : Variances may be broadly classified into two categories (A) Cost Variance and (B) Sales Variance.

(A) Cost Variance

Total Cost Variance is the difference between Standards Cost for the Actual Output and the Actual Total Cost incurred for manufacturing actual output. The Total Cost Variance Comprises the following :

- I. Direct Material Cost Variance (DMCV)
- II. Direct Labour Cost Variance (DLCV)
- III. Overhead Cost Variance (OCV)

I. Direct Material Variances

Direct Material Variances are also termed as Material Cost Variances. The Material Cost Variance is the difference between the Standard cost of materials for the Actual Output and the Actual Cost of materials used for producing actual output. The Material Cost Variance is calculated as:

$$\begin{aligned}
 \text{Material Cost Variance} &= \text{Standard Cost} - \text{Actual Cost} \\
 \text{MCV} &= \text{SC} - \text{AC} \\
 \text{(or)} & \\
 \text{MCV} &= \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} \times \begin{array}{l} \text{Standard} \\ \text{Price} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \times \begin{array}{l} \text{Actual} \\ \text{Price} \end{array} \right\} \\
 &= (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})
 \end{aligned}$$

Note : If the actual costs is more than standard cost the variance will be unfavourable or adverse variance and, on the other hand, if the actual cost is less than standard cost the variance will be favourable variance. The material cost variance is further classified into :

- (1) Material Price Variance
- (2) Material Usage Variance
- (3) Material Mix Variance
- (4) Material Yield Variance

(1) Material Price Variance (MPV) : Material Price Variance is that portion of the Material Cost Variance which is due to the difference between the Standard Price specified and the Actual Price paid for purchase of materials. Material Price Variance may be calculated by

$$\begin{aligned}
 \text{Material Price Variance} &= \text{Actual} \times \left\{ \begin{array}{l} \text{Standard} \\ \text{Price} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Price} \end{array} \right\} \\
 \text{MPV} &= \text{AQ} (\text{SP} - \text{AP})
 \end{aligned}$$

Note : If actual cost of materials used is more than the standard cost the variance is adverse, it represents negative (-) symbol. And on the other hand, if the variance is favourable it is to be represented by positive (+) symbol.

(2) Material Usage Variance (MUV): Material Usage Variance is that part of Material Cost Variance which refers to the difference between the standard cost of standard quantity of material for actual output and the Standard cost of the actual material used. Material Usage Variance is calculated as follows :

$$\begin{aligned} \text{Material Usage Variance} &= \text{Standard Price} \times \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\} \\ \text{MUV} &= \text{SP} (\text{SQ} - \text{AQ}) \end{aligned}$$

Note : This Variance will be favourable when standard cost of actual material is more than the Standard material cost for actual output, and Vice Versa.

(3) Material Mix Variance (MMV) : It is the portion of the material usage variance which is due to the difference between the Standard and the actual composition of mix. Material Mix Variance is calculated under two situations as follows :

- (a) When actual weight of mix is equal to standard weight to mix
- (b) When actual weight of mix is different from the standard mix .

(a) When Actual Weight and Standard Weight of Mix are equal :

- (i) The formula is used to calculate the Variance :

$$\begin{aligned} \text{Material Mix Variance} &= \text{Standard Price} \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\} \\ \text{MMV} &= \text{SP} (\text{SQ} - \text{AQ}) \end{aligned}$$

(ii) In case standard quantity is revised due to shortage of a particular category of materials, the formula will be changed as follows :

$$\begin{aligned} \text{Material Mix Variance} &= \text{Standard Price} \left\{ \begin{array}{l} \text{Revised Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\} \\ \text{MMV} &= \text{SP} (\text{RSQ} - \text{AQ}) \end{aligned}$$

(b) When Actual Weight and Standard Weight of Mix are different :

- (i) The formula used to calculate the Variance is :

$$\text{Material Mix Variance} = \left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \begin{array}{l} \text{Standard} \\ \text{Cost Standard} \\ \text{Mix} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard} \\ \text{Cost of} \\ \text{Actual Mix} \end{array} \right\}$$

(ii) In case the standard is revised due to the shortage of a particular category of materials, the alternative formula will be as follows :

$$\text{Material Mix Variance} = \left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \begin{array}{l} \text{Standard} \\ \text{Cost of Revised} \\ \text{Standard Mix} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard} \\ \text{Cost of} \\ \text{Actual Mix} \end{array} \right\}$$

(4) Materials Yield Variance (MYV): It is the portion of Material Usage Variance. This variance arises due to spoilage, low quality of materials and defective production planning etc. Materials Yield

Variance may be defined as “the difference between the Standard Yield Specified and the Actual Yield Obtained.” This variance may be calculated as under :

$$\text{Material Yield Variance} = \text{Standard Rate} \times \left\{ \begin{array}{c} \text{Actual} \\ \text{Yield} \end{array} - \begin{array}{c} \text{Standard} \\ \text{Yield} \end{array} \right\}$$

Where :

Standard Rate is calculated as follows :

$$\text{Standard Rate} = \frac{\text{Standard Cost of Standard Mix}}{\text{Net Standard Output}}$$

Verification :

The following equations may be used for verification of Material Cost Variances :

- (1) Material Cost Variance = Material Price Variance + Material Usage Variance
- (2) Material Usage Variance = Material Mix Variance – Material Yield Variance
- (3) Material Cost Variance = Material Mix Variance + Material Yield Variance

Illustration: 1

Calculate Material Cost Variance from the following information :

Standard Price of material per kg = Rs. 4

Standard Usage of materials = 800 kgs

Actual Usage of materials = 920 kgs

Actual Price of materials per kg = Rs. 3

Actual Cost of materials Rs. 2,760

Standard cost of material for actual production Rs. 3,200

Solution:

$$\begin{aligned} (1) \text{ Material Cost Variance} &= \left\{ \begin{array}{c} \text{Standard} \\ \text{Price} \end{array} \times \begin{array}{c} \text{Standard} \\ \text{Quantity} \end{array} \right\} - \left\{ \begin{array}{c} \text{Actual} \\ \text{Price} \end{array} \times \begin{array}{c} \text{Actual} \\ \text{Quantity} \end{array} \right\} \\ &= (4 \times 800) - (3 \times 920) \\ &= \text{Rs. } 3,200 - \text{Rs. } 2,760 = \text{Rs. } 440 \text{ (F)} \\ \\ (2) \text{ Material Price Variance} &= \text{Actual Quantity} \times \left\{ \begin{array}{c} \text{Standard} \\ \text{Price} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Price} \end{array} \right\} \\ &= 920 (4 - 3) \\ &= 920 \times \text{Rs. } 1 = \text{Rs. } 920 \text{ (F)} \\ \\ (3) \text{ Material Usage Variance} &= \begin{array}{c} \text{Standard} \\ \text{Price} \end{array} \times \left\{ \begin{array}{c} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Quantity} \end{array} \right\} \\ &= 4 (800 - 920) \\ &= 4 \times 120 = \text{Rs. } 480 \text{ (A)} \end{aligned}$$

Illustration: 2

From the following particulars calculate:

- (a) Material Cost Variance
- (b) Material Price Variance
- (c) Material Usage Variance
- (d) Material Mix Variance

The Standard Mix of Product is :

- X 300 Units at Rs. 7.50 per unit
- Y 400 Units at Rs. 10 per unit
- Z 500 Units at Rs. 12.50 per unit

The Actual Consumption was :

- X 320 Units at Rs. 10 per unit
- Y 480 Units at Rs. 7.50 per unit
- Z 420 Units at Rs. 15 per unit

Solution:

Standard Cost of Standard Materials :

X	300	x	7.50	=	Rs. 2,250
Y	400	x	10	=	Rs. 4,000
Z	500	x	12.50	=	Rs. 6,250
	1,200				Rs. 12,500

Actual Cost of Actual Materials :

X	320	x	10	=	Rs. 3,200
Y	480	x	7.50	=	Rs. 3,600
Z	420	x	15	=	Rs. 6,300
	1,220				Rs. 13,100

Revised Quantity :

$$\begin{aligned}
 X &= \frac{1,220}{1,200} \times 300 = 305 \text{ units} \\
 Y &= \frac{1,220}{1,200} \times 400 = 406.66 \text{ units} \\
 Z &= \frac{1,220}{1,200} \times 500 = 508.33 \text{ units}
 \end{aligned}$$

Calculation of Variance :

(a) *Material Cost Variance*

$$\begin{aligned}
 &= \text{Standard Cost} - \text{Actual Cost} \\
 &= \text{Rs. 12500} - \text{Rs. 13100} = \text{Rs. 600 (A)}
 \end{aligned}$$

(b) *Material Price Variance*

$$= \text{Actual Quantity} \times \left\{ \begin{array}{l} \text{Standard} \\ \text{Price} \end{array} - \left\{ \begin{array}{l} \text{Actual} \\ \text{Price} \end{array} \right\} \right\}$$

	= (or) AQ (SP – AP)
X = 320 (7.50 – 10)	= Rs. 800 (A)
Y = 480 (10 – 7.50)	= Rs. 1200 (F)
Z = 420 (12.50 – 15)	= <u>Rs. 1050 (A)</u>
Material Price Variance	= <u>Rs. 650 (A)</u>
 (c) Material Usage Variance	 = Standard Price x { Standard Quantity – Actual Quantity }
	= SP (SQ – AQ)
X = 7.50 (300 – 320)	= Rs. 150 (A)
Y = 10 (400 – 480)	= Rs. 800 (A)
Z = 12.50 (500 – 420)	= <u>Rs. 1000 (F)</u>
Material Mix Variance	= <u>Rs. 50 (F)</u>
 (d) Material Mix Variance	 = Standard Price x { Revised Standard Quantity – Actual Quantity }
	= SP (RSQ – AQ)
X = 7.50 (305 – 320)	= Rs. 112.50 (A)
Y = 10 (407 – 480)	= Rs. 730 (A)
Z = 12.50 (508 – 420)	= <u>Rs. 1100 (F)</u>
Material Mix Variance	= <u>Rs. 257.50 (F)</u>

Illustration: 3

X Y Z products Company produces a gasoline additive Gas Gain. This product increases engine efficiency and improves gasoline mileage by creating a more complex burn in the combustion process.

Careful controls are required during the production process to ensure that the proper mix of input chemicals is achieved and that evaporation is controlled. If controls are not effective, there can be loss of output and efficiency.

The Standard cost of producing a 500 litre batch of Gas Gain is Rs.6075. The Standard Material Mix and related standard cost of each chemical used in a 500 litre batch as follows :

Chemicals	Mix Litres	Standard Purchase Price Rs.	Standard Cost Rs.
Echol	200	9	1800
Protex	100	19.125	1912.50
Benz	250	6.75	1687.50
CT – 40	50	13.50	675
Total	600		6075

The quantities of chemicals purchased and used during the current production period are shown below. A total of 140 batches of Gas Gain were manufactured during the current production period. X Y Z products company determines its costs and chemical usage variations at the end of each production period.

Chemical	Quantity used (in Ltres)
Echol	26,600
Protex	12,880
Benz	37,800
CT – 40	7,140
Total	84,420

Required : Compute the total material usage variance and then breakdown this variance into mix and yield components.

Solution:**A. Standard Cost of Standard Mix for actuals of 140 batches**

<i>Chemicals</i>	<i>Standard Mix</i>	<i>Standard Cost per unit Rs.</i>	<i>Standard Cost Rs.</i>
Echol	200 Litres x 140 = 28,000 Litres	9	2,52,000
Protex	100 Litres x 140 = 14,000 Litres	19.125	2,67,750
Benz	250 Litres x 140 = 35,000 Litres	6.75	2,36,250
CT - 40	50 Litres x 140 = 7,000 Litres	13.50	94,500
Total	84,000 Litres		Rs. 8,50,500

B. Standard Cost of Actual Mix for Actual of 140 batches

<i>Chemicals</i>	<i>Actual Quantity used</i>	<i>Standard Per unit (Liters)</i>	<i>Standard Cost of Actual Quantity</i>
Echol	26,600 Liters	Rs. 9	Rs. 2,39,400
Protex	12,880 Liters	Rs. 19.125	Rs. 2,46,330
Benz	37,800 Liters	Rs. 6.75	Rs. 2,55,150
CT - 40	7,140 Liters	Rs. 13.50	Rs. 96,390
Total	84,420 Liters		Rs. 8,37,270

Material Usage Variance

<i>Chemical</i>	<i>Standard Cost of Standard Mix for = Actual output of 140 Batches</i>	<i>(—)</i>	<i>Standard Cost of Actual Mix for Actual output</i>
Echol	Rs. 2,52,000	(—)	Rs. 2,39,400 = Rs. 12,600 (F)
Protex	Rs. 2,67,750	(—)	Rs. 2,46,330 = Rs. 21,420 (F)
Benz	Rs. 2,36,250	(—)	Rs. 2,55,150 = Rs. 18,900 (A)
CT - 40	Rs. 94,500	(—)	Rs. 96,390 = Rs. 1,890 (A)
Total	Rs. 8,50,500	(—)	Rs. 8,37,270 = Rs. 13,230 (F)

Standard Cost of Standard Mix for Actual Input (84,420 Litres)

<i>Chemical</i>	<i>Standard Mix in Actual Quantity</i>	<i>Standard Cost Per unit (Litres)</i>	<i>Standard Cost of Standard Mix in Actual Quantity</i>
Echol	= $\frac{200}{600}$ x 84,420 = 28,140 Litres	Rs. 9	Rs. 2,53,260
Protex	= $\frac{100}{600}$ x 84,420 = 14,070 Litres	Rs. 19.125	Rs. 2,69,088.75
Benz	= $\frac{250}{600}$ x 84,420 = 35,175 Litres	Rs. 6.75	Rs. 2,37,431.25

Echol	= $\frac{50}{600} \times 84,420$ = 7,035 Litres		
		Rs. 13.50	Rs. 94,972.50
Total	84,420 Litres		Rs. 8,54,752.50

Material Mix Variance

Chemical	Standard Cost of Standard Mix in = Actual input used	(—)	Standard Cost of Actual Mix in Actual input used (Rs.)
Echol	Rs. 2,53,260	(—)	Rs. 2,39,400 = Rs. 13,860 (F)
Protex	Rs. 2,69,088.55	(—)	Rs. 2,46,330 = Rs. 22,758.75 (F)
Benz	Rs. 2,37,431.25	(—)	Rs. 2,55,150 = Rs. 17,718.75 (A)
CT – 40	Rs. 94,972.50	(—)	Rs. 96,390 = Rs. 1,417.50 (A)
Total	Rs. 8,54,752.50		Rs. 8,37,270 = Rs. 17,482.50 (F)

Material Yield Variance :

$$\begin{aligned}
 &= \text{Standard Rate} \left\{ \begin{array}{l} \text{Actual} \\ \text{Output} \end{array} - \begin{array}{l} \text{Output Expected} \\ \text{from Actual input} \end{array} \right\} \\
 &= \frac{\text{Rs. 8,50,500}}{140 \text{ batches}} \left\{ 140 - \frac{84,420 \text{ Litres}}{600 \text{ Ltrs / batch}} \right\} \\
 &= \text{Rs. 6,075 (140 – 140.7 batches)} \\
 &= \text{Rs. 4,252.50 (A)}
 \end{aligned}$$

II. Labour Variances

Labour Variances can be classified into:

- Labour Cost Variance (LCV)
- Labour Rate Variance or Wage Rate Variance
- Labour Efficiency Variance
- Labour Idle Time Variance
- Labour Mix Variance
- Labour Revised Efficiency Variance
- Labour Yield Variance

(a) **Labour Cost Variance (LCV):** Labour Cost Variance is the difference between the Standard Cost of labour allowed for the actual output achieved and the actual wages paid. It is also termed as Direct Wage Variance or Wage Variance. Labour Cost Variance is calculated as follows:

$$\text{Labour Cost Variance} = \text{Standard Cost of Labour} - \text{Actual Cost of Labour}$$

(or)

$$\text{Labour Cost Variance} = \left\{ \begin{array}{l} \text{Standard} \\ \text{Rate} \end{array} \times \begin{array}{l} \text{Standard Time} \\ \text{for Actual Output} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual} \\ \text{Rate} \end{array} \times \begin{array}{l} \text{Actual} \\ \text{Time} \end{array} \right\}$$

Note : If actual labour cost is more than the standard labour cost, the variance represents negative and vice versa.

(b) Labour Rate Variance: It is that part of labour cost variance which is due to the difference between the standard rate specified and the actual rate paid. This variances arise from the following reasons :

- (a) Change in wage rate.
- (b) Faulty recruitment.
- (c) Payment of overtime.
- (d) Employment of casual workers etc.

It is expressed as follows :

$$\text{Labour Rate Variance} = \text{Actual Time} \left\{ \begin{array}{l} \text{Standard} \\ \text{Rate} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Rate} \end{array} \right\}$$

Note : If the Standard rate is higher than the actual rate, the variance will be favourable and vice versa.

(c) Labour Efficiency Variance: Labour Efficiency Variance otherwise known as Labour Time Variance. It is that portion of the Labour Cost Variance which arises due to the difference between standard labour hours specified and the actual labour hours spent. The usual reasons for this variance are (a) poor supervision (b) poor working condition (c) increase in labour turnover (d) defective materials. It may be calculated as following:

Note : If actual time taken is more than the specified standard time, the variance represents unfavourable and vice versa.

(d) Labour Idle Time Variance: Labour Idle Time Variance arises due to abnormal situations like strikes, lockout, breakdown of machinery etc. In other words, idle time occurs due to the difference between the time for which workers are paid and that which they actually expend upon production. It is calculated as follows :

$$\text{Idle Time Variance} = \text{Idle Hours} \times \text{Standard Rate}$$

(e) Labour Mix Variance: It is otherwise known as Gang Composition Variance. This variance arises due to the differences between the actual gang composition than the standard gang composition. Labour Mix Variance is calculated in the same way of Materials Mix Variance. This variance is calculated in two ways :

- (i) When Standard Labour Mix is equal to Actual Labour Mix.
- (ii) When Standard Labour mix is different from Actual Labour Mix.
- (i) **When Standard and actual times of the labour mix are same :** The formula for its computation may be as follows :

$$\text{Labour Mix Variance} = \left\{ \begin{array}{l} \text{Standard Cost of} \\ \text{Standard Labour Mix} \end{array} - \begin{array}{l} \text{Standard Cost of} \\ \text{Actual Labour Mix} \end{array} \right\}$$

- (ii) **When Standard and actual times of the labour mix are different :** Changes in the composition of a gang may arise due to shortage of a particular grade of labour. It may be calculated as follows :

$$\text{Labour Mix Variance} = \left\{ \begin{array}{c} \text{Revised Standard} \\ \text{Time} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Time} \end{array} \right\} \times \left\{ \begin{array}{c} \text{Standard} \\ \text{Rate} \end{array} \right\}$$

Where :

$$\text{Revised Standard Time} = \frac{\text{Total Actual Time}}{\text{Total Standard Time}} \times \text{Actual Time}$$

(f) Labour Yield Variance: This variance is calculated in the same way as Material Yield Variance. Labour Yield Variance arises due to the variation in labour cost on account of increase or decrease in yield or output as compared to relative standard. The formula for this purpose is as follows :

$$\text{Labour Yield Variance} = \frac{\text{Standard Labour}}{\text{Cost per unit of output}} \times \left\{ \begin{array}{c} \text{Standard output} \\ \text{for Actual Time} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Output} \end{array} \right\}$$

Note : If actual output is more than Standard output for actual time, the variance is favourable and vice versa.

Verification : Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance

Illustration: 4

From the following particulars, calculate Labour Variance:

Standard hours = 200

Standard rate for actual production = Re. 1 per hour

Actual hour = 190

Actual Rate = Rs. 1.25 per hour

Solution:

$$\begin{aligned} (1) \text{ Labour Cost Variance} &= \left\{ \begin{array}{c} \text{Standard} \\ \text{Hours} \end{array} \times \begin{array}{c} \text{Standard} \\ \text{Rate} \end{array} \right\} - (\text{Actual hours} \times \text{Actual Rate}) \\ \text{(or)} &= (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR}) \\ &= (200 \times \text{Re.1}) - (190 \times \text{Rs. 1.25}) \\ &= \text{Rs. 200} - \text{Rs. 237.50} = \text{Rs. 37.50 (A)} \end{aligned}$$

$$\begin{aligned} (2) \text{ Labour Rate Variance} &= \left\{ \begin{array}{c} \text{Standard} \\ \text{Rate} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Rate} \end{array} \right\} \times \text{Actual hours} \\ &= (\text{Re. 1} - \text{Rs. 1.25}) \times 190 \\ &= \text{Rs. 0.25} \times 190 = \text{Rs. 47.50 (A)} \end{aligned}$$

$$\begin{aligned} (3) \text{ Labour Efficiency Variance} &= \left\{ \begin{array}{c} \text{Standard} \\ \text{Hours} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Hours} \end{array} \right\} \times \text{Standard Rate} \\ &= (200 - 190) \times \text{Re. 1} \\ &= 10 \times \text{Re. 1} = \text{Rs. 10 (F)} \end{aligned}$$

Verification:

$$\begin{aligned} \text{Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ \text{Rs. 37.50 (A)} &= \text{Rs. 47.50 (A)} + \text{Rs. 10 (F)} \\ \text{Rs. 37.50 (A)} &= \text{Rs. 37.50 (A)} \end{aligned}$$

Illustration: 5

The details regarding the composition and the weekly wage rates of labour force engaged on a job scheduled to be completed in 30 weeks are as follows :

Category of Workers	Standard		Actual	
	No. of workers	Weekly wage Rate per worker	No. of workers	Weekly wage Rate per worker
Skilled	75	60	70	70
Semi-Skilled	45	40	30	50
Unskilled	60	30	80	20

The work was actually completed in 32 weeks. Calculate the various labour variances.

Solution:

$$(1) \text{ Labour Cost Variance} = \text{Standard Labour Cost} - \text{Actual Labour Cost}$$

Calculation of Standard Labour Cost :**Category of Standard Workers :**

		Week		Rate Rs.		Amount Rs.
Skilled	=	75	x	30	=	2,250
Semi Skilled	=	45	x	30	=	1,350
Unskilled	=	60	x	30	=	1,800
						<u>5,400</u>
						<u>2,43,000</u>

Calculation of Actual Labour Cost :

		Actual Week		Rate Rs.		Amount Rs.
Skilled	=	75	x	32	=	2,240
Semi Skilled	=	30	x	32	=	960
Unskilled	=	80	x	32	=	2,560
						<u>5,760</u>
						<u>2,56,000</u>

$$(1) \text{ Labour Cost Variance} = \text{Standard Labour} - \text{Actual Labour Cost}$$

$$= 2,43,000 - 2,56,000 = \text{Rs. } 13,000 \text{ (A)}$$

$$(2) \text{ Labour Rate Variance} = (\text{Standard Rate} - \text{Actual Rate}) \times \text{Actual Time}$$

$$\text{Skilled} = (\text{Rs. } 60 - \text{Rs. } 70) \times 2,240 = \text{Rs. } 22,400 \text{ (A)}$$

$$\text{Semi Skilled} = (\text{Rs. } 40 - \text{Rs. } 50) \times 960 = \text{Rs. } 9,600 \text{ (A)}$$

$$\text{Unskilled} = (\text{Rs. } 30 - \text{Rs. } 20) \times 2,560 = \text{Rs. } 25,600 \text{ (F)}$$

$$\text{Labour Rate Variance} = \text{Rs. } 6,400 \text{ (A)}$$

$$(3) \text{ Labour Efficiency Variance} = \left\{ \begin{array}{l} \text{Standard} \\ \text{Time} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Time} \end{array} \right\} \times \text{Standard Rate}$$

Skilled	=	(2,250 - 2,240)	x	60	=	Rs. 600 (F)
Semi Skilled	=	(1,350 - 960)	x	40	=	Rs. 15,600 (F)
Unskilled	=	(1,800 - 2,560)	x	30	=	Rs. 22,800 (A)
						<u>Rs. 6,600 (A)</u>

$$(4) \text{ Labour Mix Variance} = \left\{ \begin{array}{c} \text{Revised Standard} \\ \text{Time} \end{array} - \begin{array}{c} \text{Actual} \\ \text{Time} \end{array} \right\} \times \text{Standard Rate}$$

Where :

$$\begin{aligned} \text{Revised Standard Time} &= \frac{\text{Standard Time}}{\text{Total Standard Time}} \times \text{Actual Time} \\ \text{Skilled} &= \frac{2,250}{5,400} \times 5,760 = 2,400 \text{ hours} \\ \text{Semi Skilled} &= \frac{1,350}{5,400} \times 5,760 = 1,440 \text{ hours} \\ \text{Unskilled} &= \frac{1,800}{5,400} \times 5,760 = 1,920 \text{ hours} \end{aligned}$$

Labour Mix Variance

$$\begin{aligned} \text{Skilled} &= (2,400 - 2,240) \times 60 = \text{Rs. } 9,600 \text{ (F)} \\ \text{Semi Skilled} &= (1,440 - 960) \times 40 = \text{Rs. } 19,200 \text{ (F)} \\ \text{Unskilled} &= (1,920 - 2,560) \times 30 = \text{Rs. } 19,200 \text{ (A)} \\ \text{Labour Mix Variance} &= \underline{\text{Rs. } 9,600 \text{ (F)}} \end{aligned}$$

$$(5) \text{ Labour Revised Efficiency Variance} = \left\{ \begin{array}{c} \text{Standard} \\ \text{Time} \end{array} - \begin{array}{c} \text{Revised Standard} \\ \text{Time} \end{array} \right\} \times \text{Standard Rate}$$

$$\begin{aligned} \text{Skilled} &= (2,250 - 2,400) \times \text{Rs. } 60 = \text{Rs. } 9,000 \text{ (A)} \\ \text{Semi Skilled} &= (2,350 - 1,440) \times \text{Rs. } 40 = \text{Rs. } 3,600 \text{ (A)} \\ \text{Unskilled} &= (1,800 - 1,920) \times \text{Rs. } 30 = \text{Rs. } 300 \text{ (A)} \\ \text{Labour Revised Efficiency Variance} &= \underline{\text{Rs. } 16,200 \text{ (A)}} \end{aligned}$$

Verification :

$$\begin{aligned} (1) \text{ Labour Cost Variance} &= \begin{array}{c} \text{Labour Rate} \\ \text{Variance} \end{array} + \begin{array}{c} \text{Labour Efficiency} \\ \text{Variance} \end{array} \\ \text{Rs. } 13,000 \text{ (A)} &= \text{Rs. } 6,400 \text{ (A)} + \text{Rs. } 6,600 \text{ (A)} \\ \text{Rs. } 13,000 \text{ (A)} &= \text{Rs. } 13,000 \text{ (A)} \end{aligned}$$

$$\begin{aligned} (2) \text{ Labour Efficiency Variance} &= \begin{array}{c} \text{Labour Mix} \\ \text{Variance} \end{array} + \begin{array}{c} \text{Labour Revised} \\ \text{Variance} \end{array} \\ \text{Rs. } 6,600 \text{ (A)} &= \text{Rs. } 9,600 \text{ (F)} + \text{Rs. } 16,200 \text{ (A)} \\ \text{Rs. } 6,600 \text{ (A)} &= \text{Rs. } 6,600 \text{ (A)} \end{aligned}$$

III. Overhead Variances

Overhead may be defined as the aggregate of indirect material cost, indirect labour cost and indirect expenses. Overhead Variances may arise due to the difference between standard cost of overhead for actual production and the actual overhead cost incurred. The Overhead Cost Variance may be calculated as follows :

$$\text{Overhead Cost Variance} = \left\{ \begin{array}{l} \text{Standard Overhead} \\ \text{Rate Per Unit} \end{array} - \begin{array}{l} \text{Actual Overhead} \\ \text{Cost} \end{array} \right\} \times \text{Actual Output}$$

(or)

$$\left\{ \begin{array}{l} \text{Standard Hours for} \\ \text{Actual Output} \end{array} \times \begin{array}{l} \text{Standard Overhead} \\ \text{Rate Per Hour} \end{array} \right\} - \text{Actual Overhead Cost}$$

Essentials of Certain Terms : For the purpose of measuring various Overhead Variances it is essential to know certain technical terms related to overheads are given below :

- (a) Standard Overhead Rate per unit = $\frac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$
- (b) Standard Overhead Rate per hour = $\frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$
- (c) Standard Output for Actual Time = $\frac{\text{Budgeted Output}}{\text{Budgeted Hours}} \times \text{Actual Hours}$
- (d) Standard Hours for Actual Output = $\frac{\text{Budgeted Hours}}{\text{Budgeted Output}} \times \text{Actual Output}$
- (e) When Output is measured in Standard Hours
 Recorded Overheads = $\frac{\text{Standard Rate}}{\text{Per Hour}} \times \text{Standard Hours for Actual Output}$

When Output is measured in Units:

- Absorbed Overheads = $\frac{\text{Standard Rate}}{\text{Per Unit}} \times \text{Budgeted Output In Units}$
- (f) Budgeted Overheads = $\frac{\text{Standard Rate}}{\text{Per Unit}} \times \text{Budgeted Output In Units}$
- (or)
- = $\frac{\text{Standard Rate}}{\text{Per Hour}} \times \text{Budgeted Hours}$
- (g) Actual Overheads = $\frac{\text{Actual Rate}}{\text{Per unit}} \times \text{Actual Output in units}$
- (or)
- = $\frac{\text{Actual Rate}}{\text{Per Hour}} \times \text{Actual Hours}$

(3) **Variable Overhead Efficiency Variance:** This variance arises due to the difference between variable overhead recovered from actual output produced and the standard variable overhead for actual hours worked. The formula is as follows :

$$\left. \begin{array}{l} \text{Variable Overhead} \\ \text{Efficiency Variance} \end{array} \right\} = \begin{array}{l} \text{Standard Rate} \\ \text{Per Hour} \end{array} \times \left\{ \begin{array}{l} \text{Standard Hours} \\ \text{for Actual Production} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Hours} \end{array} \right\}$$

Verification :

$$\begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} = \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} + \begin{array}{l} \text{Variable Efficiency} \\ \text{Variance} \end{array}$$

Illustration: 6

From the following particulars, compute the Variable Overhead Variances :

	<i>Standard</i>	<i>Actual</i>
Output in Units	2,500 units	2,000 units
Labour Hours	5,000	6,000
Variable Overheads	Rs. 1,000	Rs. 1,500

Solution:

$$\left. \begin{array}{l} \text{Standard Variable} \\ \text{Overhead rate per hour} \end{array} \right\} = \frac{\text{Budgeted Variable Overhead}}{\text{Budgeted Hours}}$$

$$= \frac{1,000}{5,000} = 0.20 \text{ per hour}$$

$$\left. \begin{array}{l} \text{Standard Variable} \\ \text{Overhead rate per} \\ \text{Unit of output} \end{array} \right\} = \frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}}$$

$$= \frac{1,000}{2,500} = \text{Rs. } 0.40 \text{ per hour}$$

Calculation of Variances:

$$\begin{aligned} (1) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Actual Variable} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Production} \end{array} \right\} \\ &= 1,500 - (2,000 \times 0.40) \\ &= \text{Rs. } 1,500 - \text{Rs. } 800 = \text{Rs. } 700 \text{ (A)} \end{aligned}$$

$$\begin{aligned} (2) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Actual Variable} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Hours Worked} \end{array} \right\} \\ &= 1,500 - (6,000 \times 0.20) \\ &= \text{Rs. } 1,500 - \text{Rs. } 1,200 = \text{Rs. } 300 \text{ (A)} \end{aligned}$$

$$\begin{aligned} (3) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Efficiency Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Hours} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Output} \end{array} \right\} \\ &= (\text{Rs. } 6,000 \times 0.20) - (2,000 \times 0.40) \\ &= \text{Rs. } 1,200 - \text{Rs. } 800 = \text{Rs. } 400 \text{ (A)} \end{aligned}$$

Verification:

$$\left. \begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} \right\} = \text{Variable Overhead Expenditure Variance} + \text{Variable Overhead Efficiency Variance}$$

$$\text{Rs. 700 (A)} = \text{Rs. 300 (A)} + \text{Rs. 400 (A)}$$

$$\text{Rs. 700 (A)} = \text{Rs. 700 (A)}$$

II. Fixed Overhead Variance

(a) Fixed Overhead Cost Variance: It is that portion of overhead cost variance which is due to over absorption or under absorption of overhead for the actual production. In other words, the variance is the difference between the standard fixed overheads allowed for the actual production and the actual fixed overheads incurred. The variance can be calculated as follows:

$$\text{Fixed Overhead Cost Variance} = \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overhead} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overhead for Actual} \\ \text{Production} \end{array} \right\}$$

(or)

$$= \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overhead Rate Per Hour} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overheads} \end{array} \right\} \times \text{Actual Output}$$

(b) Fixed Overhead Expenditure Variance: This is otherwise termed as "Budget Variance." It is the difference between the budgeted fixed overheads and the actual fixed overheads incurred during the particular period. The formula for calculation of this Variance is

$$\text{Fixed Overhead Expenditure Variance} = \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overheads} \end{array} \right\}$$

(c) Fixed Overhead Volume Variance: This Variance is the difference between the budgeted fixed overheads and the standard fixed overheads recovered on the actual production. The formula is as follows:

$$\text{Fixed Overhead Volume Variance} = \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overheads on} \\ \text{Actual Production} \end{array} \right\}$$

Note : If budgeted fixed overhead is greater than standard fixed overhead on actual production, the variance is unfavourable and vice versa.

(d) Fixed Overhead Capacity Variance: This is that portion of volume variance which is due to working at higher or lower capacity than the budgeted capacity. In other words, fixed overhead capacity variance arising due to a particular cause, i.e., unexpected holidays, breakdown of machinery, strikes, power failure etc. This is calculated as follows :

$$\left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Capacity Variance} \end{array} \right\} = \left\{ \begin{array}{l} \text{Actual Hours} \\ \text{Worked} \end{array} - \begin{array}{l} \text{Budgeted} \\ \text{Hours} \end{array} \right\} \times \text{Standard Fixed Overhead Rate Per Hour}$$

(or)

$$= \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\}$$

(e) **Fixed Overhead Efficiency Variance:** It is that portion of the Volume Variance which shows the lower or higher output arising from the efficiency or inefficiency of the workers. This is an outcome of the performance of the workers and is calculated as :

$$\left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Efficiency Variance} \end{array} \right\} = \text{Standard Fixed Overhead Rate Per Hour} \times \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\}$$

(f) **Fixed Overhead Calendar Variance:** This is part of Capacity Variance which is due to the difference between the actual number of working days and the budgeted working days. Calendar Variance can be calculated as follows :

$$\left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Calendar Variance} \end{array} \right\} = \text{Standard Rate Per hour / Per day} \times \begin{array}{l} \text{Excess or Deficit hours} \\ \text{or days worked} \end{array}$$

Note : If the actual days worked are more than the budgeted working days, the variance is favourable and vice versa.

Combined Overhead Variances

Analysis of overhead variance can be calculated by combined overhead variances methods. It may be:

- (a) Two Variance Method and
- (b) Three Variance Method

(a) **Two Variance Method :** If the Overhead Variances are analysed on the basis of both expenditure and volume is called as "Two Variance Analysis."

Illustration: 7

From the following particulars calculate Fixed Overhead Variances :

	<i>Standard</i>	<i>Actual</i>
Output in Units	5,000	5,200
Labour Hours	20,000	20,100
Fixed Overhead	Rs. 10,000	Rs. 10,200

Standard time for one unit 4 hours.

Solution:

Standard Hours for Actual Output

For 1 unit standard time 4 hours
 For 5,200 units = 5,200 x 4 = 20,800 hours

Standard Overhead Rate per Hour

For 1 unit 4 hours
 For 5,000 units = 5,000 x 4 = 20,000 hours
 For 20,000 hours Fixed Overhead is Rs. 10,000

$$\text{For 1 hour} = \frac{10,000}{20,000} = \text{Re. } 0.50$$

Standard Overhead Rate per Unit

For 500 units Fixed Overhead is Rs. 10,000

$$\text{For 1 unit} = \frac{10,000}{5,000} = \text{Rs. 2 per unit}$$

(1) Fixed Overhead Cost Variance:

$$\begin{aligned} &= \frac{\text{Standard Hours for}}{\text{Actual Output}} \times \frac{\text{Standard Overhead}}{\text{Rate Per Hour}} - \text{Actual Overhead} \\ &= (20,800 \times \text{Rs. } 0.50) - \text{Rs. } 10,400 \\ &= \text{Rs. } 10,400 - 10,200 = \text{Rs. } 200 \text{ (F)} \end{aligned}$$

(2) Fixed Overhead Expenditure of Budget Variance:

$$\begin{aligned} &= \text{Budgeted Fixed Overhead} - \text{Actual Fixed Overhead} \\ &= \text{Rs. } 10,000 - \text{Rs. } 10,200 = \text{Rs. } 200 \text{ (A)} \end{aligned}$$

(3) Fixed Overhead Volume Variance:

$$\begin{aligned} &= (\text{Budgeted Production} - \text{Actual Production}) \times \text{Standard Overhead Rate Per Unit} \\ &= (\text{Rs. } 5,000 - 5,200) \times 2 = \text{Rs. } 400 \text{ (F)} \end{aligned}$$

(4) Fixed Overhead Efficiency Variance:

$$\begin{aligned} &= \left\{ \begin{array}{l} \text{Standard Hours for} \\ \text{Actual Production} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Hours} \end{array} \right\} \times \text{Standard Overhead Rate Per Hour} \\ &= (20,800 - 10,200) \times \text{Rs. } 0.50 \\ &= \text{Rs. } 350 \text{ (F)} \end{aligned}$$

(5) Fixed Overhead Capacity Variance:

$$\begin{aligned} &= (\text{Budgeted Hours} - \text{Actual Hours}) \times \text{Standard Overhead Rate Per Hour} \\ &= (20,000 - 20,100) \times \text{Rs. } 0.50 = \text{Rs. } 50 \text{ (F)} \end{aligned}$$

Verification:

$$\begin{aligned} (1) \text{ Fixed Overhead Cost Variance} &= \text{Expenditure Variance} + \text{Volume Variance} \\ \text{Rs. } 200 \text{ (F)} &= \text{Rs. } 200 \text{ (A)} + \text{Rs. } 400 \text{ (F)} \\ \text{Rs. } 200 \text{ (F)} &= \text{Rs. } 200 \text{ (F)} \\ (2) \text{ Fixed Overhead Volume Variance} &= \text{Efficiency Variance} + \text{Capacity Variance} \\ \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 350 \text{ (F)} + \text{Rs. } 50 \text{ (F)} \\ \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 400 \text{ (F)} \end{aligned}$$

Illustration: 8

Calculate Overhead Variances from the following information :

	<i>Standard</i>	<i>Actual</i>
Fixed Overheads	Rs. 4,000	Rs. 4,250
Variable Overheads	Rs. 6,000	Rs. 5,600
Output in Units	2,000	1,900

Solution:

$$\begin{aligned} \text{Fixed Overhead Rate Per Unit} &= \frac{\text{Budgeted Fixed Overheads}}{\text{Output in Units}} \\ &= \frac{4,000}{2,000} = \text{Rs. 2} \end{aligned}$$

$$\begin{aligned} \text{Variable Overhead Rate Per Unit} &= \frac{\text{Budgeted Variable Overheads}}{\text{Output in Units}} \\ &= \frac{6,000}{2,000} = \text{Rs. 3} \end{aligned}$$

(1) Variable Overhead Variance:

$$\begin{aligned} &= (\text{Actual Output} \times \text{Standard Variable Overhead Rate}) - \text{Actual Variable Overhead} \\ &= (1,900 \times 3) - 5,600 \\ &= 5,700 - 5,600 = \text{Rs. 100 (F)} \end{aligned}$$

(2) Fixed Overhead Variance:

$$\begin{aligned} &= (\text{Actual Output} \times \text{Standard Fixed Overhead Rate}) - \text{Actual Fixed Overhead} \\ &= (1,900 \times 2) - 4,250 \\ &= 3,800 - 4,250 = \text{Rs. 450 (A)} \end{aligned}$$

(3) Fixed Overhead Volume Variance:

$$\begin{aligned} &= (\text{Actual Output} \times \text{Standard Rate}) - \text{Budgeted Fixed Overheads} \\ &= (1,900 \times 2) - 4,000 \\ &= 3,800 - 4,000 = \text{Rs. 200 (A)} \end{aligned}$$

(4) Fixed Overhead Expenditure Variance:

$$\begin{aligned} &= \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads} \\ &= \text{Rs. 4,000} - \text{Rs. 4,250} = \text{Rs. 250 (A)} \end{aligned}$$

Illustration: 9

A Company has normal capacity of 100 machines working 8 hours per day of 25 days in a month. The budgeted fixed overheads of a month are Rs. 1,50,000. The Standard time required to manufacture one unit of product is 4 hours. In a particular month, the company worked for 24 days of 750 machine hours per day and produced 4,500 units of the product. The actual fixed overheads incurred were Rs. 1,45,000. Compute :

- (a) Efficiency Variance
- (b) Capacity Variance
- (c) Calendar Variance
- (d) Expenditure Variance
- (e) Volume Variance
- (f) Total Fixed Overhead Variance

Solution:

Standard Hours Produced :

$$\begin{aligned} \text{Units Produced} &= 4,500 \text{ units} \\ \text{Hours Per Unit} &= 4 \text{ hours} \\ \text{Total Standard Hours} &= 4,500 \times 4 = 18,000 \text{ units} \end{aligned}$$

Calculation of Standard Rate:

$$\begin{aligned} \text{Standard Rate} &= \frac{1,50,000}{100 \times 25 \times 8} \\ &= \frac{1,50,000}{20,000} = \text{Rs. 7.50 per hour} \end{aligned}$$

Actual hours worked 750 x 24 days = 18,000 hours

Budgeted hours in actual days = 24 x 8 x 100 = 19,200 hours

Variance Analysis:

(A) Charged to Production = 18,000 x 7.50 Rs. 1,35,000

(B) Standard Cost of Actual Hours = 18,000 x 7.50 = Rs. 1,35,000

(C) Standard Cost of Budgeted Hours in actual days = 19,200 x 7.50 = Rs. 1,44,000

(D) Budget = Rs. 1,50,000

(E) Actuals = Rs. 1,45,000

(1) Efficiency Variance (A – B)	=	Rs. 1,35,000 – Rs. 1,35,000	= Nil
(2) Capacity Variance (B – C)	=	Rs. 1,35,000 – Rs. 1,44,000	= Rs. 9,000 Adverse
(3) Calendar Variance (C – D)	=	Rs. 1,44,000 – Rs. 1,50,000	= Rs. 6,000 Adverse
(4) Volume Variance (A – D)	=	Rs. 1,35,000 – Rs. 1,50,000	= Rs. 15,000 Adverse
(5) Expense Variance (D – E)	=	Rs. 1,50,000 – Rs. 1,45,000	= Rs. 5,000 Favourable
(6) Total Variances (A – E)	=	Rs. 1,35,000 – Rs. 1,45,000	= Rs. 10,000 Adverse

(B) Sales Variances

The Variances so far analysed are related to the cost of goods sold. Quantum of profit is derived from the difference between the cost and sales revenue. Cost Variances influence the amount of profit favourably or adversely depending upon the cost from materials, labour and overheads. In addition, it is essential to analyse the difference between actual sales and the targeted sales because this difference will have a direct impact on the profit and sales. Therefore the analysis of sales variances is important to study profit variances.

Sales Variances can be calculated by Two methods:

- I. Sales Value Method.
- II. Sales Margin or Profit Method.

I. Sales Value Method

The method of computing sales variance is used to denote variances arising due to change in sales price, sales volume or the sales value. The sales variances may be classified as follows :

- (a) Sales Value Variance
- (b) Sales Price Variance
- (c) Sales Volume Variance
- (d) Sales Mix Variance
- (e) Sales Quantity Variance

(a) Sales Value Variance: This Variance refers to the difference between budgeted sales and actual sales. It may be calculated as follows :

$$\text{Sales Value Variance} = \text{Actual Value of Sales} - \text{Budgeted Value of Sales}$$

Note : If the actual sales is more than the budgeted sales, the variance will be favourable and vice versa.

(b) Sales Price Variance: This is the portion of Sales Value Variance which is due to the difference between standard price of actual quantity and actual price of the actual quantity of sales. The formula is :

$$\text{Sales Price Variance} = \text{Actual Quantity} \times (\text{Standard Price} - \text{Actual Price})$$

Note : If the actual price is more than standard price the variance is favourable and vice versa.

(c) Sales Volume Variance: It is that part of Sales Value Variance which is due to the difference between the actual quantity or volume of sales and budgeted quantity or volume of sales. The variance is calculated as :

$$\text{Sales Volume Variance} = \left\{ \begin{array}{l} \text{Actual Quantity} \\ \text{of Sales} \end{array} - \begin{array}{l} \text{Budgeted Quantity} \\ \text{of Sales} \end{array} \right\} \times \text{Standard Price}$$

Note : If the actual quantity sold is more than the budgeted quantity or volume of sales, the variance is favourable and vice versa.

(d) Sales Mix Variance: It is that portion of Sales Volume Variance which is due to the difference between the standard proportion of sales and the actual composition or mix of quantities sold. In other words it is the difference of standard value of revised mix and standard value of actual mix. It is calculated as :

$$\text{Sales Mix Variance} = \left\{ \begin{array}{l} \text{Standard Value} \\ \text{of Actual Mix} \end{array} - \begin{array}{l} \text{Standard Value of} \\ \text{Revised Standard Mix} \end{array} \right\}$$

(e) Sales Quantity Variance: It is a sub variance of Sales Volume Variance. This is the difference between the revised standard quantity of sales and budgeted sales quantity. The formula for the calculation of this variance is :

$$\text{Sales Quantity Variance} = \left\{ \begin{array}{l} \text{Revised Standard} \\ \text{Sales Quantity} \end{array} - \begin{array}{l} \text{Budgeted Sales} \\ \text{Quantity} \end{array} \right\} \times \text{Standard Selling Price}$$

Note : If the Revised Standard Quantity is greater than the standard quantity, the variance is favourable and vice versa.

Illustration: 10

From the following information is given about standard and actual sales. You are required to calculate Sales Variances.

	<i>Standard Qty. Units</i>	<i>Sales Price</i>	<i>Actual Qty. Units</i>	<i>Sales Price</i>
X	250	2.50	250	2.50
Y	200	3	300	3.25
Z	150	3.50	200	3.75
	<u>600</u>		<u>750</u>	

Solution:**(1) Sales Value Variance :**

$$\begin{aligned}
 &= \text{Actual Value of Sales} - \text{Standard Value of Sales} \\
 \text{X} &= (250 \times 2.50) - (250 \times 2.50) \\
 &= \text{Rs. } 625 - \text{Rs. } 625 = \text{Nil} \\
 \text{Y} &= (300 \times 3.25) - (200 \times 3) \\
 &= \text{Rs. } 975 - \text{Rs. } 600 = \text{Rs. } 375 \text{ (F)} \\
 \text{Z} &= (200 \times 3.75) - (150 \times 3.50) \\
 &= \text{Rs. } 750 - \text{Rs. } 525 = \text{Rs. } 225 \text{ (F)} \\
 \text{Total Sales Value Variance} &= \text{Rs. } 375 \text{ (F)} + \text{Rs. } 225 \text{ (F)} = \text{Rs. } 600 \text{ (F)}
 \end{aligned}$$

(2) Sales Price Variance :

$$\begin{aligned}
 &= \text{Actual Quantity Sold} \times (\text{Actual Price} - \text{Standard Price}) \\
 \text{X} &= 250 (2.50 - 2.50) = \text{Nil} \\
 \text{Y} &= 300 (3.25 - 3) = \text{Rs. } 75 \text{ (F)} \\
 \text{Z} &= 200 (3.75 - 3.50) = \text{Rs. } 50 \text{ (F)} \\
 \text{Total Sales Price Variance} &= \text{Rs. } 75 \text{ (F)} + \text{Rs. } 50 \text{ (F)} = \text{Rs. } 125 \text{ (F)}
 \end{aligned}$$

(3) Sales Quantity Variance :

$$\begin{aligned}
 &= \text{Standard Price} \times (\text{Actual Quantity} - \text{Standard Quantity}) \\
 \text{X} &= 2.50 (250 - 250) = \text{Nil} \\
 \text{Y} &= 3 (300 - 200) = \text{Rs. } 300 \text{ (F)} \\
 \text{Z} &= 3.50 (200 - 150) = \text{Rs. } 175 \text{ (F)} \\
 \text{Total Sales Quantity Variance} &= \text{Rs. } 300 \text{ (F)} + \text{Rs. } 175 \text{ (F)} = \text{Rs. } 475 \text{ (F)}
 \end{aligned}$$

(4) Sales Mix Variance :

There is a difference between standard quantity and actual quantity so the standard will be revised in proportion to actual quantity of sales.

$$\begin{aligned}
 \text{X} &= \frac{250}{600} \times 750 = 312.50 \\
 \text{Y} &= \frac{200}{600} \times 750 = 250 \\
 \text{Z} &= \frac{150}{600} \times 750 = 187.50
 \end{aligned}$$

$$\text{Sales Mix Variance} = \text{Standard Value of Actual Mix} - \text{Standard Value of Revised Standard Mix}$$

Standard Value of Actual Mix

X	=	250 x 2.50 = 625
Y	=	200 x 3 = 600
Z	=	150 x 3.50 = 525
		Rs. 1750

Standard Value of Revised Standard Mix

X	=	312.50 x 2.50 = 781.25
Y	=	250 x 3 = 750.00
Z	=	187.50 x 3.50 = 656.25
		Rs. 2187.50

Sales Mix Variance = Rs. 1750 – Rs. 2187.50 = Rs. 437.50 (A)

II. Sales Margin or Profit Method

Under this method of variance analysis, variances may be computed to show the effect on profit. The sales variance according to this method can be classified as follows :

- (1) Sales Margin Value Variance
- (2) Sales Margin Volume or Quantity Variance
- (3) Sales Margin Price Variance
- (4) Sales Margin Mix Variance

(1) **Sales Margin Value Variance:** This is the difference between the actual value of sales margin and budgeted value of sales margin. It is calculated as follows :

Sales Margin Value Variance = Budgeted Profit – Actual Profit

$$= \left\{ \begin{array}{l} \text{Budget Sales} \\ \text{Quantity} \end{array} \times \begin{array}{l} \text{Budgeted} \\ \text{Profit per unit} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual} \\ \text{Quantity Sold} \end{array} \times \begin{array}{l} \text{Actual} \\ \text{Profit Per unit} \end{array} \right\}$$

Note : If the actual profit is more than budgeted profit the variance is favourable and vice versa.

(2) **Sales Margin Volume Variance:** It is that portion of Total Sales Margin Variance which is due to the difference between budgeted and actual quantity sold. The formula is as follows :

$$\text{Sales Margin Volume Variance} = \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\} \times \text{Standard Profit}$$

Note : If the actual quantity is more than standard quantity, the variance is favourable and vice versa.

(3) **Sales Margin Price Variance:** This variance is the difference between the standard price of the quantity of the sales effected and the actual price of those sales. It is calculated as follows :

Sales Margin Price Variance = Standard Profit – Actual Profit

$$= \left\{ \begin{array}{l} \text{Budgeted Profit} \\ \text{Per Unit} \end{array} - \begin{array}{l} \text{Actual Profit} \\ \text{Per Unit} \end{array} \right\} \times \text{Actual Quantity Sold}$$

Note : If the actual profit is greater than the standard profit, the variance is favourable and vice versa.

(4) **Sales Margin Mix Variance** : This is that portion of the Sales Margin Volume or Quantity Variance which is due to the difference between the actual and budgeted quantities of each product of which the sales mixture is composed valuing the difference of quantities at standard margin. Thus, this variance arises only where more than one product is sold. It is calculated as follows:

$$\text{Sales Margin Mix Variance} = \left\{ \begin{array}{l} \text{Revised Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\} \times \begin{array}{l} \text{Standard Profit} \\ \text{Per Unit} \end{array}$$

Note : If the actual quantity is greater than the revised standard quantity, the variance is favourable and vice versa.

Illustration: 11

From the following details, calculate Sales Margin Variances:

Product	Budgeted		Actual	
	Quantity Units	Sales Price	Quantity Units	Sales Price
Product X	300	46	400	50
Product Y	500	28	450	26

The cost per unit of product X and Y was Rs. 45 and Rs. 20 respectively.

Solution:

(1) Total Sales Margin Value Variance:

$$= \text{Actual Profit} - \text{Budgeted Profit}$$

(or)

$$= \left\{ \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \times \begin{array}{l} \text{Actual Profit} \\ \text{Per Unit} \end{array} \right\} - \left\{ \begin{array}{l} \text{Budgeted} \\ \text{Quantity} \end{array} \times \begin{array}{l} \text{Budgeted} \\ \text{Profit per Unit} \end{array} \right\}$$

Actual Profit Per Unit	=	Actual Sales Price – Actual Cost
Product X	=	50 – 45 = Rs. 5
Product Y	=	26 – 20 = Rs. 6
Budgeted Profit Per Unit	=	Budgeted Sales Price – Actual Cost
Product X	=	46 – 45 = Re. 1
Product Y	=	28 – 20 = Rs. 8
Actual Profit	=	Actual Quantity x Actual Profit Per Unit
Product X	=	400 x Rs. 5 = Rs. 2,000
Product Y	=	450 x Rs. 6 = Rs. 2,700
		Actual Profit = Rs. 4,700
Budgeted Profit	=	Budgeted Quantity x Budgeted Profit Per Unit
Product X	=	300 x Re. 1 = Rs. 300
Product Y	=	500 x Rs. 8 = Rs. 4,000
		Budgeted Profit = Rs. 4,300
Sales Margin Value Variance	=	Rs. 4,700 – Rs. 4,300
	=	Rs. 400 (F)

(2) Sales Margin Price Variance :

$$= (\text{Actual Price} - \text{Standard Price}) \times \text{Actual Quantity}$$

Product X	=	(50 – 46) x 400
	=	4 x 400 = Rs. 1600 (F)

$$\begin{aligned}
 \text{Product Y} &= (26 - 28) \times 450 \\
 &= 2 \times 450 = \text{Rs. } 900 \text{ (A)} \\
 \text{Sales Margin Price Variance} &= \text{Rs. } 1600 \text{ (F)} + \text{Rs. } 900 \text{ (A)} \\
 &= \text{Rs. } 700 \text{ (F)}
 \end{aligned}$$

(3) Sales Margin Volume Variance :

$$\begin{aligned}
 &= (\text{Actual Quantity} - \text{Standard Quantity}) \times \text{Standard Profit Per Unit} \\
 \text{Product X} &= (400 - 300) \times \text{Rs. } 1 \\
 &= 100 \times \text{Rs. } 1 = \text{Rs. } 100 \text{ (F)} \\
 \text{Product Y} &= (450 - 500) \times \text{Rs. } 8 \\
 &= 50 \times \text{Rs. } 8 = \text{Rs. } 400 \text{ (A)} \\
 \text{Sales Margin Volume Variance} &= \text{Rs. } 100 \text{ (F)} + \text{Rs. } 400 \text{ (A)} \\
 &= \text{Rs. } 300 \text{ (A)}
 \end{aligned}$$

Verification :

$$\begin{aligned}
 \text{Total Sales Margin Value Variance} &= \text{Sales Margin Price Variance} \\
 &+ \text{Sales Margin Volume Variance} \\
 \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 700 \text{ (F)} + \text{Rs. } 300 \text{ (A)} \\
 \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 400 \text{ (F)}
 \end{aligned}$$

Illustration: 12

The budgeted production of a company is 20,000 Units per month. The Standard Cost Sheet is as under :

Direct Materials	1.5 kg @ Rs.6 per kg
Direct Labour	6 hours @ Rs.5 per hour
Variable Overheads	6 hours @ Rs.4 per hour
Fixed Overheads	Rs. 3 per unit
Selling Price	Rs. 72 per unit

The following are the actual details for the month:

- (1) Actual production and sales 18,750 units
- (2) Direct materials consumed 29,860 kg. at Rs. 5.25 per kg.
- (3) Direct labour hours worked 1,18,125 hours at Rs. 6 per hour
- (4) Actual overheads were Rs. 5,25,000 out of which a sum of Rs. 40,000 was fixed
- (5) There is no change in the selling price.

Calculate:

- (i) Direct Materials Usage and Price Variances
- (ii) Direct Labour Efficiency and Rate Variances
- (iii) Variance Overheads Efficiency and Expense Variances
- (iv) Fixed Overhead Volume and Expense Variances
- (v) Sales Volume Variance and Gross Margin.

Solution:

Actual Output = 18,750 units

Direct Materials:

Standard Requirements	= 18,750 units x 1.5 kg.
	= 28,125 kgs.
Standard Quantity (SQ)	= 28,125 Kgs.
Actual Quantity (AQ)	= 29,860 kgs.
Standard Price (SP)	= Rs. 6 per kg.
Actual Price (AP)	= Rs. 5.25 per kg.
SQ x SP	= 28,125 x Rs. 6 = Rs. 1,68,750
AQ x SP	= 29,860 x Rs. 6 = Rs. 1,79,160
AQ x AP	= 29,860 x Rs. 5.25 = Rs. 1,56,765

Calculation of Material Variances :

(1) Material Usage Variance	= (SQ x SP) – (AQ x SP)
	= Rs. 1,68,750 – Rs. 1,79,160
	= Rs. 10,410 Adverse
(2) Material Price Variance	= (AQ x SP) – (AQ x AP)
	= Rs. 1,79,160 – Rs. 1,56,765
	= Rs. 22,395 Favourable

Direct Labour:

Standard Hours Produced 18750 x 6	= 1,12,500 hours
Standard Hours (SH)	= 1,12,500 hours
Actual Hours (AH)	= 1,18,125 hours
Standard Rate	= Rs.5
Actual Rate	= Rs.6
SH x SR	= 1,12,500 x 5 = Rs. 5,62,500
AH x SR	= 1,18,125 x 5 = Rs. 5,90,625
AH x AR	= 1,18,125 x 6 = Rs. 7,08,750

Calculation of Labour Variances:

(1) Labour Efficiency Variance	= (SH x SR) – (AH x SR)
	= Rs. 5,62,500 – Rs. 5,90,625
	= Rs. 28,125 Adverse
(2) Labour Rate Variance	= (AH x SR) – (AH x AR)
	= Rs. 5,90,625 – Rs. 7,08,750
	= Rs. 1,18,125 Adverse

Variable Overheads:

A. Charged to Production	= 1,12,500 hours x Rs. 4
	= Rs. 4,50,000
B. Standard Cost of Actual Hours	= 1,18,125 hours x Rs. 4
	= Rs. 4,72,500
C. Actuals	= Rs. 5,25,000

Calculation of Overhead Variance:

(1) Efficiency Variance (A – B)	= 4,50,000 – 4,72,500
	= Rs. 22,500 Adverse.
(2) Expenses Variance (B – C)	= Rs. 4,72,500 – Rs. 5,25,000
	= Rs. 52,500 Adverse

Fixed Overheads:

Standard Rate	$\frac{3}{6}$	=	Re. 0.50
A. Charged to Production		=	1,12,500 hours x Re. 0.50 = Rs. 56,250
B. Budget		=	20,000 hours x Rs. 3 = Rs. 60,000
C. Actuals		=	Rs. 40,000

Calculation of Fixed Overhead Variances:

(1) Volume Variance (A – B)	=	Rs. 56,250 – Rs. 60,000
	=	Rs. 3,750 Adverse
(2) Expenses Variance (B – C)	=	Rs. 60,000 – Rs. 40,000
	=	Rs. 20,000 Favourable

Sales:

Standard Quantity (SQ)	=	20,000 units
Actual Quantity (AQ)	=	18,750 units
Standard Price (SP)	=	Rs. 72
SQ x SP	=	20,000 x 72 = Rs. 14,40,000
AQ x SP	=	18,750 x 72 = Rs. 13,50,000

Calculation:

Sales Volume Variance	=	(SQ x SP) – (AQ x SP)
	=	Rs. 14,40,000 – Rs. 13,50,000
	=	Rs. 90,000 Adverse

Total Standard Cost:

Direct Material	=	Rs. 9 (1.5 kg x Rs. 6)
Direct Labour	=	Rs. 30 (6hrs x Rs. 5)
Variable Overhead	=	Rs. 24 (6 hrs x Rs. 4)
Fixed Overhead	=	Rs. 3
		Rs. 66
Standard Gross Margin (SGM)	=	Rs. 72 – Rs. 66 = Rs. 6
Standard Quantity (SQ)	=	20,000 units
Actual Quantity (AQ)	=	18,750 units
Standard Gross Margin (SGM)	=	Rs. 6
SQ x SGM	=	Rs. 1,20,000
AQ x SGM	=	Rs. 1,12,500

Calculation of GM Sales Volume Variance:

GM Sales Volume Variance	=	(SQ x SGM) – AQ x SGM)
	=	Rs. 1,20,000 – Rs. 1,12,500 = Rs. 7,500 Adverse.

Illustration: 13

A Company produces a finished product by using three basic raw materials. The following standards have been set up for raw materials :

Material	Standard Mix in Percentages	Standard Price per kg. in Rs.
A	25	4
B	35	3
C	40	2

The standard loss in process is 20% of input. During a particular month, the company produced 2,400 kgs of finished product. The details of stock and purchases for the month are as under :

Materials	Opening Stock	Closing Stock (Kgs)	Purchases during the month	
			Qty in Kgs.	Cost in Rs.
A	200	350	800	3,600
B	150	200	1,000	3,500
C	300	200	1,100	1,980

The opening stock is valued at standard cost. Compute :

(1) Material Price and Material Cost Variances, When :

- (a) Variance is calculated at the point of issue of First In – First Out basis (FIFO).
 - (b) Variance is calculated at the point of issue of Last In – First Out basis (LIFO).
- (ii) Material Usage Variance
 - (iii) Material Mix Variance
 - (iii) Material Yield Variance

Solution:

Standard Price at Standard Mix for output of 80 kg (100 kgs – 20% loss, i.e., 20 kgs)

Material	%	Qty (kgs)	Std. Price (Rs.)	Amount (Rs.)
A	25	25	4	100
B	35	35	3	105
C	40	40	2	80
		100	-	-
Standard Loss		20	-	-
		80		285

Actual Consumption : Opening Stock + Purchase – Closing Stock

For A in kgs	200 + 800 – 350	=	650
B	150 + 1,000 – 200	=	950
C	300 + 1,100 – 200	=	1,200
			2,800
		Output	2,400
		Loss	400

(1) Material Price Variance at the Point of Issue :

$$\text{MPV} = \text{AQ} (\text{SP} - \text{AP})$$

(a) When FIFO Method is used:

A	=	issued from opening stock 200kg @ Rs.4 (no variance) + balance 450 kgs	
(Rs. 4 – 4.50)			
A	=	650 – 425	= Rs. 225 Adverse
B	=	150 (Rs. 3 – 3) + 800 (Rs. 3 – 3.50)	= Rs. 400 Adverse
C	=	300 (Rs. 2 – 2) + 900 (Rs. 2 – 1.80)	= Rs. 180 Favourable
			Rs. 445 Adverse

(b) When LIFO Method is used :

A	=	650 (Rs.4 – 4.50)	=	Rs. 325 (A)
B	=	950 (Rs.3 – 3.50)	=	Rs. 475 (A)
C	=	1,100 (Rs.2 – 1.80) + 100 (2 – 2)	=	Rs. 220 (F)
				Rs. 580 (A)

(i) Material Cost Variance at the Point of Issue :

$$\text{MCV} = (\text{TSC} - \text{TAC})$$

Material Cost Variance = Total Std. Cost – Total Actual Cost

Total Std. Quantity for Actual Output (TSC)

$$= \frac{285}{80} \times 2,400 = \text{Rs. } 8,550$$

(a) Total Actual Quantity (TAC) :

$$\text{A } (200 \times 4) + 3,600 - (350 \times 4.5) = \text{Rs. } 2,825$$

$$\text{B } (150 \times 3) + 3,500 - (200 \times 3.5) = \text{Rs. } 3,250$$

$$\text{C } (300 \times 2) + 1,980 - (200 \times 1.8) = \text{Rs. } 2,220$$

$$\text{Total Actual Quantity} = \underline{\text{Rs. } 8,295}$$

$$\text{Material Cost Variance} = \text{Rs. } 8,550 - \text{Rs. } 8,295 = \text{Rs. } 255 \text{ (F)}$$

(b) When LIFO Method is used :

$$\text{TAC} = \text{A Rs. } (200 \times 4) + 3,600 - [(150 \times 4.5) + (200 \times 4)] = \text{Rs. } 2,925$$

$$\text{B Rs. } (150 \times 3) + 3,500 - (50 \times 3.5 + 150 \times 3) = \text{Rs. } 3,325$$

$$\text{C Rs. } (300 \times 2) + 1,980 - (200 \times 2) = \text{Rs. } 2,180$$

$$\text{Total Actual Cost} = \underline{\text{Rs. } 8,430}$$

$$\text{MAC} = \text{Rs. } 8,550 - \text{Rs. } 8,430 = \text{Rs. } 120 \text{ (F)}$$

(ii) Material Usage Variance (MUV)

Calculation of standard quantity for actual output

$$\text{A} = \frac{25}{80} \times 2,400 = 750 \text{ kgs}$$

$$\text{B} = \frac{35}{80} \times 2,400 = 1,050 \text{ kgs}$$

$$\text{C} = \frac{40}{80} \times 2,400 = 1,200 \text{ kgs}$$

$$\text{MUV} = \text{SP} (\text{SQ} - \text{AQ})$$

$$\text{A} = 4 (750 - 650) = \text{Rs. } 400 \text{ (F)}$$

$$\text{B} = 3 (1,050 - 950) = \text{Rs. } 300 \text{ (F)}$$

$$\text{C} = 2 (1,200 - 1,200) = \text{Nil}$$

$$\underline{\text{Rs. } 700 \text{ (F)}}$$

(iii) Material Mix Variance (MMV) = SP (RSQ – AQ)

Calculation of Revised Standard Quantity

$$\text{A} = \frac{25}{100} \times 2,800 = 700 \text{ kgs}$$

$$\text{B} = \frac{35}{100} \times 2,800 = 980 \text{ kgs}$$

$$\text{C} = \frac{40}{100} \times 2,800 = 1,120 \text{ kgs}$$

MMV	=	A	=	4 (700 – 650)	=	200 (F)
		B	=	3 (980 – 950)	=	90 (F)
		C	=	2 (1,120 – 1,200)	=	160 (A)
						<u>Rs. 130 (F)</u>

$$(iv) \text{ Material Yield Variance} = \text{Standard Rate (Actual Yield – Standard Yield)}$$

$$= \text{MYV} = \text{SC per unit (AY – SY)}$$

$$\frac{285}{80} (2,400 – 2,240) = \text{Rs. 570 (F)}$$

Where :

$$\text{SY} = \frac{80}{100} \times 2,800 = 2,240 \text{ kgs}$$

Verification :

$$\text{MMV} + \text{MYV} = \text{MUV}$$

$$\text{Rs. 130 (F)} + \text{Rs. 570 (F)} = \text{Rs. 700 (F)}$$

Flexible Budget and Standard Costing

Budgets are prepared for different functions of business such as production, sales etc. Actuals results are compared with the budgets and control is exercised. However, fixed budgets are not suited for cost control because all costs are related to one level of activity. Flexible budgets are prepared in order to overcome the limitations, they are recast on the basis of volume of activity. Flexible budgets is as an effective tool for cost control because costs are analysed by behaviour and variable costs are allowed as per activity attained. Although budgetary control is concerned with origin of expenditure at functional levels, in practice flexible budgets are well suited with standard costing. Accordingly when flexible budgetary control operates with standard costing fixed expenses, variable expenses and semi variable expenses are computed either on the basis of ratio method or variance method for different levels of activity.

Illustration: 14

The Managing Director of your company has been given the following statement showing the results for August 2003 :

	<i>Master Budget</i>	<i>Actual</i>	<i>Variance</i>
<i>Units Produced and Sold</i>	<u>10,000</u>	<u>9,000</u>	<u>(1,000)</u>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
<i>Sales</i>	<u>40,000</u>	<u>3,50,000</u>	<u>(5,000)</u>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
Direct Material	10,000	9,200	800
Direct Wages	15,000	13,100	1,900
Variance Overheads	5,000	4,700	300
Fixed Overhead	<u>5,000</u>	<u>4,900</u>	<u>100</u>
Total Cost	<u>35,000</u>	<u>31,900</u>	<u>3,100</u>
Net Profit	<u>5,000</u>	<u>3,100</u>	<u>(1,900)</u>

Figures in parentheses indicate adverse variances.

The Standard Costs of the product are as follows :

	Per unit Rs.
Direct Material (1kg @ Re.1 Per kg)	1.00
Direct Wages (1 hour @ Re.1.50)	1.50
Variable Overhead (1 hour @ Re.0.50)	0.50

Actual results for the month showed that 9,800 kgs of material were used and 8,800 labour hours were recorded.

Required :

- (a) Prepare a flexible budget for the month and compare with actual results and
- (b) Calculate the variances which have arisen.

Solution:

Statement Showing Flexible Budget and its Comparison with Actual

Particulars	Master Budget For 10,000 Units Rs.	Flexible Budget (at Standard Cost)		Actual for 9,000 units Rs.	Variance Rs.
		Per unit Rs.	For 9,000 Units Rs.		
Sales (A)	40,000	4	36,000	35,000	1,000 (A)
Direct Materials	10,000	1	9,000	9,200	200 (A)
Direct Wages	15,000	1.50	13,500	13,100	400 (F)
Variable Overhead	5,000	0.50	4,500	4,700	200 (A)
Total Variable Cost (B)	30,000	3	27,000	27,000	-
Contribution (A) – (B)	10,000	1	9,000	8,000	1,000 (A)
Less : Fixed Cost	5,000	0.50	5,000	4,900	100 (F)
Net Profit	5,000	0.50	4,000	3,100	900 (A)

Calculation of Variances:

- | | | |
|--|---------------------------|-----------------|
| (1) Material Cost Variance | = Rs. 9,000 – Rs. 9,200 | = Rs. 200 (A) |
| (2) Material Usage Variance | = Rs. 9,000 – Rs. 9,800 | = Rs. 800 (A) |
| (3) Material Price Variance | = Rs. 9,800 – Rs. 9,200 | = Rs. 600 (F) |
| (4) Labour Cost Variance | = Rs. 13,500 – Rs. 13,100 | = Rs. 400 (F) |
| (5) Labour Efficiency Variance | = Rs. 13,500 – Rs. 13,200 | = Rs. 300 (F) |
| (6) Labour Rate Variance | = Rs. 13,200 – Rs. 13,100 | = Rs. 100 (F) |
| (7) Fixed Overhead Expenditure Variance | = Rs. 5,000 – Rs. 4,900 | = Rs. 100 (F) |
| (8) Variable Overhead Efficiency Variance | = Rs. 4,500 – Rs. 4,400 | = Rs. 100 (F) |
| (9) Variable Overhead Expenditure Variance | = Rs. 4,400 – Rs. 4,700 | = Rs. 300 (A) |
| (10) Total Variable Overhead Variance | = Rs. 4,700 – Rs. 4,500 | = Rs. 200 (A) |
| (11) Sales Margin Value Variance | = Rs. 5,000 – Rs. 3,500 | = Rs. 1,500 (A) |
| (12) Sales Margin Volume Variance | = Rs. 5,000 – Rs. 4,500 | = Rs. 500 (A) |
| (13) Sales Margin Price Variance | = Rs. 4,500 – Rs. 3,500 | = Rs. 1,000 (A) |

Note : If Fixed Overhead is changed proportionately on volume basis in the Flexible Budget, then Fixed Overhead at level 9,000 units would be shown as Rs. 4,500 in the budget. In that case the total variance would become Rs. 400 (A). The break up of the Same would be :

(1) Fixed Overhead Efficiency Variance	= Rs. 4,500 – Rs. 4,400	=	Rs. 100 (F)
(2) Fixed Overhead Capacity Variance	= Rs. 4,400 – Rs. 5,000	=	Rs. 600 (A)
(3) Fixed Overhead Expenditure Variance	= Rs. 5,000 – Rs. 4,900	=	Rs. 100 (F)
			<u>Rs. 400 (A)</u>

Illustration: 15

P Q R Ltd. uses a comprehensive budgeting process and compares actual results to the budgeted amount on a monthly basis. The production is upset about the result of October 2003 that are shown below. He has implemented several cost cutting measures in the manufacturing area and is discouraged by Adverse Variance in Variable Costs.

Operating Results for the month of October, 2003

<i>Particulars</i>	<i>Master Budget</i>	<i>Actual</i>	<i>Variance</i>
Units Sold	7,500	7,200	300 (A)
Revenues	Rs. 18,00,000	Rs. 17,28,000	Rs. 72,000 (A)
Variable Costs	Rs. 11,40,000	Rs. 11,70,000	Rs. 30,000 (A)
Contribution Margin	Rs. 6,60,000	Rs. 5,58,000	Rs. 1,02,000 (A)
Fixed Overheads	2,70,000	2,70,000	-
Fixed General and Administration Overheads	1,80,000	1,72,500	7,500 (F)
Operating Income	Rs. 2,10,000	Rs. 1,15,500	Rs. 94,500 (A)

When master budget was being prepared, the Cost Accountant supplied the following unit costs data:

	<i>Rs.</i>
Direct Material	60
Direct Labour	44
Variable Overheads	36
Variable Selling Overheads	12

The total variable costs for the month of October, 2003 of Rs. 11,70,000 are comprised of :

	<i>Rs.</i>
Direct Materials	4,80,000
Direct Labour	2,88,000
Variable Overheads	2,64,000
Variable Selling Overheads	1,38,000

The Cost Accountant believes that monthly report would be more meaningful to everyone, if the company adopts flexible budgeting and prepares more detailed analysis.

Required :

Determine the flexible budget variances.

Solution:**Master Budget**

Particulars	Based on Output (Actual 7,200 Units)		Actual		Variance
	Per unit	Amount (Rs.)	Per unit	Amount (Rs.)	
Revenue (A)	Rs. 240	Rs. 17,28,000	Rs. 240	Rs. 17,28,000	Nil
Variable Cost :					
Direct Material	60	4,32,000	66.67	4,80,000	48,000 (A)
Direct Labour	44	3,16,800	40	2,88,000	28,800 (F)
Variable Overheads	36	2,59,200	36.67	2,64,000	4,800 (A)
Variable Selling Overheads	12	86,400	19.16	1,38,000	51,600 (A)
Total Variable Cost (B)	152	10,94,400	162.50	11,70,000	75,600 (A)
Contribution (A – B)	88	6,33,600	77.50	5,58,000	75,600 (A)
Fixed Costs :					
Fixed Overheads		2,70,000		2,70,000	Nil
Fixed Gen. & Admn. Overheads		1,80,000		1,72,500	7,500 (F)
Total Fixed Cost (C)		4,50,000		4,42,500	
Operating Profit (Contribution–Fixed Cost)		1,83,600		1,15,500	68,100 (A)

VARIANCE ANALYSIS

Summary of Formulas

Variances	Formulas
I. Material Variances	
(1) Material Cost Variance (MCV)	= (Standard Quantity x Standard Price) - (Actual Quantity x Actual Price) (or) = (SQ x SP) - (AQ x AP)
(2) Material Price Variance (MPV)	= Actual Quantity x (Standard Price - Actual Price) (or) = AQ (SP - AP)
(3) Material Usage Variance (MUV)	= Standard Price (Standard Quantity - Actual Quantity) (or) = SP (SQ - AQ)
(4) Material Mix Variance (MMV)	= Standard Price (Standard Quantity - Actual Quantity) (or) = SP (SQ - AQ)
(a) Revised Standard Quantity (RSQ)	= Standard Unit Cost (Revised Standard Quantity - Actual Quantity) (or) = SP (RSQ - AQ)
(b) Revised Material Usage Variance	= $\left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \text{Standard Cost of Standard Mix} \right\} - [\text{Standard Cost of Actual Mix}]$
(5) Materials Yield Variance (MYV)	= Standard Rate (Actual Yield - Standard Yield)
Standard Rate	= $\frac{\text{Standard Cost of Standard Mix}}{\text{Net Standard Output}}$

Verification

- | | |
|-----------------------------|---|
| (1) Material Cost Variance | = Material Price Variance + Material Usage Variance |
| (2) Material Usage Variance | = Material Mix Variance + Material Yield Variance |
| (3) Material Cost Variance | = Material Mix Variance + Material Price Variance + Material Yield Variance |

II. Labour Variances

- | | |
|---|--|
| (1) Labour Cost Variance (LCV) | = (Standard Cost of Labour - Actual Cost of Labour)*
(or) (Standard Rate x Standard Time for Actual Output) - (Actual Rate x Actual Time) |
| (2) Labour Rate Variance (LRV) | = Actual Time Standard Rate - Actual Rate |
| (3) Labour Efficiency Variance | = Standard Rate Standard Time - Actual Time |
| (4) Labour Idle Time Variance | = Idle Hours x Standard Rate |
| (5) Labour Mix Variance (LMV) | |
| (a) When Standard & Actual Time of the Labour Mix are same | } = Standard Cost of Standard Labour Mix - Standard Cost of Actual Labour Mix |
| (b) When Standard & Actual Time of Labour Mix are different | |
| | = Standard Rate Revised Standard Time - Actual Time |

<i>Variances</i>	<i>Formulas</i>
-------------------------	------------------------

$$\text{Revised Standard Time} = \frac{\text{Total Actual Time}}{\text{Total Standard Time}} \times \text{Actual Time}$$

Verification

$$\begin{aligned} \text{Total Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ \text{Total Labour Efficiency Variance} &= \text{Labour Efficiency Variance} + \text{Labour Idle Time Variance} \end{aligned}$$

III. Overhead Variances*Essentials of Certain Terms :*

$$(1) \text{ Standard Overhead Rate per unit} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$$

$$(2) \text{ Standard Overhead Rate per hour} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$$

$$(3) \text{ Standard Output for Actual Time} = \frac{\text{Budgeted Output}}{\text{Budgeted Hours}} \times \text{Actual Hours}$$

(4) When Output is measured in Standard Hours:

$$\text{Recorded Overheads} = \text{Standard Rate Per Hour} \times \text{Standard Hours for Actual Output}$$

When Output is measured in units :

$$\text{Absorbed Overhead} = \text{Standard Rate Per Unit} \times \text{Actual Output in Units}$$

$$(5) \text{ Budgeted Overhead} = \text{Standard Rate Per Unit} \times \text{Budgeted Output in Units (or)} = \text{Standard Rate Per Hour} \times \text{Budgeted Hours}$$

$$(6) \text{ Actual Overhead} = \text{Actual Rate Per Unit} \times \text{Actual Output in Units (or)} = \text{Actual Rate Per Hour} \times \text{Actual Hours}$$

$$(7) \text{ Standard Overhead} = \text{Standard Rate Per Unit} \times \text{Standard Output for Actual Time (or)} = \text{Standard Rate Per Hour} \times \text{Actual Hours}$$

Overhead Variances

$$\begin{aligned} \text{Overhead Cost Variance} &= (\text{Actual Output} \times \text{Standard Overhead Rate per Unit}) - \text{Actual Overhead Cost} \\ &(\text{or}) = \text{Standard hours for Actual Output} \times [\text{Standard Overhead Rate Per Hour} - \text{Actual Overhead Cost}] \end{aligned}$$

(A) Variable Overhead Variances :

$$(1) \text{ Variable Overhead Cost Variance} = \text{Standard Variable Overhead for Actual Output} - \text{Actual Variable Overhead}$$

<i>Variations</i>	<i>Formulas</i>
(2) Variable Overhead Expenditure Variance	} = Actual Time (Standard Variable Overhead Rate per Hour - Actual Variable Overhead Rate per Hour) (or) = Standard Variable Overheads - Actual Variable Overheads
(3) Variable Overhead Efficiency Variance	
	= Standard Rate per Hour x (Standard Hours for Actual Production - Actual Hours)

(B) Fixed Overhead Variances

- (1) Fixed Overhead Cost Variance : = Actual Fixed Overhead - Standard Fixed Overhead for Actual Production
(or) = Actual Output Standard Fixed Overhead Rate per Hour - Actual Fixed Overheads
- (2) Fixed Overhead Expenditure Variance (or) Budget Variance } = (Budgeted Fixed Overheads) - (Actual Fixed Overheads)
- (3) Fixed Overhead Volume Variance = Budgeted Fixed Overheads - Standard Fixed Overheads on Actual Production
- (4) Fixed Overhead Capacity Variance = Standard Fixed Overheads - Budgeted Fixed Overheads
(or) = Standard Fixed Overhead Rate per Hour x (Actual Hours Worked - Budgeted Hours)
- (5) Fixed Overhead Efficiency Variance } = Standard Fixed Overhead Rate per Hour x (Standard Quantity - Actual Quantity)
- (6) Fixed Overhead Calendar Variance = Standard Rate per Hour / per Day x Excess or Deficit Hours or Days Worked

IV. Sales Variances**(A) Sales Value Method Variances**

- (1) Sales Value Variance = Actual Value of Sales - Budgeted Value of Sales
- (2) Sales Price Variance = Actual Quantity x (Standard Price - Actual Price)
- (3) Sales Volume Variance = Standard Price Actual Quantity of Sales - Budgeted Quantity of Sales
- (4) Sales Mix Variance = (Standard Value of Actual Mix) - (Standard Value of Revised Standard Mix)
- (5) Sales Quantity Variance = Standard Selling Price Revised Standard Sales Quantity - Budgeted Sales Quantity

(B) Sales Margin or profit Method of Variances :

- (1) Sales Margin Value Variance = Budgeted Profit - Actual Profit (or)
(Budgeted Sales Quantity x Budgeted Profit Per Unit) - (Actual Quantity Sold x Actual Profit per Unit)
- (2) Sales Margin Volume Variance = Standard Profit x (Standard Quantity - Actual Quantity)
- (3) Sales Margin Price Variance = Standard Profit - Actual Profit (Or)
Actual Quantity Sold Budgeted per Unit - Actual Profit per Unit
- (4) Sales Margin Mix Variance = Standard Profit per Unit Revised standard Quantity - Actual Quantity)

QUESTIONS

1. Define Standard Costing.
2. What do you understand by Standard Cost and Standard Costing?
3. What are the differences between Standard Costing and Estimated Costing?
4. Briefly explain and compare and contrast between Standard Costing and Budgetary Control.
5. What are the advantages of Standard Costing?
6. Discuss the preliminary steps for determination of Standard Cost.
7. Explain the limitations of Standard Costing.
8. Explain the different types of Standards.
9. What do you understand by Variance Analysis?
10. Explain the different types of variances used in Standard Costing.
11. Write short notes on :
 - (a) Material Cost Variance. (b) Labour Mix Variance. (c) Fixed Overhead Cost Variance. (d) Fixed Overhead Calendar Variance. (e) Sales Margin Volume Variance.
12. Explain the different types of Material Cost Variance.
13. What are the important uses of Variance Analysis?

PRACTICAL PROBLEMS

- (1) From the following information, calculate:

- (a) Material Cost Variance
- (b) Material Price Variance
- (c) Material Usage Variance

Quantity of materials purchased 3,000 units

Value of material purchased Rs. 9,000

Standard quantity of material required per tone of finished product = 25 units

Standard rate of materials Rs. 2 per unit

Opening stock of materials Nil

Closing stock of materials 500 units

Finished production during the year 800 tons

[Ans : Material Cost Variance Rs. 3,500 (A) ; Material Price Variance Rs. 2,500 (A) ; Material Usage Variance Rs. 1,000 (A)].

- (2) From the following details, calculate (a) Material Cost Variance (b) Material Price Variance (c) Material Usage Variance (d) Material Mix Variance and (e) Material Yield Variance:

Materials	Standard		Actual	
	Qty.	Rate	Qty.	Rate
A	8,000	1.05	7,500	1.20
B	3,000	2.15	3,300	2.30
C	2,000	3.30	2,400	3.50

[Ans : (a) Rs. 3,540 (A) ; (b) Rs. 2,100 (A) ; (c) Rs. 1,440 (A) (d) Rs. 1,110 (A) ; (e) Cannot be Calculated]

- (3) Calculate labour variances from the following information standard hours for manufacturing a product X - 7,800 hours:

Actual Hours Worked = 8,050 hours

Actual Wages paid during the period = Rs. 16,100

Standard Wages = Rs. 15,600

[Ans : (a) Labour Cost Variance = Rs. 500 (A) ; (b) Labour Rate Variance = Nil ; (c) Labour Efficiency = Rs. 500 (A)]

- (4) From the following data, calculate labour variances : The budgeted labour force for producing product A is :

20 Semi-Skilled workers @ Re. 0.75 per hour for 50 hours

10 Skilled workers @ Rs. 1.25 per hour for 50 hours

The actual labour force employed for producing A is :

22 Semi-Skilled workers @ Re. 0.80 per hour for 50 hours

8 Skilled workers @ Rs. 1.20 per hour for 50 hours

[Ans : (a) Labour Cost Variance = Rs. 15 (F)

(b) Labour Rate Variance = Rs. 35 (A)

(c) Labour Efficiency Variance Rs. 50 (F)

(e) Labour Mix Variance = Rs. 50 (F)]

(5) From the following data, calculate Overhead Variances:

	Budgeted	Actual
Output 15,000 units	16,000 units	
Number of working days	25	27
Fixed Overheads	Rs. 30,000	Rs. 30,500
Variable Overheads	Rs. 45,000	Rs. 47,000

There was an increase of 5% in capacity

- [Ans : (1) Total Overhead Cost Variance Rs. 2,500 (F) (5) Volume Variance Rs. 2,000 (F)
 (2) Variable Overhead Expenditure Variance Rs. 1,000 (F) (6) Capacity Variance Rs. 1,620 (F)
 (3) Fixed Overhead Variance Rs. 1,500 (F) (7) Calendar Variance Rs. 2,400 (F)
 (4) Expenditure Variance Rs. 500 (A) (8) Efficiency Variance Rs. 2,020 (A)].

(6) From the following information, calculate: (1) Overhead Budget Variance (2) Volume Variance (3) Efficiency Variance (4) Capacity Variance (5) Total Overhead Cost Variance:

Normal Overhead Rate Rs. 3
 Actual hours worked 20,000
 Allowed hours for actual production 21,000
 Allowed overheads for budgeted hours Rs. 70,000
 Actual overheads Rs. 72,000

- [Ans : (1) Overhead Budget Variance Rs. 2,000 (A) (4) Capacity Variance Rs. 10,000 (A)
 (2) Volume Variance Rs. 7,000 (A) (5) Total Overhead Cost Variance Rs. 9,000 (A)
 (3) Efficiency Variance Rs. 3,000 (F)]

(7) From the following informations calculate (a) Calendar Variance (b) Capacity Variance (c) Efficiency Variance and (d) Volume Variance:

Actual Overheads Rs. 1,800
 Budgeted Overheads Rs. 2,000
 Budgeted period 4,000 labour hours
 Standard hours per unit 10 labour hours
 Budgeted number of days 20
 Standard overhead per hour Re. 0.50
 Actual number of days 22
 Actual hours 4,300
 Actual production 425 units.

- [Ans : (a) Calendar Variance Rs. 200 (F) ; (b) Capacity Variance Rs. 150 (F) (c) Efficiency Variance Rs. 25 (A) ; (d) Volume Variance Rs. 125 (F)].

(8) The budgeted and actual sales of a concern manufacturing a single product are given below :

Sales as budgeted : 10,000 units at Rs. 3 per unit Rs. 30,000 ; Actual Sales.
 5,000 units at Rs. 3 per unit Rs. 15,000
 8,000 units at Rs. 2.50 per unit Rs. 20,000

Ascertain Sales Price Variance and Sales Volume Variance

- [Ans : Sales Value Variance Rs. 5,000 (F); Sales Price Variance Rs. 4,000 (A) Sales Volume Variance Rs. 9,000 (F)]

(9) From the following information relating to the month of Jan. 2002, you are required to compute Sales Margin Variances:

Product	Budgeted Sales			Actual Sales		
	Qty.	Price Rs.	Value Rs.	Qty.	Price Rs.	Value Rs.
X	2,500	4	10,000	2,000	4	8,000
				600	3.75	2,250
Y	3,000	2	6,000	2,500	2	5,000
				350	1.80	630
				5,500		15,880
				950		

Budgeted Costs : X Rs. 3 per unit
 Y Rs. 1.50 per unit

Calculate Sales Margin Variance :

[Ans : (1) Total Sales Margin Variance X Rs.50 (A) ; Y Rs.145 (A)

(2) Sales Margin Price Variance X Rs.150 (A) ; Y Rs.70 (A)

(3) Sales Margin Volume Variance X Rs.100 (F) ; Y Rs.75 (A)

(4) Sales Margin Quantity Variance X Rs.15.63 (F) ; Y Rs.9.37 (F)

(5) Sales Margin Mix Variance X Rs.84.37 (F) ; Y Rs.84.37 (A)]

- (10) From the following information, calculate Labour Variances for the two departments.

	<i>Department X</i>	<i>Department Y</i>
Actual Gross Wages	Rs. 2,000	Rs. 1,800
Standard Hours Produced	8,000	6,000
Standard Rate per hour	80 Paise	35 Paise
Actual Hours Worked	8,200	5,800

[Ans : Labour Cost Variance X Rs.400 (F) ; Y Rs.300 (F)

Labour Rate Variance X Rs.460 (F) ; Y Rs.230 (F)

Labour Efficiency Variance X Rs.60 (A); Y Rs.70 (F)].

- (11) The standard materials required to produce 100 units is 120 kgs. A standard price of 0.50 paise per kg is fixed and 2,40,000 units were produced during the period. Actual materials purchased were 3,00,000 kgs at a cost of Rs. 1,65,000. Calculate material variance.

[Ans: material cost variance Rs. 21,000 unfavourable; material price variance Rs. 15,000 unfavourable; materials usage variance Rs. 6,000 unfavourable]

- (12) The standard cost of a certain chemical mixture is:

Material P - 40% at Rs. 20 per tonne

Material Q - 60% at Rs. 30 per tonne

A standard loss of 10% as expected in production. During a period there is used :

90 tonnes material P at the cost of Rs. 18 per tonne; 110 tonnes material Q at the cost of Rs. 354 per tonne.

The weight produced is 182 tonnes of good production. Calculate : (a) material cost variance, (b) material price variance, (c) material mix variance and (d) material yield variance.

[Ans: material cost variance Rs. 102:22 Adverse

Material price variance Rs. 260 Adverse

Material usage variance Rs. 157.78 Favourable

Material mix variance Rs. 100 Favourable

Material yield variance Rs. 57.78 Favourable]

- (13) The following figures have been extracted from the cost books of a factory for the month of January 2003 :

	<i>Standard Rs.</i>	<i>Actual Rs.</i>
Number of units produced	30,000	32,000
Capacity	100%	100%
Number of days worked	25	26
Variable overheads	60,000	63,000
Fixed overheads	90,000	93,000

Analyse the total overhead variance in to:

(a) Expenditure

(b) Capacity

(c) Calendar

(d) Efficiency variance.

[Ans: Expenditure variance Rs. 300 (A)

Efficiency variance Rs. 800 (F)

Total variable overhead variance Rs. 500(F)

Fixed overhead variance Rs. 1,500 (F)

Fixed expenditure variance Rs. 1,500 (A)

Fixed volume variance Rs. 3,000 (F)

Capacity variance Rs. 1,800 (F)

Efficiency variance Rs. 1,200(F)

Calendar variance Rs. 1,800 (F)]

- (14) RR& Co. Ltd. manufacture a simple product the standard mix of which is:

Material × 60% at Rs. 20 per kg

Material × 40% at Rs. 10 per kg

Normal loss in production is 20% of input. Due to shortage of material X, the standard mix was changed. Actual results for March 2003 were :

Materials X 105 Kg at Pr. 20 per Kg

Materials Y 95 Kg at Pr. 3 per Kg

Input 200 Kg

Loss 35 Kg

Output 165 Kg

Calculate:

- (1) Material price variance
- (2) Material usage variance
- (3) Material mix variance and
- (4) Material yield variance.

[Ans : Material price variance X Nil ; Y Rs. 95 (F)

Material usage variance X Rs. 375 (F) ; Y Rs. 125(F)

Material mix variance X Rs. 300 (F) ; Y Rs. 150 (A)

Material yield variance Rs. 100 (F)]

- (15) A gang of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hours rates as under:

Men Re. 0.80

Women Re. 0.60

Boys Re. 0.40

In a normal week of 40 hours, the gang is expected to produce 2000 units of output. During the weekend 31st December 2003, the gang consisted of 40 men, 10 women and 5 boys. The actual wages paid were @Re. 0.70, Re. 0.65 and Re. 0.30 respectively. 4 hours were lost due to abnormal idle time and 1600 units were produced.

Calculate : (1) Wage variance (2) Wage rate variance (3) Labour efficiency variance (4) Gang composition variance (i.e., Labour mix variance) and (5) Labour idle time variance.

[Ans : Labour cost variance Rs. 256 (A)

Labour rate variance Rs. 160 (F)

Labour efficiency variance Rs. 416 (A)

Labour mix variance Rs. 108 (A)

Labour idle Time variance Rs. 160 (A)].



CHAPTER 29

Capital Budgeting

Meaning

The term Capital Budgeting refers to the long-term planning for proposed capital outlays or expenditure for the purpose of maximizing return on investments. The capital expenditure may be :

- (1) Cost of mechanization, automation and replacement.
- (2) Cost of acquisition of fixed assets, e.g., land, building and machinery etc.
- (3) Investment on research and development.
- (4) Cost of development and expansion of existing and new projects.

DEFINITION OF CAPITAL BUDGETING

Capital Budget is also known as “Investment Decision Making or Capital Expenditure Decisions” or “Planning Capital Expenditure” etc. Normally such decisions where investment of money and expected benefits arising therefrom are spread over more than one year, it includes both raising of long-term funds as well as their utilization. Charles T. Horngnen has defined capital budgeting as “Capital Budgeting is long-term planning for making and financing proposed capital outlays.”

In other words, capital budgeting is the decision making process by which a firm evaluates the purchase of major fixed assets including building, machinery and equipment. According to Hampton, John. J., “Capital budgeting is concerned with the firm’s formal process for the acquisition and investment of capital.”

From the above definitions, it may be concluded that capital budgeting relates to the evaluation of several alternative capital projects for the purpose of assessing those which have the highest rate of return on investment.

Importance of Capital Budgeting

Capital budgeting is important because of the following reasons :

- (1) Capital budgeting decisions involve long-term implication for the firm, and influence its risk complexion.
- (2) Capital budgeting involves commitment of large amount of funds.

- (3) Capital decisions are required to assessment of future events which are uncertain.
- (4) Wrong sale forecast ; may lead to over or under investment of resources.
- (5) In most cases, capital budgeting decisions are irreversible. This is because it is very difficult to find a market for the capital goods. The only alternative available is to scrap the asset, and incur heavy loss.
- (6) Capital budgeting ensures the selection of right source of finance at the right time.
- (7) Many firms fail, because they have too much or too little capital equipment.
- (8) Investment decision taken by individual concern is of national importance because it determines employment, economic activities and economic growth.

Objectives of Capital Budgeting

The following are the important objectives of capital budgeting :

- (1) To ensure the selection of the possible profitable capital projects.
- (2) To ensure the effective control of capital expenditure in order to achieve by forecasting the long-term financial requirements.
- (3) To make estimation of capital expenditure during the budget period and to see that the benefits and costs may be measured in terms of cash flow.
- (4) Determining the required quantum takes place as per authorization and sanctions.
- (5) To facilitate co-ordination of inter-departmental project funds among the competing capital projects.
- (6) To ensure maximization of profit by allocating the available investible.

Principles or Factors of Capital Budgeting Decisions

A decision regarding investment or a capital budgeting decision involves the following principles or factors :

- (1) A careful estimate of the amount to be invested.
- (2) Creative search for profitable opportunities.
- (3) A careful estimates of revenues to be earned and costs to be incurred in future in respect of the project under consideration.
- (4) A listing and consideration of non-monetary factors influencing the decisions.
- (5) Evaluation of various proposals in order of priority having regard to the amount available for investment.
- (6) Proposals should be controlled in order to avoid costly delays and cost over-runs.
- (7) Evaluation of actual results achieved against those budget.
- (8) Care should be taken to think all the implication of long range capital investment and working capital requirements.
- (9) It should recognize the fact that bigger benefits are preferable to smaller ones and early benefits are preferable to latter benefits.

Capital Budgeting Process

The following procedure may be considered in the process of capital budgeting decisions :

- (1) Identification of profitable investment proposals.
- (2) Screening and selection of right proposals.
- (3) Evaluation of measures of investment worth on the basis of profitability and uncertainty or risk.
- (4) Establishing priorities, i.e., uneconomical or unprofitable proposals may be rejected.
- (5) Final approval and preparation of capital expenditure budget.
- (6) Implementing proposal, i.e., project execution.
- (7) Review the performance of projects.

Types of Capital Expenditure

Capital Expenditure can be of two types :

- (1) Capital expenditure increases revenue.
- (2) Capital expenditure reduces costs.

(1) Capital Expenditure Increases Revenue : It is the expenditure which brings more revenue to the firm either by expanding the existing production facilities or development of new production line.

(2) Capital Expenditure Reduces Costs : Such a capital expenditure reduces the cost of present product and thereby increases the profitability of existing operations. It can be done by replacement of old machine by a new one.

Types of Capital Budgeting Proposals

A firm may have several investment proposals for its consideration. It may adopt after considering the merits and demerits of each one of them. For this purpose capital expenditure proposals may be classified into :

- (1) Independent Proposals
- (2) Dependent Proposals or Contingent Proposals
- (3) Mutually Exclusive Proposals

(1) Independent Proposals : These proposals are said to be economically independent which are accepted or rejected on the basis of minimum return on investment required. Independent proposals do not depend upon each other.

(2) Dependent Proposals or Contingent Proposals : In this case, when the acceptance of one proposal is contingent upon the acceptance of other proposals, it is called as "Dependent or Contingent Proposals." For example, construction of new building on account of installation of new plant and machinery.

(3) Mutually Exclusive Proposals : Mutually Exclusive Proposals refer to the acceptance of one proposal results in the automatic rejection of the other proposal. Then the two investments are mutually exclusive. In other words, one can be rejected and the other can be accepted. It is easier for a firm to take capital budgeting decisions on such projects.

Methods of Evaluating Capital Investment Proposals

There are number of appraisal methods which may be recommended for evaluating the capital investment proposals. We shall discuss the most widely accepted methods. These methods can be grouped into the following categories :

I. Traditional Methods :

Traditional methods are grouped in to the following :

- (1) Pay-back period method or Payout method.
- (2) Improvement of Traditional Approach to Pay-back Period Method.
 - (a) Post Pay-back profitability Method.
 - (b) Discounted Pay-back Period Method.
 - (c) Reciprocal Pay-back Period Method.
- (3) Rate of Return Method or Accounting Rate of Return Method.

II. Time Adjusted Method or Discounted Cash Flow Method

Time Adjusted Method further classified into :

- (1) Net Present Value Method.
- (2) Internal Rate of Return Method.
- (3) Profitability Index Method.

I. Traditional Methods

(1) Pay-back Period Method : Pay-back period is also termed as “Pay-out period” or Pay-off period. Pay out Period Method is one of the most popular and widely recognized traditional method of evaluating investment proposals. It is defined as the number of years required to recover the initial investment in full with the help of the stream of annual cash flows generated by the project.

Calculation of Pay-back Period : Pay-back period can be calculated into the following two different situations :

- (a) In the case of constant annual cash inflows.
- (b) In the case of uneven or unequal cash inflows.

(a) In the case of constant annual cash inflows : If the project generates constant cash flow the Pay-back period can be computed by dividing cash outlays (original investment) by annual cash inflows. The following formula can be used to ascertain pay-back period :

$$\text{Pay-back Period} = \frac{\text{Cash Outlays (Initial Investment)}}{\text{Annual Cash Inflows}}$$

Illustration: 1

A project requires initial investment of Rs. 40,000 and it will generate an annual cash inflows of Rs. 10,000 for 6 years. You are required to find out pay-back period.

Solution:

Calculation of Pay-back period :

$$\begin{aligned} \text{Pay-back Period} &= \frac{\text{Cash Outlays (Initial Investment)}}{\text{Annual Cash Inflows}} \\ &= \frac{\text{Rs. 40,000}}{\text{Rs. 10,000}} = 4 \text{ Years} \end{aligned}$$

Pay-back period is 4 years, i.e., the investment is fully recovered in 4 years.

(b) In the case of Uneven or Unequal Cash Inflows : In the case of uneven or unequal cash inflows, the Pay-back period is determined with the help of cumulative cash inflow. It can be calculated by adding up the cash inflows until the total is equal to the initial investment.

Illustration: 2

From the following information you are required to calculate pay-back period :

A project requires initial investment of Rs. 40,000 and generate cash inflows of Rs. 16,000, Rs. 14,000, Rs. 8,000 and Rs. 6,000 in the first, second, third, and fourth year respectively.

Solution:**Calculation Pay-back Period with the help of "Cumulative Cash Inflows"**

Year	Annual Cash Inflows Rs.	Cumulative Cash Inflows Rs.
1	16,000	16,000
2	14,000	30,000
3	8,000	38,000
4	6,000	44,000

The above table shows that at the end of 4th years the cumulative cash inflows exceeds the investment of Rs. 40,000. Thus the pay-back period is as follows :

$$\begin{aligned} \text{Pay-back Period} &= 3 \text{ Years} + \frac{40,000 - 38,000}{6,000} \\ &= 3 \text{ Years} + \frac{\text{Rs. 2,000}}{\text{Rs. 6,000}} \\ &= 3.33 \text{ Years} \end{aligned}$$

Illustration : 3

Rahave Ltd. is producing articles mostly by manual labour and is considering to replace it by a new machine. There are two alternative models X and Y of the new machine. Prepare a statement of profitability showing the pay-back period from the following information :

	Machine X	Machine Y
Estimate life of the Machine	4 Years	5 Years
Cost of machine	Rs. 1,80,000	Rs. 3,60,000
Estimated savings in scrap	Rs. 10,000	Rs. 16,000

Estimated savings in direct wages	Rs. 1,20,000	Rs. 1,60,000
Additional cost of maintenance	Rs. 16,000	Rs. 20,000
Additional cost of supervision	Rs. 24,000	Rs. 36,000

Solution:**Calculation of Annual Cash Inflows**

<i>Particulars</i>	<i>Machine X Rs.</i>	<i>Machine Y Rs.</i>
Estimated saving in scrap	10,000	16,000
Add : Estimated saving in direct wages	1,20,000	1,60,000
Total saving (A)	1,30,000	1,76,000
Additional cost of maintenance	16,000	20,000
Additional cost of supervision	24,000	36,000
Total additional cost (B)	40,000	56,000
Net Cash Inflows (A) – (B)	90,000	1,20,000

$$\text{Pay-back Period} = \frac{\text{Original Investment}}{\text{Annual Average Cash Inflows}}$$

$$\text{Machine X} = \frac{\text{Rs.1,80,000}}{\text{Rs.90,000}} = 2 \text{ Years}$$

$$\text{Machine Y} = \frac{\text{Rs.3,60,000}}{\text{Rs.1,20,000}} = 3 \text{ Years}$$

Machine X should be preferred because it has a shorter pay-back period.

Illustration: 4

From the following information advise the management as to which project is preferable based on pay-back period. Two projects X and Y, each project requires an investment of Rs. 30,000. The standard cut off period for the company is 5 years.

(Net profit before depreciation and after tax)

<i>Years</i>	<i>Project X Rs.</i>	<i>Project Y Rs.</i>
I st	10,000	8,000
II nd	10,000	8,000
III rd	4,000	12,000
IV th	6,000	6,000
V th	8,000	7,000

Solution:**Calculation of Pay-back Period**

$$\text{Project X} = \text{Rs. 10,000} + \text{Rs. 10,000} + \text{Rs. 4,000} + \text{Rs. 6,000}$$

$$= \text{Rs. 30,000 is recovered in 4th year}$$

$$\text{Project Y} = \text{Rs. 8,000} + \text{Rs. 8,000} + \text{Rs. 12,000}$$

$$= \text{Rs. 30,000 is recovered in 3rd year}$$

The Pay-back period of project X and Y are 4 years and 3 years respectively and thus project Y should be preferred because it has a shorter pay-back period.

Accept or Reject Criterion

Investment decisions based on pay-back period used by many firms to accept or reject an investment proposal. Among the mutually exclusive or alternative projects whose pay-back periods are lower than the cut off period, the project would be accepted, if not it would be rejected.

Advantages of Pay-back Period Method

- (1) It is an important guide to investment policy
- (2) It is simple to understand and easy to calculate
- (3) It facilitates to determine the liquidity and solvency of a firm
- (4) It helps to measure the profitable internal investment opportunities
- (5) It enables the firm to select an investment which yields a quick return on cash funds
- (6) It used as a method of ranking competitive projects
- (7) It ensures reduction of cost of capital expenditure.

Disadvantages of Pay-back Period Method

- (1) It does not measure the profitability of a project
- (2) It does not value projects of different economic lives
- (3) This method does not consider income beyond the pay-back period
- (4) It does not give proper weight to timing of cash flows
- (5) It does not indicate how to maximize value and ignores the relative profitability of the project
- (6) It does not consider cost of capital and interest factor which are very important factors in taking sound investment decisions.

2. Improvement of Traditional Approach to Pay-back Period

The demerits of the pay-back period method may be eliminated in the following ways:

(a) Post Pay-back Profitability Method : One of the limitations of the pay-back period method is that it ignores the post pay-back returns of project. To rectify the defect, post pay-back period method considers the amount of profits earned after the pay-back period. This method is also known as Surplus Life Over Pay-back Method. According to this method, pay-back profitability is calculated by annual cash inflows in each of the year, after the pay-back period. This can be expressed in percentage of investment.

$$\text{Post Pay-back Profitability} = \text{Annual Cash Inflow} \times (\text{Estimated Life} - \text{Pay-back Period})$$

The post pay-back profitability index can be determined by the following equation :

$$\text{Post Pay-back Profitability Index} = \frac{\text{Post Pay-back Profits}}{\text{Initial Investments}} \times 100$$

(b) Discounted Pay-back Method : This method is designed to overcome the limitation of the pay-back period method. When savings are not levelled, it is better to calculate the pay-back period by taking into consideration the present value of cash inflows. Discounted pay-back method helps to measure the present value of all cash inflows and outflows at an appropriate discount rate. The time period at which the cumulated present value of cash inflows equals the present value of cash outflows is known as discounted pay-back period.

(c) Reciprocal Pay-back Period Method : This methods helps to measure the expected rate of return of income generated by a project. Reciprocal pay-back period method is a close approximation of the Time

Adjusted Rate of Return, if the earnings are levelled and the estimated life of the project is somewhat more than twice the pay-back period. This can be calculated by the following formula :

$$\text{Reciprocal Pay-back Period} = \frac{\text{Annual Cash Inflows}}{\text{Total Investment}} \times 100$$

Illustration: 5

The company is considering investment of Rs. 1,00,000 in a project. The following are the income forecasts, after depreciation and tax, 1st year Rs. 10,000, 2nd year Rs. 40,000, 3rd year Rs. 60,000, 4th year Rs. 20,000 and 5th year Rs. Nil.

From the above information you are required to calculate : (1) Pay-back Period (2) Discounted Pay-back Period at 10% interest factor.

Solution:

(1) Calculation of Pay-back Period

Year	Annual Cash Inflows Rs.	Cumulative Cash Inflows Rs.
1	10,000	10,000
2	40,000	50,000
3	60,000	1,10,000
4	20,000	1,30,000
5	—	1,30,000

The above table shows that at the end of 3rd year the Cumulative Cash Inflows exceeds the investment of Rs. 1,00,000. Thus the Pay-back Period is as follows :

$$\begin{aligned} \text{Pay-back Period} &= 2 \text{ Years} + \frac{1,00,000 - 50,000}{60,000} \\ &= 2 \text{ Years} + \frac{\text{Rs. } 50,000}{\text{Rs. } 60,000} \\ &= 2 \text{ Years} + 0.833 = 2.833 \text{ Years} \end{aligned}$$

(2) Calculation of Discounted Pay-back Period 10% Interest Rate:

Year	Cash Inflows Rs.	Discounting Present Value Factor at 10% Rs.	Present Value of Cash Inflows (2 x 3) Rs.	Cumulative Value of Cash Inflows Rs.
1	10,000	0.9091	9,091	9,091
2	40,000	0.8265	33,060	42,151
3	60,000	0.7513	45,078	87,229
4	20,000	0.6830	13,660	1,00,889
5	—	0.6209	—	1,00,889

From the above table, it is observed that upto the 4th year Rs. 1,00,000 is recovered. Because the Discounting Cumulative Cash Inflows exceeds the original cash outlays of Rs. 1,00,000. Thus the Discounted Pay-back Period is calculated as follows :

$$\begin{aligned}
 \text{Pay-back Period} &= 3 \text{ Years} + \frac{1,00,000 - 87,229}{13,660} \\
 &= 3 \text{ Years} + \frac{12,771}{13,660} \\
 &= 3 \text{ Years} + 0.935 = 3.935 \text{ Years}
 \end{aligned}$$

(3) **Average Rate of Return Method (ARR) or Accounting Rate of Return Method** : Average Rate of Return Method is also termed as Accounting Rate of Return Method. This method focuses on the average net income generated in a project in relation to the project's average investment outlay. This method involves accounting profits not cash flows and is similar to the performance measure of return on capital employed. The average rate of return can be determined by the following equation :

$$\begin{aligned}
 \text{Average Rate of Return (ARR)} &= \frac{\text{Average Income}}{\text{Average Investments}} \times 100 \\
 &\quad \text{(or)} \\
 &= \frac{\text{Cash Flow} - (\text{After Depreciation and Tax})}{\text{Original Investments}} \\
 &= \frac{\text{No. of Projects}}{\text{No. of Years}} \times 100
 \end{aligned}$$

Where,

Average investment would be equal to the Original investment plus salvage value divided by Two

$$\begin{aligned}
 \text{Average Investment} &= \frac{\text{Original Investment}}{2} \\
 &\quad \text{(or)} \\
 &= \frac{\text{Original Investment} - \text{Scrap Value of the Project}}{2}
 \end{aligned}$$

Advantages

- (1) It considers all the years involved in the life of a project rather than only pay-back years.
- (2) It applies accounting profit as a criterion of measurement and not cash flow.

Disadvantages

- (1) It applies profit as a measure of yardstick not cash flow.
- (2) The time value of money is ignored in this method.
- (3) Yearly profit determination may be a difficult task.

Illustration: 6

From the following information you are required to find out Average Rate of Return :

An investment with expenditure of Rs.10,00,000 is expected to produce the following profits (after deducting depreciation)

1st Year	Rs. 80,000
2nd Year	Rs. 1,60,000
3rd Year	Rs. 1,80,000
4th Year	Rs. 60,000

Solution:**Calculation of Accounting Rate of Return**

$$\text{Average Rate of Return} = \frac{\text{Average Annual Profits} - \text{Depreciation and Taxes}}{\text{Average Investments}} \times 100$$

$$\text{Average Annual Profits} = \frac{80,000 + 1,60,000 + 1,80,000 + 60,000}{4}$$

$$= \frac{4,80,000}{4} = \text{Rs. } 1,20,000$$

$$\text{Average Investments (Assuming Nil Scrap Value)} = \frac{\text{Investment at beginning} + \text{Investment at the end}}{2}$$

$$= \frac{10,00,000 + 0}{2} = \text{Rs. } 5,00,000$$

$$\text{Average Rate of Return} = \frac{1,20,000 + 0}{5,00,000} \times 100 = 24\%$$

The percentage is compared with those of other projects in order that the investment yielding the highest rate of return can be selected.

Illustration: 7

Calculate the Average Rate of Return for project 'A' and 'B' from the following information :

	<i>Project A</i>	<i>Project B</i>
Investments (Rs.)	25,000	37,000
Expected Life (in years)	4	5
Net earnings (After Depreciation & Taxes) :		
	<i>Rs.</i>	<i>Rs.</i>
1st Year	2,500	3,750
2nd Year	1,875	3,750
3rd Year	1,875	2,500
4th Year	1,250	1,250
5th Year	-	1,250
	<u>7,500</u>	<u>12,500</u>

If the desired rate of return is 12%, which project should be selected?

Solution:**Calculation of Accounting Rate of Return**

$$\text{Average Rate of Return} = \frac{\text{Average Annual Profit} - \text{Depreciation and Taxes}}{\text{Average Investments}} \times 100$$

Annual Average Profits :

$$\text{Project A} = \frac{7,500}{4} = \text{Rs. } 1,875$$

$$\text{Project B} = \frac{12,500}{5} = \text{Rs. } 2,500$$

Average Investments :

$$= \frac{\text{Investment at beginning} + \text{Investment at the end}}{2}$$

$$\text{Project A} = \frac{25,000 + 0}{2} = \text{Rs. } 12,500$$

$$\text{Project B} = \frac{37,500 + 0}{2} = \text{Rs. } 18,750$$

$$\text{Average Rate of Return} = \frac{\text{Average Annual Profit} - \text{Depreciation and Taxes}}{\text{Average Investments}} \times 100$$

$$\text{Project A} = \frac{1,875}{12,500} \times 100 = 15\%$$

$$\text{Project B} = \frac{2,500}{18,750} \times 100 = 13.33 \%$$

Both the project satisfy the minimum required rate of return. The percentage is compared with those of other project in order that the investment yielding the highest rate of return can be selected. Project A will be selected as its ARR is higher than Project B.

Illustration: 8

A project costs Rs. 5,00,000 and has a scrap value of 1,00,000 after 5 years. The net profit before depreciation and taxes for the five years period are expected to be Rs. 1,00,000, Rs. 1,20,000, Rs. 1,40,000, Rs. 1,60,000 and Rs. 2,00,000. You are required to calculate the Accounting Rate of Return, assuming 50% rate of tax and depreciation on straight line method.

Solution:**Calculation of Accounting Rate of Return**

Particulars	Years					
	1 Rs.	2 Rs.	3 Rs.	4 Rs.	5 Rs.	Average Rs.
Net Income before Depreciation and Taxes	1,00,000	1,20,000	1,40,000	1,60,000	2,00,000	1,44,000
Less : Depreciation [$\frac{5,00,000 - 1,00,000}{5}$]	80,000	80,000	80,000	80,000	80,000	80,000
Net Profit before Taxes	20,000	40,000	60,000	80,000	1,20,000	64,000
Less : Taxes @ 50%	10,000	20,000	30,000	40,000	60,000	32,000
Net Profit After Tax	10,000	20,000	30,000	40,000	60,000	32,000

$$\text{Accounting Rate of Return} = \frac{\text{Average Annual Profits} - \text{Depreciation and Taxes}}{\text{Average Investment}} \times 100$$

Average Annual Profits After Depreciation and Taxes = Rs. 32,000

$$\begin{aligned} \text{Average Investments} &= \frac{\text{Original Investments} - \text{Scrap Value}}{2} \\ &= \frac{5,00,000 - 1,00,000}{2} = \frac{4,00,000}{2} \\ &= \text{Rs. 2,00,000} \end{aligned}$$

$$\text{Accounting Rate of Return} = \frac{32,000}{2,00,000} \times 100 = 16\%$$

The percentage is compared with those of other projects in order that the investment yielding the highest rate of return can be selected.

Discounted Cash Flow Method (or) Time Adjusted Method : Discount cash flow is a method of capital investment appraisal which takes into account both the overall profitability of projects and also the timing of return. Discounted cash flow method helps to measure the cash inflow and outflow of a project as if they occurred at a single point in time so that they can be compared in an appropriate way. This method recognizes that the use of money has a cost, i.e., interest foregone. In this method risk can be incorporated into Discounted Cash Flow computations by adjusting the discount rate or cut off rate.

Disadvantages

The following are some of the limitations of Discounted Pay-back Period Method :

- (1) There may be difficulty in accurately establishing rates of interest over the cash flow period.
- (2) Lack of adequate expertise in order to properly apply the techniques and interpret results.
- (3) These techniques are based on cash flows, whereas reported earnings are based on profits. The inclusion of Discounted Cash Flow Analysis may cause projected earnings to fluctuate considerably and thus have an adverse on share prices.

Net Present Value Method (NPV) : This is one of the Discounted Cash Flow technique which explicitly recognizes the time value of money. In this method all cash inflows and outflows are converted into present value (i.e., value at the present time) applying an appropriate rate of interest (usually cost of capital).

In other words, Net Present Value Method discount inflows and outflows to their present value at the appropriate cost of capital and set the present value of cash inflow against the present value of outflow to calculate Net Present Value. Thus, the Net Present Value is obtained by subtracting the present value of cash outflows from the present value of cash inflows.

Equation for Calculating Net Present Value:

- (1) In the case of conventional cash flows, i.e., all cash outflows are entirely initial and all cash inflows are in future years, NPV may be represented as follows :

$$NPV = \left[\frac{R_1}{(1+K)^1} + \frac{R_2}{(1+K)^2} + \frac{R_3}{(1+K)^3} + \frac{R_n}{(1+K)^n} \right] - 1$$

- (2) In the case of non-conventional cash inflows, i.e., where there are a series of cash inflows as well as cash outflows the equation for calculating NPV is as :

$$NPV = \left[\frac{R_1}{(1+K)^1} + \frac{R_2}{(1+K)^2} + \frac{R_3}{(1+K)^3} + \frac{R_n}{(1+K)^n} \right] - \left[10 + \frac{I_1}{(1+K)^1} + \frac{I_2}{(1+K)^2} + \frac{I_3}{(1+K)^3} + \frac{I_n}{(1+K)^n} \right]$$

Where :

NPV	=	Net Present Value
R	=	Future Cash Inflows at different times
K	=	Cost of Capital or Cut-off rate or Discounting Rate
I	=	Cash outflows at different times

Rules of Acceptance : If the rate of return from a project is greater than the return from an equivalent risk investment in securities traded in the financial market, the Net Present Value will be positive. Alternatively, if the rate of return is lower, the Net Present Value will be negative.

In other words, if a project has a positive Net Present Value it is considered to be viable because the present value of the inflows exceeds the present value of the outflows. If the projects are to be ranked or the decision is to select one or another, the project with the greatest Net Present Value should be chosen

Symbolically the accept or reject criterion can be expressed as follows :

Where

NPV > Zero	Accept the proposal
NPV < Zero	Reject the Proposal

Advantages of Net Present Value Method

- (1) It recognizes the time value of money and is thus scientific in its approach.
- (2) All the cash flows spreadover the entire life of the project are used for calculations.
- (3) It is consistent with the objectives of maximizing the welfare of the owners as it depicts the positive or otherwise present value of the proposals.

Disadvantages

- (1) This method is comparatively difficult to understand or use.
- (2) When the projects in consideration involve different amounts of investment, the Net Present Value Method may not give satisfactory results.

Illustration: 9

Calculate the Net Present Value of the following project requiring an initial cash outlays of Rs. 20,000 and has a no scrap value after 6 years. The net profits after depreciation and taxes for each year of Rs. 6,000 for six years. Assume the present value of an annuity of Re.1 for 6 years at 8% p.a. interest is Rs. 4.623.

Solution:**Calculation of Net Present Value**

Initial Cash Outlays	=	Rs. 20,000
Present Value of Cash Inflows	=	Rs. 6,000 x Rs. 4,263
	=	Rs. 27,738
Net Present Value (NPV)	=	Present Value of Cash Inflows – Value of Cash Outflows
	=	Rs. 27,738 – Rs. 20,000
	=	Rs. 7,738
Net Present Value (NPV)	=	Rs. 7,738

Illustration: 10

A project cost Rs. 25,000 and it generates cash inflows through a period of five years Rs. 9,000, Rs. 8,000, Rs. 7,000, Rs. 6,000 and Rs. 5,000. the required rate of return is assumed to be 10%. Find out the Net Present Value of the project.

Solution:

The following table gives us the Net Present Value of the Project :

Calculation of Net Present Value

Year 1	Cash inflows 2 Rs.	Discounted Factor 3 Rs.	Present Value of Cash Inflows (2 x 3) = 4 Rs.
1	9,000	0.9091	8,181
2	8,000	0.8264	6,608
3	7,000	0.7513	5,257
4	6,000	0.6830	4,098
5	5,000	0.6209	3,100
Net Present Value of Cash Inflows			27,244

Net Present Value	=	Present Value of Cash Inflows – Value of Cash Outflow
	=	Rs. 27,244 – 25,000 = Rs. 2,244

Now the NPV of the project is positive and it can be accepted for investment.

Illustration: 11

A project costing Rs. 5,00,000 has a life of 10 years at the end of which its scrap value is likely to be Rs. 50,000. The firm cut-off rate is 12%. The project is expected to yield an annual profit after tax of Rs. 1,00,000 depreciation being charged on straight line basis. At 12% P.A. the present value of the rupee received annually for 10 years is Rs. 5.65 and the value of one rupee received at the end of 10th year is Re. 0.322. Ascertain the Net Present Value of the project.

Solution:

Calculation of Net Present Value :

	<i>Rs.</i>
Annual Profit after Tax	1,00,000
Add : Depreciation $\left[\frac{\text{Rs. 5,00,000}}{5} \right]$	50,000
Cash flows after tax (for year 1 to 10)	1,50,000
Present value factor for 10 years at 12 % - 5.65]
Total Present Value (1,50,000 x 5.65)	8,47,500
Cash flow in 10th year (scrap value) 50,000]
Present value factor in 10th years 0.322 (50,000 x 0.322)	16,100
Present value of cash inflow in 10th year	8,63,600
Less : Present value of cash outflows	5,00,000
Net Present Value (NPV) =	3,63,600

Now the Net Present Value of the project is positive and it can be accepted for investment.

Illustration: 12

M/s. Pandey Ltd. is contemplating to purchase a machine A and B each costing of Rs.5,00,000. Profits before depreciation are expected as follows :

Year	Cash Inflows		Discounted Factor 10%
	Machine A Rs.	Machine B Rs.	
1	1,50,000	50,000	0.9092
2	2,00,000	1,50,000	0.8264
3	2,50,000	2,00,000	0.7513
4	1,50,000	3,00,000	0.6830
5	1,00,000	2,00,000	0.6209

Using a 10% discounted rate indicate which of the machine would be profitable using the Net Present Value (NPV) method.

Solution:

Year	Discounted Factor 10%	Machine A		Machine B	
		Cash Flow Rs.	Present Value Rs.	Cash Flow Rs.	Present Value Rs.
0	1.0000	(-)5,00,000	(-)5,00,000	(-)5,00,000	(-)5,00,000
1	0.9091	1,50,000	1,36,365	50,000	45,455
2	0.8264	2,00,000	1,65,280	1,50,000	1,23,960
3	0.7513	2,50,000	1,87,825	2,00,000	1,50,260
4	0.6830	1,50,000	1,02,450	3,00,000	2,04,900
5	0.6209	1,00,000	62,090	2,00,000	1,24,180
		8,50,000	6,54,010	9,00,000	6,48,755

Net Present Value	=	
Machine A	=	Rs. 6,54,010 – 5,00,000 = Rs. 1,54,010
Machine B	=	Rs. 6,48,755 – 5,00,000 = Rs. 1,48,755

From the above table, we observed that the Net Present Value of Machine A is higher than that of Machine B. Hence Machine A is preferable.

(2) Internal Rate of Return Method (IRR) : Internal Rate of Return Method is also called as “Time Adjusted Rate of Return Method.” It is defined as the rate which equates the present value of each cash inflows with the present value of cash outflows of an investment. In other words, it is the rate at which the net present value of the investment is zero.

Hornigren and Foster define Internal Rate of Return as the rate of interest at which the present value of expected cash inflows from a project equals the present value of expected cash outflows of the project.

The Internal Rate of Return can be found out by Trial and Error Method. First, compute the present value of the cash flow from an investment, using an arbitrarily selected interest rate, for example 10%. Then compare the present value so obtained with the investment cost.

If the present value is higher than the cost of capital, try a higher interest rate and go through the procedure again. On the other hand if the calculated present value of the expected cash inflows is lower than the present value of cash outflows, a lower rate should be tried. This process will be repeated until and unless the Net Present Value becomes zero. The interest rate that brings about this equality is defined as the Internal Rate of Return.

Alternatively, the internal rate can be obtained by Interpolation Method when we come across 2 rates. One with positive Net Present Value and other with negative Net Present Value. The IRR is considered as the highest rate of interest which a business is able to pay on the funds borrowed to finance the project out of cash inflows generated by the project.

The Interpolation formula can be used to measure the Internal Rate of Return as follows :

$$\text{Lower Interest Rate} + \frac{\text{NPV of Lower Rate}}{\text{NPV Lower Rate (-) NPV Higher Rate}} \times (\text{Higher Rate} - \text{Lower Rate})$$

Evaluation

A popular discounted cash flow method, the internal rate of return criterion has several virtues :

- (1) It takes into account the time value of money.
- (2) It considers the cash flows over the entire life of the project.
- (3) It makes more meaningful and acceptable to users because it satisfies them in terms of the rate of return on capital.

Limitations

- (1) The internal rate of return may not be uniquely defined.
- (2) The IRR is difficult to understand and involves complicated computational problems.
- (3) The internal rate of return figure cannot distinguish between lending and borrowings and hence high internal rate of return need not necessarily be a desirable feature.

Illustration: 13

The cost of a project is Rs. 32,400. It is expected to generate cash inflows of Rs. 16,000, Rs. 14,000 and Rs. 12,000 through its three year life period. Calculate the Internal Rate of Return of the Project.

Solution:**Calculation of Internal Rate of Return (IRR)**

To begin with let us try a rate of 20% and calculate the present value of cash inflows on this rate. The following table will give the calculations :

Year 1	Cash inflows 2 Rs.	Discounted Factor at 20% 3	Present Value of Cash Inflows (2 x 3) = 4 Rs.
1	16,000	0.833	13,328
2	14,000	0.694	9,716
3	12,000	0.579	6,948
Total Present Value of Cash Inflows =			Rs. 29,992

Net Present Value = Present Value of Cash Inflows – Value of Cash Outlays
= Rs. 29,992 – Rs. 32,400 = (-) Rs. 2408

Net Present Value (NPV) = – Rs. 2408

The Net Present Value in this case is negative indicating that 20% is the higher rate and so a lower rate should be tried. Let us try 18%, 16% and 14% respectively. On these rates we will get the following results :

Year 1	Cash Inflows 2 Rs.	Discounted Factor 18% 3	Present Value (2 x 3) 4 Rs.	Discount Factor 16% 5	Present Value (2 x 5) 6 Rs.	Discount Factor 14% 7	Present Value (2 x 7) 8 Rs.
1	16,000	0.847	13,552	0.862	13,792	0.877	14,032
2	14,000	0.718	10,052	0.743	10,402	0.769	10,766
3	12,000	0.609	7,308	0.641	7,692	0.675	8,100
Present Value of Cash Inflows			30,912	31,886		31,898	
Less: Value of Cash Outflows			32,400	32,400		32,400	
Net Present Value (NPV) = (-)			1,488	(-) 514		(-) 498	

From the above table of Calculation it can be observed that the real rate lies in between 14% and 16%. Therefore let us select 15% as the internal rate to ascertain its applicability.

Year 1	Cash inflows 2 Rs.	Discounted Factor 15% 3	Present Value of Cash Inflows (2 x 3) 4 Rs.
1	16,000	0.870	13,920
2	14,000	0.756	10,584
3	12,000	0.658	7,896

Present Value of Cash Inflows = 32,400
Less : Value of Cash Outflow = 32,400
Net Present Value = 0

Thus, the Net Present Value at 15% rate is zero. It indicates that the present value of cash inflows is equal to the present value of cash outflows. Thus internal rate of return 15% for the project under review.

Illustration: 14

The cash flows of projects C and D are reproduced below :

Project	Cash Flows				NVP at 10%	IRR
	C_0	C_1	C_2	C_3		
C —	Rs. 10,000	+ 2,000	+ 4,000	+ 12,000	+ Rs. 4,139	26.5%
D —	Rs. 10,000	+ 10,000	+ 3,000	+ 30,000	+ Rs. 3,823	37.6%

- (i) Why there is a conflict of ranking?
(ii) Why should you recommend Project C in spite of lower internal rate of return?

Time	1	2	3
	Period		
PVIF 0.10 t	0.909	0.8264	0.7513
PVIF 0.14 t	0.8772	0.7695	0.6750
PVIF 0.15 t	0.8696	0.7561	0.6575
PVIF 0.30 t	0.7692	0.5917	0.4552
PVIF 0.40 t	0.7143	0.5102	0.3644

[CA, May, 2002]

Solution:

- (i) Suppose the discount rates are 0%, 10%, 15%, 30%, and 40%. The Net Present Value for each of the project is given below :

Discount Rate (%)	Net Present Value (NVP)	
	C	D
0	8,000	6,000
10	4,139	3,823
15	2,660	2,942
30	- 634	831
40	- 2164	- 238

The conflict in ranking arises because of skewness in cash flows. In case of project C, cash flows occur later in the life and in case of project D, cash flows are skewed towards the beginning.

At lower discount rate, project C's NPV will be higher than that of project D.

As the discount rate increases, project C's NPV will fall at a faster rate, due to compounding effect. After break-even discount rate (14%) project D has higher NPV as well as higher IRR.

- (ii) If the opportunity cost of funds is 10%, project C should be accepted because the firm's wealth will be more by Rs.316 (Rs.4139 – Rs.3823)

The incremental analysis will substantiate this point :

Project	Cash Flows (Rs.)				NVP at 10%	IRR
	C_0	C_1	C_2	C_3		
C – D	0	- 8,000	+ 1,000	+ 9,000	Rs. 316	12.5%

Thus Project C should be accepted, when opportunity cost of fund is 10%.

(3) Profitability Index Method

Profitability Index is also known as Benefit Cost Ratio. It gives the present value of future benefits, computed at the required rate of return on the initial investment. Profitability Index may either be Gross Profitability Index or Net Profitability Index. Net Profitability Index is the Gross Profitability Index minus one. The Profitability Index can be calculated by the following equation :

$$\text{Profitability Index} = \frac{\text{Present Value of Cash Inflows}}{\text{Initial Cash Outlays}}$$

Rule of Acceptance : As per the Benefit Cost Ratio or Profitability Index a project with Profitability Index greater than one should be accepted as it will have Positive Net Present Value. Likewise if Profitability Index is less than one the project is not beneficial and should not be accepted.

Advantages of Profitability Index:

- (1) It duly recognizes the time value of money.
- (2) For calculations when compared with internal rate of return method it requires less time.
- (3) It helps in ranking the project for investment decisions.
- (4) As this method is capable of calculating incremental benefit cost ratio, it can be used to choose between mutually exclusive projects.

Illustration: 15

A project is in the consideration of a firm. The initial outlay of the project is Rs. 10,000 and it is expected to generate cash inflows of Rs. 4,000, Rs. 3,000, Rs. 5,000 and Rs. 2,000 in four years to follow. Assuming 10% rate of discount, calculate the Net Present Value and Benefit Cost Ratio of the project.

Solution:**Profitability Index**

Year 1	Cash inflows 2 Rs.	Discounted Factor 10% 3	Present Value of Cash Inflows (2 x 3) 4 Rs.
1	4,000	0.909	3,636
2	3,000	0.826	2,478
3	5,000	0.751	3,755
4	2,000	0.683	1,366
Net Present Value of Cash Inflows =			11,235

$$\begin{aligned} \text{Net Present Value (NPV)} &= \text{Present Value of Cash Inflows} - \text{Value of Cash Outflows} \\ &= \text{Rs.}11,235 - 10,000 = \text{Rs.}1,235 \end{aligned}$$

$$\text{Net Present Value} = \text{Rs.}1,235$$

$$\begin{aligned} \text{Gross Profitability Index} &= \frac{\text{Present Value of Cash Inflows}}{\text{Initial Cash Outlays}} \\ &= \frac{\text{Rs. } 11,235}{\text{Rs. } 10,000} = 1.1235 \end{aligned}$$

$$\begin{aligned} \text{Net Profitability Index} &= \text{Gross Profitability Index} - 1.0 \\ &= 1.1235 - 1.0 \\ &= 0.1235 \end{aligned}$$

The Profitability Index indicates less than one, the project is not beneficial and should not be accepted.

Illustration: 16

There are two mutually exclusive projects under active consideration of a company. Both the projects have a life of 5 years and have initial cash outlays of Rs. 1,00,000 each. The company pays tax at 50% rate and the maximum required rate of the company has been given as 10%. The straight line method of depreciation will be charged on the projects. The projects are expected to generate a net cash inflow before taxes as follows :

Year	Project X Rs.	Project Y Rs.
1	40,000	60,000
2	40,000	30,000
3	40,000	20,000
4	40,000	50,000
5	40,000	50,000

With the help of the above given information you are required to calculate :

- The Pay-back Period of each project
- The Average Rate of Return for each project
- The Net Present Value and Profitability Index for each project
- The Internal Rate of Return for each project

On the basis of your calculations advise the company which project it should accept giving reasons.

Solution:**Calculation of Net Income and Net Cash Flows after Taxes**

Project	Cash Flows before Taxes Rs.	Depreciation Rs.	Income before Taxes Rs.	Taxes 50% Rs.	Net Income Rs.	Net Cash Inflow after Taxes Rs.
X	40,000	20,000	20,000	10,000	10,000	30,000
	40,000	20,000	20,000	10,000	10,000	30,000
	40,000	20,000	20,000	10,000	10,000	30,000
	40,000	20,000	20,000	10,000	10,000	30,000
	40,000	20,000	20,000	10,000	10,000	30,000
Y	60,000	20,000	40,000	20,000	20,000	40,000
	30,000	20,000	10,000	5,000	5,000	25,000
	20,000	20,000	0	0	0	20,000
	50,000	20,000	30,000	15,000	15,000	35,000
	50,000	20,000	30,000	15,000	15,000	35,000

(a) Calculation of Pay-back Period:

$$\text{Pay-back Period} = \frac{\text{Cash Outlays}}{\text{Annual Cash Inflows}}$$

$$\text{Project X} = \frac{\text{Rs. 1,00,000}}{\text{Rs. 30,000}} = 3 \text{ years 4 months}$$

Project Y = Rs. 40,000 + 25,000 + 20,000 = Rs. 85,000 for 3 years and the remaining amount of Rs. 15,000 (i.e., Rs. 1,00,000 – Rs. 85,000) will be recovered during the fourth year. The total amount realized during the 4th year is Rs. 35,000. Therefore the amount of Rs. 15,000 can be recovered in 5 months and 4 days

Thus, the pay-back period of project Y will be 3 years 5 months and 4 days.

(b) Calculation of Average Rate of Return (ARR):

In this method we need an average income of the two projects and their average investment outlays:

$$\begin{aligned} \text{Average Income of Project X} &= \frac{\text{Total Income of 5 years}}{5} \\ &= \frac{\text{Rs. } 10,000 + 10,000 + 10,000 + 10,000 + 10,000}{5} \\ &= \frac{\text{Rs. } 50,000}{5} = \text{Rs. } 10,000 \end{aligned}$$

$$\begin{aligned} \text{Average Income of Project Y} &= \frac{\text{Rs. } 20,000 + 5,000 + 0 + 15,000 + 15,000}{5} \\ &= \frac{\text{Rs. } 55,000}{5} = \text{Rs. } 11,000 \end{aligned}$$

$$\begin{aligned} \text{Average Investment for both Project X and Project Y} &= \frac{\text{Rs. } 1,00,000}{2} = \text{Rs. } 50,000 \end{aligned}$$

$$\begin{aligned} \text{The Average Rate of Return for Project X} &= \frac{\text{Rs. } 10,000}{\text{Rs. } 50,000} = 20\% \end{aligned}$$

$$\begin{aligned} \text{Project Y} &= \frac{\text{Rs. } 11,000}{\text{Rs. } 50,000} = 22\% \end{aligned}$$

From the above analysis it follows that project Y is superior to project X as it gives 22% average rate of return as against only 20% average rate of return from project X.

(c) Calculation of Net Present Value (NPV) :**Project X**

The Present value of one rupee of an annuity for 5 years at 10% rate of interest is 3.791.

Thus, present value of an annuity of Rs.30,000 for 5 years at 10% rate is Rs.30,000 x 3.791 =

$$\begin{aligned} \text{Less : Cash Out lays} &= \frac{\text{Rs. } 1,13,730}{\text{Rs. } 1,00,000} \\ \text{Net Present Value} &= \frac{\text{Rs. } 13,730}{\text{Rs. } 1,00,000} \end{aligned}$$

$$\begin{aligned} \text{Profitability Index} &= \frac{\text{Rs. } 1,13,730}{\text{Rs. } 1,00,000} = 1.137 \end{aligned}$$

Project Y

<i>Net Cash Flow</i> 1 Rs.	<i>Present Value Factor</i> at 10% 2	<i>Present Value</i> (1 x 2) 3
40,000	0.909	36,630
25,000	0.826	20,650
20,000	0.751	15,020
35,000	0.683	23,905
35,000	0.621	21,735

Total Present Value		1,17,670
Less : Cash Outlays		1,00,000
Net Present Value (NPV)	=	17,670

$$\text{Profitability Index} = \frac{\text{Rs.1,17,670}}{\text{Rs.1,00,000}} = 1.177$$

(d) Calculation of Internal Rate of Return (IRR):

IRR is the rate which when applied to discount the cash flow makes the Net Present Value equal to zero. So IRR of the project X will be :

Project X : There is constant cash inflow of Rs. 30,000 for 5 years. The nearest discount factor for this flow can be obtained by dividing the cash outlays of Rs. 1,00,000 by Rs. 30,000 which comes to 3.33 (i.e., Rs. 1,00,000 ÷ Rs. 30,000).

Referring to the present value of annuity table in the annexure (Table A – 4). We find that the nearest discount factor on the 5 year row is 3.352 which corresponds to a discount rate of 15%. But since 3.333 is lower than 3.352, the actual rate should be between 15% and 16%. To obtain the actual rate of discount, the interpretation will be done as follows :

		Differences	
Present value required	Rs. 1,00,000		
Present value at 15% for Rs.30,000 (i.e., 3.352 x 30,000)	1,00,560	Rs. 560	} 1%
Present value @ 16 % for Rs.30,000 (i.e., 3.274 x 30,000)	98,220	Rs. 2,340	

The actual rate of discount in this way will be :

$$= 15\% = \left[1\% \times \frac{560}{2,340} \right]$$

$$= 15\% + 0.24 = 15.24\%$$

Project Y : In the case of project Y the cash inflow stream is uneven and so the trial and error method will be used to find out the actual rate of discount.

Let us begin with 16% rate of discount. The present value will be

Cash Flow <i>I</i> Rs.	Present Value Factor at 16% <i>2</i>	Present Value (<i>I x 2</i>) = <i>3</i> Rs.
40,000	0.862	34,480
25,000	0.743	18,580
20,000	0.641	12,820
35,000	0.552	19,320
35,000	0.476	16,660
Total Present Value =		Rs. 1,01,860

So the total present value is higher than the cash outlay, therefore to make it equal to Rs. 1,00,000, higher rate of discount should be used. Therefore let us calculate the present value at 18% discount rate which read as follows :

Cash Flow <i>I</i> Rs.	Present Value Factor at 18% <i>2</i>	Present Value (<i>I x 2</i>) = <i>3</i> Rs.
40,000	0.847	33,880
25,000	0.718	17,950
20,000	0.609	12,180
35,000	0.516	18,060
35,000	0.437	15,090
Total Present Value =		Rs. 97,160

The amount of total value at 18% discount rate is, thus, lower than the cash outlay and therefore a rate lower than 18% is needed to make the NPV equal to Zero. This actual rate can be now, determined with the help of the process of interpolation as follows :

	Rs.	Difference	
Present value required	1,00,000		
Present value at 16%	1,01,860	1,860	} 2%
Present Value at 18%	97,160	4,700	
In this way the actual rate of discount will be :			
	$= 16\% + \left[2\% \times \frac{1,860}{4,700} \right]$		
	$= 16\% + 0.79 = 16.79\%$		

The Internal Rate of Return Project X has been found out to be 15.24% whereas the IRR of Project Y is 16.79%. Thus, Project Y should be accepted and project X rejected.

Precisely Project Y is recommended by the IRR method, NPV method, PI method and IRR method. Project X is recommended by Pay-back Period Method. However, it should be noted that Pay-back Period Method is not theoretically sound method.

QUESTIONS

- I.
 1. What do you understand by Capital Budgeting?
 2. Discuss briefly the principles and characteristics of capital budgeting.
 3. State the different techniques of selecting capital budgeting proposals.
 4. What do you mean by Average Rate of Return?
 5. What is Pay-back Method? State its advantages and limitations.

Write Short Notes on :

 - (a) Net Present Value Method
 - (b) Profitability Index
 - (c) Internal Rate of Return
 - (d) Discounted Pay-back Period Method
 - (e) Average Rate of Return
 - (f) Reciprocal Pay-back Period Method
 6. What is the importance of Capital Budgeting?
 7. State the objectives of Capital Budgeting.
 8. Explain the process of Capital Budgeting.
 9. Explain the different types of Capital Budgeting Proposals.
 10. What do you understand by Net Present Value Method? State its advantages and disadvantages.
- II. **Chose the Correct Answer :**
 1. Fixed Assets are those which are of a _____ nature
 - (a) Fixed
 - (b) Current
 - (c) Acid
 - (d) Liquid

2. The simplest capital budgeting technique is _____
 - (a) Net Present Value Method
 - (b) Pay-back Period Method
 - (c) Internal Rate of Return Method
 - (d) Average Rate of Return Method
3. _____ is the rate which equates the present value of expected future cash flows with the cost of the investment.
 - (a) Average Rate of Return
 - (b) Discounted Rate of Return
 - (c) Internal Rate of Return
 - (d) Time Adjusted Rate of Return
4. _____ is the relationship that exists between the present value of net cash inflows and the present values of cash outflows.
 - (a) Profitability Index
 - (b) Distribution of Capital
 - (c) Discounted Benefit-Cost Ratio
 - (d) Cut-off Point
5. While evaluating capital investment proposals, the time value of money is considered in the case of
 - (a) Pay-back method
 - (b) Discount Cash Flow Method
 - (c) Accounting Rate of Return Method
 - (d) Net Present Value Method
6. The return after the pay-off period is not considered in case of
 - (a) Internal rate of Return Method
 - (b) Net Present Value Method
 - (c) Pay-back Period Method
 - (d) Accounting Rate of Return Method
7. Depreciation is included in cost in case of
 - (a) Average Rate of Return Method
 - (b) Accounting Rate of Return Method
 - (c) Pay-back Period Method
 - (d) Present Value Index Method
8. The Cash flows on account of operations are presumed to have been reinvested at the cut-off rate in case of _____
 - (a) Net Present Value Method
 - (b) Pay-back Period Method
 - (c) Internal Rate of Return Method
 - (d) Discounted Cash Flow Method
9. The technique of long-term planning for proposed capital outlays, and their financing is termed as _____
 - (a) Capital Budgeting
 - (b) Cash Budgeting
 - (c) Sales Budgeting
 - (d) Revenue Budgeting
10. The Minimum Rate of Return expected of a capital investment project is termed as _____
 - (a) Single Point Rate
 - (b) Cut-off Rate
 - (c) Normal Rate
 - (d) Both a and b
11. _____ is the annual average yield on a project
 - (a) Internal Rate of Return
 - (b) Cut-off Rate
 - (c) Accounting Rate of Return
 - (d) None of the above
12. Capital budgeting is also known as _____
 - (a) Investment Decision Making
 - (b) Planning Capital Expenditure
 - (c) Capital Expenditure Decisions
 - (d) All the above
13. Capital Investment Decisions are generally _____
 - (a) Irreversible
 - (b) Reversible
 - (c) Recurring
 - (d) Constant
14. Profitability index is also termed as _____
 - (a) Benefit Cost Ratio
 - (b) Liquidity Ratio
 - (c) Turnover Ratio
 - (d) Solvency Ratio
15. Internal Rate of Return and _____ are the same
 - (a) Time Adjusted Rate of Return
 - (b) Average Rate of Return
 - (c) Accounting Rate of Return
 - (d) Profitability Index

[Ans : (1) Fixed (2) Pay-back Period Method (3) Internal Rate of Return (4) Profitability Index (5) Discounted Cash flow Method (6) Pay-back Period Method (7) Accounting Rate of Return Method (8) Discounted Cash Flow Method (9) Capital Budgeting (10) Both a and b (11) Accounting Rate of Return (12) All the above (13) Irreversible (14) Benefit Cost Ratio (15) Time Adjusted Rate of Return]

PRACTICAL PROBLEMS

(1) Calculate the pay-back periods of the following projects each requiring a cash outlays of Rs.1,00,000. Suggest which projects are acceptable if the standard pay-back period is 5 years:

Year	Cash Inflows	
	Project A	Project B
1	30,000	30,000
2	30,000	40,000
3	30,000	20,000
4	30,000	10,000
5	30,000	5,000

[Ans : Pay-back period : Project A – 3.33 years, Project B – 4 years. Both Project A and Project B are acceptable]

(2) From the following data calculate : (1) Net Present Value (2) Internal Rate of Return and (3) Pay-back Period for the following projects. Assume a required rate of return of 10% and a 50% tax rate. Firm has a policy of charging depreciation on diminishing balance method. No capital gain taxes are assumed:

	M	N
Initial Cash outlay	Rs. 1,00,000	Rs. 1,40,000
Salvage Value	Nil	20,000
Earning before Depreciation and Taxes :		
Year		
1	25,000	40,000
2	25,000	40,000
3	25,000	40,000
4	25,000	40,000
5	25,000	40,000
Expected Life	5 years	5 years

(3) A company has to choose one of the following mutually exclusive projects. Both the projects will be depreciated on a straight line basis. The firm's cost of capital is 10% and the tax rate is 50%. The before tax cash flows are :

	0	1	2	3	4	5
X – Rs. 20,0004,200		4,800	7,000	8,000	2,000	
Y – Rs. 15,0004,200		4,500	4,000	5,000	1,000	

Which project should the firm accept, if the following criteria are used?

- (a) Pay-back Period
- (b) Internal Rate of Return
- (c) Net Present Value
- (d) Profitability Index

(4) The cash flow streams for four alternative investment A, B, C, and D are :

Year	A	B	C	D
0	2,00,000	3,00,000	2,10,000	3,20,000
1	40,000	40,000	80,000	2,00,000
2	40,000	40,000	60,000	20,000
3	40,000	40,000	80,000	—
4	40,000	40,000	60,000	—
5	40,000	40,000	80,000	—
6	40,000	30,000	60,000	—
7	40,000	30,000	40,000	—
8	40,000	20,000	40,000	—
9	40,000	20,000	40,000	2,00,000
10	40,000	20,000	40,000	50,000

Calculate the (a) Pay-back Period (b) Net Present Value (c) Internal Rate of Return and (d) Profitability Index.

(5) Atlanda Footwear is considering the purchase of a new leather stitching machine to replace an existing machine. The existing machine has a book value of Rs. 20,000 and a salvage value of Rs. 30,000. It can be used for 5 more years at the end of which its salvage value would be nil. The new machine cost Rs. 80,000. It is expected to bring an annual saving of Rs. 30,000 in operating costs. The depreciation rate on both the machines will be 33 1/3 % on the written down value method. The new machine will fetch a salvage value of Rs.50,000 after 5 years. The tax rate for the firm is 60%.

What is the Internal Rate of Return of the replacement proposal?

(6) AVS Ltd is considering the purchase of a new machine for Rs. 1,20,000. It has a life of 4 years and an estimated scrap value of Rs. 20,000. The machine will generate an extra revenue of Rs. 4,00,000 P.A. and have additional operating cost of Rs. 3,20,000 P.A. The company cost of capital is 20% and tax rate 50%. Should the machine be purchased?

[Ans : Yes, NPV Rs. 23,486]

(7) William & Co. has to choose one of the two alternative machines. Calculate the Pay-back Period and suggest the profitable machine :

	Machine X	Machine Y
Cost of Machine	Rs. 2,00,000	2,50,000
Working Life years	5	5
Profit before tax :		
1st Year	60,000	80,000
2nd Year	70,000	1,00,000
3rd Year	80,000	80,000
4th Year	60,000	70,000
5th Year	40,000	60,000
Rate of Income Tax	50%	50%

[Ans : Pay-back period, Machine x – 2.69 years, Y – 2.67 years, Machine y is better]

(8) Following data relate to five independent investment projects :

Projects	Initial Outlay	Annual Cash Inflows	Life in Years
P	10,00,000	2,50,000	8
Q	2,40,000	24,000	15
R	1,84,000	30,000	20
S	11,500	4,000	5
T	80,000	12,000	10

Assume a 10% required rate of return and a 50% tax rate. Rank these five investment projects according to each of the following criteria :

- (1) Pay-back Period
- (2) Accounting Rate of Return
- (3) Net Present Value Index
- (4) Internal Rate of Return

(9) X Y Z Ltd. Company is considering the purchase of a machine. Two machines P and Q, each costing Rs.50,000, are available. Earning after taxes are expected to be as under :

Year	Machine P	Machine Q	Discount Factor at 10%
	Rs.	Rs.	
1	15,000	5,000	0.9091
2	20,000	15,000	0.8264
3	25,000	20,000	0.7513
4	15,000	30,000	0.6830
5	10,000	20,000	0.6209

Evaluate the two alternatives according to NPV method (a discount of 10% is to be used). Which machine should be selected? Why?

[Ans : Pay-back period P - 2.6 years; Q - 3.33 years; NPV - P - Rs. 15,385; Q 14,865; profitability Index - P - 1.308; Q - 1.297; P is better.]

(10) (a) A project of Rs. 40,00,000 yielded annually a profit of Rs. 6,00,000 after depreciation) 12½% and is subject to income tax @ 50%, you are required to calculate pay-back period. (b) No-Project is acceptable unless the yield is 10% cash inflows of a certain project along with cash outflows are given below :

Year	Outflows Rs.	Inflows Rs.
0	3,00,000	-
1	60,000	40,000
2		60,000
3		1,20,000
4		1,60,000
5		60,000
		80,000 (being salvage value at the end of 5 years)

You are required to calculate Net-Present value

[Ans : (a) Pay-back period 5 years. (b) Net present value 17,772.]

- (11) SS & Co. Ltd. is considering investing in a project requiring a capital outlay of Rs. 2,00,000. Forecast for annual income after depreciation but before tax is as follows :

Year	Rs.
1	1,00,000
2	1,00,000
3	8,000
4	80,000
5	40,000

Depreciation may be taken as 20% on original cost and taxation at 50% of net income. You are required to evaluate the project according to each of the following methods :

- Pay-back method
- Rate of Return on Original Investment method
- Discounted Cash Flow Method taking cost of capital as 10%
- Net Present Value Index Method and
- Internal Rate of Return Method

[Ans : (a) Pay-back period is 2.25 years

- Rate of return on original investment Method 20%
- Rate of return on average investment method 40%
- Discounted cash flow method Rs. 1,08,130
- Net present value index 154%
- Internal rate of return method 2.5]

- (12) AVS & Co. Ltd. is contemplating the purchase of machine. Two machines P and Q are available; each machine costing Rs. 5,00,000. In comparing the profitability of the machines, a discount rate of 10% is to be used. Earnings after taxation are expected to be as under :

Year	Cash flow	
	Machine P Rs.	Machine Q Rs.
1	1,50,000	50,000
2	2,00,000	1,50,000
3	2,50,000	2,00,000
4	1,50,000	3,00,000
5	1,00,000	2,00,000

Indicate which machine would be more profitable investment using the various methods of ranking investment proposals.

[Ans : (1) Pay-back period P - 2 $\frac{3}{5}$ years, Q - 3 $\frac{1}{2}$ years; machine P is better.

(2) Return on Investment method

Machine P - 28% : Q - 32%; Machine Q is better

(3) Net Present Value method

Machine P - Rs 1,53,850; Q - Rs. 1,48,650; Machine P is better.)

- (13) The life of a machine which costs Rs. 1,20,000 is estimated 5 years. Its salvage value is estimated at Rs. 20,000 at the end of the fifth year. The earnings after taxes (before depreciation) are estimated as given below :

Year	Rs.
1	10,000
2	60,000
3	90,000
4	80,000
5	70,000

Calculate : (a) Rate of Return on Original Investments

(b) Earnings per (Rupee) unit of investment

(c) Average Rate of Return on Original Investments

(d) Average Rate of Return on Average Investments

[Ans : (a) 158% (b) Rs. 158% (c) 31% (d) 76%]

- (14) A company has an investment opportunity costing Rs. 40,000 with the following expected net cash flow (i.e., after tax and before depreciation) :

<i>Year</i>	<i>Net - cash flow Rs.</i>
1	7,000
2	7,000
3	7,000
4	7,000
5	7,000
6	8,000
7	10,000
8	15,000
9	10,000
10	4,000

Using 10% as the cost of capital (rate of discount) determine the following :

- (a) Pay-back period
 (b) Net present value at 10% discounting factor
 (c) Profitability Index at 10% discounting factor
 (d) Internal rate of return with the help of 10% discounting factor and 15% discounting factor
- [Ans : (a) 5.62 years (b) Rs. 8,961 (c) 1.22 (d) 14.70%]
- (15) Calculate the Pay-back period, Average Rate of Return and Net Present Value for a Project which requires an initial outlays of Rs. 10,000 and generates year ending cash flows of Rs. 6,000; Rs. 3,000; Rs. 2,000 and Rs. 5,000; and Rs. 5,000 from the end of the first year to the end of fifth year. The required rate of return is 10% and pays tax at 50% rate. The project has a life of five years and depreciated on straight line basis :

<i>Year</i>	<i>Discounting factor at 10%</i>
1	0.909
2	0.826
3	0.751
4	0.683
5	0.621

[Ans : Pay-back period - 3.43 years; ARR - 22%; NPV - 1,768].



CHAPTER 30

Cost Audit

Meaning

Cost Audit is the verification of the cost accounts and of the adherence to the cost accounting plan. That is, it not only involves the examination of cost accounts but also the fact that plan prepared in this connection has been duly executed. The Indian Companies Act has made provisions to perform cost audit to certain categories of companies engaged in the production processing, manufacturing and mining activities under section 209 and 233 B. It has however not been made compulsory for all the companies. The duties and powers of the Auditor are set out under section 227 of the said Act. Cost Auditor will not submit his report to the members of the company but will have to submit to the Company Law Board.

Definition

Cost Audit may be defined as “the verification of cost records and accounts and a check on the adherence to the prescribed cost accounting procedures and the continuing relevance of such procedures.”

Difference between Financial Audit and Cost Audit

<i>Financial Audit</i>	<i>Cost Audit</i>
(1) It is statutory compulsory under Companies Act.	(1) It is not compulsory except in certain cases as provided under section 233B.
(2) It covers all the financial transactions recorded in financial books and financial records.	(2) It covers only cost records and cost accounts.
(3) It aims to examine that the business transactions have been recorded correctly.	(3) It aims to verification of cost accounts and ensures the plan prepared in this connection has been duly executed.
(4) It is concerned with the past and historical in nature.	(4) It concerned with forward looking approach.
(5) Reporting the true and fair view of the company's earnings and state of affairs.	(5) Cost Auditor is required to report to the management except statutory audit.

<i>Financial Audit</i>	<i>Cost Audit</i>
(6) Financial aspect of the accounts is a matter of concern.	(6) Cost aspect of account is of main concern.
(7) It is concerned with the scrutiny of reliability or otherwise of transactions.	(7) It is concerned with the propriety and efficiency of the transactions.

Proposes or Objectives of Cost Audit

The purpose of Cost Audit is to examine whether the methods laid down for ascertaining costs and other decisions are being properly implemented and whether the cost accounting plan is being adhered to or not. The purposes can, therefore, be classified under two heads, namely :

- (1) Protective
- (2) Constructive

(1) Protective Purpose : Under protective purpose, it aims to examine that there is no undue wastage or losses and costing system brings out the correct and realistic cost of production or processing.

(2) Constructive Purpose : Cost Audit has a constructive purpose as well. Cost Audit plays a constructive role by providing management of the company with information useful in regulating production, choosing economical methods of operation, reducing operation costs and reformulating plans etc. on the basis of his findings during the course of Cost Audit.

Circumstances Under Which Cost Audit is Desirable

The following are the circumstances under which cost audit is ordered :

- (1) Price Fixation
- (2) Cost variation within the industry
- (3) Inefficient Management
- (4) Tax Assessment
- (5) Trade Disputes

Types of Cost Audit

The following are the important types of Cost Audit :

- (1) Efficiency Audit
- (2) Propriety Audit
- (3) Statutory Audit

(1) Efficiency Audit : Efficiency Audit is directed towards the measurement of whether corporate plans have been effectively executed. It is concerned with the utilization of resources in economic and most remunerative manner to achieve the objectives of the concern. For example, the effective utilization of capital in an organization can be gauged by determining return on capital employed.

(2) Propriety Audit : Propriety Audit is concerned with executive actions and plans bearing on the finance and expenditure of the company. The auditor has to judge whether the planned expenditure is designed to give optimum results.

(3) Statutory Audit : This type of audit is conducted in accordance with the provisions of Section 233B of the Companies Act 1956. It is the compulsory audit which required to maintain the related books and accounts of specified establishments. The chief aims of this types of audit is that the government wants to ascertain the relationship of costs and prices.

Advantages or Usefulness of Cost Audit

Besides the chief merit of detecting and preventing errors and frauds as in the case of audit in general, cost audit secures the following advantages to the management, shareholders and Government.

I. Usefulness to the Management:

- (1) It ensures effective internal control.
- (2) It provides necessary information for prompt decision making.
- (3) It facilitates inter firm comparison.
- (4) It helps to increase the overall efficiency of productivity.
- (5) Inefficiency can be eliminated by suitable corrective actions.
- (6) Errors, omission, fraud and mistakes can be detected and prevented due to effective auditing of Cost Accounts.
- (7) It facilitates cost control and cost reduction.
- (8) It creates cost consciousness among employer and employees.
- (9) It assists in valuation of stock of materials, work in progress and finished goods.
- (10) It ensures maximum utilization of available resources.

II. Usefulness to the Government:

- (1) Cost Audit helps in fixing contract price in cost plus contract.
- (2) Helps in fixing of selling price for essential commodities.
- (3) Enables Government to focus attention on inefficient work.
- (4) Enables Government to give protection to certain industries.
- (5) Facilitates settlement of trade disputes.
- (6) It imposes an automatic check on inflation.

III. Usefulness to the Shareholders:

- (1) It ensures more profit and high return to the shareholders.
- (2) It creates an image of creditworthiness of the concern.
- (3) It reflects a high degree of reliability to cost data.
- (4) It ensures efficient management in utilization of plant and machinery, land and building, worker and employees etc.

Cost Audit Programme

A suitable programme for cost audit should be drawn out in detail, specifying each item of audit work to be carried out. An audit programme is a written plan prepared by the Cost Auditor showing the following salient features :

- how much work is to be done?
- who is going to do a particular portion of work?
- and what is the duration of time by which the work is to be finished?

Prof. Meig defines “An audit programme is the detailed plan of auditing work to be performed specifying the procedures to be followed in verification of each item in the financial statements and giving the estimated time required.”

Areas of Cost Audit Programme is Carried Out

The areas which a cost audit programme should include are as below :

- (1) Inventory of stores and work in progress
- (2) Labour
- (3) Overheads
- (4) Selling, Distribution, Office and Administrative expenses
- (5) Capital expenditure
- (6) Utilization of capacity, plant and equipments

Advantages of Cost Audit Programme

The following advantages will accrue, if a cost audit is carried out with the help of a cost audit programme :

- (1) It helps the auditor to know about the progress of audit.
- (2) It increases the efficiency of the cost audit associates.
- (3) It facilitates the uniformity in work.
- (4) It helps to safeguard against omission.
- (5) It guides for proper distribution of works and fixing responsibility.
- (6) It serves as a defense against charge of negligence.
- (7) It serves as a reference for the future audit of the same concern.

Disadvantages of Cost Audit Programme

There are certain disadvantages, if the cost audit work is carried out with the help of cost audit programme. They are as follows :

- (1) For small concern, it would be unnecessary to prepare a programme.
- (2) Audit associates have no interest and initiative since, they perform their work mechanically.
- (3) As each business has its own problems and procedures, a rigid audit programme cannot be laid for all types of business.

Cost Accounting Records

The areas of activity in respect of which cost accounting records are to be maintained under Cost Accounting Record Rules are :

- (1) Raw Materials, Components, Stores and Spare Parts
- (2) Salaries and Wages
- (3) Service Department Expenses
- (4) Utilities
- (5) Depreciation
- (6) Other Overheads
- (7) Conversion Cost
- (8) Research and Development Expenses
- (9) Interest
- (10) Joint Products and By-products
- (11) Work in Progress and Finished Goods Stock
- (12) Cost Statements
- (13) Records of Physical Verification
- (14) Packing
- (15) Production Records

QUESTIONS

1. Define Cost Audit. Explain the purposes of Cost Audit.
2. Explain the types of Cost Audit.
3. What are the advantages of Cost Audit?
4. What do you understand by Cost Audit Programme?
5. Explain the difference between Financial Audit and Cost Audit.
6. Mention the areas of activity in respect of which cost accounting records are to be maintained.
7. What are the circumstances under which cost audit is ordered?



CHAPTER 31

Reporting to Management

Introduction

The success or otherwise of any business undertaking depends primarily on earning revenue that would generate sufficient resources for sound growth. To achieve this objective, the management should discharge its functions efficiently and effectively. The reporting systems are highly useful to the management for effective planning and control. A regular system of reporting is considered as a better guidance for prompt decision making. Hence, it is necessary to have a good management reporting system.

DEFINITION OF MANAGEMENT REPORTING

According to Kohler reporting refers to “A body of information organized for presentation or transmission to others. It often includes interpretations, recommendations and findings with supporting evidence in the form of other reports.”

‘Management Reporting’ may be defined as “A system of communication, normally in the written form, of facts which should be brought to the attention of various levels of management who use them to take suitable action.” In other words the process of providing information to the management is known as Management Reporting. The word “Information” refers to the data processed or evaluated for a specific purpose.

Dr. Maheshwari has also defined Management reporting system as “an organized method of providing each manager with all the data and only those data which he needs for his decisions, when he needs them and in a form which aids his understanding and stimulates his action.”

Objectives of Management Reporting

- (1) To obtain the required information relating to the business to discharge its managerial functions of planning, organizing, controlling, directing, and decision making etc. efficiently and effectively.
- (2) To ensure the operational efficiency of the concern.
- (3) To facilitate the maximum utilization of resources.

- (4) To secure industrial understanding among people who are engaged in various aspects of work of enterprise.
- (5) To enable to motivating improving discipline and morale.
- (6) To help the management for effective decision making.

Essentials of Good Reporting System

The following are the essentials of a good management reporting system :

(1) Proper Form : A good report should have a comprehensive form with suggestive title, heading, sub heading and number of paragraphs as and where necessary for easy and quick reference.

(2) Contents : Simplicity is one of the requisites of reporting in relation to the contents of a report. Further the contents should follow a logical sequence. Wherever necessary the contents should be represented in the form of visual aids such as charts and diagrams etc.

(3) Promptness : It means that the system should ensure the preparation and submission of report at the proper time. It facilitates business executives to make suitable decisions based on quick reports without delay.

(4) Accuracy : Information conveyed should be accurate. This means that the person responsible for reporting should have sufficient care in preparing the report as correctly as possible within the parameters of possible accuracy in this regard.

(5) Comparability : In order to ensure that the furnished information is useful, it is essential that reports are also meant for comparison. The report should provide information about both the actual and the budgeted performance of the budget period. So that meaningful comparison can be made to find out the deviations and to initiate appropriate action.

(6) Consistency : In order to make a meaningful and useful comparison, uniform accounting principles and procedures should be followed on consistent basis over a period of time for collection, classification and presentation of accounting information.

(7) Relevancy : The report should be presented with relevant data to disclose the fact in unambiguous terms. Because, inclusion of both the relevant and the irrelevant data in the management reports may result in faulty decisions. Therefore, the contents expressed therein should reveal the reporter's greater consciousness of expression with reference to length and time in particular.

(8) Simplicity : The report should be as far as possible in simple form. In other words, the report should avoid technical jargons, duplication of work and presented in a simple style.

(9) Flexibility : The system should be capable of being adjusted according to the requirement of the users.

(10) Cost-Benefit Analysis : Cost-Benefit Analysis should be made and the cost of reporting should commensurate with the expenditure involved.

(11) Principle of Exception : Since the time and effort of managerial personel are precious, the principle of management by exception has become the rule of the day instead of exception. It is necessary therefore to draw the attention of management, through reports, only towards exceptional matters.

(12) Controllability : It is necessary that every report should be addressed to a responsibility centre and analysed the factors into controllable and uncontrollable separately. So that the head of the responsibility centre can be held responsible only for controllable variance but not for variances which are beyond his control.

Further, in order to assist the management to imitate remedial measures, probable reasons for the factors of uncontrollable should also be incorporated in the reports.

Classification of Management Reporting

Basically, there are two ways to report to the management. They are (1) Oral Report and (2) Written Report. The Written Reports may be classified into number of ways. The following are the important types:

I. According to Objects:

- (A) External Reports
- (B) Internal Reports
 - (1) Reports Meant for Top Management
 - (2) Reports Meant for Middle Level Management
 - (3) Reports Meant for Junior Level Management

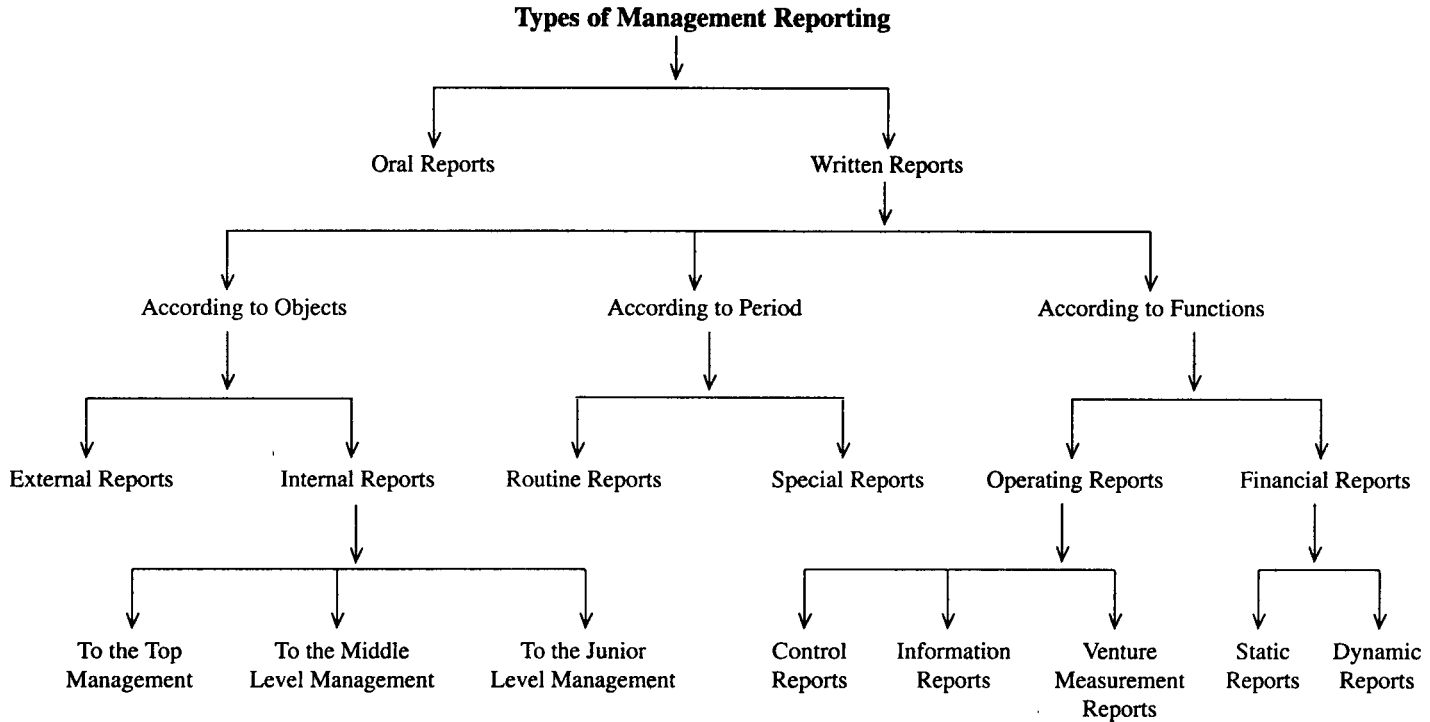
II. According to Period:

- (1) Routine Reports
- (2) Special Reports

III. According to Functions:

- (A) Operating Reports
 - (1) Control Reports
 - (2) Information Reports
 - (3) Venture Measurement Reports
- (B) Financial Reports
 - (1) Static Reports
 - (2) Dynamic Reports

The following chart explains this more about the types of reporting :



According to Object or Purposes

(A) External Reports : These reports prepared for persons outside the business such as Government, shareholders, bankers, investors and financial institutions etc. External Reports usually represent published annual reports. Annual Reports of Trading, Profit and Loss Accounts and Balance Sheet of the Indian Companies are to be prepared in terms of Schedule VI of the Indian Companies Act of 1956.

(B) Internal Reports : Internal Reports are those which are prepared for internal uses of different level of management. It is also called as Management Reports. These reports are not meant for disclosure to those who are outsiders to the business. They do not have to comply with any statutory requirements. From the managerial point of view the reports can be classified into the following categories :

- (1) Report Meant for the Top Level of Management
- (2) Report Meant for the Middle Level of Management
- (3) Report Meant for the Junior Level of Management

(1) Report Meant for the Top Level of Management

Top Level Management is concerned with the formulating policies planning and setting goals and objectives. This level of management consisting of the Board of Directors including Chairman, Managing Directors, General Manager or any other chief executive as the case may be. The report to this level of management should be specifically summarized with all aspects of operating performance together with a comparison of actuals with budgeted performance. The usual reports sent to this level of management are:

- (a) Reports on budgeted and actual profit
- (b) Reports on sales and production
- (c) Capital budget
- (d) Master budget
- (e) Periodical financial reports
- (f) Plant utilization report
- (g) Machine and labour utilization report
- (h) Reports on research and development activities
- (i) Project evaluation report
- (j) Report on stock of raw materials, work in progress and finished goods
- (k) Overhead cost absorption and efficiency reports
- (l) Reports on selling and distribution overhead.

(2) Reports Meant for Middle Level Management

The Middle Management is constituted of the heads of all departments such as production department headed by production manager, marketing department headed by marketing manager and so on. This level of management is concerned with the functioning and control of their departments. They act mainly as co-ordinating executives to administer policies directly through operating supervisors and evaluate their performance. Hence, they may require more detailed information about their departments and at frequent intervals. Generally, the middle level management should receive the following reports at different intervals:

(a) Purchase Manager:

- (1) Reports on material price and usage variance
- (2) Reports on material carrying cost, loss of material in the storage etc.
- (3) Reports on trends in the pertaining of various items of materials.

(b) Materials Manager:

- (1) Reports on stock of raw materials, work in progress and finished goods
- (2) Reports on material wastage and losses
- (3) Reports on stock of materials planning and control
- (4) Reports on level of materials stock at the stores
- (5) Reports on surplus and deficiency report.

(c) Production Manager:

- (1) Reports on budgeted and actual production
- (2) Reports on overtime work and ideal time
- (3) Reports on labour utilization statement
- (4) Reports on machine utilization statement
- (5) Reports on scrap production cost
- (6) Reports on any accident causing dislocation of activity.

(d) Sales Manager:

- (1) Reports on budgeted and actual sales
- (2) Reports on sales efficiency
- (3) Reports on orders received and orders executed
- (4) Reports on cash sales and credit sales
- (5) Reports on stock of finished goods
- (6) Reports on market share and market potential
- (7) Reports on sales promotion efficiency.

(3) Reports Meant for Junior Level Management

The lower level management is directly responsible for executing various policies assigned by top management. This level of management is constituted of Foremen, Supervisors and sectional in charges etc. They are in touch with the day-to-day performance of their section. The report meant for this level are mainly in terms of physical units. The usual reports sent to this level are :

- (1) Reports on labour efficiency variance
- (2) Reports on ideal time, overtime and machine utilization
- (3) Reports on materials usage variance
- (4) Reports on credit collections and outstanding