



**B.B.A.**

**Third Year**

**Core Paper No.11**

**COST AND MANAGEMENT ACCOUNTING**

**BHARATHIAR UNIVERSITY  
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(Syllabus)

## **COST AND MANAGEMENT ACCOUNTING**

### **UNIT – I**

Cost accounting: Meaning, Definition, objectives, Importance, Merits and demerits of Cost and Management Accounting – Differentiate Cost Accounting with Financial Accounting and Management Accounting – elements of cost – Preparation of cost sheet.

### **UNIT – II**

Material: Bin card, Stores ledger, different levels of stock; Maximum level, Minimum level, Reorder level, Average Stock level, Danger level – Material Issues: FIFO, LIFO, Average Cost method, Standard price.

Labour: Labour turnover, wages and Incentives.

### **UNIT – III**

Objectives of Management Accounting – Scope and functions. Financial Statement Analysis – Comparative, Common Size Statement, Trend analysis; Ratio Analysis: Liquidity, Profitability, Proprietary Ratios, Turnover Ratios.

### **UNIT – IV**

Fund Flow statements – Cash flow Statement.

### **UNIT – V**

Standard Costing – Marginal costing – Budget and Budgetary Control; preparation of various types of budgets, Capital budgeting.

Recommended Books:

1. Jain and Narang: Cost accounting
2. Dr.S.N. Maheswari – Management accounting
3. Dr.R. Ramachandran & Dr.R.Srinivasan – Cost and Management accounting.

# UNIT - I

This unit introduces the Cost concepts and cost sheets

Lesson No.	Title
1	Overview of Cost Accounting
2	Classification of Cost – Elements
3	Cost Sheet
4	Tender and Quotation

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## LESSON-1

### OVERVIEW OF COST ACCOUNTING

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- 1.0 Aims and Objectives
- 1.1 Introduction
- 1.2 Meaning and Definitions
- 1.3 Scope of Cost Accounting
- 1.4 Objectives of Cost Accounting
- 1.5 Functions of Cost Accounting
- 1.6 Importance of Cost Accounting
- 1.7 Merits of Cost Accounting
- 1.8 Objections to Cost Accounting
- 1.9 Demerits of Cost Accountancy
- 1.10 Characteristics of a Good Costing System
- 1.11 Installation of a Costing System
- 1.12 Relationship between Financial Accounting and Cost Accounting
- 1.13 Let us Sum Up
- 1.14 Lesson-end Activities
- 1.15 Model Answers to “Check your Progress”
- 1.16 Suggested Reading/References/Sources

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#### 1.0 AIMS AND OBJECTIVES

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The objective of the lesson is to expose concepts and after studying this lesson you should be able to:-

- Understand the Meaning and Definition of cost, costing and cost Accounting
- Know the objectives and functions of cost Accounting
- Describe the importance of cost Accounting
- Know the Characteristics of a good costing system

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## 1.1 INTRODUCTION

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Cost Accounting is a branch of accounting and has been developed due to the limitations of Financial accounting. Financial accounting is primarily concerned with record keeping directed towards the preparation of financial accounts i.e., trading, profit and loss account and balance sheet. It provides information regarding the financial positions of business on a particular date.

Cost accounting is a set of procedures used in refining raw data into usable information for management decision making, for ascertainment of cost of products and services and its profitability. Cost accounting is a management information system which analyses past, present and future data for to provide the basis for managerial decision making.

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## 1.2 MEANING AND DEFINITIONS

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### 01.02.01 Cost

The term 'Cost' has a variety of meanings according to its purpose and conditions. As per the definition by Institute of Cost and Management Accountants (I.C.M.A.), now known as **Chartered Institute of Management Accountants (C.I.M.A.)**, London, "Cost" is the amount of :

- [a] actual expenditure incurred on a given thing ; and*
- [b] notional expenditure attributable to a given thing.*

In simple words, cost may be described as the total of all expenses incurred, whether paid or outstanding, in the production and sale of a product, or in rendering a service.

### 1.2.2 Costing

**Staubus** observes "Costing is the process of determining the cost of doing action something i.e the cost of manufacturing an article, rendering a service or performing a function".

**CIMA** defines as "the techniques and process of ascertaining cost and studies the principles and rules concerning the determination of costs of products and services".

It is referred to as classifying, recording and appropriate allocation of expenditure for the determination of the costs of product or services.

### 1.2.3 Cost Accounting

Cost Accounting primarily deals with collection, analysis of relevant cost data for interpretation and presentation for various problems of management.

Cost accounting is the application of accounting and costing principles, methods and techniques in the ascertainment of costs and the analysis of savings and / or excess as compared with previous experience or with the standard.

*CIMA* defines Cost Accounting as ‘ *the establishment of budgets, standard costs and actual costs of operations, processes, activities or products; and the analysis of variances, profitability or the social use of funds*’.

Thus, Cost accounting is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services and for the presentation of suitably arranged data for purposes of control and guidance of management. It includes the ascertainment of the cost of every order, job, contract, processes, service or unit as may be appropriate. It deals with the cost of production, selling and distribution and total cost of any particular unit of production or service to be at the same time to disclose exactly how such total cost is constituted and also to control and reduce its costs.

### 1.2.4 Cost accountancy

Cost accountancy is a comprehensive term. Cost accountancy is 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 as well as the presentation of information for purposes of decision-making. Thus, the term cost accountancy includes costing, cost accounting, budgetary control, cost control and cost audit.

Cost accountancy is the *science, art and practice* of a cost accountant. It is *science* because it is a body of systematic knowledge having certain principles which a cost accountant should possess for proper discharge of his responsibility. It is an *art* as it requires the ability and skill with which a cost accountant is able to apply the principles of cost accountancy to various managerial problems. *Practice* includes the continuous efforts of a cost accountant in the field of cost accountancy.

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## 1.3 SCOPE OF COST ACCOUNTING

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The term scope here refers to field of activity. Cost accounting is concerned with ascertainment and control of costs. The information provided to the management is helpful for cost control and cost reduction through functions of planning, decision making and control.

In the initial stages of evolution, cost accounting confined itself to cost ascertainment and presentation of the same with the main objective of finding the product cost. With the development of business activity and introduction of large scale production, the scope of cost accounting was broadened and providing information for cost control and cost reduction has assumed equal significance along with finding out cost of production.

In addition to enlargement of scope, the area of application of cost accounting has also widened. Initially cost accounting was applied in manufacturing activities only. Now, it is applied in service organizations, government organizations, local authorities, farms, extractive industries, etc.

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## **1.4 OBJECTIVES OF COST ACCOUNTING**

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The main objectives of cost accounting are as follows:

### **(i) Ascertainment of cost**

The primary objective of cost accounting is ascertainment of cost. It (enables) the management to ascertain the cost of product, job, contract, service or unit of production so as to develop cost standard. Cost may be ascertained, under different circumstances using one or more types of costing principles – standard costing, marginal costing, uniform costing etc.

### **(ii) Determination of selling price**

Cost data are useful in the determination of selling price or quotations. The price of a product consists of total cost and the margin required. Cost account provide detailed information regarding total cost in the form of various components. They also provide information in terms of fixed cost and variable costs so that extent of price reduction to be done in case of intensive competition etc, can be decided.

### **(iii) Cost control & Cost reduction**

A basic function of cost accounting is to control cost. The objective is to minimize the cost of manufacturing comparison of actual cost with standard reveals the discrepancy is variances. If the variances are adverse, the management enters into investigation so as to adopt corrective action immediately.

### **(iv) Ascertaining the profit of each activity**

The profit of any activity can be ascertained by matching cost with the revenue of that activity. The purpose under this step is to determine costing profit or loss of any activity on an objective basis.



#### **(v) Assisting management in decision making**

Decision making means as a process of selecting a course of action out of two or more alternative courses. For making a choice between different courses of action. It is necessary to make a comparison of the outcomes which may be arrived under different alternatives. Such comparison has only been made possible with the help of cost accounting information.

Cost accountings are helpful to the management in taking decision regarding:

- a) Production or discontinuation of a product.
- b) Utilization of idle capacity.
- c) The most profitable sales mix.
- d) Alternative based on key factor.
- e) Export decision.
- f) Make or Buy decisions etc.

#### **vi) Matching cost with revenue**

The determination of profitability of each product, process, department etc. is the important object of costing.

#### **vii) Preparation of financial statements P& L A/c and Balance Sheet**

To prepare these statements, the value of stock work in progress, finished goods etc. all essential. In the absence of the costing department when we have to close the accounts it rather takes too much time. But a good system of costing facilitates the preparation of statements as the figures are easily available they can be prepared monthly or even weekly.

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### **1.5 FUNCTIONS OF COST ACCOUNTING**

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The main functions of cost accounting are:

- i) To serve as a guide to price fixing of products.
- ii) To disclose sources of wastage in process of production.
- iii) To reveal sources of economy in production process.
- iv) To provide for an effective system of stores, materials etc.
- v) To exercise effective control on factors of production.
- vi) To ascertain the profitability of each product.
- vii) To suggest management of future expansion policies.
- viii) To present and interpret data for management decisions.
- ix) To organize cost reduction programmes.

- x) To facilitate planning and control of business activity.
- xi) To supply timely information for various decisions.
- xii) To organize the internal audit systems etc.

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## **1.6 IMPORTANCE OF COST ACCOUNTING**

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The following are importance of cost accounting to business concerns.

**(a) Control of material cost**

Costs of material usually constitute a substantial portion of the total cost of the product. Therefore it is necessary to control it as far as possible.

**(b) Control of labour cost**

It can be controlled if workers complete their work within the standard time and also by reducing of labour turnover and idle time.

**(c) Control of over heads**

Overhead consists of indirect expenses which are incurred in the factory office and sales department they are part of production and sales cost such expenses may be controlled by keeping a strict check over them.

**(d) Measuring efficiency**

For measuring efficiency, cost accounting department should provide information about standards and actual performance of the concerned activity.

**(e) Budgeting**

Nowadays detailed estimates in terms of quantities and amounts are drawn up before the start of each activity. This is done to ensure that a practicable course of action can be chalked out and the actual performance corresponds with the estimated or budgeted performance. The preparation of the budget is the function of costing department.

**(f) Price determination**

Cost accounts should provide information which enables the management to fix remunerative selling prices for various items of products and services in different circumstances.

**(g) Curtailment of loss during the off season**

Cost accounting can also provide information which may enable reduction of overhead, by utilizing idle capacity during the off season or by lengthening the season.

**(h) Expansion**

Cost accounts may provide estimates of production of various levels on the basis of which the management may be able to formulate its approach to expansion.

**(i) Arriving at decisions**

Most of the decision in a business undertaking involves correct statements of the likely effect on profits. Cost accounts are of vital help in this respect. In fact, without proper cost accounting, decision would be like taking a jump in the dark such as when production of a product is stopped.

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**1.7 MERITS OF COST ACCOUNTING**

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The deficiencies of financial accounting are compensated by cost accounting. It is immensely useful to the management, to the employees, to the public and to the creditors. The following are the advantages of cost accounting

**01.07.01 To the management**

**1) Facilitates decision making**

Cost accounting provides necessary data along with information regarding individual products, departments, divisions and cost centers and these information will help the management to take decision on any matter relating to the business.

**2) Measuring efficiency**

With the help of cost accounting the management can prepares budgets and standards for various elements of cost and compare them with actual to measures efficiency.

**3) Cost reduction**

It is helpful to management in reduction of cost through its techniques by efficient and effective utilization of raw material, labour and optimum production output.

**4) Fixation of selling price**

It provides information under various classifications. One of them is on the basis of behaviors of cost. Availability of information in detail regarding variable and fixed cost help in fixing selling price under different circumstances.

**5) Facilitates cost control**

Cost accounting main objective is to ascertain and control cost. The segregation of cost at different stages is helpful in effective control through standard costing and budgetary control

**6) Improve efficiency**

Under cost accounting system, proper inventory control, labour utilization and proper analysis of expenditure is possible. This results in increased efficiency throughout the firm

**7) Facilitate Inventory control**

An effective system and check are provided on all materials and stores. Interim profit and loss A/c and balance sheet can be prepared without checking the physical inventory.

### **8) Reduction of wastages**

Cost accounting can reduce wastages on material and labour.

### **9) Effective utilization of resources**

Decision making problem in marginal costing helps in decision making regarding make or buy of components, profit planning, export decisions, effective utilization of key factor, sales mix etc. Standard costing and budgetary control are also helpful in effective utilization of resources.

### **10) Help in effective budgeting**

Cost to accounting emphasis and records both historical costs and pre determined costs, which are essential for the technique of budgetary control. Without additional efforts budgetary control can be operated when costing systems are used.

## **01.07.02 To the employees**

### **(i) Sound wage policy**

Cost Accounting introduces incentive wage scheme, bonus plan etc., which bring better reward to sincere and efficient workers. Cost data aid the management in devising a suitable wage policy for the workers. Time wage system and piece rate system can be blended to provide higher wages and at the same time increasing productivity rate.

### **2) Higher bonus plan**

Cost accounting leads to increase in productivity, lowering of costs and increase in profitability. Workers get their share in profits in the form of bonus; higher profits naturally allow higher bonus distribution.

### **3) Rewards for higher efficiency through incentive scheme**

Cost Accounting provides standards for the measurement of efficiency of workers can be distinguished and their efficiency recognized and rewarded. Employees have initiated and recommended for higher promotions, this means increase in earnings through the motion study and time study in doing jobs. Others get the encouragement to be more efficient and to earn more wages in the given time of work.

### **4) Security of job**

Employees get better remuneration security of job etc., due to increasing prosperity of the industries monetary appreciation of the efficiency of a worker is a good tonic which leads to higher rate of productivity.

## **1.7.3 To the creditors**

Bankers, creditors, investors etc. can have a better understanding of the originations as regards the improvement and prosperity before they offer financial lending.

#### **1.7.4 To the public**

- 1) It removes all types of wastage.
- 2) The customer to pay fair price for products
- 3) It create more Employment opportunities.

#### **1.7.5 To the Government**

- (i) The proper systems of cost accounting are of great use in the preparation of national plans, economic developments etc.
- (ii) By studying the trend of cost, the government can make policies like taxation, import, export, price ceiling, granting subsidy etc.
- (iii) Costing system has stability and cost reduction in industries. Cost audit is important and industries have to keep books of accounts to show the utilization of materials, labour and other costs.

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### **1.8 OBJECTIONS TO COST ACCOUNTING**

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1. It is more expensive to install and operate.
2. It is felt unnecessary and redundant.
3. Costing may not be applicable in all types of industries.
4. It involves many forms and statements.
5. It is based on estimation and predetermination.

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### **1.9 DEMERITS OF COST ACCOUNTANCY**

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- 1) It is not an exact science and involves inherent element of judgment.
- 2) The establishment cost may be heavy to be afforded by medium size concern.
- 3) Most of the cost accounting techniques are based on some pre- assumed notions.
- 4) Cost accounting is not static, as it is dynamic with the change of time estimation, conventions etc. are adopted in the system.
- 5) Cost accounting presents the base for taking the best decision. It does not give out right solution of the problem.
- 6) Different views are held by different cost accountants above the items to be included in cost.
- 7) It is difficult to derive correct cost the valuation of stock, work in progress, estimated cost etc. are calculated in the basis of estimation.

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## **1.10 CHARACTERISTICS OF A GOOD COSTING SYSTEM**

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An ideal system of cost accounting must possess some characteristics which bring all the advantages, discussed above; to the business, in order to be ideal and objective. The main characteristics are:

### **1. Simplicity**

It must be simple and it must be easily understandable to the personnel. The information provided must be in the proper order, in right time and to the right persons so as to be utilized fully.

### **2. Flexibility and Adaptability**

The costing system must be flexible to accommodate the changing conditions and circumstances. The expansion, contraction of changes must be adopted in the existing system with minimum changes.

### **3. Economy**

The costing system must suit the finance available. The expenditure must be less than the benefits derived from the system adopted.

### **4. Comparability**

The management must be able to make comparison of the facts and figures with the past figures, figures of other concerns, or other departments of the same concern.

### **5. Suitability to the Firms**

Before accepting a costing system, the nature, requirements, size, conditions of the business etc., must be carefully considered. The system must be capable of prompt and accurate reporting to different levels of management according to their requirements.

### **6. Minimum Changes to the Existing one**

When introducing a costing system, it may cause minimum disturbance to the existing set up of the business.

### **7. Uniformity of Forms**

Forms of different colours can be used to distinguish them. Forms must be uniform in size and quality. Form should contain instructions to fill, to use and for disposal.

### **8. Less Clerical Work**

Printed forms will involve less labour to fill in, as the workers may be a little educated. They may not like to spend much time in filling the forms.

## **9. Efficient Material Control and Wage System**

There must be a proper procedure for recording the time spent on different jobs, by workers for the payment of wages. A systematic method of wage system will help in the control of labour cost. Since the cost of material forms a great proportion to the total cost, there must be an efficient system of stores control.

## **10. A Sound Plan**

There must be proper and sound plans to collect, to allocate and to apportion overhead expenses on each job or each product in order to find out the cost accurately.

## **11. Reconciliation**

The systems of costing and financial accounting must be facilitated to reconcile in the easiest manner.

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### **1.11 INSTALLATION OF A COSTING SYSTEM**

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The costing system of an organization should be carefully planned in order to achieve its objectives. The important steps for the installation of a costing system are discussed below:

#### **1. Determination of objectives**

The first and foremost step is to clearly lay down the objectives of the costing system. If the objective is only to ascertain the cost, a simple system will be sufficient. However, if the objective is to get information for decision making, planning and control, a more elaborate system of costing is necessary.

#### **2. Study of the nature of business**

The nature of the business and other technical aspects like nature of the products, methods and stages of production cycle should be carefully analyzed. Such an analysis is necessary to decide the method of costing to be adopted. For example, contract costing is suitable for large construction projects. Operating costing is adopted by service industries like transport.

#### **3. Study of the nature of the organization**

The costing system should be designed to meet the requirements of the organization. Hence, it is necessary to study the nature, size and layout of the organization. The factors to be considered are:

- a. Size of the organization and the size of the departments.
- b. The physical layout of the organization.
- c. The different levels of management.
- d. The extent of decentralization of authority.
- e. The nature of authority relationships.

#### **4. Deciding the structure of cost accounts**

A suitable costing system can be developed on the basis of the study of the nature of business and organization. The structure of cost accounts should be simple and in accordance with the natural production process.

#### **5. Determination of cost rates**

This step involves a thorough study of the following points for developing an integrated costing system.

- a. Classification of costs into direct and indirect costs.
- b. Grouping of indirect costs (overheads) into production, administration, selling and distribution etc.
- c. Methods of pricing issues.
- d. Treatment of wastes of all types.
- e. Absorption of overheads.
- f. Calculation of overhead rates.

#### **6. Organization of the cost office**

The cost office is responsible for the efficient operation of the costing system. The cost office, with adequate staff must be located as close as possible to the factory. The following are the major functions of the cost office.

- a. Stores accounts,
- b. Labour accounting
- c. Recording of cost data and
- d. Cost control.

Further, the role and duties and responsibilities of the cost accountant must be clearly defined. He must have the necessary authority to discharge his duties effectively.

#### **7. Introducing the system**

After completion of the above steps, the costing system may be formally introduced. Introduction of the system in an existing organization should be done gradually. Before introduction, the features of the systems, its working and advantages must be explained to the concerned employees to secure their co-operation.

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### **1.12 RELATIONSHIP BETWEEN FINANCIAL ACCOUNTING AND COST ACCOUNTING**

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Both financial and cost accountings are the branches of accounting. They are aimed at providing financial information for interested parties. In both the systems of accounting, information is accumulated and presented to serve the needs of management, proprietors



and the outsiders. The sources of the two systems for recording the transactions are the same. Double entry system of accounting is followed in both the system of accounting. Both are in monetary terms. They are supplementary each other. But the two systems differ in their purpose and scope.

**Difference between Financial accounting and Cost accounting**

The main differences between Financial Accounting and Cost Accounting are given as under.

S.No	Point of difference	Financial accounting	Cost accounting
1	<i>Object</i>	It’s main objective is to prepare final A/c to report to owner and outsiders.	It aims to provide cost information to management for decision making.
2	<i>Legal requirement</i>	Financial records are maintained as per the requirement of IT act and companies act	It is maintained to fulfill the internal requirement of the management.
3	<i>Nature</i>	It is maintained on the basis of his historical records	It is maintained on both historical and predetermined costs.
4	<i>Stock evaluation</i>	Stock are valued at cost market price which ever is less	Stocks are valued at cost.
5	<i>Period</i>	Transactions are recorded for a particular period (annually)	Transaction is identified with cost units it may be daily, weekly, monthly etc.
6	<i>Information</i>	Only monetary transactions are recorded	It deals with monetary as well as non monetary information.
7	<i>Figure</i>	It deals mainly with actual facts and figure	It deals partly with facts and figures and partly with estimates.

**Check Your Progress 01.01**

***Distinguish between cost accounting and Financial Accounting***

Notes: (a) Write your answer in the space given below.

- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

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**1.13 LET US SUM UP**

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Cost is the expenditure incurred on product/services. Costing is the method/techniques of ascertaining cost. The process of accounting for cost is called cost accounting. Cost accounting is helpful to reduce cost and for cost control. Cost accounting is helpful in decision making, production, marketing and administrative areas require cost reduction programmes. The relationship cost accounting and financial accounting are supplementary to each other to the management. However, it has certain major differences.

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**1.14 LESSON – END ACTIVITIES**

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- 2. Define ‘costing’, ‘cost accounting’ and cost accountancy.
- 3. Explain the scope of cost accounting.
- 4. Explain the objectives of cost accounting.
- 5. What is limitation of cost accounting?
- 6. What are the advantages and objections of cost accounting?
- 7. Explain the differences between financial accounting and cost accounting.
- 8. Explain the functions of cost accounting.
- 9. What are the essentials of good costing system?

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**1.15 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ 10.01**

The difference between cost and financial accounting are in respect of objects, legal requirements, nature, stock valuation, period of accounting, information recorded.

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**1.16 SUGGESTED READING/REFERENCES/SOURCES**

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
3. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
4. Alex K., Cost Accounting, ARR publications
5. Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education

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## LESSON-2

### CLASSIFICATION OF COST

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#### **Contents:**

- 2.0 Aims and objectives
- 2.1 Introduction
- 2.2 Important Terms in Cost Accounting
- 2.3 Classification of Cost
- 2.4 Elements of Cost
- 2.5 Methods of Costing
- 2.6 Techniques of costing
- 2.7 Let us Sum Up
- 2.8 Lesson-end Activities
- 2.9 Model Answers to “Check your Progress”
- 2.10 Suggested Reading/References/Sources

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#### **2.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should be able to:

- Explain the meaning and definition of the terms like cost unit, cost centre and profit center
- Classify the costs
- Describe the various methods and techniques of costing
- Describe the elements of classification

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#### **2.1 INTRODUCTION**

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The basic objective of cost accounting is the ascertainment and control of costs. In order to effectively calculate the cost of the product or service and control the cost, the cost needs to be classified according to some basis. They are called as classification of cost. The most important classification is element wise classification. Furthermore, the computation of cost varies with industry to industry, according to its nature of operation. Hence, in order to ascertain the cost of the product or service, we have to apply various methods and techniques of costing and they are the subject matter of this lesson.

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## 2.2     IMPORTANT TERMS IN COST ACCOUNTING

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In the previous lesson we have discussed about the basic concepts – cost, costing, cost accounting and accountancy. Apart from the above we have some important terms used in the cost accounting. They are discussed in this section.

**Cost unit:** - A cost unit is a unit of a product or service or time to which costs are ascertained by means of allocation, apportionment and absorption.

**CIMA** defines cost unit as "a quantitative unit of product or service in relation to which costs are ascertained". [e.g., cost of Refrigerator is ascertained per unit [per piece]

The selection of cost unit is important in cost accounting. It should be carefully selected to suit the nature of business operation. The selected unit should be neither too small nor too big, but ideal for cost ascertainment. Cost unit may be expressed in terms of number (units), weight, area, length etc. The following are the cost units in various industries.

Industry	Cost Unit
Refrigerators, Cars, Scooters	Per unit
Television sets, Motor Cycles	Per unit
Watches, Radios	Per unit
Sugar	Per quintal
Cement, Steel, Coal	Per tonne
Paper	Per tonne
Textiles	Per metre
Chemicals	Per kg/tonne/litre
Electricity	Per kilowatt hour (kwh.)
Passenger transport	Per passenger k.m.
Goods transport	Per tonne k.m.
Ceramic tiles	Per square foot or per unit
Bricks	Per 1,000 Nos.
Road contract	Per. k.m.

Cost units are of two types: [1] *Single* and [2] *Composite*.

The examples of single cost unit are – Kilogram, Ton, Piece, Liter, etc.  
The examples of composite cost unit are- Passenger Kilometer, Tonne kilometer for transport firm, per bed day for hospitals, etc.

**Cost centre:** - The firm is generally divided into a number of functional departments [viz., production, marketing and finance] for administrative convenience. These departments [some times] may further divided into smaller divisions for cost ascertainment and control. These smaller divisions are called cost center.

In simple, cost center is a location, person or item of equipment for which cost may be ascertained and used for the purpose of cost control.

**CIMA** defines cost center as “ a production or service, function, activity or item of equipment whose costs may be attributed to cost units. A cost center is the smallest organizational sub-unit for which separate cost allocation is attempted.”

Cost centre can be classified into the following four types:

1. *An Impersonal cost centrer* consists of a location or item of equipment production department, a machine or a group of machine.
2. *Personal Cost Centre* is one, which consists of a person or group of persons.
3. *Operation Cost Centre* is one, which consist of those machines and /or persons carrying out similar operations.
4. *Process Cost Centre* is one, which consists of a specific process or a continuous sequence of operation.

**Profit centre:** - It is a segment of a business responsible for all activities involved in the production and sales of products and services. It is responsible for both revenue and expenses. Profit centers are created to delegate responsibility to individuals and measure their performances.

#### **Distinguish between cost centre and profit centre**

Important differences between cost centre and profit centre are:

- i) Cost centre is created by the cost accountant. On the other hand, a profit centre is created by the top management.
- ii) Cost centre is created for the purpose of cot ascertainment and control. But the profit centre is created for the purpose of evaluation of performance.
- iii) Cost centre is a small segment, whereas profit centre is a large segment.
- iv) Cost centres do not enjoy autonomy. But, profit centres enjoy autonomy.
- v) Cost centre does not have a target of costs. But a profit centre has a target of profit for performance evaluation.

2.3 CLASSIFICATION OF COST

Cost classification is the process of grouping cost according to their common characteristics. Suitable classifications of costs are of vital importance in order to identify the cost with cost centers or cost unit. Cost may be classified according to their nature or purpose for which they are incurred. The following are the bases on which costs can be classified.

- By nature or element
- By functions
- By relation - as direct and indirect
- By variability
- By controllability
- By normality
- By capital or revenue
- By time
- By purpose - according to planning and control
- By usefulness - for managerial decisions.

CLASSIFICATION OF COST

Functional Classification	Element wise Classification	Cost Components	Accounting Classification				
<i>Production Cost</i>	Direct Cost [ <i>Prime Cost</i> ]	Direct Materials	Prime Cost	Works Cost	Cost of Production	Cost of Sales Or Total Cost	Selling price/ Sales
		Direct Labour					
		Direct Expenses					
	Indirect Cost [ <i>Overhead</i> ]	Manufacturing Expenses					
Admn. Cost		Administrative Expenses					
Selling & Distribution Cost		Selling Expenses					
		Distribution Expenses					
Net Profit	<i>Net Profit</i>	<i>Net Profit</i>				Net Profit	

**1. Cost according to nature or element;** [analytical classification] based on element, cost is classified into materials, labour and expenses. [discussed in detail under elements of cost].

**2. Functional Classification;** Here the classification is under four major purpose of the business.

*a. Production cost b. Administration cost c. Selling cost and d. Distribution cost.*

**[a] Production cost** is ‘the cost of sequence of operations which begins with supplying materials, labour and services and ends with primary packing of the product’ – I.C.M.A. It is also known as manufacturing or factory cost incurred in converting raw material into finished product.

**[b] Administration cost** is ‘the cost of formulating the policy, directing the organization and controlling the operations of an undertaking, which is not related directly to a production, selling, distribution, research or development activity or function’- I.C.M.A. Administration cost is incurred for overall planning, organizing and control of the enterprise.

**[c] Selling cost** is ‘the cost of seeking to create and stimulate demand and of securing orders’ – I.C.M.A.

Selling costs are also known as selling expenses and selling overheads, which comprise of all the expenses of selling department including product promotion and advertising.

**[d] Distribution cost** is ‘the cost of sequence of operations which begin with making the packed product available for dispatch and ends with making the reconditioned, returned empty package, if any, available for reuse’- I.C.M.A.

It is also known as distribution expenses or overheads which comprises of packing, warehouse expenses, cost of freight, etc.

I.C.M.A. Terminology also defines the following terms:

**[e] Research Cost:-** “This is the cost of searching for new or improved products, new application of materials, or new or improved methods”.

**[f] Development Cost:-** “Having made the research the management decides to produce a new or improved product or to employ a new or improved method, the cost of process beginning with the commencement of formal production of that product or by that method, is called the development cost”.

### **3. Direct and Indirect Cost**

Direct Costs are those, which are incurred for and may be conveniently identified with a particular cost center or cost unit. Materials used and labour employed in manufacturing an article or in a particular process of production are common examples of direct costs. Indirect costs are those cost which cannot be conveniently identified with a particular cost center or cost unit. Examples of indirect cost include rent of building, management salaries, machinery depreciation etc.



#### 4. By Variability

According to this classification, costs are classified according to their behavior in relation to changes in the level of activity or volume of production. On this basis, costs are classified into three groups viz. fixed, variable and semi-variable.

- (1) **Fixed (or period) cost** are commonly described as those which remain fixed in total amount with increase or decrease in the volume of output or productive activity for a given period of time. Fixed cost per unit decreases as production increases and increases as production declines. Examples of fixed costs are rent, insurance of factory building, factory manager's salary etc.
- (2) **Variable (or product) costs** are those, which vary in total in direct proportion to the volume of output. These costs per unit remain relatively constant with changes in production. Thus, variable costs fluctuate in total amount but tend to remain constant per unit as production activity changes. Examples are direct material costs, direct labor costs, power, repairs etc. such costs are known as product costs because they depend on the quantum of output rather than on time.
- (3) **Semi-variable costs** are those which are partly fixed and partly variable. For example, telephone expenses include a fixed portion of annual charge plus variable charge according to calls; thus total telephone expenses are semi-variable. Other examples of such costs are depreciation, repairs and maintenance of building and plant etc.

#### 5. On the basis of controllability, cost can be classified into

- (a) *Controllable cost* (b) *Uncontrollable*.

(a) **Controllable cost**: - This is the cost, which can be influenced by the action of a specified member of an undertaking. e.g., direct materials, direct labour. Etc.

(b) **Uncontrollable cost**: - This is the cost, which cannot be influenced by the action of any specified member of an undertaking. e.g., rent, rates, taxes, insurance, etc.

#### (6) By Normality

Under this, costs are classified according to whether these are costs which are normally incurred at a given level of output in the conditions in which that level of activity is normally attained. On this basis, it is classified into two categories:

(a) **Normal cost**; it is the cost, which is normally incurred at a given level of output in the conditions in which that level of output is normally attained. It is a part of cost of production.

(b) **Abnormal cost**; It is the cost which is not normally incurred at a given level of output in the conditions in which that level of output is normally attained. It is not a part of cost of production and charged to Costing Profit and Loss Account.

### **(7) By Capital and Revenue or Financial Accounting Classification**

The cost which is incurred in purchasing assets either to earn income or increasing the earning capacity of the business is called capital cost.

**(8) By Time:-** Costs can be classified as ( i ) *Historical costs* and ( ii ) *predetermined costs*.

( i ) **Historical costs:** The costs which are ascertained after being incurred are called historical costs.

( ii ) **Predetermined costs:** such costs are estimated costs i.e. computed in advance of production taking into consideration the previous periods' costs and the factors affecting such costs.

### **(9) According to Planning and Control**

Planning and control are two important functions of management. Cost accounting furnishes information to the management which is helpful in the due discharge of these two functions. According to this, costs can be classified as budgeted costs and standard costs.

(i) **Budgeted costs:-** Budgeted costs represent an estimate of expenditure for different phases of business operations such as manufacturing, administration, sales, research and development etc.

(ii) **Standard cost:-** Budgeted costs are translated into actual operation through the instrument of standard costs. The Institute Of Costs And Management Accountants, London defines standard cost as “the predetermined cost based on a technical estimate for materials, labour and overhead for a selected period of time and for a prescribed set of working conditions”. Thus, standard cost is a determination, in advance of production of what should be the cost.

**(9) For Managerial Decisions:-** On this basis, costs may be classified into the following costs:

1. **Marginal cost** is the total of variable costs i.e. prime cost plus variable overheads.

2. **Out of pocket costs:** This is that portion of the cost which involves payment to outsiders i.e., gives rise to cash expenditure as opposed to such costs as depreciation, which do not involve any cash expenditure.

3. **Differential costs:** The change in costs due to change in the level of activity or pattern or method of production is known as differential cost.

4. **Sunk costs:** A sunk cost is an irrecoverable cost.

5. **Imputed(or notional) costs:** These costs are those costs which appear in cost accounts only e.g. notional rent charged on business premises owned by the proprietor, interest on capital for which no interest has been paid.

- 6. Opportunity cost:** It is the maximum possible alternative earning that might have been earned if the productive capacity or services had been put to some alternative use.
- 7. Replacement cost:** It is the cost at which there could be purchase of an asset or material identical to that which is being replaced or revalued. It is the cost of replacement at current market price.
- 8. Avoidable and unavoidable cost:** Avoidable costs are those, which can be eliminated if a particular product or department, with which they are directly related, is discontinued. Unavoidable cost is that cost which will not be eliminated with the discontinuation of a product or department.

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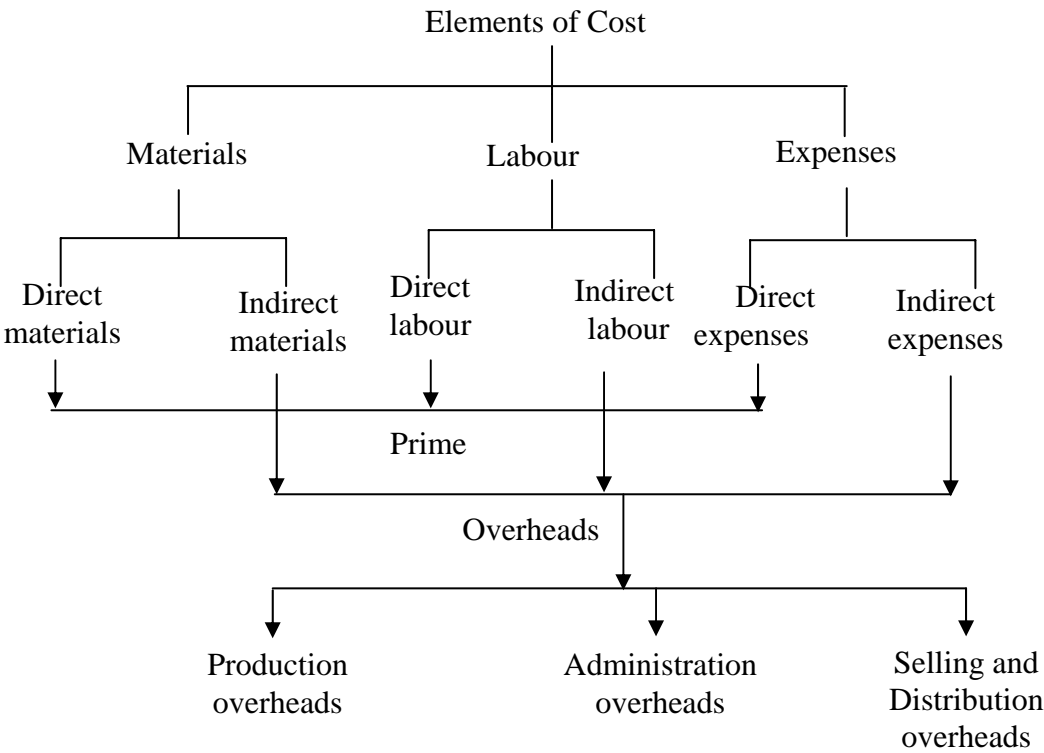
## 2.4 ELEMENTS OF COST

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A manufacturing organization is concerned with the conversion of raw materials into finished products with the help of labour and certain other services. In order to compute the cost of each stage of production, the cost of manufacturing a product is sub-divided and they are known as **elements of cost**. Thus elements of costs are the primary classification of costs according to the factors upon which expenditure is incurred.

The elements of cost consists of :- **[a] Materials ; [b] Labour; and [c] Expenses**. Each element can again be divided into Direct and Indirect costs.

The above elements of cost are analysed in the chart given below:



**[A] Materials:** The substances from which the products are made are known as materials. They may be in a raw or manufactured state. It may be of Direct as well as Indirect.

**[a] Direct Materials:** Direct materials are those materials, which can be *identified with the product and can be conveniently and economically measured and directly charged to the product.*

**Example**

- i. Timber used in furniture making.
- ii. Cloth used in Ready made dress making.
- iii. Bricks used in building a house.

Cotton, leather timber, cloth, bricks, jute there are all materials directly entered in the production. i.e. known as Raw Material (or) Direct Material.

**[b] Indirect Materials:** Indirect materials are those materials, which cannot normally form a part of the finished product. Cost of it cannot be identified and allocated but can be apportioned to a particular product. [e.g. lubricants, cotton waste, grease, oils etc.,]

**Example:**

- i. Material used in maintenance of plant & machinery like, lubricant, cotton waste, grease, oil, stationary etc.
- ii. Small tools for general use.
- iii. Cost of thread in dress making
- iv. Cost of nails in shoe-making and furniture

**[B] Labour:** For conversion of materials into finished product, human effort is needed. For such human effort the remuneration is paid, and that is called labour cost or wages. Labour can be direct as well as indirect.

**[a] Direct Labour:** All labour expenses in altering, composition, construction, and conformation etc., of the product are included in direct wages. These are the wages, which can be identified with and allocated to cost centers and cost units.

Direct wages are also known as direct labour, productive labour, process labour or prime cost labour.

**Example:**

- (i) Carpenters engaged in furniture making
- (ii) Workmen engaged in assembling parts.

**[b] Indirect Labour:** Labour employed for the purpose of carrying out work incidental to products or services are called indirect labour. These wage cost cannot be allocated, but which can be apportioned to or absorbed by the cost centre or cost units.

**Example:**

- (i) Labour cost of idle time, overtime, holidays etc.
- (ii) Wages & Salaries of clerical and managerial staff, salesman, etc.

**[C] Expenses:** Expenditures other than material and labour is called as expense. Expenses may be direct or indirect.

**[a] Direct or Chargeable Expenses:** These are expenses which can be directly, conveniently and wholly allocated to cost centers or cost units. It is the part of prime cost. [e.g., Excise duty, Royalty on production, cost of special drawings and designs, etc.]

**[b] Indirect Expenses:** These expenses are other than indirect material and indirect labour, which cannot be directly identified and allocated but can only be apportioned to or absorbed with cost centers or cost units.

**Example:**

- (i) Rent rates and insurance
- (ii) Power & Lighting
- (iii) Depreciation and Repairs, of fixed Assets
- (iv) Bank Charges.
- (v) Advertisement
- (vi) Employees' welfare & medical expenditure.
- (vii) Expenses of service department

**INDIRECT COSTS / OVERHEADS:** All expenses other than the direct material cost, direct labour cost and direct expense are known as indirect expenses or overhead.

According to **Weldon**, overhead means, "the cost of indirect materials, indirect labour and such other expenses, including services as cannot conveniently be charged direct to specific cost units." It is also called as "*On cost*" and "*Burden*".

**Classification of overheads**

There are four types of overheads

- (i) Production of overhead/ Factory overhead.
- (ii) Office & Administration overhead.
- (iii) Selling overhead.
- (iv) Distribution overhead.

**[a] Production Overhead or Works Overhead or Factory Overhead or Manufacturing Overhead:** They refer to all indirect expenses incurred on processes and operations, which commence from the receipt of work order till its completion, ready for delivery to customer or to the finished goods store.

**Example**

- (i) Indirect Material, Indirect Labour.
- (ii) Direct factory expenses, Rent, power, depreciation, repairs, lighting, heating incurred in the factory.
- (iii) Welfare & Medical expenses of factory employees.

**[b] Administrative Overheads/Office Overheads:** It consists of all expenses incurred in formulating the policies, directing the organization and controlling the operations of an undertakings.

**Example**

- (i) Office expenses, including rent, tax, lighting, printing, stationary, insurance, postage, telegram, telephone etc.
- (ii) Bank charges.

**[c] Selling Overhead:** It is the cost of seeking to create and stimulate demand and of securing orders. In other words, all expenses in securing and retaining customers for the products are selling expenses, since they have been spent on creating and maintaining demand for the product. [e.g., Salaries of sales manager, commission, traveling expenses, show room expense, expenses of sales promotion, gifts and samples etc.]

**[d] Distribution overheads:** These are the expenses concerned with the delivery and dispatch of finished goods to customers. In other words, it is expenditure incurred from the time, the product is completed until it reaches its destination.

**Example**

- (i) Salesmen, Salaries, commission, Bonus.
- (ii) Advertising.
- (iii) Warehouse rent, lighting, staff salary
- (iv) Delivery van, expenses, depreciation etc.

**Expenses excluded from costing**

The following expenses are excluded from the computation of total costs.

- (i) Capital expenditure – purchase of fixed assets. Building, plant, machinery, furniture, etc.
- (ii) Capital loss - Loss on sales of fixed assets, abnormal loss, goodwill, written off, preliminary expenses written off, loss due to strikes and lockouts.
- (iii) Transfer to any reserve, Income tax, dividend, bonus to shareholders etc.
- (iv) Expenditure of raising long term funds i.e., Discount on issue of shares, and debenture, brokerage, and underwriting commission, interest on debenture, interest on own capital etc.
- (v) Pure finance expenses – cash discount, interest on loan, interest on investment, Rent received, donations, charity, capital expenditure etc.

**Check your progress 2.1**

Classify the cost on the basis of its elements.

- (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson

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**Elements of Cost**

By grouping the above elements of cost, the following divisions of cost are obtained:

1. Prime Cost

= Direct Materials + Direct Labour + Direct Expenses.
2. Works or Factory Cost

= Prime Cost + Works or Factory Overheads.
3. Cost of production

= Works Cost + Administration Overheads.
4. Total Cost or Cost of Sales

= Cost of production + Selling and Distribution Overheads.
- The difference between the cost of sales and selling price represents profit or loss.

**Illustration 2.1**

Ascertain the prime cost, works cost, cost of production, total cost and profit form the under mentioned figures:

Direct Materials Rs. 5,000; Direct Labour Rs.3,000; Direct Expenses Rs.500; Factory Expenses Rs.1,500;Administration Expenses Rs.800; Selling Expenses Rs.700 and Sales Rs.15,000.

**Solution 02.01**

Particulars	Rs.
Direct Materials	5,000
Direct Labour	3,000
Direct Expenses	500
<i>Prime Cost</i>	8,500
ADD: Factory Expenses	1,500

<b>Works Cost</b>	
ADD: Administration Expenses	10,000
	800
<b>Cost of Production</b>	
ADD: Selling Expenses	10,800
	700
<b>Cost Of Sales /Total cost</b>	11,500
Profit	3,500
Sales	15,000

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## 2.5 METHODS OF COSTING

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The method of costing refers to a system of cost ascertainment and cost accounting. Industries differ in their nature, in the products they produce and the services they offer. Hence, different methods of costing are used by different industries. For example, the method of costing employed by a building contractor is different from that of a transport company.

Job costing and process costing are the two basic methods of costing. Job costing is suitable to industries which manufacture or execute the work according to the specifications of the customers. Process costing is suitable to industries where production is continuous and the units produced are identical. All other methods are combinations, extensions or improvements of these basic methods. The methods of costing are explained in detail.

### 1. Job costing

It is also called specific order costing. It is adopted by industries where there is no standard product and each job or work order is different from the others. The job is done strictly according to the specifications given by the customer and usually the job takes only a short time for completion. The purpose of job costing is to ascertain the cost of each job separately. Job costing is used by printing presses, motor repair shops, automobile garages, film studios, engineering industries etc.

### 2. Contract costing

It is also known as terminal costing. Basically, this method is similar to job costing. However, it is used where the job is big and spread over a long period of time. The work is done according to the specifications of the customer. The purpose of contract costing is to ascertain the cost incurred on each contract separately. Hence a separate account is prepared for each contract. This method is used by firms engaged in ship building, construction of buildings, bridges, dams and roads.



### **3. Batch costing**

It is an extension of job costing. A batch is a group of identical products. All the units in a particular batch are uniform in nature and size. Hence each batch is treated as a cost unit and costed separately. The total cost of a batch is ascertained and it is divided by the number of units in the batch to determine the cost per unit. Batch costing is adopted by manufacturers of biscuits, ready made garments, spare parts medicines etc.

### **4. Process costing**

It is called continuous costing. In certain industries, the raw material passes through different processes before it takes the shape of a final product. In other words, the finished product of one process becomes the raw material for the subsequent process. Process costing is used in such industries.

A separate account is opened for each process to find out the total cost as well as cost per unit at the end of each process. Process costing is applied to continuous process industries such as chemicals, textiles, paper, soap, lather etc.

### **5. Unit costing**

This method is also known as single or output costing. It is suitable to industries where production is continuous and units are identical. The objective of this method is to ascertain the total cost as well as the cost per unit. A cost sheet is prepared taking into account the cost of material, labour and overheads, Unit costing is applicable in the case of mines, oil drilling units, cement works, brick works and units manufacturing cycles, radios, washing machines etc.

### **6. Operating costing**

This method is followed by industries which render services. To ascertain the cost of such services, composite units like passenger kilometers and tone kilometers are used for ascertaining costs. For example, in the case of a bus company, operating costing indicates the cost of carrying a passenger per kilometer. Operating costing is adopted by airways railways, road transport companies (goods as well as passengers) hotels, cinema halls, power houses etc.

### **7. Operation costing**

This is a more detailed application of process costing. It involves costing by every operation. This method is used where there is mass production of repetitive nature involving a number of operations. The main purpose of this method is to ascertain the cost of each operation. For instance, the manufacture of handles for bi-cycles involves a number of operations such as cutting steel sheets into proper strips, moulding, machining and finally polishing. The cost of these operations may be found out separately. Operation costing provides a minute analysis of costs to achieve accuracy and it is applied in industries such as spare parts, toy making and engineering.

## **8. Multiple Costing**

It is also known as composite costing. It refers to a combination of two or more of the above methods of costing. It is adopted in industries where several parts are produced separately and assembled to a single product.

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## **2.6 TECHNIQUES OF COSTING**

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In addition to different methods of costing, the following techniques are used for the purpose of ascertaining costs.

### **1. Historical costing**

In this, actual costs are ascertained after they have been incurred. This is a conventional method of cost ascertainment.

### **2. Direct costing**

The ascertainment of direct costs in respect of department, product or process. This is the aggregate of marginal cost and a portion of fixed cost that are identifiable with the product or process. Direct costs are, therefore, traceable costs.

### **3. Absorption costing**

It is also known as total cost approach. Under this technique, all costs, both fixed and variable are charged to product, process or operations. It is useful in submitting tenders, preparing job estimates etc.

### **4. Uniform costing**

It is the use of some costing principles and methods by several concerns for common control or comparison of costs.

### **5. Marginal costing**

It classifies cost into fixed and variable and only variable costs are charged to product. This type of costing is useful in taking important decisions such as price decisions in time of competition make or buy decisions, selecting profitable product mix etc.

### **6. Standard costing**

Standard cost is predetermined cost. The costs are determined in advance of production. Standard performance is set in terms of costs. Actual costs are compared with the standards and variations are found. Then, reasons for variations are investigated and remedial actions are taken. This system enables control of costs and also measurement of efficiency of operations.

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## 2.7 LET US SUM UP

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Cost on element can be found at different levels. Cost at factory, administrative cost, selling and distribution cost. Direct cost can be calculated in order to know the cost at different levels for cost control purpose. Not only that cost can be classified into various ways namely cost by time, cost by function, cost by planning and control, cost by variability, cost by capital and revenue. Each and every classification has its own purpose. Costing method differ from industry to industry according to the nature of productive process.

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## 2.8 LESSON – END ACTIVITIES

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1. Classify and describe the different elements of cost.
2. What do you understand by the terms “Prime cost” and ‘overhead’?
3. Write short notes on:
  - a. Cost centre b) profit centre c) material d) labour
4. Explain the methods of Costing.
5. Explain the different techniques of costing.

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## 2.9 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

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### Check Your Progress ‘Answers’ 02.01

The three basic elements of cost are material, labour and expenses and they are further classified into direct and indirect. Direct costs are collectively refereed as prime cost and indirect cost are collectively known as overheads.

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## 2.10 SUGGESTED READING/REFERENCES/SOURCES

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
3. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
4. Alex K., Cost Accounting, ARR publications
5. Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education.

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## **LESSON-3**

### **COST SHEET**

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#### **Contents:**

- 3.0 Aims and objectives
- 3.1 Introduction
- 3.2 Meaning and definition of cost sheet
- 3.3 Purpose of cost sheet
- 3.4 Specimen of cost sheet
- 3.5 Cost sheet and production Account
- 3.6 Cost sheet and production statement
- 3.7 Treatment of stocks
- 3.8 Important points to be remembered
- 3.9 Illustrations
- 3.10 Let us Sum Up
- 3.11 Lesson-end Activities
- 3.12 Model Answers to “Check your Progress”
- 3.13 Suggested Reading/References/Sources

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### **3.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should be able to:

- To study the meaning and definition of cost sheet.
- To understand the treatment of stocks.
- To learn and work out cost sheet.

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### **3.1 INTRODUCTION**

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One of the core objectives of cost accounting is ascertainment of cost of product or service. The simplest way to finding the cost of product or service is cost sheet. A cost sheet is a statement prepared to show the different elements of cost. Preparation of cost sheet is one of the functions of cost accounting.

3.2 MEANING AND DEFINITION OF COST SHEET

The expenses of a product are analysed under different heads in the form of statement. This statement is called cost sheet.

Walter & Bigg define, “The expenditure which has been incurred upon production for a period is extracted from the financial books and the store records, and set out in a memorandum or a statement. If this statement is confined to the disclosure of the cost of the units produced during the period, it is termed as a cost sheet”. In other words cost sheet is a statement showing the total cost under proper classification in a logical order.

3.3 PURPOSE OF COST SHEET

- 1. It provides details of total cost under logical classification.
- 2. It provides cost per unit in difference stages.
- 3. It helps in comparison and control of cost.
- 4. Cost sheet is helpful in estimation of cost for preparation of tender and quotations.
- 5. It acts as basis for fixation of selling price.

3.4 SPECIMEN OF COST SHEET

COST SHEET FOR THE PERIOD \_\_\_\_\_

Production \_\_\_\_\_ Units

		Total Cost Rs.	Cost per unit Rs.
Add: Less:	Direct Material Consumed:		
	Opening stock		
	Purchases		
	Closing Stock	—	
	Cost of drawings	—	
	Direct Expenses	—	
	Primary Packing materials	—	
	PRIME COST	xxx	xxxx
Add:	Works / Factory overheads:	—	—
	Indirect Materials	—	
	Indirect Wages	—	
	Factory Rent and Rates	—	

	Factory Lighting and Heating	—	
	Power and Fuel	—	
	Repairs and Maintenance	—	
	Drawing Office Expenses	—	
	Research and Experiment cost	—	
	Depreciation of Factory Plant	—	
	Works Stationery	—	
	Insurance of factory	—	
	Works Manager's salary	—	
	<b>WORKS COST/FACTORY COST/ MANUFACTURING COST</b>	xxx	xxxx
Add:	Office and Administrative Overheads:	—	
	Office salaries	—	
	Office Rent and Rates	—	
	Lighting and Heating	—	
	Cleaning	—	
	Telephone and Postages	—	
	Printing and Stationery	—	
	Depreciation of office Furniture	—	
	Depreciation of office Equipment	—	
	Insurance	—	
Add:	Legal Expenses	—	
	<b>COST OF PRODUCTION</b>	xxx	xxxx
	Selling and Distribution Overhead:	—	
	Advertising	—	
	Salesmen Salaries	—	
	Samples and Free gifts	—	
	Sales Office Rent	—	
	Sales Promotion Expenses	—	
	Packing and Demonstration	—	
	Showroom Rent and Rates	—	
	Commission	—	
	Traveling Rent and Rates	—	
	Warehouse Rent and Rates	—	
	Repair of Delivery vans	—	
	Carriage freight Outwards etc.	—	
	<b>COST OF SALES</b>	xxx	xxxx

**Prime cost:** This is also called direct cost. It is the aggregate of direct materials direct labour and direct expenses, which are easily identifiable with the product.

**Work cost:** It consists of the total of all items of expenses incurred in the manufacturing of a product, viz., prime cost plus factory expenses. It is also known as factory cost or manufacturing cost.

**Cost of Production:** This includes work cost and administration expenses. Production is not deemed to be complete without the managerial and facilitating costs.

**Cost of Sales:** It represents cost of production plus selling and distribution cost incurred. Thus, the cost of sales is the aggregate of all the direct and indirect costs connected to the goods sold.

When profit is added to the cost of sales, sales can be found. Usually, selling prices are fixed on the basis of the cost of sales. It ensures that all the costs are recovered and any desired profit is also obtained.

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### 3.5 COST SHEET AND PRODUCTION ACCOUNT

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Cost sheet is a statement of total cost under different classifications of costs. The classification of cost is done on the basis of elements of cost, functions and behaviour of cost. The total cost in the form of cost of sales and cost per unit is revealed.

On the other hand, the cost, sales, and profits presented in the form of a ledger account is known as production account or manufacturing account. The debit side of the account is shown with opening stock, expenses and the credit side is shown with closing stock and sales. The balancing figure is either profit or loss.

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### 3.6 COST SHEET AND PRODUCTION STATEMENT

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The cost of output can be ascertained from the statement known as cost sheet. The items of various costs are extracted from financial books and presented in logical order. Thus, total cost of a cost centre or cost unit is shown in the cost sheet.

When sales, stocks and profits are included in the cost sheet it is called production statement. Bigg has defined it as “The expenditure which has been incurred upon production for a period is extracted from the financial books and stores records and set out in a memorandum statement. If the statement is confined in the disclosure of the cost of the units produced during the period it is termed as cost sheet, but where the statement records, cost, sales and profit it is usually known as production or output statement or account”. However the modern practice is to extend the cost sheet to show profit and sales also and call it “statement of cost and profit”.

3.7 TREATMENT OF STOCKS

3.7.1 Stocks of Raw materials

When opening stock of raw materials, purchase of raw materials and closing stock of raw materials are given, raw materials consumed can be calculated as follows:

			Rs.
	Opening stock of raw materials		xxx
Add:	Purchase of raw materials		xxx
Add:	Carriage inwards		xxx
Add:	Other direct materials used		xxx
Add:	Taxes and duties on the material purchased		xxx
			xxx
Less :	Closing stock of raw materials	xxx	
Less :	Sale of unsuitable raw materials	xxx	
Less :	Sale of scrap of raw materials	xxx	xxx
	Cost of raw materials consumed		xxx

3.7.2 Stock of Work – in – Progress

‘Work-in-progress’ means units of production on which work has been done but are not yet completely finished. Work-in-progress is valued on prime cost or works cost basis but the latter is preferred. The opening and closing work in-progress are adjusted as given below:

	Prime cost		Xxx
Add:	Factory overhead		Xxx
Add:	Opening work-in-progress		Xxx
Less:	Closing work-in-progress		Xxx
	Works cost		Xxx

3.7.3 Stock of Finished Goods

If opening and closing stocks of finished goods are given they are to be adjusted to find out cost of production of goods sold.

			Rs.
	Cost of production		xxx
Add:	Opening stock of finished goods		xxx
			xxx
Less:	Closing stock of finished goods		xxx
	Cost of production of goods sold		xxx

Specimen of Cost sheet, with inventories



Statement of Cost and Profit (with stocks)

	Particulars		Rs.	Rs.
Add:	Opening stock of direct materials		xxx	
	Purchase of direct materials		xxx	
	Expenses, taxes and duties on materials purchased		xxx	
			xxx	
Less:	Closing stock of direct materials	xxx		
	Direct material scrap sold	xxx	xxx	
	Cost of direct material consumed			xxx
	Direct wages			xxx
	Direct or chargeable expenses			xxx
	<b>Prime cost</b>			xxxx
Add:	Factory overhead			xxx
				xxx
Add:	Opening work-in-progress			xxx
				xxx
Less:	Closing work-in-progress			xxx
	<b>Works cost (or) Factory cost</b>			xxxx
Add:	Administration overheads			xxx
	<b>Cost of production</b>			xxxx
Add:	Opening stock of finished goods			xxx
				xxx
Less:	Closing stock of finished goods			xxx
	<b>Cost of goods sold</b>			xxxx
Add:	Selling and distribution overheads			xxx
	<b>cost of sales</b>			xxxx
Add:	Profit / Less: loss			xxx
	<b>Sales</b>			xxxx

3.8 IMPORTANT POINTS TO BE REMEMBERED

1 Alternative term are used for many items in cost sheet

The following are some of them:

- |    |                         |   |
|----|-------------------------|---|
| a. | Direct Labour           | - Direct wages, Production wages, Productive wages, Productive labour |
| b. | Direct expenses         | - Chargeable expenses   |
| c. | Overhead                | - ‘On-cost’, ‘Burden’   |
| d. | Factory overhead        | - Works-overhead, production overhead, manufacturing overhead         |
| e. | Factory cost            | - Works cost, Manufacturing cost                                      |
| f. | Administrative overhead | - Office overhead   |

**2 Valuation of Stocks of Finished Goods**

When details of units produced and sold are available, the closing stock of finished units can be valued at ‘current cost of production’.

**Value of closing stock units** =  $\frac{\text{Cost of production}}{\text{Units produced}}$  x Closing stock units

If value of opening stock units is not given, they can also be valued on the current cost basis, assuming that costs in the pervious period were similar to the current period.

**3 Sale of Material Scrap**

It can direct material scrap and can be shown as a deduction from direct material cost. It may also be indirect material scrap in which case it has to be reduced from the factory overhead cost.

When there is no indication, either method can be followed by stating the assumption.

**4 Items excluded from cost accounts**

(a) Purely financial expenses and losses like interest on loans and debentures, loss on sale of investments and fixed assets, cash discount.(b) Provisions like provision for income tax, provision for doubtful debts.(c) Capital expenses and losses written off like goodwill, preliminary expenses, discount on issue of shares, etc.(d) Appropriations like dividends paid transfer to reserves.

**5 Profit given as percentage of selling price**

Usually profit is added to the cost of sales to ascertain the sale price. If profit percentage is given on sales, it must be converted to percentage on cost.

For example if profit is 20% on sale.

Sales is 100; profit 20, Therefore, the Cost will be = 100-20 = 80

Profit to cost  $\frac{20}{80} = \frac{1}{4}$  (or) 25%

**Check your progress 03.01**

Explain the following terms:

- (i) Prime cost (ii) Work cost (iii) Cost of production (iv) Cost of sales

Notes: (a) Write your answer in the space given below.

- (b) Check your answer with the ones given at the end of this Lesson

.....  
.....  
.....  
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### 3.9 ILLUSTRATIONS

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**Illustration 03.01**

Calculate Prime Cost, Factory Cost, Cost of Production, Cost of Sales and Profit from the following details:

Direct Materials	Rs.	10,000
Direct Labour	Rs.	4,000
Direct Expenses	Rs.	500
Factory Expenses	Rs.	1,500
Administrative Expenses	Rs.	1,000
Selling Expenses	Rs.	300
Sales	Rs.	20,000

**Solution 3.1**

<b>Prime Cost</b>	=	Direct Materials + Direct Labour + Direct Expens
(Rs.14,500)	=	Rs. 10,000 + Rs. 4,000 + Rs.500
<b>Works Cost</b>	=	Prime Cost + Factory Expenses
(Rs.16,000)	=	Rs. 14,500 + Rs.1,500
<b>Cost of Production</b>	=	Works Cost + Administrative Expenses
(Rs.17,000)	=	Rs. 16,000 + Rs.1,000
<b>Total Cost</b>	=	Cost of Production + Selling Expenses
(Rs.17,300)	=	Rs.17,000 + Rs.300
<b>Profit</b>	=	Sales – Total Cost
(Rs.2,700)	=	Rs. 20,000 – Rs.17,300

**Illustration 3.2**

Draw a statement of cost form the following particulars:

Opening Stock:		<b>Rs.</b>
	1. Materials	2,00,000
	2. Work-in-progress	60,000
	3. Finished goods	5,000
Closing Stock:	1. Materials	1,80,000
	2. Work-in-progress	50,000
	3. Finished goods	15,000
Materials purchased		5,00,000
Direct Wages		1,50,000
Manufacturing expenses		1,00,000
Sales		8,00,000
Selling and distribution expenses		20,000

Solution 3.2

Statement of Cost

		Rs.	Rs.
Add:	Opening stock of materials	2,00,000	
	Purchase of materials	5,00,000	
		7,00,000	
Less	Closing stock of materials	1,80,000	
	Materials consumed:		5,20,000
	Direct Wages		1,50,000
	<b>Prime Cost</b>		6,70,000
Add:	Manufacturing expenses		1,00,000
			7,70,000
Add:	Opening stock of work-in-progress		60,000
			8,30,000
Less:	Closing stock of work-in-progress		50,000
	<b>COST OF PRODUCTION (work cost)</b>		7,80,000

Statement of Profit

			Rs.
Add:	Good manufacture		7,80,000
	Opening stock of finished goods		5,000
			7,85,000
Less:	Closing stock of finished goods		15,000
			7,70,000
Add:	Selling and distribution expenses		20,000
	<b>Total Cost</b>		7,90,000
	<b>Net Profit</b>		10,000
	<b>Sales</b>		8,00,000

Illustration 3.3

The following data relate to the manufacture of a product during the month of January

Raw materials consumed Rs.80,000

Direct Wages Rs.48, 000

Machine hour worked 8,000

Machine hour rate Rs.4

Office overhead 10% of works cost

Selling overhead Rs.1.50 Per unit

Unit produced 4,000

Units sold 3,600 at Rs.50 each.

Prepare cost sheet and show (a) cost per unit and (b) profit for the period.

**Solution 3.3**

**Cost sheet for January** (output: 4,000 Units)

	Total Cost Rs.	Cost per Unit Rs.
Raw Materials	80,000	20,00
Direct Wages	48,000	12,00
<b>Prime Cost</b>	<b>1,28,000</b>	<b>32,00</b>
Add: Factory Overhead (8,000 x Rs.4)	32,000	8,00
<b>Works Cost</b>	<b>1,60,000</b>	<b>40.00</b>
Add: Office overhead (10% of work cost)	16,000	4.00
<b>Cost of production</b>	<b>1,76,000</b>	<b>44.00</b>

**Statement of Profit (3,600 units sold)**

	Rs.	Rs.
Cost of Production (3,600 x Rs.44)	1,58,400	44.00
Add: Selling Overhead (3,600 x Rs.1.50)	5,400	1.50
Cost of Goods Sold	1,63,800	45,50
Add: Profit	16,200	4.50
Sales (3,600 x Rs.50)	1,80,000	50.00

(a) Cost per unit = Rs.44 (b) Total Profit = Rs.16,200

Note: Cost Sheet discloses the total cost and the cost per unit during the given period.

**Illustration 3.4**

From the following particulars prepare a statement showing the components of the total sales and the profit for the year ended 31<sup>st</sup> December.

	Rs.
Stock of finished goods (1 <sup>st</sup> Jan.)	6,000
Stock of raw materials (1 <sup>st</sup> Jan.)	40,000
Work-in-progress (1 <sup>st</sup> Jan.)	15,000
Purchase of raw materials	4,75,000
Carriage inwards	12,500
Factory rent, taxes	7,250
Other production expenses	43,000
Stock of goods (31 <sup>st</sup> Dec.)	15,000
Wages	1,75,000

Work manager’s salary	30,000
Factory employees’ salary	60,000
Power expenses	9,500
General expenses	32,500
Sales for the year	8,60,000
Stock for the year [Raw Materials]	50,000
Work-in-progress (31 <sup>st</sup> Dec.)	10,000

Solution 3.4

Cost Sheet for the year ending 31<sup>st</sup> Dec.

		Rs.	Rs.
Add:	Stock of raw materials on 1 <sup>st</sup> Jan.	40,000	
	Purchase during the year	4,75,000	
		5,15,000	
Less:	Stock of materials on 31 <sup>st</sup> Dec.	50,000	
	Cost of materials consumed		4,65,000
Add:	Wages		1,75,000
	Carriage inwards		12,500
	<b>Prime Cost</b>		6,52,500
Add:	Factory on cost:		
	Works manager’s salary	30,000	
	Factory employees’ salary	60,000	
	Factory rent, taxes and insurance	7,250	
	Power expenses	9,500	
	Other production expenses	43,000	1,49,750
			8,02,250
Add:	Works-in-progress 1 <sup>st</sup> Jan.		15,000
			8,17,250
Less:	Works-in-progress 31 <sup>st</sup> Dec.		10,000
	<b>Factory Cost</b>		8,07,250
Add:	Office on cost:		
	General expenses		32,500
	<b>Total Cost</b>		8,39,750
Add:	Stock of finished goods 1 <sup>st</sup> Jan.		6,000
			8,45,750
Less:	Stock of Finished goods 31 <sup>st</sup> Dec.		15,000
			8,30,750
	<b>Cost of sales</b>		
	<b>Profit</b>		29,250
	<b>Total sales</b>		8,60,000

Illustration 3.5

From the following particulars prepare a cost sheet showing the total cost per tonne for the period ended 31<sup>st</sup> Dec 2007

	Rs		Rs.
Raw materials	33000	Water supply (works)	1200
Direct wages	38000	Rent (office)	500
Indirect wage	10500	Factory insurance	1100
Factory Rent	5000	Office insurance	500
Factory Rate	2500	Legal expenses	400
Factory lighting	2200	Rent of warehouse	300
Factory heating	1500	Depreciation of :	
Motive power	4400	-Machinery	2000
Haulage (works)	3000	-Office building	1000
Directors fees (works)	1000	- Delivery vans	200
Directors fees(office)	2000	Bad debts	100
Factory cleaning	500	Advertising	300
Office expenses	200	Salesmen’s salary	1500
Estimation expenses (work)	800	Repairs of delivery vans	700
Factory stationary	750	Bank charges	50
Office stationary	900	Commission on sales	1500
Loose tool written off	600		

The total output for the period has been 10,000 tonnes.

Solution 3.6

Cost sheet (for the year ended 31<sup>st</sup> Dec. 2007)

Particulars	Rs	Cost Rs.
Raw materials		33000
Direct wages		38000
PRIME COST		71000
Add : Factory overheads		
Indirect wages	10500	
Factory rent	5000	
Factory rate	2500	
Factory Lightning	2200	
Factory heating	1500	
Motive power	4400	
Haulage	3000	

Director fees	1000	
Factory cleaning	500	
Estimation exp(works)	800	
Factory Stationary	750	
Loose tools written off	600	
Water supply	1200	
Depreciation of machinery	2000	
Factory insurance	1100	37050
FACTORY COST		108050
<b>Add: Office and admin expenses</b>		
Director fees	2000	
Office expenses	200	
Office Stationary	900	
Rent and taxes	500	
Office Insurance	500	
Legal Expenses	400	
Office building-depreciation	1000	
Bank Charges	50	5550
COST OF PRODUCTION		113600
<b>Add: Selling and Distribution expenses</b>		
Rent of Warehouse	300	
Depreciation of Delivery van	200	
Bad debt	100	
Advertising	300	
Salesmen salary	1500	
Repairs of delivery van	700	
Commission on sales	1500	4600
COST OF SALES		118200

$$\begin{aligned}
\text{Cost per tone} &= \frac{\text{Total cost}}{\text{Output(tonns)}} \\
&= \frac{118200}{10000} \\
&= 11.82
\end{aligned}$$

**Check your progress 3.2**

From the following data prepare a cost sheet:



Particulars	Rs.	Particulars	Rs.
Direct Materials	1,00,000	Factory overheads	60,000
Direct wages paid	80,000	Administrative overheads	70,000
Direct expense	20,000	Selling and Distribution	
		overheads	48,000

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

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### 3.10 LET US SUM UP

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Cost sheet shows the elements of cost at different levels. Work-in-progress at the beginning and at the end adjusted in factory cost. We can take cost as the base for preparing quotation foe a job. Overheads are absorbed on the basis of the information given in cost sheet. Expenses and losses are purely financial nature, capital, expenses and less written off and appropriations are not taken into consideration while preparing cost sheet.

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### 3.11 LESSON – END ACTIVITIES

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- What is cost sheet?
- What are the purposes of cost sheet?
- What do you understand overhead?
- Write short notes on:
 

(i) Prime cost

(ii) Work cost

(iii) Work-in-progress

(iv) Cost of production

(v) Cost of sales.
- From the following information prepare a cost sheet for the month of January

	Rs.
Stock of raw materials on 1 <sup>st</sup> January	25,000
Stock of raw materials on 31 <sup>st</sup> January	26,200
Purchase of raw materials	21,900
Carriage on purchases	1,100
Sale of finished goods	72,300
Direct wages	17,200
Non-productive wages	800
Direct expenses	1,200
Factory overheads	8,300
Administrative overheads	3,200
Selling overheads	4,200

6. The Sivika Co. Ltd. has received an enquiry for supply of 10,000 steel folding chairs. The costs are estimated as under:

Raw Materials	-	1,00,000 Kgs. at Rs.1 per Kg.
Direct Wages	-	10,000 hours at Rs.4 per hour.
Variable Overheads	:	Factory Rs.2.40 per labour hour Selling and Distribution Rs.16,000.
Fixed Overheads	:	Factory Rs.6,000 Selling and Distribution Rs.14,000

Prepare statement showing the price to be fixed which will result in a profit of 20 per cent on selling price.

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### 3.12 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

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#### Check Your Progress ‘Answers’ 03.01

**Prime cost:** This is also called direct cost. It is the aggregate of direct materials direct labour and direct expenses, which are easily identifiable with the product.

**Work cost:** It consists of the total of all items of expenses incurred in the manufacturing of a product, viz., prime cost plus factory expenses. It is also known as factory cost or manufacturing cost.

**Cost of Production:** This includes work cost and administration expenses. Production is not deemed to be complete without the managerial and facilitating costs.

**Cost of Sales:** It represents cost of production plus selling and distribution cost incurred. Thus, the cost of sales is the aggregate of all the direct and indirect costs connected to the goods sold.

**Check Your Progress ‘Answers’ 03.02**

*Prime cost Rs.2,00,000; Factory Cost Rs.2,60,000; Cost of production Rs.3,30,000;  
Cost of Sales Rs. 3,78,000*

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**3.13 SUGGESTED READING/REFERENCES/SOURCES**

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- 1 Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
- 2 Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
- 3 Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
- 4 Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education
- 5 Jesse T.Barfield, Cecily A. Raiborn and Michael R. Kinney, Cost Accounting Traditions and Innovations, West Publishing company.

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## LESSON-4

### TENDER & QUOTATION

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#### Contents:

- 4.0 Aims and objectives
- 4.1 Introduction
- 4.2 Steps in Preparation of Tender and Quotations
- 4.3 Illustration
- 4.4 Let us Sum Up
- 4.5 Lesson-end Activities
- 4.6 Model Answers to “Check your Progress”
- 4.7 Suggested Reading/References/Sources

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#### 4.0 AIMS AND OBJECTIVES

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After you have studied this lesson, you should be able to:

- Know the meaning of tender and quotation
- Solve the problems on tender and quotation

---

#### 4.1 INTRODUCTION

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Frequently the manufacturers of consumer's durables and capital goods are asked to quote the price at which they can supply their output. The price at which the items of output are offered for sale is known as 'tender' or 'quotation' price. The tender has to be prepared carefully since it may be accepted and goods have to be supplied in future at the quoted rate.

---

#### 4.2 STEPS IN PREPARATION OF TENDER AND QUOTATIONS

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Estimation of different elements of cost has to be made. The following are the accepted norms. Frequently a manufacturer of consumer durable goods and capital goods etc. is required to quote the price at which they can supply their output. The price at which the items of output are offered for sale is known as 'tender' or 'quotation'. A tender has to be prepared very carefully and it may be accepted and goods have to be supplied in future at the quoted price.

In order to prepare a tender the following details are to be analyzed.

1. Raw material
2. Direct labour
3. Direct expenses (or) chargeable expenses
4. Factory/ work overheads
5. Office and administration overheads
6. Selling & Distribution overheads
7. Estimated profit

Estimation of different elements of cost has to be made. Direct material cost & direct labour cost is generally estimated on the basis of cost per unit of preceding period, subject to fluctuations in market price of material and labour rate.

Over heads are estimated on the basis of past experience as a percentage as given below.

$$1. \text{ Percentage of factory overheads to direct wages} = \frac{\text{Factory overheads}}{\text{Direct wages}} \times 100$$

$$2. \text{ Percentage of office \& administration overheads to works cost} \\ = \frac{\text{office and Administration overheads}}{\text{work cost}} \times 100$$

$$3. \text{ Percentage of selling and distribution overheads} \\ = \frac{\text{Selling \& Distribution Overheads}}{\text{Work cost}} \times 100$$

#### **Estimation of profit:**

Some times profit is given as percentage of cost (profit on cost). In that cost profit for the tender (or) question is ascertained as given below.

$$\text{Profit} = \text{Cost of sales} \times \frac{\text{Percentage of profit}}{100}$$

when profit is to be determined as a percentage of selling piece (profit on selling piece) of the tender or quotation. The profit is to be calculated as given below.

$$\text{Profit} = \frac{\text{Cost of sales} \times \text{Rate of profit on Sales}}{100 - \text{Rate percentage on sales}}$$

#### **Standard assumption:**

In the context of tender or quotations, the following assumptions can be made if nothing contrary is given in the problem.

- (a) Factory / work overheads to direct wages ratio of the preceding period holds good for current period also
- (b) Office and Administrative overhead to work/ factory cost ratio of the previous period is applicable in current period also.

4.3 ILLUSTRATION

Illustration 4.1

The accounts of a machine manufacturing company disclose the following information for six months ending 31<sup>st</sup> December, 2005.

Particulars	Rs.
Materials used	1,50,000
Direct wages	1,20,000
Factory Overheads	30,000
Administrative expenses	15,000

Prepare cost sheet of the half year and calculate the price which the company should quote for the manufacture of a machine requiring materials value at Rs.1,250 and expenditure in productive wages Rs.750so that the price might yield a profit of 20 % of the selling price.

Solution 4.1

Statement of Cost for the six months ending 31-12 - 2005

Particulars	Rs.
Materials	1,50,000.
Direct Wages	<u>1,20,000</u>
<b>Prime Cost</b>	2,70,000
ADD: Factory Overheads	<u>30,000</u>
<b>Works Cost</b>	3,00,000
ADD: Administrative Overheads	<u>15,000</u>
<b>Cost of Production</b>	315,000

Percentage of factory overheads to wages = 30,000/ 1, 20,000 X 100 = 25 %

Percentage of Administrative Overheads to works cost = 15,000/3, 00,000 X 100 = 5 %]

Statement showing price to be quoted for a machine

Particulars	Rs.
Materials	1,250.00
Direct Wages	750.00
<b>Prime Cost</b>	2,000.00
ADD: Factory Overheads [25 % of wages - Rs.750 x 25 %]	<u>187.50</u>
<b>Works Cost</b>	2,187.50

ADD: Administrative Overheads [5 % of Works cost Rs.2,187.50 x 5 %]	109.38
<b>Cost of Production</b>	2,296.88
ADD: Profit [20 % on sales or 25 % on cost 2.296.88 X 25 % ]	574.22
<b>Sales price to be quoted</b>	2,871.10

**Illustration 4.2**

From the following particulars you are required to prepare a statement showing (a) the cost of Materials Consumed (b) Prime Cost (c) Works Cost (d) Total Cost (e) the percentage of works overheads to productive wages and (f) the percentage of general overheads to works cost.

Stock of Finished Goods on 1-1-2008	72,800
Stock of Raw Materials on 1-1-2008	33,280
Purchases of Raw Materials	7,59,200
Sales of Finished Goods	15,39,200
Productive Wages	5,16,880
Stock of Finished Goods on 31-12-2008	78,000
Stock of Raw Materials on 31-12-2008	35,360
Works overhead Charges	1,29,220
Office and general Expenses	70,161

The company is about to send a tender for a large plant. The Costing Department estimated that the materials required would cost Rs.52,000 and the wages to workmen for making the plant would cost Rs.31,200. The tender is to be made at a net profit of 20% on the selling price. Show what the amount of tender would be if based on the above percentages.

**Solution 4.2**

**STATEMENT OF COST**

<b>Raw Materials (opening stock)</b>	33,280
Add: Purchase of Raw Materials	7,59,200
	-----
	7,92,480
Less: Raw Material(closing stock)	35,360
	-----
(a) Material consumed	7,57,120
Productive wages	5,16,880

(b) Prime Cost	12,74,000
Works overhead charges	1,29,220
(c) Works Cost	14,03,220
Office and General Expenses	70,161
(d) Cost of production	14,73,381
(e) Percentage of Works Overhead Charges to Productive Wages = $\frac{1,29,220}{5,16,880} \times 100 = 25\%$	
(f) Percentage of Office and General Expenses to Works Cost = $\frac{70,161}{14,03,220} \times 100 = 5\%$	

#### ***TENDER FOR A LARGE PLANT***

	Rs
Raw Materials	52,000
Wages	31,200
Prime Cost	83,200
Works overhead (25% of wages)	7,800
Works Cost	91,000
Office and General Expenses(5% of works cost)	4,550
Cost of Production	95,550
Profit (1/4 of cost of production)	23,888
Tender Price	1,19,438

#### **ILLUSTRATION 4.3**

On 15th August 2008, the New India Cycle Manufacturing Co., was required to quote for a contract for the supply of 500 bicycles. From the following details, prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realized during the six months to 30th June, 2008.

	Rs		Rs
Stock of materials on 1st Jan.2008	50,000	Indirect charges during 6 months to 30th June 2008	25,000
Stock of materials			



30th June,2008	7,000	Completed stock-in-hand on 1st Jan.2008	Nil
Purchase of materials during 6 months			
30th June,2008	75,000	Completed stock-in-hand on 30th June,2008	50,000
Direct wages for six months to 30th June,2008			1,50,000

The number of bicycles manufactured during the six months was 2,000 including those sold and those in stock at the end of the period. The bicycles to be quoted for are to be of uniform size and quality and similar to those manufactured during the six months to 30th June,2008.As from 1st August, the cost of factory labour has increased by 10% and that of materials by 15%.Sales during six months to 30th June,2008,were Rs 2,70,000.

**SOLUTION 4.3**

STATEMENT OF COST			
for the half year ended 30th June,2008			
		(No.of cycles 2,000)	
		Total	Per cycle
		Rs	Rs
Opening Stock of Material	50,000		
Add: Purchase of Material	75,000		
	-----		
	1,25,000		
Less: Closing of Material	7,000		
	-----		
Material Used		1,18,000	59.00
Direct Wages		1,50,000	75.00
		-----	-----
Prime Cost		2,68,000	134.00
Indirect charges		25,000	12.50
		-----	-----
Cost of Production		2,93,000	146.50
Less: Completed stock in hand		50,000	
		-----	
Cost of goods sold		2,43,000	
Profit(10% on sales)		27,000	
		-----	
Sales		2,70,000	
		-----	
Percentage of Indirect Charges on Direct wages =			
	Indirect charges	25,000	
	----- X 100	= -----	x 100 = 16.67%
	Direct wages	1,50,000	

STATEMENT OF COST FOR TENDER OF 500 CYCLES		
	Per Unit	Total
	Rs	Rs
Material (Rs.59 + 15% of Rs.59)	67.85	33,925
Direct wages (Rs.75 + 10% of Rs.75)	82.50	41,250
	-----	-----
Prime Cost	150.35	75,175
Indirect charges (1/6 of wages)	13.75	6,875
	-----	-----
Cost of Production	164.10	82,050
Profit (10% on sales or 1/9 of cost of production)	18.23	9,117
	-----	-----
Amount of Tender	182.33	91,167
	=====	=====

**Check your progress 4.1**

On August 15, 2003 a manufacturer Sashank desired to quote for a contract for the supply of 500 radio sets. From the following details prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realized during 6 months ending on 30<sup>th</sup> June 2003:

	Rs.
Stock of materials as on 1 <sup>st</sup> Jan. 2003	20,000
Stock of materials as on 30 <sup>th</sup> June 2003	25,000
Purchases of materials during 6 months	1,50,000
Factory wages during 6 months	1,20,000
Indirect charges during 6 months	25,000
Opening stock of completed sets	Nil
Closing stock of completed sets	100
Sales during 6 months	3,24,000

The number of radio sets manufactured during these six months was 1450 sets including those sold and those stocked at the end of the period. The radios to be quoted are of uniform quality and size as were manufactured during the six months to 30<sup>th</sup> June 2003. As from August 1, the cost of factory labour has gone up by 10%.

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson

.....  
 .....  
 .....  
 .....

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**4.4 LET US SUM UP**

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The price at which, the units produced are offered for sale is known as” tender” or ‘quotation’. In tender generally we have to estimate the overhead cost based on certain formulas. The profit for the tender is calculated as percentage of tender or quotation price.

---

**4.5 LESSON – END ACTIVITIES**

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- 1. What do you mean by Tender and Quotations?
- 2. How are “Tenders” and Quotations” prepared?
- 3. The accounts of Pleasant Company Ltd. which produces refrigerators show for 2005. Materials Rs 3,50,000; Labour Rs 2,70,000; Factory overheads Rs 81,000 and Administration overheads Rs 56,080.

What price should the company quote for a refrigerator? It is estimated that Rs 1,000 in material and Rs 700 in labour will be required for one refrigerator. Absorb Factory overheads on the basis of labour and Administration overheads on the basis of works overheads and profit of 12 ½ % on selling price is required.

(Ans: Cost of production 7,57,080 ; % of factory O.H on Labour 30 % ; % of administration O.H on works cost 8 % ; Selling price quoted 2357.49 )

- 4. From the following data prepare a cost and profit statement of Popular Stoves Manufacturing Co. for the year 1994:

	Rs		Rs
Stock of materials on 1-1-1994	35,000	Establishment expenses	10,000
Stock of materials on 31-12-1994	4,900	Completed stock in hand on 1-1-1994	Nil
Purchase of materials	52,500	Completed stock in hand on 31-12-1994	35,000
Direct Wages	95,000	Sales	1,89,000
Factory expenses	17,500		

The number of stoves manufactured during the year 1984 was 4,000.

The company wants to quote for a contract for the supply of 1,000 Electric Stoves during the year 1995.The Stoves to be quoted are of uniform quality and make and similar to those manufactured in the previous year; but cost of materials has increased by 15% and cost of factory labour by 10%.

Prepare a statement showing the price to be quoted to give the same percentage of net profit as was realized during the year 1994, assuming that the cost per unit of overheads will be the same as in the previous year.

5. The account's of a manufacturing company disclose the following information for the s<sup>ix</sup> months ending 31st December,1994:

Materials used 1,50,000; direct wages Rs.1,20,000;Factory overhead Rs.30,000 and Administrative Expenses Rs.15,000.

Prepare the cost sheet of the machine and calculate the price which the company should quote for manufacture of the machine requiring materials valued Rs.1,250 and expenditure in productive wages Rs.750 so that the price might yield a profit of 20% on the selling price. [Ans: Price to be quoted Rs.2,871.10]

---

**4.6 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ 04.01**

**Statement of cost and profit of Radio sets for six month ending 30<sup>th</sup> June 2003**

Particulars	Rs	Per unit Rs
Opening stock of raw material	20,000	
(+) Purchases of material	150,000	
	170,000	
(-) Closing stock of material	25,000	
<b>Material consumed</b>	1,45,000	100
Factory wages	1,20,000	82.76
<b>Prime cost</b>	2,65,000	182.76
(+) Indirect wages	25,000	17.24
(+) Opening work-in-progress	-	
(-) Closing work-in-progress	-	
<b>Work cost</b>	2,90,000	200.00
(+) Administration overhead	-	
<b>Cost of production</b>	2,90,000	200.00
(+) Opening stock of finished goods	-	
(-) Closing stock of finished goods (100 x 200)	20,000	
<b>Cost of goods sold</b>	2,70,000	200
(+) Selling & Distribution overhead	-	
<b>Cost of sales</b>	2,70,000	200
<b>Profit</b>	54,000	40
<b>Sales (1450-100)</b>	324,000	240

**Working Note**

1.	Profit on sales	:	$\frac{Profit}{Sales} \times 100$	$\frac{54000}{324000} \times 100$	16.66%
	Profit on costs	:	$\frac{Profit}{Cost} \times 100$	$\frac{54000}{270000} \times 100$	20%
2.	Factory wages	:	Per unit	82.76	
	(+) 10% increase	:	$\left(82.76 \times \frac{10}{100}\right)$	8.28	
	Wages per unit for quotation			<u>91.04</u>	

**Statement showing quotation for 500 radio sales**

Particulars	Total	Per unit
Materials	50,000	100.00
Factory wages	45,520	91.04
<b>Prime cost</b>	95,520	191.04
(+) Indirect changes	8,620	17.24
<b>Cost of sales</b>	1,04,140	208.28
<b>Profit</b> 20% on cost $104140 \times \frac{20}{100}$	20,828	41.66
<b>sales</b>	1,24,968	249.94

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**4.7 SUGGESTED READING/REFERENCES/SOURCES**

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- 1 Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
- 2 Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
- 3 Alex K., Cost Accounting, ARR publications

## UNIT - II

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### LESSON-5

#### MATERIALS PURCHASE PROCEDURE

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##### Contents:

- 5.0 Aims and objectives
- 5.1 Introduction
- 5.2 Meaning of Materials Control
- 5.3 Need for (or objectives) of material control
- 5.4 Purchase Procedure
- 5.5 Let us Sum Up
- 5.6 Lesson-end Activities
- 5.7 Model Answers to “Check your Progress”
- 5.8 Suggested Reading/References/Sources

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#### 5.0 AIMS AND OBJECTIVES

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After you have studied this lesson, you should able to:

- Explain the meaning of material control and purchase procedure
- Explain the needs and objective of material control
- Describe the procedure relating to material control

---

#### 5.1 INTRODUCTION

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The major objective of cost accounting is cost control. Every element of cost as to be effectively controlled. Out of the three elements of the cost i.e, material, labour and overhead. Material is the first and most important elements of the cost. It is a very important factor of production. Material account more than 50% of the cost of production. As materials forms as major chunk of cost of production, it should be controlled effectively.

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## 5.2 MEANING OF MATERIAL CONTROL

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An efficient material control system can improve the input output ratio. It is an effective integration of various aspects and includes scheduling their requirements purchasing, receiving and inspection, maintaining stock records and stock control.

Material control is a system which ensures required quantity of material of the required quality at the right time and place with minimum investment of capital. It may be defined as “The regulations of function of all organization relating to the procurement storage and usage of materials in such a way as to maintain an even flow of production without excessive investment in material stock”

It is also affected by establishment of functional organization and fixation of responsibilities through standard forms of accounting records and reports.

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## 5.3 NEED FOR [OBJECTIVES] MATERIAL CONTROL

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1. Material should be continuously available for production.
2. To control of obsolescence and spoilage,
3. It is a proper control system for settlement of invoices.
4. To prevent misappropriation of material
5. To secure favorable terms of purchase.
6. To ensure proper reporting to management.
7. Avoids excessive investment in stock.
8. To achieve economy of buying and storage cost.

---

## 5.4 PURCHASE PROCEDURE

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### **Purchasing Department:**

Purchasing is the most important function of materials management. If the size of the business concerns permits, there should be a separate purchasing department. All types of purchases of materials should be entrusted to this department.

### **Function of a Purchasing Department (or Purchase Routine or Purchase Cycle)**

Following are the functions of a purchase department:

1. What to purchase?
2. When to purchase?
3. Where to purchase?
4. How much to purchase?
5. At what price to purchase?

**Centralized Vs. Decentralized Purchasing:**

Purchasing function may be centralized or decentralized.

Centralised purchasing refers to purchasing of requirements of the entire organization by one particular department. It reduces the cost of administration.

Decentralised purchasing refers to each of department in an organization buying their requirements directly.

Whether the firm should have centralized or decentralized system of purchasing is a decision to be taken after considering the merits and demerits of both the methods.

**Advantages of Centralised Purchasing:**

1. Favorable purchase terms;
2. Specialisation;
3. Avoidance of duplication;
4. Reduction of administration cost;
5. Maintenance of recorders;
6. Uniform policy.

**Demerits of centralized Purchasing:**

1. Delay in purchasing;
2. Lack of knowledge of specific departments requirements
3. Non utilization of locally available materials
4. High cost of maintaining a separate department.

**Purchase procedure or routine or cycle**

Purchasing department follows the following procedure:

- (a) Receiving purchase requisitions.
- (b) Exploring the sources of supply and choosing supplier.
- (c) Preparation and execution of purchase orders.
- (d) Receiving and inspecting materials.
- (e) Checking and passing of bills for payment.

**(a) Purchase requisitions or Indenting for Materials**

The purchase officer does not initiate any action for the purchase of materials on his own accord. Only with the help of the purchase requisitions, the purchase officer comes to know the types of materials needed in the organization. A purchase requisition is a form used as a formal request to the purchasing department to purchase materials.



Specimen of purchase requisition

SAKITHI LIMITED

Purchase requisition

PR. No:Date:Date by which:Materials are required:

Item No	Code	Description	Quality required	Remarks

Requested by ----- Checked by----- Approved by-----  
Purchase manager -----

**b) Exploring the sources of supply and choosing the suppliers:**

A source of supply of materials must be selected after the receipt of the purchase requisition. The purchase department usually maintains for very group of material a list of the supplies names and addreses. Quotations may be invited from these supplies by issuing centers to them. On receipt of quotations from the suppliers, a comparative statement of various quotations received should be prepared and a desirable supplier should be selected.

Purchase manager will obtain the necessary information from schedule of quotations, past records, catalogues, buyer’s guides and other books. Purchasing right quantity and reality of materials at the cheapest rate at proper time to help smooth running of the production function.

**The specimen of a tender form which is issued to the various supplies for inviting quotations is as follows.**

Dev Company Limited Tender form

Indent No.Tender No:  
To:Date:  
Dear Sir:

Please let us have your best offer for the supply of the following items. The items should be delivered F.O.R. Delhi. The tender closes on August 25 2008 at 2.00 P.m and will be opened at 10A.m. on the next day. The first copy of the tender should be dispatched to us duly filled in

Yours faithfully

For Dev Company Ltd

Purchasing manager

(Enclose the detailed all Description List)

S. No	Description of the items	Quality	Quantity	price	Terms of delivery	Other terms

**c) Issuing purchase order and following up of delivery schedules:**

After selecting the supplier, the purchase department prepares a purchase order for the supply of materials to the stores. The purchase order is the written commitment from purchase department to supplier. It is the contract between the buyer and seller for stated terms and conditions

Generally, five copies of the purchase order are prepared and used as follows:

1. One copy is sent to the supplies.
2. One copy is retained by the purchasing department
3. One copy is sent to the store keeper/department which has requisitioned materials.
4. One copy is sent to the receiving department
5. One copy is sent to the accounts department.

The following is a specimen form of purchase order

**Specimen form of purchase order**

ABC Company Purchase order						
No:			Date:			
To:			One Ref:			
Your quotations number _____ dated _____ has been accepted please supply the following items in accordance with various terms and conditions mentioned here with						
S. No	Description	Quality	Price / unit	Unit	Total volume	Remarks
Delivery terms _____			Receipt of this order now			
Discount:			Places be acknowledged			
Excise Duty			for ABC Company			

Carriage and Freight	
Terms of payment	Signature
Other particulars	
	For office use only
Follow up: Acknowledgment	
Received on	
Reminder	
D.O. Delivery	
Invoice No	Date:

**d) Receiving and inspection of material:**

In large concern’s a separate receipt and inspection department independent of stocking locations. Should be set up to receive and inspect the material. But small concern, the work of receiving the goods may be entrusted to the store keeper. The functions of the receipt and inspection department are.

1. Keeping purchase order files in a systematic way.
2. Receiving unloading and unpacking the material delivered by the suppliers under delivery challans.
3. Verifying the material received by comparing with purchase orders. This includes checking quantity quality and physical condition of material.
4. Submitting a report of any materials to be rejected with reasons.
5. Preparing goods received note, entering the details of materials received.

**e) Checking and parsing of Bills for payment.**

When the invoice is received from the supplier, it is sent to the stores accounting section to check both the authenticity as well as the arithmetical accuracy. Having verified the invoice in all respect, the stores accounting section certifies and passes the invoice for payment and on the basis the cashier can make the payment.

**Check your progress 05.01**

Spell out the purchase procedure.

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

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## **5.5 LET US SUM UP**

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The effective and efficiency of industry depends upon buying right goods at right time, at right quantity at right price. There are two kinds purchasing systems exists, viz., centralized and decentralized purchasing system. The purchase procedure of an purchase departments are Receiving purchase requisitions; Exploring the sources of supply and choosing supplier; Preparation and execution of purchase orders; Receiving and inspecting materials; Checking and passing of bills for payment.

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## **5.6 LESSON – END ACTIVITIES**

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1. What is Material control ? State its objectives?
2. Explain the purchase procedure?

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## **5.7 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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### **Check Your Progress ‘Answers.**

The purchase routine of an purchase departments are Receiving purchase requisitions; Exploring the sources of supply and choosing supplier; Preparation and execution of purchase orders; Receiving and inspecting materials; Checking and passing of bills for payment.

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## **5.8 SUGGESTED READING/REFERENCES/SOURCES**

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
3. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.

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## LESSON-6

### INVENTORY CONTROL AND ITS TECHNIQUES

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#### **Contents:**

- 6.0 Aims and objectives
- 6.1 Introduction
- 6.2 Meaning and Classification of Inventory
- 6.3 Objectives of Inventory Control
- 6.4 Important Techniques of Inventory Control
- 6.5 Illustrations
- 6.6 Let us Sum Up
- 6.7 Lesson-End Activities
- 6.8 Model Answers to “Check your Progress”
- 6.9 Suggested Reading/References/Sources

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#### **6.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should be able to:

- Describe the store control and inventory control tools
- know and solve problems on various stock levels and EOQ

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#### **6.1 INTRODUCTION**

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Inventories constitute major share of costs of a product. Therefore, it is obvious that it needs to be controlled. There are various techniques or models or tools available for the inventory control management. In this lesson, we shall discuss about the various techniques of inventory control.

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#### **6.2 MEANING AND CLASSIFICATION OF INVENTORY**

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ICAI has defined inventory as “tangible property held [i] for sale in the ordinary course of business or [ii] in the process of production for sale or [iii] for consumption in the production of goods or service for sale, including maintenance supplies and consumables other than machinery spares.”

**Classification of Inventory:**

In a manufacturing concern, inventory is classified as follows:

- a. Raw materials – the materials, components, fuels etc. used the manufacture of products.
- b. Work-in-Progress [WIP] – partly finished goods and materials, sub-assemblies etc. held between manufacturing stages.
- c. Finished goods – completely ready for sale or distribution.

**Meaning of inventory control:**

Inventory control is a system which ensures the maintenance of required quantity of inventories of the required quality at the required time with minimum amount of investment.

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**6.3 OBJECTIVES OF INVENTORY CONTROL**

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1. The main objectives of inventory control are to achieve maximum possible inventory turnover.
2. Optimizing investment in inventory and reducing carrying cost.
3. Keeping required materials of adequate quantity in order to avoid disruption of production.
4. Following the policy of management by exception by relieving the top management from involving in each and every decision relating to inventory.

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**6.4 IMPORTANT TECHNIQUES OF INVENTORY CONTROL**

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- A. Stock level and EOQ
- B. ABC Analysis
- C. VED Analysis
- D. JIT inventory management
- E. Perpetual inventory system

**A. Stock levels and EOQ**

The purpose of material control is to maintain the stock of raw materials as low as possible, and at the same time they may be made available as and when required by the production department. There may be over stocking or under stocking. If there is no chalked out planning, over stock means blocking up the capital and it leads to

deteriorations or obsolescence. On the other hand under stocking will hold up production and cause idleness. Customer may turn away on account of failure of timely supply. Therefore must fix the inventory level which is also known as the demand and supply method of inventory control.

The different stock levels are

1. Minimum stock level
2. Maximum stock level
3. Reorder level.
4. Danger level
5. Reordering quantity
6. Average stock level

#### **1. Minimum stock level:**

It represents the minimum quantity of material which must be maintained in hand at all times. This level is decided on the basis of rate of consumption, the lead time, availability of substitute and reorder level. Minimum stock level calculated the following formula .  
$$\text{Minimum stock level} = \text{reorder level} - (\text{Normal consumption} \times \text{Normal Reorder period}).$$

#### **2. Maximum level:**

It is the maximum quantity of an item of material which can be held in stock at any time. Stock should not exceed this quantity. The maximum quantity is fixed so that there may be no overstocking. In this method overstocking should be avoided. The maximum stock level calculated the following formula.

$$\text{Maximum stock level} = (\text{Reorder level} + \text{Reorder quantity}) - \text{Minimum consumption} \times \text{Minimum Reorder period}$$

#### **3. Re order level: (ordering level = When to order)**

It is between maximum and minimum stock levels. Once the stock level reaches level, the stockkeeper initiates purchase requisition to obtain fresh stocks Reorder level depends on economic ordering quantity lead time and rate of consumption of material. Reorder level calculated the following formula.

$$\text{Reorder level} = \text{Maximum Consumption} \times \text{Maximum Reorder period}$$

#### **4. Danger level:**

This is the stock level below the minimum level. When stocks reach this level action for immediate purchase is necessary. Issues are controlled by stopping normal issues and issuing only on special instructions.

Danger level calculated by the following formula

$$\text{Danger level} = \text{Average consumption} \times \text{Maximum Reorder period for emergency purchases}.$$

**5. Re-ordering Quantity (EOQ)**

It is also called Economic order Quantity (EOQ)

It is not stock level. It is a quantity to be ordered when the stock reaches the minimum level. It is the quantity of inventory which can be reasonably ordered at a time and purchased economically. It is also known as standard order quantity. The quantity to be ordered depends upon two factors i.e., the acquisition cost and the cost of possessing material. When order for material is placed, it must facilitate more trade discount, economy in transport etc. and at the same time it should not incur heavy charges on account of storage, insurance etc. Economic ordering quantity calculated by the following formula

$$EOQ = \sqrt{\frac{2AB}{CS}}$$

EOQ= Economic ordering quantity

A = Annual Consumption

B= Buying cost per order

C= Cost per unit

S= Storage and carrying cost.

**6. Average stock:**

The level indicates the average stock held by the firm. It is calculated by the following formula

$$\text{Average stock level} = \frac{\text{Maximum level} + \text{Minimum level}}{2}$$

(or)

$$\text{Average stock level} = \text{Minimum stock level} + \frac{1}{2} (\text{Reorder Quantity})$$

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**6.5 ILLUSTRATIONS**

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**ILLUSTRATION 6.1.**

Find out the economic ordering quantity (E.O.Q) from the following particulars.

Annual usage :6,000 units

Cost of material per unit : Rs 20

Cost of placing and receiving one order : Rs 60

Annual carrying cost of one unit : 10% of inventory value.



**SOLUTION 06.01**

The formula for the calculation of economic ordering quantity is :

$$E.O.Q = \sqrt{2CO/I}$$
  
where

- C = Annual usage of material i.e, 6,000 units
- O = Cost of placing one order i.e, Rs 60
- I = Annual carrying cost of one unit  
i.e,  $20 \times 10/100 = \text{Rs } 2.$

Therefore

$$E.O.Q = \sqrt{2 \times 6,000 \times 60/2} = \sqrt{3,60,000} = 600 \text{ units}$$

**ILLUSTRATION 6.2**

From the following data find out economic order Quantity:

- Annual usage = 6000 units
- Cost per unit = 0.30
- Buying cost = 7per order
- Caring cost = 15% of average inventory holding

**SOLUTION 6.2**

Economic order Quantity =  $\sqrt{\frac{2AB}{CS}}$

Here    A        =        6000  
          B        =        7  
          C        =        0.30  
          S        =        15%

EOQ    =         $\sqrt{\frac{2 \times 6000 \times 7}{0.30 \times 15/100}}$

          =         $\sqrt{\frac{84000}{0.045}}$

          =         $\sqrt{186666667}$

EOQ    =        1366 Units

**ILLUSTRATION 6.3**

- Calculation EOQ
- (a) Annual consumption 600 units
  - (b) Ordering cost Rs. 12 per unit
  - (c) Carrying cost =20%
  - (d) Price per unit 20

**SOLUTION 6.3**

$$\text{EOQ} = \sqrt{\frac{2AB}{CS}}$$

Here

$$A = 600 \text{ units}$$

$$B = \text{Rs.}12$$

$$C = 20$$

$$S = 20\%$$

$$\text{EOQ} = \sqrt{\frac{2 \times 600 \times 12}{20 \times 20/100}}$$

$$= \sqrt{\frac{14400}{4}}$$

$$= \sqrt{3600}$$

$$= 60 \text{ units}$$

**ILLUSTRATION 6.4**

Find out EOQ

Cost or material per unit 20

Annual usage 6000 units

Cost of placing and receiving one order Rs. 60

**SOLUTION 6.4**

$$\text{EOQ} = \sqrt{\frac{2AB}{CS}}$$

$$= \sqrt{\frac{2 \times 6000 \times 60}{20 \times 10/100}}$$

$$= \sqrt{\frac{7200000}{2}}$$

$$= \sqrt{360000}$$

$$= 600 \text{ units}$$

**Check your progress 6.1**

*Find out the economic order quantity from the following information*

*Monthly consumption = 3,000 units*

*Cost per unit Rs.54*

*Ordering cost Rs.150 per order*

*Inventory carrying cost 20 % of the average inventory*

Notes: (a) Write your answer in the space given below.

(b) Check your answer with the ones given at the end of this Lesson

.....

.....

.....

.....

.....

**ILLUSTRATION 6.5**

- Material is used as follows
- |                          |            |
|--------------------------|------------|
| Maximum usage in a month | 600 units  |
| Minimum usage in a month | 300 units  |
| Average usage in a month | 350 units  |
| Reorder period minimum   | 2 month    |
| Maximum                  | 6 month    |
| Reorder Quantity         | 1000 units |
- Maximum reorder period for emergency purchases 1 month calculate:
- a) Reorder level
  - b) Maximum level
  - c) Minimum level
  - d) Average stock level
  - e) Danger level

**SOLUTION 6.5**

- (a) Reorder level = Maximum consumption x reorder period  
= 600 units x 6 month  
= 3600 units
- (b) Maximum stock level = (Reorder level + Reorder quantity)-(Minimum consumption x Minimum Reorder period)  
= (3600+100) – (300 x 2)  
= 3700-600  
= 3100
- (c) Minimum stock level = Reorder level – (Normal consumption X Normal Reorder period)  
= 3600 – (350 x 4)  
= 3600-1400  
= 2200

Normal Reorder period =  $\frac{\text{Minimum Reorder period} + \text{Maximum Reorder period}}{2}$

$$= \frac{2+6}{2} = \frac{8}{2} = 4$$

$$\begin{aligned}
 \text{(d) Average stock level} &= \text{Minimum stock level} + \frac{1}{2} (\text{Reorder quantity}) \\
 &= 2200 + \frac{1}{2} (1000) \\
 &= 2200 + 500 \\
 &= 2700
 \end{aligned}$$

$$\begin{aligned}
 \text{(e) Danger level} &= \text{Average consumption} \times \text{Maximum reorder period for emergency purchases} \\
 &= 350 \times 1 \\
 &= 350
 \end{aligned}$$

### ILLUSTRATION 6.6

From the following particulars, calculate (a) Reorder level (b) Minimum level (c) Maximum level

Normal usage 100 units per day  
 Minimum usage 60 units per day  
 Maximum usages 130 units per day  
 Economic order quantity 5000 units  
 Re-order period 25 to 30 days

### SOLUTION 6.6

$$\begin{aligned}
 \text{(a) Re order level} &= \text{Maximum consumption} \times \text{Maximum Reorder period} \\
 &= 130 \times 30 \\
 &= 3900 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) Minimum stock level} &= \text{Reorder level} - (\text{Normal consumption} \times \text{Normal reorder period}) \\
 &= 3900 - (100 \times 27.5) \\
 &= 3400 - 2750 \\
 &= 650 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 \text{Normal Reorder period} &= \frac{\text{Minimum Reorder period} + \text{Maximum Reorder period}}{2} \\
 &= \frac{25 + 30}{2} \\
 &= \frac{55}{2} \\
 &= 27.5
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) Maximum stock level} &= (\text{Reorder level} + \text{Reorder quantity}) - (\text{Minimum consumption} \times \text{Minimum Reorder period}) \\
 &= (3900 + 5000) - (60 \times 25) \\
 &= 8900 - 1500 \\
 &= 7400 \text{ units}
 \end{aligned}$$

### ILLUSTRATION 6.7

Two components X and Y are used as follows:

Minimum usage : 50 units per week each  
 Maximum usage : 150 units per week each

Normal usage : 100 units per week each  
 Ordering quantity X : 600 units  
                           Y : 1000 units  
 Delivery period X : 4 to 6 weeks  
                           Y : 2 to 4 weeks  
 Maximum reorder period for emergency purchases:  
                           X : 2 weeks  
                           Y : 2 weeks

**Calculate for each component:**

- a) Reordering level
- b) Maximum level
- c) Minimum level
- d) Danger level.

**SOLUTION 6.7**

- a) Re-order level= Maximum usage x Maximum reorder period

$$\begin{aligned}
 X &= 150 \times 6 \\
 &= 900 \text{ units} \\
 Y &= 150 \times 4 \\
 &= 600 \text{ units}
 \end{aligned}$$

- b) Maximum level= (Reorder level+ Reorder quantity) – (Minimum usage X Minimum Reorder period)

$$\begin{aligned}
 X &= (900+600) - (50 \times 4) \\
 &= 1500- 200 \\
 &=1300 \\
 Y &= (600 + 1000) - (50 \times 2) \\
 &= 1600-100 \\
 &= 1500 \text{ units}
 \end{aligned}$$

- c) Minimum level = Reorder level- (Normal usage x Normal reorder period)

$$\begin{aligned}
 X &= 900-(100 \times 5) \\
 &= 900-500 \\
 &= 400 \text{ units} \\
 Y &= 600 - (100 \times 3) \\
 &= 600 -300 \\
 &= 300 \text{ units}
 \end{aligned}$$

$$\text{Normal Reorder period} = \frac{\text{Minimum Reorder period} + \text{Maximum reorder period}}{2}$$

$$\begin{aligned}
 X &= \frac{4+6}{2} \\
 &= 5 \\
 Y &= \frac{2+ 4}{2} \\
 &= 3
 \end{aligned}$$

(d) Danger level = Average usage x Maximum reorder period for emergency purchases

$$X = 100 \times 2 = 200 \text{ units}$$

$$Y = 100 \times 2 = 200 \text{ units}$$

### ILLUSTRATION 6.8

Material 'A' is used as follows:

Maximum usage in a month 600 Nos.

Minimum usage in a month 400 Nos.

Average usage in a month 450 Nos.

Lead Time : Maximum 6 months. Minimum 2 months

Reorder Quantity: 1,500 Nos.

Maximum reorder period for emergency purchases – 1 month

### SOLUTION 6.8

The terms "lead time" and "Reorder period" mean the same thing.

"usage" and "consumption" are also used as alternative terms.

Normal reorder period = Maximum reorder period + Minimum reorder period / 2

#### [a] Reorder level:

$$\begin{aligned} & \text{Maximum consumption X Maximum reorder period} \\ &= 600 \times 6 \text{ months} \\ &= 3,600 \text{ units} \end{aligned}$$

#### [b] Maximum Stock Level:

$$\begin{aligned} & \text{Reorder level + Reorder Quantity} - [\text{minimum consumption X Minimum} \\ & \text{reorder period}] \\ &= 3,600 + 1,500 - [400 \times 2] \\ &= 5,100 - 800 \\ &= 4,300 \text{ units} \end{aligned}$$

#### [c] Minimum level

$$\begin{aligned} & \text{Re-order level} - (\text{Normal consumption X Normal re-order period}) \\ &= 3,600 - [450 \times [6 + 2] / 2] \\ &= 3,600 - [450 \times 4] \\ &= 3,600 - 1,800 \\ &= 1,800 \text{ units} \end{aligned}$$

#### [d] Average stock level

$$\begin{aligned} & 1/2(\text{Minimum level} + \text{Maximum level}) \\ &= 4,300 + 1,800 / 2 \\ &= 5,200 \text{ units} \end{aligned}$$

**[e] Danger Level:**

Average consumption X Maximum reorder period for emergency purchase  
= 450 units X 1 month  
= 450 units

**ILLUSTRATION 6.9**

Two components, A and B, 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	A: 300 units; B: 500 units
Re-order period	A: 4 to 6 weeks B: 2 to 4 weeks

Calculate for each component : (a) Re-order level, (b) Minimum level,(c) Maximum level, and (d) Average stock level.

**SOLUTION 6.9**

Re-order level

= Maximum consumption X Maximum re-order period

Component A =  $75 \times 6 = 450$  units

Component B =  $75 \times 4 = 300$  units

Minimum level

= Re-order level-(Normal consumption X Normal re-order period)

Component A =  $450 - (50 \times 5) = 200$  units

Component B =  $300 - (50 \times 3) = 150$  units

Maximum level

= Re-order level + Re-order quantity-(Minimum consumption X Minimum re-order period)

Component A =  $450 + 300 - (25 \times 4) = 650$  units

Component B =  $300 + 500 - (25 \times 2) = 750$  units

Average stock level

=  $1/2(\text{Minimum level} + \text{Maximum level})$

Component A =  $1/2(200 + 650) = 425$  units

Component B =  $1/2(150 + 750) = 450$  units

**ILLUSTRATION 6.10**

In manufacturing its products a company uses three raw materials A,B and C in respect of which the following applies:

Raw materials	Usage per unit of product (lb.)	Re-order quantity (lb.)	Price per lb(paise)	Delivery period	Order level (lb)	mini mum level (lb.)
A	10	10,000	10	1 to 3	8,000	
B	4	5,000	30	3 to 5	4,750	
C	6	10,000	15	2 to 4		2,000

Weekly production varies from 175 to 225 units, averaging 200.  
What would you expect the quantities of the following to be:

- [a] Minimum stock of A,(b) Maximum stock of B,(c) Re-order level of C, and (d) Average stock level of A ?

**SOLUTION 6.10**

Minimum stock of A  
= Re-order level-(Normal consumption X Normal re-order period)  
= 8,000-(200 X 10 X 2) = **4,000 units**

Maximum stock of B  
= Re-order level + Re-order quantity - (Minimum consumption X Minimum re-order period)  
= 4,750+5,000-(175 X 4 X 3) = **7,650 units**

Re-order level of C  
= maximum consumption X Maximum re-order period  
= 225 X 6 X4 = **5,400 units**

Average stock of level A  
= 1/2(Minimum level + Maximum level)  
= 1/2(4,000+16,250\*) = **10,125 units**

**\*Maximum level of A**  
= Re-order level + Re-order quantity-(Minimum consumption X Minimum re-order period)  
= 8,000 + 10,000 - (175 X 10 X 1) = **16,250 units**



**Check your progress 6.2**

In a company, weekly minimum and maximum consumption of Material “AA” are 25 and 75 units respectively. The reorder quantity as fixed by the company is 300 units. The material is received within 4 to 6 weeks from issue of supply order. Calculate various stock levels.

- Notes: (a) Write your answer in the space given below.  
(b) Check your answer with the ones given at the end of this Lesson

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**B. Stock control through ABC- Analysis:**

ABC analysis is a basic analytical management tool it is based on “Management by exception” system of inventory control. ABC analysis also known as proportional parts value analysis. Under this method (always better control) efficient control of store is required to give move care on costlier items. As such on the basis of value of different material items are grouped into three categories.

- (i) High priced material – category (A)
- (ii) Medium priced material – category (B)
- (iii) Low priced Material – category (C)

General classification of items under ABC categories all as given below.

Category	% of total income	% of material cost
A	5 - 10	80 – 90
B	15 - 25	40 – 45
C	60 - 70	10 - 20

Again the high cost items may represent 80-90% of the total cost, but their number may be say 5- 10% under groups “A”. Some items constitute 15%-20% of the total cost, but this number may be 40-45% of the items of all under group B. The rest of the items have low value, but represent large number of items under group “C”. These groups will facilitate the management to exercise control on the basis of value of material

### **Advantages of ABC Analysis**

1. Closer control on the basis of investment
2. Development of scientific inventory control
3. Saving the time of management, as attention is given to high value materials
4. Ensuring minimum cost.

### **(C) VED Analysis**

Vital essential and desirable analysis is done mainly for control of spare parts. Spares are controlled of their important.

Vital spares are crucial for production. Non –availability may stop production. The stock out cost of these spares is very high

Essential spares are spares the ‘stock out’ of which cannot be sustained for more than a hours and cost of loss of production is high

Desirable spares are needed but there absence for a short time may not lead to stoppage of production.

Some items of spares though negligible in value may be vital for production. Such items may not be given importance under ABC analysis method which operates on value based control.

### **(d) Just in time inventory (JIT)**

Firms are giving maximum attention to reducing stock levels by establishing cordial relationship with suppliers it arranges for frequent delivery of quantities. This is called just in time purchasing. The objective of just-in-time purchasing is to obtain delivery of material immediately before their use. This is possible with the co-operation of the supplier. The company guarantees to purchase large quantities. The suppliers guarantee good quality material at responsible prices. This arrangement helps in directly delivering the material to the shop floor instead of receiving in to stores.

### **(e) Perpetual Inventory System**

CIMA defines perpetual inventory system as “the recording as they occur of receipts, issues and the resulting balances of individual item of stock in either or quality or quantity value.

Under this system a continuous record of receipt and issue of materials is maintained by the stores department and the information about the stock of material is always available. In the method of stock records are maintained in such a way as to make an entry in the records, the physical movement of stock on receipt and issues of material and include the balance of each item of material in the stores at any point of time.

**Operation of perpetual inventory system:**

- (a) The entries for receipt or issue of the material are made in the bin card and stores ledger account and the balance is ascertained.
- (b) Stores received but not inspected are not mixed up with regular stocks.
- (c) Stock taking is done continuously. The stores records are compared and entered in stock verification report for suitable treatment

**(f) Inventory Turnover**

Kohler defines inventory turnover ratio as “a ratio which measures the number of times a firm’s average inventory is sold during a year”, In his view the ratio is an indicator of a firm’s inventory management efficiency. A high inventory turn over ratio indicates fast movement of material. A low ratio on the other hand indicates over investment and blocking up of working capital.

The Inventory turnover is calculated on the sales or cost of sales. It is measured in terms of value of materials consumed to the average inventory during a period. It indicates number of times the inventory is consumed and replenished. If the number of days in a year is divided by turn over ration, the number of days for which the average inventory is held can be ascertained.

The turnover ratio differs from industry to industry. On the basis of the ratio, a decision is made to reduce investment on slow moving materials and stop over stocking of undesirables material.

$$(i) \quad \text{Inventory Turnover Ratio} = \frac{\text{Cost of Materials Consumed}}{\text{Cost of Average Stock}}$$

$$(ii) \quad \text{Average Stock} = \frac{\text{Opening Stock of Material} + \text{Closing stock of Material}}{2}$$

$$(iii) \quad \text{Inventory Turnover in days} = \frac{\text{Days in the period}}{\text{Inventory Turnover Ratio}}$$

**(g) Input-output-Ratio**

This is yet another method of inventory control. Input output ratio is the ratio of the quantity of material to production and standard material content of the actual output. This is possible in industries where the product and raw material are being expressed in same quantitative measurement such as kilograms, Metric tonnes, etc.

The Input-output ratio analysis indicates whether the consumption of actual material when compared with standards is favorable or adverse. The raw material cost of the finished product can be arrived at by multiplying material cost per unit by the input-output ratio.

The ratio is obtained as given below:

$$\frac{\textit{Standard cost of Actual quantity}}{\textit{Standard cost of Standard quantity}}$$

**Other Techniques of inventory control:**

- (a) FNSD Analysis
  - ‘F’ stands for fast moving items
  - ‘N’ Stands for Normal moving items
  - ‘S’ stands for slow moving items
  - ‘D’ Stands for Dead items
- (b) Automatic order system
- (c) Ordering cycle method
- (d) Min-Max method
- (e) Material (Inventory) cost reports

**Check your progress 06.03**

What you understand about ABC analysis

- Notes:
- (a) Write your answer in the space given below.
  - (b) Check your answer with the ones given at the end of this Lesson

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**6.6 LET US SUM UP**

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Inventory control is a system in which right quantity of materials are maintained. Excessive investment in inventory and shortage of raw materials must be avoided. For that purpose minimum level and maximum level of inventory is fixed. In order to reduce carrying and ordering cost, economic ordering level is calculated and orders made accordingly. Minimum level of stock is always to be maintained. So re-order level is fixed that minimum and maximum level.

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**6.7 LESSON – END ACTIVITIES**

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- 1. What is inventory control? What are its importance?
- 2. Explain the important techniques of inventory control?
- 3. What do you mean ABC analysis?What are its advantages?
- 4. What is EOQ?
- 5. Calculate the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year  
Usage of material per annum 10000kgs  
Order placing cost per order RS.50  
Cost per kg of raw material Rs.2  
Storage Cost 8 % on average in inventory  
[ANS: EOQ=2500KG]
- 6. From the following information calculate Maximum,Minimum and average level  
Normal usage per day 500kgs  
Minimum usage per day 200kgs  
Maximum usage per day 800kgs  
Lead Time 10 – 16 days  
Re order Quality 3000kgs

[ANS:Maximum stock level 13800 units: Minimum stock level 6300 units:  
Average stock level 7800 units]

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**6.8 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ 06.01**

*C = 3,000 units X 12 months = 36,000 units ; EOQ units – 1,000 units]*

**Check Your Progress ‘Answers’ 06.02**

Reorder level 450 units; Maximum stock level 650 units; Minimum stock level 200 units;  
average stock level 425 units

**Check Your Progress ‘Answers’ 06.03**

ABC analysis is ‘Management by exception’ system of Inventory control. In this Always Better Control (ABC) technique of inventory control, the materials are classified and controlled according to value of the materials involved. It is also called proportional parts value analysis. Thus, high value items are paid more attention than low value items. The materials are classified under ‘A’, ‘B’ or ‘C’ designation on the basis of their value and importance.

‘A’ category consists of a few items of high value. Category ‘B’ includes more items of medium value and category ‘C’ includes all other materials of small value.

legal requirements, nature, stock valuation, period of accounting, information recorded.

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## **6.9 SUGGESTED READING/REFERENCES/SOURCES**

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
3. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
4. Alex K., Cost Accounting, ARR publications
5. Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education

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## LESSON-7

### STORES LEDGER AND METHODS OF PRICING

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#### Contents:

- 7.0 Aims and objectives
- 7.1 Introduction
- 7.2 Issue Procedure
- 7.3 Pricing of Material Issues
- 7.4 Comprehensive Illustration
- 7.5 Let us Sum Up
- 7.6 Lesson-end Activities
- 7.7 Model Answers to “Check your Progress”
- 7.8 Suggested Reading/References/Sources

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#### 7.0 AIMS AND OBJECTIVES

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After you have studied this lesson, you should be able to :

- Explain the meaning and definition of the terms like Bin Card and Stores Ledger
- Calculate the cost of materials issue based on FIFO, LIFO, average cost methods etc.,

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#### 7.1 INTRODUCTION

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One of the main objectives of cost accounting is to ascertain the accurate cost. Material usage is a vital part of the business concerns engaged in manufacturing. The ascertainment of accurate cost largely depends upon the correct valuation of material and labour used in the particular product. The valuation of material is divided into two parts.

- (a) Valuation of material received
- (b) Valuation of material issued

Materials are received cost should be include invoice price plus freight, carriage inward, insurance, tax etc.

Materials are issued to different jobs from the stores. But the stock of material kept in stores different rates and dates. Therefore it becomes necessary to decide about the price which is to be charged from a particular job when materials are issued.

## 7.2 ISSUE PROCEDURE

The store keeper receives material and other items stores than carefully issues them for the purpose of production. He is accountable for every item received and stored in the store, under his case. The store keeper makes issue of materials only against proper material requisition slip from different department. Therefore material is equivalent to cash. The storekeeper must take as much care as a cashier in dealing with stores items.

## Material Requisition

The storekeeper should always issue the material on proper authority to avoid the misappropriation material. This authority is usually given by the foremen (or) the production department head on a form known as material requisition. The proforma of material requisition as follows.

### XYZ Company Ltd.

### Material Requisition Slip

M.R. No.

Job. No.

Section

Date

Stores L.F

To

The store keeper please issue the following materials as detailed below

S. No.	Description	Code No	Quantity		Price		Bin cord no	Remarks
			Required	Issued	Rate	Total		
1								
2								
3								

Authorized by

Issued by

Received by

Checked by



**BIN Card (Bin tag or stock card)**

A bin card is a record used by storekeeper for all items of material and goods in his store. This card readily gives the information about the nature of contents of any particular bin. A bin card is used for each material. Each receipt and issue is recorded on bin card in a chronological order and the latest balance is shown after each receipt and issue. The main feature of a bin card is that after posting a transaction, whether relating to receipt or issue, the balance quantity is calculated and recorded. Thus a bin card is a document maintained by the store keeper in his store to assist him to control stock form of Bin card pattern

**Bin Card**

Bin No

Name of material

Material code

Stocks ledger folios

Maximum level

Minimum level

Ordering level

Ordering quantity

Unit

Date	Receipt		Issues		Balance	Checked
	GRN	Qty	RSN No	Quantity	Quantity	Date initial

Note GRN – Goods Received Note No

RDN – Requisitions slip No

**Stores ledger:**

A stores ledger is a record of stock both in quantity and value. It consists of the same columns as a being card but in addition, there is the amount column in the values are entered. The ledger shows the balance in hand at any time

Form of stress ledger

Stores ledger (Method of issue)

Bin No.

Maxi level

Name of material

Minimum level

Material code

Ordering level

Ordering quantity

Name of material

Unit

Date	Particular	Receipts			Issues			balance		
		Unit	CPU	Cost	Unit	CPU	Cost	Unit	CPU	Cost

**Bin card Vs stores ledger**

The differences between bin card and stores ledger are mentioned below

	Store Ledger	Bin Card
1.	It is a record of both quantity and value.	It is a record of quantity only.
2.	It is maintained by the cost clerk.	It is maintained by the storekeeper.
3.	It is kept in the cost office.	It is attached to the bin.
4.	Entries are made by the cost clerk.	Entries are made by the store keeper.
5.	Entries are made on the basis of documents like goods received note, material requisition note etc.	Entries are made on the basis of actual quantity received and issued.
6.	Posting are made after the transactions.	Postings are made before the transactions.
7.	Transactions are periodically recorded.	Individual transactions are recorded.
8.	Inter departmental transactions are recorded for costing purpose.	Inter departmental transfers are not shown.
9.	Facilitates physical verification of closing stock.	Facilitates physical verification of closing stock.

**Check your progress 7.1**

List out any three difference between store ledger and Bin card

- Notes: (a) Write your answer in the space given below.  
(b) Check your answer with the ones given at the end of this Lesson
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**7.3 PRICING OF MATERIAL ISSUES**

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When materials are issued for any production work or any job they have to be valued in the costing department of the materials can be charged to that job. But generally raw materials are purchased in anticipation and issued whenever they are needed for production assuming that the rate of raw materials is the same. But this notes the care always. Prices of every thing change on the prevailing condition of the market. The stock lying in the store consists of many purchases at deterrent rates and when issued, they create problems as to the fixation of the price.

**Need for pricing**

Materials are issued to different departments, different orders and jobs from stores. The jobs are to be correctly charged with materials consumed. But materials in stores will be of different lots received at different prices on different occasions. This makes it necessary to decide about the price to be charged to jobs which are issued with materials from different lots.

Therefore the important methods of pricing of materials issued are:

**(a) Cost price method**

- a) First in first out (FIFO)
- b) Last in first out (LIFO)
- c) Specific price
- d) Base stock
- e) highest in first out (HIFO)

**(B) Average price method**

- a) Simple average
- b) Weighted average
- c) Periodic simple average
- d) Periodic weighted average

**(C) Notional price method.**

- a) Standard price
- b) Market price
- c) Inflated price

Before elaborate into various methods of pricing, let us first discuss about treatment of surplus and treatment of various losses.

**Treatment of Surplus Materials**

**Return of Surplus Material:**

Sometimes, excess materials may be issued to production departments. When these materials are returned to stores a Material Return Note is to be prepared by the department which has the excess materials. Generally, three copies are prepared. One copy is retained by the department which is returning the material. Two copies are sent to the store keeper. The store keeper keeps one copy for making entries in the Bin card and the second copy is sent to the cost office for making entries in the stores ledger and for giving credit to the job where the material is in excess.

**Transfer of Surplus Materials**

Transfer of excess material from one job to another job is to be avoided as far as possible. This is because record for transfer may not be made and actual material cost of jobs may be inaccurate. However, sometimes the material may be allowed to be transferred to avoid delays and handling charges. The transfer is to be allowed only with preparation of material transfer note so that the cost of material transferred is debited to the job receiving the material and credited to the job transferring the material.

**Treatment of Various material losses:**

The material requirements of production are issued on the basis of material requisitions. The output is obtained along with wastage, scrap, spoilages and defectives. The accurate cost of output can be computed after taking the losses into account.

Losses in the form of waste, scraps, spoilage and defectives are inherent and inevitable with any manufacturing activity. These losses can be controlled through adequate reporting and responsibility accounting. Standard for each type of loss is fixed. Actual are compared and action is to be taken by the management to control the abnormal losses, based on the variance.

## **Types of Material Losses**

### **Waste:**

Waste is inherent in any manufacturing activity. Waste is a part of raw material lost in the process of production having no recoverable value. Waste occurs invisibly in the form of evaporation or shrinkage. It can be visible and solid also. Examples of visible wastes are gases, dust, valueless residue, etc. Sometimes disposal of waste entails additional expenditure. Example: atomic waste. Loss in the form of waste increase with cost of production.

**Control of Waste:** A waste report is prepared periodically. The actual waste is compared with standard waste and remedial action is taken to control abnormal waste.

### **Accounting Treatment**

Waste has no value. The accounting treatment differs according to waste being normal or abnormal.

- i) **Normal Waste:** This is the inherent waste while manufacturing. It is in the form of evaporation, deterioration etc. The total cost of normal waste is distributed among the good units of output.
- ii) **Abnormal waste:** The abnormal waste is transferred to costing profit and loss A/c to avoid fluctuation in production cost.

### **Scrap:**

Scrap is the residue from certain manufacturing activities usually having disposable value. It can also be the discarded materials which can fetch some income. Examples of scrap are outlined material from stamping operations, filings, Saw dust, short lengths from wood working operations, sprues and 'flash' from foundry and moulding processes. Scrap may be sold or reused.

### **Control of Scrap**

Scrap is controlled by fixation of standards for scrap, fixation of department wise responsibilities for scrap, etc. Keeping up proper records of scrap and periodical reporting helps in control of scrap. Actual scrap is compared with standard scrap. Suitable action is taken for excessive actual scrap over standard scrap.

### **Accounting Treatment**

- i) **Sale value of scrap credited to profit and loss A/c:** The sale value is credited to profit and loss account as other income. The cost of output is inclusive of scrap cost. This method of accounting treatment is adopted when the value is negligible.

- ii) **The Sale value credited to overhead or material cost:** The sale value is reduced with selling cost of scrap and the net sale value is deducted from factory overhead or from material cost. This method is adopted when several jobs are done simultaneously and it is not possible to segregate the scraps job wise.
- iii) **Crediting the sale value to the Job or process in which Scrap arises:** The sale value of scrap is credited to the job or process concerned from which the scrap has arisen. This method is followed when identification of scrap with specific jobs of processes is easy.

### **Spoilage:**

Spoilage occurs when goods are damaged beyond rectification. Spoilage is disposed off without further processing. Spoilage cost is the cost upto the point of rejection less sale value.

The method of sale of spoilage depends on the extent of spoilage. Some of the spoilage is sold as seconds if the extent of damage is less; rest may be sold as scrap or treated as waste.

**Control of Spoilage:** Spoilage is controlled through proper reporting about the extent of spoilage. Standards are fixed as a percentage on production. Actual spoilage is compared with standard and variance is recorded. If the actual spoilage is more than the standard, suitable action is suggested to control it.

### **Accounting Treatment of Spoilage**

Accounting treatment depends on whether the spoilage is normal or abnormal. Normal spoilage is borne by good units of output since it is inherent with production and it happens even under efficient conditions. Abnormal spoilage is avoidable under efficient conditions. The cost of abnormal spoilage is charged to profit and loss account.

### **Defectives**

It is a part of production which can be rectified and made into good units with additional cost. The defective work occurs due to raw materials of inferior quality, bad planning and poor workmanship. Defective units are rectified with additional cost of material, labour and overheads and sold as 'first quality' or 'seconds'.

- i) **Control of Defective:** As in the case of other losses, defectives are controlled by accurate and periodical reports. Standards are fixed for defectives. Actual defective work is compared with standards. If actuals are more than the standards remedial action is taken to control it.
- ii) **Accounting Treatment of Defectives:** The accounting treatment depends on the extent of defective production. If it is normal being inherent with production, it is identified with specific jobs. The cost of rectification is charged to specific jobs. If the cost is not treated with a job, the cost of rectification is treated as factory overhead.

If the defective work is out of abnormal circumstances the cost of rectification is transferred to profit and loss account.

### **Obsolete, slow moving and Dormant Stocks:**

These items are part of inventory. They need suitable and timely action on the part of the management to avoid occurrence of loss in due course and to prevent locking up of working capital.

- i) **Obsolete Stocks:** They are those stocks in the inventory which have been lying unused due to change in product process and design or method of manufacturing. They are generally out of date.
- ii) **Slow moving Materials:** They are items in stock used at long intervals and thus lying idle for long periods.
- iii) **Dormant Stocks:** They are items in stock not at all in use for a significant period of time.

The store keeper should highlight such items in his periodical reports so that the management may try (a) to dispose them off at any price or (b) clear them out to save space in the stores (c) exercise caution in future purchase of such items of materials.

## **PRICING METHODS**

### **Cost price method:**

This group of methods consists all those methods where in each lot of material purchased is charged to various departments at the actual cost of purchase. When one lot at a particular price is exhausted, the next lot is issued at the purchase price of that lot and so on as per the particulars method issued. This other prices charged are always the actual prices and not average or notional price.

### **First in First out (FIFO)**

Under this system, materials are issued in the order in which they are received first will be issued first ie first come first served. In other words old stocks are issued first and new stocks will be issued afterwards, result of this system when we value the closing stock of materials that will be at the latest price.

### **Advantages of FIFO method:**

1. Prices are based on actual costs. No period or loss on stocks results from using this method
2. Stock balance valued at latest price.
3. This method is suitable in case of slow moving materials.
4. It is appropriate in situations of falling prices to charge the jobs with higher purchased earlier.

Disadvantages of FIFO method

- 1. Possibility of more clerical errors due to more number of calculations.
- 2. The cost of similar jobs differ in the price fluctuate.
- 3. In times of rising prices, the cost of jobs does not reflect current market prices. This inflates the profit unnecessarily resulting in higher takes.

ILLUSTRATION 7.1

Prepare a stoners ledger on FIFO method from the following information.

- 1<sup>st</sup> Jan 2008 opening balance 1500 units @ Rs. 5
- 5<sup>th</sup> Jan 2008 Received 400 units @ Rs. 10
- 6<sup>th</sup> Jan 2008 Received 300 units @ Rs. 3
- 10<sup>th</sup> Jan 2008 Issued 500 units
- 11<sup>th</sup> Jan 2008 Received 1000 units @ Rs. 5
- 16<sup>th</sup> Jan 2008 Issued 1800 units

SOLUTION 7.1

Stores ledger (Method of issue-FIFO)

Bin No.	Maxi level
Name of material	Minimum level
Material code	Ordering level
	Ordering quantity
	Name of material
	Unit

Date	Particular	Receipts			Issues			Balance		
		Unit	CPU	Cost	Unit	CPU	Cost	Unit	CPU	Cost
1.1.2008	Balance b/d							1500	5	7500
5.1.2008	GRN no	400	10	4000				1500	5	7500
								400	10	4000
6.1.2008	GRN no	300	3	900				1500	5	7500
								400	10	4000
								300	3	900
10.1.2008	RN no				500	5	2500	1000	5	5000
								400	10	4000
								300	3	900
11.1.2008	GRN no	1000	5	5000				1000	5	5000
								400	10	4000
								300	3	900
								1000	5	5000
16.1.2008	RN no				1000	5	5000			
					400	10	4000			
					300	3	900			
					100	5	500	900	5	4500



Closing Stock 900 unit at Rs.4500  
[GRN - Good Received Note and MRN / RN – [Material] Requisition Note]  
**Last in First Out(LIFO)**  
Under this method the latest receipts of materials are issued first and earlier receipts are issued last of production.

**Advantages of LIFO method**

- 1. This method is simple to operate when issues are not too many.
- 2. Prices are based on actual cost. Therefore there is no possibility of profit or loss in stocks.
- 3. Production cost reflects latest market price.
- 4. This method is suitable in case of rising prices because materials are issued at current market price. The jobs and production are charged at the latest prices. Thus profit on the jobs is not unnecessarily inflated.

**Disadvantages of LIFO method**

- 1. This method also involves tedious clerical work which may lead to clerical errors.
- 2. Comparison of jobs becomes difficult as they use same raw material but are charged with different prices.
- 3. During the period of falling prices the stocks are at high prices, which may necessitate writing off stock values to show the stocks at this market values.

**ILLUSTRATION 7.2**

See problem Illustration No 7.1

**Solution 7.2**

Stores ledger (Method of issue-LIFO)									
Bin No.									Maxi level
Name of material									Minimum level
Material code									Ordering level
									Ordering quantity
									Name of material
									Unit

Date	Particular	Receipts			Issues			Balance		
		Unit	CP U	Cost	Unit	CP U	Cost	Unit	CP U	Cost
1.1.2008	Balance b/d							1500	5	7500

5.1.2008	GRN no	400	10	4000				1500 400	5 10	7500 4000
6.1.2008	GRN no	300	3	900				1500 400 300	5 10 3	7500 4000 900
10.1.2008	RN no				500 300 200	3  10	900 2000	1500 200	5 10	7500 2000
11.1.2008	GRN no	100 0	5	5000				1500 200 1000	5 10 5	7500 2000 5000
16.1.2008	RN no				1000 200 600	5 10 5	5000 2000 3000	900	5	4500

Closing Stock 900 unit at Rs.4500

**Simple average price method:**

Under this method the total of the prices of material in the stock (from which the material to be priced could have drawn) is divided by the number of prices used to ascertain the simple average price. Irrespective of the quantities the average of the prices is found. It should be noted that for the purpose of physical movement of materials, FIFO method is assumed which forms the basis of simple average method thus the prices of earlier lots are left out of simple average calculation as and when materials are issues and other lots are exhausted.

**Advantages**

1. It is simple and easy to calculate the issues price
2. This method reduces the effect of fluctuation of prices by averaging the prices.

**Disadvantages:**

1. This method does not take into account the quantity purchased at each price this may lead to absurd results.
2. As the actual price is not used, profit or loss on material will usually arise.
3. The value of closing stocks under this method is absurd. When price fluctuates sharply, the closing stock will not show real value.

ILLUSTRATION 7.3

(See problem Example No 7.1)

Solution 7.3

Stores ledger (Simple average method)

Bin No.	Maxi level
Name of material	Minimum level
Material code	Ordering level
	Ordering quantity
	Name of material
	Unit

Date	Particular	Receipts			Issues			Balance		
		Unit	CPU	Cost	Unit	CPU	Cost	Unit	CPU	Cost
1.1.2008	Balance b/d	1500	5	7500				1500	5	7500
5.1.2008	GRN no	400	10	4000				1900		11500
6.1.2008	GRN no	300	3	900				2200		12400
10.1.2008	RN no				500	6	3000	1700		9400
11.1.2008	GRN no	1000	5	5000				2700		14400
16.1.2008	RN no				1800	5.75	10350	900		4050

Closing Stock 900 unit at Rs.4050

First Issued average price =  $5 + 10 + 3 / 3 = 6$

Second Issued average price=  $5 + 3 + 10 + 5 / 4 = 5.75$

Weighted average Price method:

The weighted average price is calculated by dividing the value of stock in the stores by the quantity in the stock form which material are to be issued. As this method takes into account the relative weights it reduces the effect of fluctuations in prices.

The method is different from all other method because in this method prices are calculated on receipt of material and not at time of issue of materials.

Weighted Average price = 
$$\frac{\text{Value of material in stock}}{\text{Quantity in stock}}$$

**Advantages:**

- 1. The method is suitable where the prices vary much from one purchase to another. As it uses quantities for calculation of average prices. The fluctuations are eventually out.
- 2. The basis of calculation in the method is simple as the price is calculated by dividing the value of materials by this quantity.
- 3. The new price is calculated when new materials are purchased. All the subsequent issues are made at the price calculated until the next lot is received. Thus the clerical work is simplified and reduced.

**Disadvantages:**

- 1. This method is more complicated than simple average price as it takes into account the total quantity and value.
- 2. Since actual price is not used, profit or loss may arise in material cost by using the method.
- 3. Where receipts are numerous calculation will be many and may result in errors.
- 4. The prices may have to be taken up to three or four decimal places to calculate the correct value of large quantities. Otherwise, approximation may lead to difference in accounts.

**ILLUSTRATION 7.4**  
(See problem Example No 7.1)

**SOLUTION 7.4**

**Stores ledger (Weighted average method)**

Bin No.	Maxi level
Name of material	Minimum level
Material code	Ordering level
	Ordering quantity
	Name of material
	Unit

Date	Particular	Receipts			Issues			Balance		
		Unit	CPU	Cost	Unit	CPU	Cost	Unit	CPU	Cost
1.1.2008	Balance b/d	1500	5	7500				1500	5	7500
5.1.2008	GRN no	400	10	4000				1900	6.05	11500

6.1.2008	GRN no	300	3	900				2200	5.64	12400
10.1.2008	RN no				500	5.64	2820	1700	5.64	9580
11.1.2008	GRN no	1000	5	5000				2700	5.4	14580
16.1.2008	RN no				1800	5.4	9720	900	5.4	4860

**Specific price method:**

This method is followed in concerns which use job order costing. In order show the correct material cost of a job materials are purchased for the job and the purchase price is charged to that job. This is done when non standard materials are to be purchased for a particular job specification. Under this method materials of are used for the special nature and costly items etc. when used for specific work are priced at the actual price and charged to the work. This method is good on individual job contracts etc.

**Base stock method:**

Under this method in almost all concerns a minimum quantity of stock is always kept in store, A fixed minimum stock of the material is always maintained and is know as safely or Base Stock. This stock is valued at a price at which the first lot of material is received. Such minimum stock is not used unless an emergency arises. The quantity is excess of this base stock may be issued either in FIFO or LIFO method.

**ILLUSTRATION 7.5**

- Prepare stores ledger (FIFO) A/C from the following information
- Dec 4 Purchased 500kg at Rs 20 per kg
- Dec 10 Purchased 300kg at Rs 21 per kg
- Dec 15 Issued 600kg
- Dec 20 Received 1000kg at Rs 15 per kg
- Dec 25 Received 500kg at Rs 25 per kg
- Dec 28 Issued 800kg
- Dec 31 Issued 200kg

Adopt the base stock method of issue and ascertain the value of closing stock base stock 200kg.

SOLUTION 7.5

Stores Ledger Base Stock Method)

Date	Particular	Receipts			Issues			Balance		
		Unit	CPU	Cost	Unit	CPU	Cost	Unit	CPU	Cost
Dec 1	GRN no	500	20	10000				500	20	10000
Dec 10	GRN no	300	21	6300				200	20	4000
								300	20	6000
								300	21	6300
Dec 15	MR no				600					
					300	20	6000			
					300	21	6300	200	20	4000
Dec 20	GRN no	1000	15	15000				200	20	4000
								1000	15	15000
Dec 25	GRN no	500	25	12500				200	20	4000
								1000	15	15000
								500	25	12500
Dec 28	MR no				800			200	15	3000
					800	15	12000	500	25	12500
Dec 31	MR no				800			200	15	3000
					200	25	5000	300	25	7500

Closing stock 300 unit at amount Rs.7500

Highest in first out method (HIFO)

In this method the highest priced material in stock are issued first.This method is based on the principle of consumption at the highest cost and inventory value of material at the lowest possible price. In short, materials purchased at the highest price will be first issued, irrespective of the order of purchase.

Standard price Method:

This is a method of valuing the issues on a pre determined price. Standard price of the materials is decided, taking into account the quantity purchased, Market condition future trend of the prices and all other matters concerned with the materials. If actual price is more than the standards price loss occurs and if actual price is less than the standard price a profit will be obtained. While operating the pricing method the issue price is uniform for all quantities issued the less or profit on material is termed as “material price variance”  
Variance = (Actual receipts x standard price) Actual amount

**Advantages:**

- 1. It is simple in working
- 2. Material cost can be fixed in advance
- 3. Comparison of jobs becomes easy.
- 4. Control over purchase in possible.

**Disadvantages:**

- 1. Some times it fails to recover the cost of materials.
- 2. It will reflect the market price
- 3. Price variance account has to be created in addition.

**ILLUSTRATION 7.6**

Prepare a stores ledger for the following receipts and issues order standard price method. The standard price per unit of material is Rs.20 Fixed for the year.

- Jan 3 Purchases 800 units @ Rs. 25
- Jan8 Purchases 900 units @ Rs. 30
- Jan 9 Issue 600 units
- Jan 15 Issue 200 units
- Jan21 Received 800 units @ Rs. 22
- Jan 26 Received 500 units @ Rs. 25
- Jan 28 Issue 1000 units
- Jan 31 Issue 55 units

**Solution 7.6**

**Stores ledger (Standard price method)**

Date	Particulars	Receipts			Issues			Balance		
		Qty	Rate Rs.	Cost	Qty	Rate Rs.	Cost	Qty	Rate Rs.	Cost
Jan 3	GRN No	800	25	20000				800		20,000
Jan 8	GRN No	900	30	27000				1700		47000
Jan 9	MR No				600	20	12000	1100		35000
Jan 15	MR No				200	20	4000	900		31000
Jan 21	GRN No	800	22	17600				1700		48600

Jan 26	GRN No	500	25	12500				2200		61100
Jan 28	MR No				1000	20	20000	1200		41100
Jan 31	MR No				55	20	1100	1145		40000

- Closing stock = 1145 units of Rs 40000
- The stock valuation of 1145 units of standard price of Rs 20 per unit comes to Rs (1145 x 20) = 22900
- Material variance = Standard cost – actual cost  

= 22900-4000

= 17100 (Adverse)

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### 7.4 COMPREHENSIVE ILLUSTRATIONS

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#### ILLUSTRATION 07.07

From the following transactions prepouce stokes ledger account (Using FIFO and LIFO method)

- Jan 1 2008 opening balances 100 units @ Rs. 5
- Jan 15 2008 Received 500 units @ Rs. 4
- Jan 31 2008 Issued 200 units
- Feb10 2008 Received 700 units @ Rs. 6
- Feb 25 2008 Issued 800 units
- Mar 22 2008 Received 1500 units @ Rs. 7
- April 25 2008 Issued 500 units
- May 10 2008 Material Returned to stores 100 (Issued on Feb 25 @ Rs.4)
- June 30 2008 Issued 200 units

#### SOLUTION 7.7

Stores ledger (FIFO method)										
Date	Particulars	Receipts			Issues			Balance		
1.1.2008	Balance bld	100	5	500				100	5	500
15.1.2008	GRN No	500	4	2000				100 500	5 4	500 200
31.1.2008	MR No				200 100 100	5 4	500 4000	400	4	1600



10.2.2008	GRN No	700	6	4200				400 700	4 6	1600 4200
25.2.2008	MR No				800 400 400	4 6	1600 24000	300	6	1800
22.3.2008	GRN No	1500	7	10500				300 1500	6 7	1800 10500
25.4.2008	MR No				500 300 200	6 7	1800 1400	1300	7	9100
10.5..2008	Returned	100	4	400				100 1300	4 7	400 9100
30.6.2008	MR No				200 100 100	4 7	400 700	1200	7	8400

Stores ledger (LIFO Method)

Date	Particulars	Receipts			Issues			Balance		
		Qty	CP Q	Cost	Qty	C P Q	Cost	Qty	CPQ	Cost
1.1.2008	Balance bld	100	5	500				100	5	500
15.1.2008	GRN No	500	4	2000				100 500	5 4	500 2000
31.1.2008	MR No				200 200	4	800	100 300	5 4	500 1200
10.2.2008	GRN No	700	6	4200				100 300 700	5 4 6	500 1200 4200
25.2.2008	MR No				800 700 100	6 4	4200 400	100 200	5 4	500 800
22.3.2008	GRN No	1500	7	10500				100 200 1500	5 4 7	500 800 10500

25.4.2008	MR No				500 500	7	3500	100 200 1000	5 4 7	500 800 7000
10.5..2008	Returned	100	4	400				100 200 1000 100	5 4 7 4	500 800 7000 400
30.6.2008	MR No				200 100 100	4 7	400 700	100 200 900	5 4 7	500 800 6300

ILLUSTRATION 7.8

The following particulars have been extracted in respect of material x Prepare stores ledger A/c showing the receipts and issues pricing the material issued on the basis of

- (a) Simple Average method
- (b) Weighted Average method

Receipts:

1.4.2008 Purchased 500 units @ Rs. 4  
13.4.208 Purchased 900 units @ Rs 5  
23.4.2008 Purchased 600 units @ Rs. 6

Issues:

5.4.2008 Issued 400 units  
15.4.2008 Issued 400 units  
25.4.2008 Issued 600 units

SOLUTION 7.8

Stores ledger (Simple Average method)

Date	Particu lars	Receipts			Issues			Balance		
		Qty	R at e R s.	Cost	Qty	Rate Rs.	Cost	Qty	R at e R s.	Cost
1.4.2008	GRN No	500	4	2000				500	4	200

5.4.2008	MR No				400	4	1600	100	4	400
13.4.2008	GRN No	900	5	4500				1000		4900
15.4.2008	MR No				400	$\frac{4+5}{2} = 4.5$	1800	600		3100
23.4.2008	GRN No	600	6	3600				1200		6700
25.4.2008	MR No				600	$\frac{6+5}{2} = 5.5$	3300	600		3400

**Store ledger Weighted Average Method**

Date	Particulars	Receipts			Issues			Balance		
		Qty	Rate Rs.	Cost	Qty	Rate Rs.	Cost	Qty	Rate Rs.	Cost
1.4.2008	GRN No	500	4	2000				500	4	2000
5.4.2008	MR No				400	4	1600	100	4	400
13.4.2008	GRN No	900	5	4500				1000	4.9	4900
15.4.2008	MR No				400	4.9	1960	600	4.9	2940
23.4.2008	GRN No	600	6	3600				1200	5.45	6540
25.4.2008	MR No				600	5.45	3270	600	5.45	3270

**7.5 LET US SUM UP**

Stores ledger is a ledger where in we records the details of materials stored. In addition to that bin card is maintained in which details of materials in a particular bin is recorded. As and when the material requisition received from production department, the store keeper is need material. Some times Production Company may send bill of materials, in that materials required completing a particular job is specified. After a particular job is over excess materials may be returned to store, that is recorded in materials return note. Wastage may be classified as normal, abnormal, scrap, and spoilage and suitable controlling measures must be taken in order to control wastage and properly recorded into accounts.

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## 7.6 LESSON – END ACTIVITIES

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1. Explain the need for pricing of material issues
2. What are the methods of pricing materials issues?
3. What is bin card?
4. What do you mean by Stores Ledger?
5. Differentiate between Bin Card and Stores Ledger.
6. Compare and contrast:
  - [a] FIFO and LIFO methods of pricing of materials
  - [b] Simple and Weighted average method of pricing of materials issues
7. Prepare a stores ledger account form the following information adopting FIFO method of pricing of issues of materials.

1998	March	1	Opening Balance	500 tonnes at Rs.200
		3	Issue	70 tonnes
		4	Issue	100 tonnes
		8	Issue	80 tonnes
		13	Received from supplier	200 tonnes at Rs.190
		14	Returned from department 'A'	15 tonnes
		16	Issue	180 tonnes
		20	Received from supplier	240 tonnes at Rs.195
		24	Issue	300 tonnes
		25	Received from supplier	320 tonnes at Rs.200
		26	Issue	115 tonnes
		27	Returned from department 'B'	35 tonnes
		28	Received from supplier	100 tonnes at Rs.200

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## 7.7 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

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### Check Your Progress ‘Answers 07.01

Your answer may include any five of the following

- (i) Store ledger is a record of both quantity and value. Bin card is a record of quantity only.
- (ii) Store ledger is maintained by the cost clerk. Bin card is maintained by the storekeeper.
- (iii) Store ledger is kept in the cost office. Bin card is attached to the bin.
- (iv) Store ledger entries are made by the cost clerk. Bin card entries are made by the store keeper.
- (v) Store ledger entries are made on the basis of documents like goods received note, material requisition note etc. Bin card entries are made on the basis of actual quantity received and issued.

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## **7.8 SUGGESTED READING/REFERENCES/SOURCES**

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- 1 Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
- 2 Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
- 3 Sexena V.K. and Vashist C.D., Cost Audit and Management Audit, Sultan Chand & Sons
- 4 Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
- 5 Alex K., Cost Accounting, ARR publications

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## LESSON-8

### LABOUR COST ANALYSIS AND WAGES SYSTEM

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#### Contents:

- 8.0 Aims and objectives
- 8.1 Introduction
- 8.2 Types of Labour cost
- 8.3 Objectives of labour cost analysis
- 8.4 Methods of remuneration
- 8.5 Wage rate system for costing purpose
- 8.6 Idle Time
- 8.7 Over Time
- 8.8 Let us Sum Up
- 8.9 Lesson-end Activities
- 8.10 Model Answers to “Check your Progress”
- 8.11 Suggested Reading/References/Sources

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#### 8.0 AIMS AND OBJECTIVES

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After you have studied this lesson, you should be able to:

- Explain the objectives of labour cost analysis and various types of Labour cost
- Describe the various methods of remunerations.

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#### 8.1 INTRODUCTION

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Labour cost is an important element of cost. It also forms significant part of prime cost and total cost. Labour costs are associated with human beings. Labour cost associated with human beings. The human element makes the control of labour cost difficult. Labour is the most perishable commodity. Once labour efforts are not utilized fully it cannot be recovered and the labour cost is bound to increase cost of production. At the same time labour is the only factor which has the unlimited productive capacity. In many instances labour can achieve wonders in regard to the amount and quality of work performed by them. However, labour is complex and therefore it requires systematic planning and control.

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## 8.2 TYPES OF LABOUR COST

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For the purpose of accounting labour costs, labour cost is classified into [i] Direct Labour and [ii] Indirect labour.

### 8.2.1 Direct Labour Cost

The labour cost incurred on the employees who are engaged directly in making the product, their work can be identified clearly in the process of converting the raw materials into finished product is called direct labour cost. For example, wages paid to workers engaged in machining department, fabrication department, etc.

### 8.2.2 Indirect Labour Cost:

The indirect employees are not directly associated with the conversion process but assist in the process by way of supervision, maintenance, transportation of materials, materials handling etc. Their work benefits all the items being produced and cannot be specifically identified with the individual products. These costs will be accumulated and apportioned to different cost centres on equitable basis and absorbed into production by applying the overhead absorption rates.

### 8.2.3 Items of Labour Cost

The labour cost can be analyzed into the following:

- Monetary benefits payable immediately  
Salaries and Wages, Dearness and other allowances, production incentive or bonus
- Monetary benefits after some time in the future  
Employer's contribution to P.F., E.S.I., Pension etc./, Gratuity, Profit linked bonus
- Non-monetary benefits [Fringe benefits]  
Free or subsidised food, free medical or hospital facilities, free or subsidized education to the employees children, free or subsidized housing etc.

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## 8.3 OBJECTIVES OF LABOUR COST ANALYSIS

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Every firm is interested in labour cost with the following objectives:

1. To estimate the correct labour cost of orders, jobs and processes to ascertain the cost of each job, process, or order.
2. Reduction of labour turnover.
3. Absorption of overheads by using direct labour cost as a basis.
4. To find out the correct amount of overheads by ascertaining the indirect labour cost; and
5. To increase the efficiency of labour by taking direct labour cost as a guideline.

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## 8.4 METHODS OF REMUNERATION

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There are two basic methods of wage payment:

- ❖ Payment made on the basis on the basis of time spent by the workers in the factory irrespective of output produced.
- ❖ Payment of wages on the basis of production or work done irrespective of time taken by the worker.

The first method is known as Time Rate and the second as Piece Rate. Most of wage systems in use these days are modifications or combinations of these two methods. The various incentive schemes also take into consideration the primary principles of these two systems

The various methods of labour remuneration may be classified according to their characteristics under the following broad categories:

- (1) Time Rates;
- (2) Piece Rates;
- (3) Bonus Systems or Incentive Schemes;
- (4) Indirect Monetary Incentive; and
- (5) Non-monetary Incentives.

These may be further analysed as under:

- (1) Time Rates -
  - (a) at ordinary levels
  - (b) at high levels
  - (c) graduated time rates.
- (2) Piece Rates -
  - (a) Straight Piece Rates.
  - (b) Piece Rates with guaranteed day rate
  - (c) Differential Piece Rates.
- (3) Bonus Systems or Incentive Scheme
  - (a) Individual for direct workers
  - (b) Group or collective for direct workers
  - (c) For indirect workers.
- (4) Indirect Monetary Incentives
  - (a) Profit sharing
  - (b) Co-partnership
- (5) Non-Monetary    Related to working conditions and other welfare measures.



#### **8.4.1 ESSENTIALS OF A GOOD WAGE SYSTEM**

The features of a good wage system are listed below:

- (1) The wage system has to be fair to employees and the employer.
- (2) The workers are to be assured of minimum guaranteed wages irrespective of work done.
- (3) Workers are to be compensated on the basis of their relative efficiency.
- (4) The wage system should be flexible to incorporate future changes.
- (5) The wage system should encourage higher productivity and reduce labour turnover.
- (6) The wage system should be as per the labour policy of the government and follow the legislations applicable.
- (7) The wage system should equate with industry wage levels.
- (8) The method of calculation of wages, wage rates and incentive system should be simple and easy for workers to understand.

#### **8.4.2 TIME RATE SYSTEM**

Under this method the workers are paid on the basis of hourly, daily, weekly or monthly rate. The time rate is suitable for highly skilled workers, unskilled workers and apprentices.

- (1) Where high quality goods are being produced.
- (2) Situations where output cannot be measured.
- (3) Where incentive schemes cannot be introduced as the workers may not be directly involved with the final output.

Time rate is simple and easy to calculate. The worker is assured of payment for time spent in the factory. However, this method has the following disadvantages, which far outweigh its advantages:

- (1) Employees are not rewarded on the basis of merit as both inefficient and efficient workers are paid at the same rate.
- (2) Employees are paid wages for idle time also, since they are not paid on the basis of output.
- (3) The labour cost per unit does not remain constant as the output fluctuates and this makes it difficult to prepare tenders or quotations.
- (4) Supervision cost may go up, as strict supervision is essential to get the work done.
- (5) The workers may go slow on work to create scope for overtime, which doubles the labour cost.

To conclude the flat time rate does not recognize effort and it is not helpful in increasing output.

### **8.4.3 PIECE RATE SYSTEM**

This is also called 'payment by results'. The workers are paid on the basis of output produced by them. The earnings of the workers depend on the number of units of output produced.

#### **Variations of piece wages**

There are four variations of piece wages. They are as under:

- (I) Straight piece rate
- (II) Differential piece rate:
  - (a) Taylor's differential piece rate system.
  - (b) Merrick's multiple piece rate system
  - (c) Gantt's task and bonus plan

#### **(I) Straight piece rate system**

Under straight piece rate system workers are paid according to the number of units produced at a fixed rate per unit.

#### **Advantage**

- (1) Employees are paid according to merit as the efficient workers earn more wages, as their output is more. In this way it distinguishes between efficient and ordinary workers.
- (2) Piece rate acts as incentive to induce the workers to produce more.
- (3) Higher output brings down the cost per unit and increases the profit margin of employers.
- (4) Under this method employer has no worries about payment for idle time and more over it reduce idle time, thus ensuring effective usage of available time.
- (5) Submitting of tenders does not create any difficulty as the labour cost per unit is constant.
- (6) Machinery and tools are taken care of by the workers as they are aware that the defects or breakdown will reduce their chances of higher production and higher wages.
- (7) The supervision cost is low. It is in the workers' interest to work sincerely and close supervision is not required.
- (8) There is inducement or encouragement to average workers also to produce more and earn more wages.

**Disadvantage**

- (1) Fixing of straight piece rate is difficult. If low piece rate is fixed it will frustrate the workers. Thus, 'equitable piece rates' are to be fixed to induce the workers.
- (2) Flat piece rate being uniform piece rate paid to the employees irrespective of level of output, it may not induce efficient workers to produce more and reach higher levels of effectiveness.
- (3) The wages of employees may reduce considerably due to the fault of employer or co-workers in many instances.
- (4) In situations of declining demand for goods, the production may go on increasing, embarrassingly.
- (5) Workers will always be aiming to produce more and their anxiety may cause more accidents and undue haste and strain may prove to be injurious to the worker's health.
- (6) The workers' anxiety for higher production may lead to more defective goods, spoilage, and wastage of raw materials.

**II Differential Piece Rates**

This is an improvement over straight piece rate to increase the performance of both efficient and inefficient workers. Two or more rates are offered to workers. Higher performance is paid at a higher rate and lower performance is paid at lower piece rate. In other words the increase in wages is in proportion to increase in production.

There are three types of differential piece rates.

- (1) Taylor's differential piece rate.
- (2) Merrick's differential piece rate system (Multiple piece rate system)
- (3) Gantt's task and bonus plan.

**1. TAYLOR'S DIFFERENTIAL PIECE RATE SYSTEM**

This system was introduced by Taylor, the father of scientific management. The underlying principle of this system is to penalise a slow worker by paying him a low piece rate for low production and to reward an efficient worker by giving him a higher piece rate for a higher production. Taylor advocated two piece rates, so that if a worker performs the work within or less than the standard time, he is paid a higher piece rate and if he does not complete the work within the standard time, he is given a lower piece rate. Thus if the standard production has been fixed at 8 units per day of 8 hours, the higher piece rate for 8 units or beyond may be Re.1 per unit and the lower rate for an output of less than 8 units per day, may be 80 P.per unit.

### ILLUSTRATION 8.1

Calculate the earnings of workers A and B under Straight Piece-rate System and Taylor's Differential Piece-rate System from the following particulars:

Normal rate per hour = Rs.1.80

Standard time per unit = 20 seconds

Differentials to be applied:

80% of piece rate below standard

120% of piece rate at or above standard.

Worker A produces 1,300 units per day and worker B produces 1,500 units per day.

### SOLUTION 8.1

Standard production per 20 seconds = 1 unit

Standard production per minute =  $60 / 20 = 3$  units

Standard production per hour =  $3 \times 60 = 180$  units

Standard production per day of 8 hours =  $180 \times 8 = 1440$  units

Normal rate per hour = Rs.1.80

Therefore, Normal Piece rate =  $\frac{\text{Rs.1.80}}{180 \text{ units}} = 1 \text{ paise}$

Low piece rate below standard production =  $\frac{1 \text{ P.} \times 80}{100} = 0.8 \text{ paise}$

High piece rate at or above standard =  $\frac{1 \text{ P.} \times 120}{100} = 1.2 \text{ paise}$

### Earnings of Worker A:

Under Straight Piece System

1,300 units @ 1 P. =  $\frac{1,300 \times 1}{100} = \text{Rs.13}$

Under Taylor's Differential Piece System

1,300 units @ 0.8 P =  $\frac{1,300 \times 0.8}{100} = \text{Rs.10.40}$

Low piece-rate has been applied because worker A's daily production of 1,300 units is less than the standard daily production of 1,440 units.

Earnings of Worker B:

Under Straight Piece System

$$1,500 \text{ units @ } 1 \text{ P.} = \frac{1,500 \times 1}{100} = \text{Rs.15}$$

Under Taylor's Differential Piece System

$$1,500 \text{ units @ } 1.2 \text{ P} = \frac{1,500 \times 1.2}{100} = \text{Rs.18}$$

High piece-rate has been applied because worker B's daily production of 1,500 units is more than the standard daily production of 1,440 units.

Check your progress 8.1

Calculate the earning of a worker A and B under [A] Straight Piece Rate System and [B]Taylor’s differential piece rate system from the following details.

- Standard production per day of 8 hours 40 units
- Standard rate per hour Rs.60
- Differentials to be used 80 % and 120 %.

In a particular day of 8 hours, the worker “A” produced 30 units and worker ‘B’ produced 50 units.

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

2. Merrick's Multiple Piece Rate System

This method seeks to make an improvement in the Taylor's differential piece rate system. Under this method, three piece rates are applied for workers with different levels of performance. Wages are paid at ordinary piece rates to those workers performance is less than 83% of the standard output,110% of the ordinary piece rate is given to workers whose level of performance is between 83% and 100% of the standard and 120% of the ordinary piece rate is given to workers who produce more than 100% of the standard output.

**ILLUSTRATION 8.2**

Calculate the earnings of workers A,B and C under straight piece rate system and Merrick's multiple piece rate system from the following particulars:

Normal rate per hour                      Rs.1.80  
Standard time per unit                      1 minute

Output per day is as follows:  
Worker A : 384 units  
Worker B : 450 units  
Worker C : 552 units  
Working hours per day are 8.

**SOLUTION 8.2**

Standard output per minute = 1 unit  
Standard output per hour = 60 units  
Standard production per day of 8 hours = 60 x 8 = 480 units  
Normal rate per hour = Rs.1.80  
Normal output per hour = 60 units  
Normal piece rate =  $\frac{1.80}{60}$  = 3 paise

**Calculation of level of performance:**

Standard output per day                      = 480 units  
Worker A's output per day                      = 384 units  
Worker A's level of performance =  $\frac{384}{480} \times 100 = 80\%$   
Worker B's output per day                      = 450 units  
Worker B's level of performance =  $\frac{450}{480} \times 100 = 93.75\%$   
Worker C's output per day                      = 552 units  
Worker C's level of performance =  $\frac{552}{480} \times 100 = 115\%$

**Earnings of Worker A:**

Under straight piece rate system:  
For 384 units @ 3 paise per unit =  $384 \times \frac{3}{100} = \text{Rs.11.52}$

Under Merrick's multiple piece rate system:

$$\text{For 384 units @ 3 paise per unit} = 384 \times \frac{3}{100} = \text{Rs.11.52}$$

Normal piece rate has been applied because worker A's level of performance is 80% which is below 83%.

### **Earnings of Worker B:**

Under straight piece rate system:

$$\text{For 450 units @ 3 paise per unit} = 450 \times \frac{3}{100} = \text{Rs.13.50}$$

Under Merrick's multiple piece rate system:

$$\text{For 450 units @ 3.3 paise per unit} = 450 \times \frac{3.3}{100} = \text{Rs.14.85}$$

Worker A's level of performance is 93.75% which is between 83% and 100%;so he is entitled to get 110% of normal piece rate(i.e.,110% of 3 paise or 3.3 paise per unit).

### **Earnings of Worker C:**

Under straight piece rate system:

$$\text{For 552 units @ 3 paise per unit} = 552 \times \frac{3}{100} = \text{Rs.16.56}$$

Under Merrick's multiple piece rate system:

$$\text{For 552 units @ 3.6 paise per unit} = 552 \times \frac{3.6}{100} = \text{Rs.19.87}$$

Worker C's level of performance is 115% which is more than 100% of standard output; so he is entitled to get 120% of normal piece rate(i.e.,120% of 3 paise or 3.6 paise per unit).

### **3. Grant's Task and Bonus Plan.**

This plan is based on careful time and motion study. A standard time is fixed for doing a particular task, worker's actual performance is compared with the standard time and his efficiency is determined. If a worker takes more time than the standard time to complete the task (i.e., efficiency is below 100%) he is given the wages for the time taken by him and if a worker takes the standard time to perform the task(i.e efficiency is 100%) he is given wages for the standard time and a bonus of 20% on the wages earned. If the worker completes the task in less than the standard time he is given wages for the standard time plus a bonus of 20% of the wages for the standard time. In other words , if a worker's performance is more than 100% he is given piece wages plus bonus at 20% of piece wages. Thus, with every reduction in time, the plan ensures progressive increase in total wages. For this reason, the plan is also known as "Progressive Rate System".

**ILLUSTRATION 8.3**

From the following data, calculate total monthly remuneration of three workers A,B and C under the "Grants Task and Bonus Scheme".

- (i) Standard production per month per worker is 1000 units
- (ii) Actual production during the month:  
A - 850 units, B-1000 units and C - 1100 units.
- (iii) Piece work rate - 50 Paise per unit.

**SOLUTION 8.3**

Standard production per month is 1000 units and piece work rate is 50 paise per unit: So guaranteed monthly payment is Rs. 500 (i.e 1000 units @ 50 paise).

Level of performance:

Standard output per month = 1000 units.  
Worker A's output = 850 units.

Worker A's level of performance =  $(850/1000) \times 100 = 85\%$ .

Worker B's output = 1000 units.

Worker B's level of performance =  $(1000/1000) \times 100 = 100\%$

Worker C's output = 1100 units.

Worker C's level of performance =  $(1100/1000) \times 100 = 110\%$

**Earnings of Worker A:**

Worker A's level of performance is 85% which is below the standard performance; so he will get Rs.500 - the guaranteed monthly payment.

**Earnings of Worker B:**

Worker B's level of performance is 100%; so he will get wages for the standard time and a 20% bonus. Thus, his earnings will be as follows:

	Rs.
Wages for 1000 units @ 50 paise per unit	500
Add: 20% bonus	100
	-----
	600
	-----



**Earnings of worker C:**

Worker C's level of performance is 110% which is more than the standard performance: so he will get piece wages plus 20% bonus.

Thus, his earnings are as follows:

	Rs.
Piece wages for 1100 units @ 50 paise per unit	550
Add: 20% bonus (i.e 550 x (20/100))	110
	-----
Total earnings	660
	-----

---

**8.5 WAGES RATE FOR COSTING PURPOSES**

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Labour costs represent not only basic wages but also a number of other expenses such as dearness allowance, employer's contribution to provident fund and E.S.I scheme, production bonus, holiday pay etc. Such expenses may be included in overheads, but it is better if these expenses are treated as direct. All these expenses are added to the basic wages and then divide the total by the effective hours worked. The resulting figure will be the labour cost per hour and a job should be charged with the amount, which is arrived at by multiplying the hours worked with such a figure.

**ILLUSTRATION 8.4**

From the following data, prepare a statement showing the cost per day of 8 hours engaging a particular type of labour:

- [a] Monthly salary [Basic plus dearness allowance] Rs.400
- [b] Leave salary payable to workman 15% of basic and dearness allowance
- [c] Employee’s contribution to Provident fund 8 % of salary [item (a) and (b)]
- [d] Employer’s contribution to E.S.I. 5 % of salary [item (a) and (b)]
- [e] pro rata expenditure on amenities to labour Rs.25 per head per month.
- [f] Number of working hours in a month 200.

**Solution 8.4**

**Working Note:**

No. of working hours in a month = 200  
Working hours per day = 8  
Working days in a month = 200/8 = 25 days

Statement of showing Labour Cost [per man day of 8 hours]

Particulars	Rs.
[a] Monthly Salay [Basic + DA] Rs.400/25	16.00
[b] Leave salary –[ 15 % of Basic + DA ]16 X 15 %]	2.40
[c] Employer’s contribution to E.S.I. 5 % of [a] + [b] = [16+2.40] X 5%	092
[d] Amentities to labour at Rs.25 per month [Rs.25/25 days]	1.00
Cost per man day	20.32

ILLUSTRATION 8.5

Find out the labour cost per hour if a worker is paid Rs.200 per month in addition to D.A. of Rs.50 per month. He is entitled to bonus @ 10% on wages. Employer's contribution is 8 1/3% of wages towards contributory provident fund and 1% towards E.S.I scheme. The employee's contribution towards E.S.I.scheme is 1/2%. The worker is entitled to leave on full pay for 1/20 of days worked. The employer maintains a canteen where subsidised tea and lunch are provided to workers and a monthly subsidy of Rs.1000 is provided to the canteen. The total number of the employees who take advantage of this canteen is 200.normal idle time amounts to 20%. The average working days in a month are 25 of 8 hours each.

SOLUTION 8.5

Total expenses incurred per month:	Rs
Wages	= 200.00
Dearness Allowance	= 50.00
200 x 10	
Bonus 10% of Wages -----	= 20.00
100	
Contribution towards contributory	
200 x 25	
Provident fund @ 8 1/3% of wages -----	= 16.67
100 x 3	
200 x 1	
Contribution towards E.S.I scheme -----	= 2.00
100	
Proportion of Canteen's Subsidy 1,000/200	= 5.00
	-----
Total	293.67
	-----
Number of working hours:	
Working days in a month	= 25 x

Working hours per day	= 8
	-----
Total working hours in a month	= 200
Less: 1/20 for Leave (200 x 1/20)	= 10
	-----
	190
Less: 20% for Normal Idle Time (190x20/100)	= 38
	-----
Effective hours in a month	= 152
	-----
Total expenses per month (as calculated)	= Rs.293.67
Therefore, Labour cost per hour	= 293.67/152 = Rs.1.93

### ILLUSTRATION 8.6

From the particulars given below, prepare labour cost per man-day of 8 hours:

(a)	Basic salary	Rs.2 per day
(b)	Dearness Allowance	25 paise per every point over 100 cost of living index for working class.Current cost of living index is 700 points.
(c)	Leave Salary	10 % of (a) and (b)
(d)	Employer's contribution to Provident fund	8 % of (a),(b) and (c)
(e)	Employer's contribution to State Insurance	2.5% of (a),(b) and (c)
(f)	Expenditure on amenities to labour	Rs.20 per head per mensem
(h)	Number of working days in a month	25 days of 8 hours each

### SOLUTION 8.6

#### STATEMENT OF LABOUR COST (per man-day of 8 hours)

		<b>Rs</b>
(a)	Basic Salary	2.00
(b)	Dearness Allowance @ 25 paise per every point over 100 cost of living index for a month of	
	<div> <div>600 x 25</div> <div>25 days</div> <div>-----</div> <div>100</div> </div> <div> <div>1</div> <div></div> <div>x</div> <div>-----</div> <div>25</div> </div> <div>=</div>	6.00

(c)	$\frac{8 \times 10}{100}$ Leave Salary-10% of (a) and (b) ----- =	0.80
(d)	Employer's contribution to Provident fund:-	
	$\frac{8.80 \times 8}{100}$ 8% of (a),(b) and (c) = ----- =	0.70
(e)	Employer's contribution to State Insurance-	
	$\frac{8.80 \times 2.5}{100}$ 2.5% of (a),(b) and (c) = ----- =	0.22
(f)	Amenities to labour @ Rs.20 per head per month of 25 working days = 20/25 =	0.80
	Total	<div style="border-top: 1px solid black; border-bottom: 1px solid black;">10.52</div>

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## 8.6 IDLE TIME

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The attendance time should agree with job time. Generally it does not happen on account of many reasons. For example, time required for walking from factory gate to the department, time lost in waiting for materials, tools, time lost due to break-down of machinery, power failure, etc. This time, which is wasted, is termed as idle time. It is the time for which payment is made but no production is obtained. Idle time arises only when the wages are paid on time basis. It does not arise when the wages are paid on piece rate basis.

### 08.06.01 Types of Idle Time:

#### [a] Normal Idle Time:

Normal idle time is the part of it and which is unavoidable. It is uncontrollable and is considered as a normal occurrence in the factory.

#### Causes for Normal Idle Time:

- Traveling time from one Job or department to another
- The distance covered between the factory gate and the department or actual place of work
- Elapse of time between finishing one Job and starting another job
- Time spend to overcome fatigue
- Tea and lunch breaks
- Machine or Job setting up time etc.

### **Accounting Treatment of Normal Idle Time:**

The cost of labour idle time can be treated in two ways.

- [a] A worker has to work for, say 8 hours a day; but he actually puts in only 7 ½ hours on jobs and half an hour is wasted. The labour cost of the normal idle time [here half an hour], may be charged to factory overhead and 7 ½ hours to the job concerned.
- [b] The hourly rate may be raised and the cost of complete labour may be charged to the job concerned. For example. A worker has to work for 8 hours. He actually spends 7 ½ hours and his hourly wage rate is Rs.3. The wage rate may be inflated as follows:  
$$8 \text{ hours} \times \text{Rs.}3 / 7 \frac{1}{2} \text{ hours} = \text{Rs.}3.20$$

### **[b] Abnormal idle time:**

Abnormal idle time is a wasted and avoidable time which can be avoided, controlled and prevented. Following are some of the examples of abnormal idle time:

#### **Causes for Abnormal Idle Time:**

- Time lost due to machine break down
- Time lost due to power failure
- Time lost on account of shortage of materials
- Time wasted due to lack of instructions
- Waiting of tools
- Time lost due to strikes and lockouts etc.,

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## **8.7 OVERTIME**

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Usually the workers are supposed to work for a given time per day or per week. It is called the normal work period. Whereas overtime is the work done beyond the normal work period, for which extra remuneration will be paid. If a worker works more than 9 hours on any day or 48 hours in a week, the worker is entitled for overtime payment. According to Factories Act, 1948, overtime has to be paid at double the normal rate. If the Factory Act does not apply, Establishment Act will apply. According to this Act, overtime has to be paid at 1 ½ times the normal rate of wages. The excess paid over usual normal rate is called overtime premium.

### **8.7.1 Accounting Treatment:**

The treatment of overtime depends upon the circumstances under which it arises:

1. If the overtime is paid on the instruction of a customer then the additional amount is charged directly to the job;
2. If the overtime wages paid due to negligence or delay of worker or of a particular department, it may be charged to the concerned department.

3. The extra amount may be charged to prime cost, if there is rush of seasonal work.
4. If the overtime premium is paid due to abnormal causes like fire, accidents, etc., it should be charged to Costing Profit and Loss Account.

**ILLUSTRATION 8.7**

Calculate the normal and overtime wages payable to a workman from the following data:

Days	Hours Worked
Monday	8 hrs.
Tuesday	10 hrs.
Wednesday	9 hrs.
Thursday	11 hrs.
Friday	9 hrs.
Saturday	4 hrs.
	-----
Total	51 hrs.
	-----
Normally working hours	8 hours per day
Normal rate	Re 1 per hour

Overtime rate upto 9 hours in a day at single rate and over 9 hours in a day at double rate; or upto 48 hours in a week at single rate and over 48 hours at double rate whichever is more beneficial to the workmen.

**SOLUTION 8.7**

Days	Total Hours	Normal Working Hours	Overtime Hours	
			At single rate	At Double rate
Monday	8	8	-----	-----
Tuesday	10	8	1	1
Wednesday	9	8	1	-----
Thursday	11	8	1	2
Friday	9	8	1	-----
Saturday	4	4		
Total	51	44	4	3

Normal wages for 44 hours @ Re. 1 =	Rs. 44
Overtime Wages:	
At single rate for 4 hours @ Re.1 = Rs.4	
At double rate for 3 hours @ Rs.2 = Rs.6	Rs. 10
	-----
Total Wages	Rs. 54
	-----
Or	

Normal Wages for 48 hours @ Re.1 per hour =	Rs. 48
Overtime wages for 3 hours @ Rs.2 per hour =	Rs. 6
	-----
Total Wages	Rs. 54
	-----

Therefore whichever method is followed; the amount of the wages payable to the worker is Rs. 54.The method favorable to the worker will be acceptable.

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### 8.8 LET US SUM UP

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Labour cost refers to remuneration paid for human effort in an organization. There are two wages systems of payment is used by industries. They are time wage system and piece rate system. Piece rate system is further classified into straight piece rate system and differential piece rate system.

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### 8.9 LESSON – END ACTIVITIES

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- Describe the essentials of a good wage system.
- Distinguish between time wages and piece wages and their comparative merits.
- Explain the different variations of time rate system.
- Describe various Piece Rate systems and their pros and cons.
- Distinguish between the Differential Piece rates systems of Taylor and Merrick.
- What is idle time? How is it treated in cost accounts?
- Explain the meaning and treatment of overtime. How is it controlled?
- Calculate the earnings of workers X and Y under (A) straight piece rate system and (B) Taylor’s differential piece rate system from the following details:  
 Standard time per unit = 12 minutes  
 Standard rate per hour = Rs.60  
 Differentials to be used 80% and 120%  
 In a particular day of 8 hours,worker ‘X’ produced 30 units and worker ‘Y’ produced 50 units [Ans :- (A) Earnings ofworkers under straight piece rate systemEarnings = Production of worker x Straight piece rate; Worker X : 30 units x Rs.12 per unit = Rs.360 Worker Y : 50 units x Rs.12 per unit = Rs.600  
 (B) Earnings of worker under Taylor’s differential piece rate system  
 Earnings = Production of worker x differential piece rate  
 Worker X = 30 units x Rs.9.60 per unit = Rs.288  
 Worker Y = 50 units x Rs.14.40 per unit = Rs.720 ]
- Calculate the earnings of 3 workers A,B and C under ‘Merrick’s Multiple piece rate system’,given the following:  
 Standard production per day : 150 units  
 Normal piece rate : Re.0.50 per unit

Production of workers on a particular day:  
A 120 units , B 140 units ,C 160 units

[Ans:- Earnings of worker A = Rs.60  
Earnings of worker B = Rs.77  
Earnings of worker C = Rs.96]

**10.** From the following data, prepare a statement showing the cost per day of 8 hours of engaging a particular type of labour:

- (a) Monthly salary (Basic plus dearness allowance) Rs.400
- (b) Leave salary payable to workman 15% of basic and dearness allowance.
- (c) Employee's contribution to provident fund 8% of salary (item a and b).
- (d) Employer's contribution to E.S.I 5% of salary (item a and b)
- (e) Pro rata expenditure on amenities to labour Rs.25 per head per month
- (f) No. of working hours in a month 200.

[Ans :- Cost per man day = Rs.20.32 ]

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## **8.10 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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### **Check Your Progress ‘Answers’ 07.01**

Worker A – Straight Piece rate system Rs.360;

Taylor's differential piece rate system Rs.288

Worker B – Straight Piece rate system Rs.600

Taylor's differential piece rate system Rs.720

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## **8.11 SUGGESTED READING/REFERENCES/SOURCES**

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
3. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting –
4. [Problems and Solutions] Sultan Chand & Sons
5. Sexena V.K. and Vashist C.D., Cost Audit and Management Audit, Sultan Chand & Sons
6. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
7. Alex K., Cost Accounting, ARR publications
8. Ravi M. Kishore, Cost and Management Accounting, Taxmann's Allied services Pvt. Ltd.,



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## **LESSON-9**

### **LABOUR COST – INCENTIVE SCHEMES**

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#### **Contents:**

- 9.0 Aims and objectives
- 9.1 Introduction
- 9.2 Premium and Bonus Plans –Incentive Plans
- 9.3 Labour Turnover
- 9.4 Let us Sum Up
- 9.5 Lesson-end Activities
- 9.6 Model Answers to “Check your Progress”
- 9.7 Suggested Reading/References/Sources

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#### **9.0 AIMS AND OBJECTIVES**

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After you have studied this lesson, you should be able to:

- Elaborate the various incentive schemes
- Explain the meaning and methods of labour turnover

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#### **9.1 INTRODUCTION**

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The system of wage payment is of two types – time rate system and piece rate system. In the plan of incentive wage payment, both time and piece rate are blended together. The purpose of incentive system is to overcome the limitations of both systems and combine the advantages of both the systems. In order to increase the production through encouragement the benefits are shared by employer and the employee.

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#### **9.2 PREMIUM AND BONUS PLAN**

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The object of a premium plan is to increase the production by giving an inducement to the workers in the form of higher wages for less time worked.

Under a premium plan, a standard time is fixed for the completion of a specific job or operation and the worker is paid for the time taken by him to complete the job or operation at an hourly rate plus wages for a certain fraction of the time saved on the standard by way of a bonus.

### 9.2.1 Halsey Premium Plan

Under this method, standard time for doing each job is fixed and the worker is given wages for the actual time he takes to complete the job at the agreed rate per hour plus a bonus equal to (usually) one-half of the wages of the time saved. In practice, the bonus may vary from 33 1/3% to 66 2/3% of the wages of the time saved. Thus, if S is standard time, T the time taken, R the labour rate per hour, and % the percentage of the wages of time saved to be given as bonus, total earnings of the worker will be :

$$T \times R + \% (S - T) R .$$

Under Halsey-Weir plan, the premium is set at 50% of the time saved.

#### Merits

- (1) It is simple to understand and easy to calculate.
- (2) Standard time is fixed for each job.
- (3) Both employer and employee get benefited equally from the time saved by the worker
- (4) Introducing this method is easy.
- (5) It provides incentive for efficient workers. At the same time below average workers are not penalized.
- (6) The time saved has the effect of reducing labour cost and overhead.

#### Demerits

- (1) Fixation of standard time, which is to be uniform, is very difficult.
- (2) If wage rates are low incentive value may be low.
- (3) Earnings are reduced at high level of efficiency.

#### Illustration 9.1

Rate per hour = Rs.1.50 per hour

Time allowed for job = 20 hours

Time taken = 15 hours

Calculate the total earnings of the worker under the Halsey Plan. Also find out effective rate of earning.

#### Solution 9.1

S (Standard Time) = 20 hours

T (Time taken) = 15 hours

R (Rate) = Rs.1.50 per hour

Total Earnings =  $T \times R + 50\% (S - T) \times R$   
 $= 15 \times 1.50 + (50/100)(20 - 15) \times 1.50$   
 $= 22.50 + 3.75 = \text{Rs.}26.25$

Total wages for 15 hours = Rs.26.25

Therefore, effective rate of earning per hour

$$\frac{\text{Total wages}}{\text{Actual time taken}} = \frac{26.25}{15} = \text{Rs.1.75}$$

Note: Percentage of bonus is to be taken 50% when it is not given.

**9.2.2 Rowan plan**

Under this method, the worker is again guaranteed wages at the ordinary rate for the time taken by him to complete the job or operation. The difference between the Halsey Premium Plan and the Rowan Premium Plan is only in the calculation of the bonus. Under the Halsey Plan, bonus is a fixed percentage of the wages of the time saved whereas under the Rowan Plan bonus is that proportion of the wages of the time taken which the time saved bears to the standard time allowed. Thus, bonus under this system will be calculated as:

$$\frac{S-T}{S} \times T \times R$$

and the total earnings will be calculated as :

$$T \times R + \frac{S-T}{S} \times T \times R$$

where    T = Time taken (Actual Time)  
              S = Standard Time (Time Allowed)  
              R = Rate per hour

**Merits**

- (1) Time wages are guaranteed to the worker.
- (2) It is suitable for learners and beginners.
- (3) Both the workers and employers are benefited.
- (4) It pays higher bonus to workers when compared with Halsey scheme upto a specific level of time saved.

**Demerits**

- (1) It is difficult to understand and calculate for the ordinary workers.
- (2) Efficiency beyond certain point is not rewarded.
- (3) The system is more complex and expensive.

**Illustration 9.2**

A worker completes a job in a certain no of hours. The standard time allowed for the job is 10 hours, and the hourly rate of wages is Re.1. The worker earns at the 50% rate a bonus of Rs.2 under Halsey Plan.

Ascertain his total wages under the Rowan Premium Plan.

**Solution 9.2**

The worker earns Rs.2 as bonus at 50% ; so total bonus at 100% should be Rs.4. The hourly rate of wages being Re.1, the time saved should be 4 hours.

Standard time allowed	10 hours
Less : Time saved	4 hours
	-----
Time taken	6 hours
	-----

Earnings under the Rowan Premium Plan

$$\text{Earnings} = T \times R + \frac{S-T}{S} \times T \times R$$

where T = Time taken i.e., 6 hours  
S = Standard Time i.e., 10 hours  
R = Rate per hour i.e., Re.1

$$\begin{aligned} \text{Earnings} &= 6 \times 1 + \left[ \frac{10-6}{10} \times 6 \times 1 \right] \\ &= \text{Rs.}6 + \text{Rs.}2.40 = \text{Rs.}8.4 \end{aligned}$$

**9.2.3 Emerson Efficiency Plan or Empiric System**

In this plan bonus becomes payable only when efficiency touches 66 2/3% of the standard laid down. If a worker takes 10 hours to complete a job for which standard time fixed is 6 2/3 hours, he is entitled to get some bonus. If he takes more than 10 hours he gets only the time wages. The amount of bonus payable increases progressively with increase in efficiency in such a manner that at 100% efficiency, the bonus is 20% of the hourly rate. For efficiency beyond 100% additional 1% bonus is payable for each 1 % increase in efficiency beyond 100% ; thus, at 110% efficiency bonus payable is 30% (20% upto 100% + 10 for 10% efficiency beyond 100%) and total wages payable are time wages, for the actual time taken plus 30% of time wages as bonus.

### Illustration 9.3

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. Calculate the wages payable to the worker according to the Emerson's Efficiency Plan.

### Solution 9.3

$$\text{Level of Performance} = \frac{\text{Actual Output}}{\text{Standard Output}} \times 100$$

$$= \frac{20 \text{ units}}{16 \text{ units}} \times 100 = 125\%$$

Bonus payable is 45% calculated as follows :

At 100% efficiency                      20% of time wages

For next 25% efficiency @ 1% for each

1% increase in efficiency beyond 100%    25% of time wages

Total bonus payable 45% of time wages

### Calculation of Total Wages

Time wages for 8 hours @ 2.50 per hour	Rs 20
Add: 45% bonus of time wages $\left[ \text{i.e., } \frac{45}{100} \times \text{Rs.20} \right]$	9
Total wages payable	29

#### 9.2.4 Bedeaux's point premium system

It is a combination of time and bonus schemes. Standard time for a job is determined by time study. Standard production per hour is fixed and the unit of measurement is 'minute'.

An hour is taken as sixty minutes. Each minute at standard time is called a point – Bedaux's point or 'B'. The number of points has to be determined in respect of each job. If actual time is more than standard time the worker is paid on hourly basis. Excess production is counted in points, for which a bonus of 75% is allowed to the worker and remained 25% goes to the foremen, which itself is a novel feature.

$$\text{Earnings} = \text{Hours worked} \times \text{Rate per hour} + \frac{75}{100} \times \frac{\text{BS} \times \text{RH}}{60}$$

where

B.S. = Number of points saved, i.e., number of points actually earned less the standard number of points for the job.

R.H. = Basic Rate per hour.

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### 9.3 LABOUR TURNOVER

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#### 9.3.1 Meaning:

Labour turnover denotes the percentage of change in the labour force of an organisation. High percentage of labour turnover denotes that labour is not stable and there are frequent changes in the labour force because of new workers engaged and workers who have left the organisation. A high labour turnover is not desirable. At the same time very low labour turnover indicates inefficient workers are being retained in the organization.

#### 9.3.2 Methods of Measurement of Labour Turnover:

There are three methods for the measurement of labour turnover and they are:

##### (1) Labour turnover according to separation method

$$= \frac{\text{Number of employees left during a period}}{\text{Average number of employees during a period}} \times 100$$

This definition does not take into consideration the fact of surplus labour. This definition will give incorrect result when the surplus workers are discharged. So labour turnover calculated in this way will be high.

##### (2) Labour turnover according to flux method

$$= \frac{\text{Number of additions} + \text{Separations during a period}}{\text{Average number of employees during a period}} \times 100$$

This definition will not be applicable when the organization is expanding. In such a case, many new workers are engaged and there may be no separation; even then labour turnover calculated will be high.

##### (3) Labour turnover according to replacement method

$$= \frac{\text{Number of workers replaced during a period}}{\text{Average number of workers during the period}} \times 100$$

This definition takes into account the surplus labour. This definition will also give correct labour turnover when the factory is expanding because all additions are not to be taken; only workers replaced due to leavers are to be taken.

### Illustration 9.4

From the following information, calculate the labour turnover rate and labour flux rate:

Number of workers at the beginning of the year      3,800  
 Number of workers at the end of the year              4,200

During the year 40 workers leave while 160 workers are discharged. 600 workers are required during the year, of these 150 workers are recruited because of leavers and the rest are engaged in accordance with an expansion scheme.

### Solution 9.4

$$\text{Average no. of workers during the year} = \frac{3,800 + 4,200}{2} = 4,000$$

Labour turnover rate:

$$= \frac{\text{Number of workers replaced during the year}}{\text{Average no.of workers during the year}} \times 100$$

$$= \frac{150}{4,000} \times 100 = 3.75\%$$

Labour flux rate:

$$= \frac{\text{Number of additions + separations during the year}}{\text{Average number of workers during the year}} \times 100$$

$$= \frac{600 + 200}{4,000} \times 100 = 20\%$$

Labour flux rate denotes total change in the composition of labour force due to additions and separations of workers.

### Check your progress 9.1

Calculate the earnings of a worker under (A) Halsey premium plan and (B) Rowan scheme.

Time allowed                                      = 48 hours  
 Time taken                                        = 40 hours  
 Rate per hour                                    = Re .1

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

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**9.4 LET US SUM UP**

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In order to increase the production and productivity of the industry, the incentives are given to the workers. The popular methods of incentive are Halsey Plan and Rowan Plan. Apart from the above two plans we have Emerson Efficiency plan and Bedeaux plan.

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**9.5 LESSON – END ACTIVITIES**

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1. What are the objectives of incentive plans of wage system?
2. Discuss the advantages and disadvantages of the various incentive plans.
3. What is ‘Labour Turnover’? Explain the methods of measuring labour turnover.
4. Discuss the causes for labour turnover. What are its effects? How it can be reduced?
5. A worker is paid at 25 paise per hour for completing a work within 8 hours. If he completes the work within 6 hours, calculate his wages under Halsey plan when the rate of premium is 50%. Also ascertain the effective hourly rate of earning by the worker.

Ans: - Re.0.292 per hours (approx)

6. Calculate the total earnings from the following data under Halsey Plan  
Standard Time : 10 hours  
Time taken : 8 hours  
Time rate : Rs.2.50 per hour [Ans: - Halsey Plan = Rs.22.50]
7. X Ltd., employs Emerson’s efficiency plan in its factory. Standard output per day of 8 hours is fixed at 50 units . Normal time wage is Rs. 5 per hour.  
Four workers M,N,O and P produced goods as follows on a specific day:  
‘M’ 30 units. ‘N’ 45 units. ‘O’ 50 units. ‘P’ 58 units.

Ascertain the earnings of workers under Emerson’s efficiency plan. You may assume . 6% as bonus for every additional 1% efficiency between 66 2/3 % and 100%.

Ans: - M = Rs.45      N = Rs.45.60      O = Rs.48      P = Rs.54.4



8. From the following data given by the Personal Department, calculate the labour turnover rate by applying:

- (a) Separation method
- (b) Replacement method
- (c) Flux method

No. of workers on the payroll:

At the beginning of the month	900
At the end of the month	1,100

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: - Separation method = 5%      Replacement method = 2.5%      Flux method = 20%

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## 9.6 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

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### Check Your Progress ‘Answers’ 09.01

Halsey premium plan = Rs.44

Rowan scheme = Rs. 46.67

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## 9.7 SUGGESTED READING/REFERENCES/SOURCES

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1. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
2. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
3. Alex K., Cost Accounting, ARR publications
4. Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education

## UNIT - III

The third unit exposes the students to the two important management accounting tool. Before that introduction to management accounting is given to have a basic knowledge on management accounting even though it is part of Unit I

Lesson No.	Title
10	Introduction to Management Accounting
11	Financial Statement Analysis
12	Ratio Analysis

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### LESSON-10

#### NATURE AND SCOPE OF MANAGEMENT ACCOUNTING

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##### Contents:

- 10.0 Aims and objectives
- 10.1 Introduction
- 10.2 Definitions
- 10.3 Objectives of Management Accounting
- 10.4 Scope of Management Accounting
- 10.5 Functions of Management Accounting
- 10.6 Advantages of Management Accounting
- 10.7 Limitations of Management Accounting
- 10.8 Distinguish between Management Accounting and cost accounting
- 10.9 Distinguish between management accounting and financial accounting
- 10.10 Let us Sum Up
- 10.11 Lesson-end Activities
- 10.12 Model Answers to “Check your Progress”
- 10.13 Suggested Reading/References/Sources

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#### 10.0 AIMS AND OBJECTIVES

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After studying this lesson, you should able to:

- To study the definition, objectives and scope of management accounting.
- To understand the functions, advantages and limitations of management accounting.
- To study the distinction between management, cost and financial accounting.

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## **10.1 INTRODUCTION**

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The term management accounting refers to accounting for the management. Management accounting provides necessary information to assist the management in the creation of policy and in the day-to-day operations. It enables the management to discharge all its functions i.e. planning, organization, staffing, direction and control efficiently with the help of accounting information.

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## **10.2 DEFINITIONS**

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“Management accounting is concerned with accounting information that is useful to management”. – R.N. Anthony.

“Management accounting is the presentation of accounting information in such a way as to assist management in the creation of policy and in the day-to-day operations of an undertaking”.- Anglo American Council of Productivity.

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## **10.3 OBJECTIVES OF MANAGEMENT ACCOUNTING**

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The objectives of management accounting are:

- (1) to assist the management in promoting efficiency. Efficiency includes best possible services to the customers, investors and employees.
- (2) to prepare budget covering all functions of a business (i.e. production, sales, research and finance).
- (3) to analysis monetary and non-monetary transactions.
- (4) to compare the actual performance with plan for identifying deviations and their causes.
- (5) to interpret financial statements to enable the management to formulate future policies.
- (6) to submit to the management at frequent intervals operating statements and short-term financial statements.
- (7) to arrange for the systematic allocation of responsibilities.
- (8) to provide a suitable organization for discharging the responsibilities.

In short, the objective of management accounting is to help the management in making decisions and implementing them efficiently.

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## **10.4 SCOPE OF MANAGEMENT ACCOUNTING**

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Management accounting has various facets. The field of management accounting is very wide. The main purpose of management accounting is to provide information to the management to perform its functions of planning directing and controlling. Management accounting includes various areas of specialization to render effective service to the management.

#### **10.4.1 Financial Accounting**

Financial Accounting deals with financial aspects by preparation of Profit and Loss Account and Balance Sheet. Management accounting rearranges and uses the financial statements. Therefore management accounting does not exclusively maintain factual data for itself. It is closely related and connected with financial accounting. thus, management accounting is dependent on financial accounting which limits its scope.

#### **10.4.2 Cost Accounting**

Cost accounting is an essential part of management accounting. Cost accounting, through its various techniques, reveals efficiency of various divisions, departments and products. It also provides information regarding cost of products process and jobs through different methods of costing. Management accounting makes use of all this data by focusing it towards managerial decisions.

#### **10.4.3 Budgeting and Forecasting**

Budgeting is setting targets by estimating expenditure and revenue for a given period. Forecasting is prediction of what will happen as a result of a given set of circumstances. Targets are fixed for various departments and responsibility is pinpointed for achieving the targets. Actual results are compared with preset targets and performance is evaluated.

#### **10.4.4 Inventory Control**

This includes, planning, coordinating and control of inventory from the time of acquisition to the stage of disposal. This is done through various techniques of inventory control like stock levels, ABC and VED analysis physical stock verification, etc.

#### **10.4.5 Statistical Analysis**

In order to make the information more useful statistical tools are applied. These tools include charts, graphs, diagrams index numbers, etc. For the purpose of forecasting, other tools such as time series regression analysis and sampling techniques are used.

#### **10.4.6 Analysis of Data**

Financial statements are analysed and compared with past statements, compared with those of other firms and with standards set. The analysis and interpretation results in drawing reports and presentation to the management.

#### **10.4.7 Internal Audit**

Internal audit helps the management in fixing individual responsibility for internal control.

#### **10.4.8 Tax Accounting:**

Tax liability is ascertained from income statements. Tax planning is done by following the various tax incentives offered by the Central and State Governments. Knowledge of tax provisions helps the management in meeting the tax liabilities and complying with other legislations like Sales tax, Companies Act and MRTP Act.

#### **10.4.9 Methods and Procedures:**

It includes keeping of efficient system for data processing and effective reporting of required data in time.

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### **10.5 FUNCTIONS OF MANAGEMENT ACCOUNTING**

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Main objective of management accounting is to help the management in performing its functions efficiently. The major functions of management are planning, organizing, directing and controlling. Management accounting helps the management in performing these functions effectively.

#### **1 Presentation of Data**

Traditional Profit and Loss Account and the Balance Sheet are not analytical for decision making. Management accounting modifies and rearranges data as per the requirements for decision making through various techniques.

#### **2 Aid to Planning and Forecasting**

Management accounting is helpful to the management in the process of planning through the techniques of budgetary control and standard costing. Forecasting is extensively used in preparing budgets and setting standards.

#### **3 Decision Making**

Management accounting provides comparative data for analysis and interpretation for effective decision making and policy formulation.

#### **4 Communication of Management Policies**

Management accounting conveys the policies of the management downward to the personnel effectively for proper implementation.

#### **5 Effective Controls**

Standard costing and budgetary control are integral part of management accounting. These techniques lay down targets, compare actual with standards and budgets to evaluate the performance and control the deviations.

## **6 Incorporation of non-financial information**

Management accounting considers both financial and non-financial information for developing alternative courses of action which leads to effective and accurate decisions.

## **7. Coordination**

The targets of different departments are communicated to them and their performance is reported to the management from time to time. This continual reporting helps the management in coordinating various activities to improve the overall performance.

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## **10.6 ADVANTAGES OF MANAGEMENT ACCOUNTING**

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The advantages of management accounting are summarized below:

### **1 Helps in Decision Making**

Management accounting helps in decision making such as pricing, make or buy, acceptance of additional orders, selection of suitable product mix etc. These important decisions are taken with the help of marginal costing technique.

### **2 Helps in Planning**

Planning includes profit planning, preparation of budgets, programmes of capital investment and financing. Management accounting assists in planning through budgetary control, capital budgeting and cost-volume-profit analysis.

### **3 Helps in Organizing**

Management accounting uses various tools and techniques like budgeting, responsibility accounting and standard costing. A sound organizational structure is developed to facilitate the use of these techniques.

### **4 Facilitates Communication**

Management is provided with up-to-date information through periodical reports. These reports assist the management in the evaluation of performance and control.

### **5 Helps in coordinating**

The functional budgets (purchase budget, sales budget, and overhead budget etc.) are integrated into one known as master budget. This facilitates clear definition of department goals and coordination of their activities.

### **6 Evaluation and Control of Performance**

Management accounting is a convenient tool for evaluation of performance. With the help of ratios and variance analysis, the efficiency of departments can be measured. Management accounting assists the management in the location of weak spots and in taking corrective actions.

## **7 Interpretation of Financial Information**

Management accounting presents information in a simple and purposeful manner. This facilitates quick decision making.

## **8 Economic Appraisals**

Management accounting includes appraisal of social and economic forces and government policies. This appraisal helps the management in assessing their impact on the business.

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## **10.7 LIMITATIONS OF MANAGEMENT ACCOUNTING**

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Management accounting suffers from the following limitations:

### **1 Based on Accounting Information**

Management accounting derives information from past financial accounting and cost accounting records. If the past records are not reliable, it will affect the effectiveness of management accounting.

### **2 Wide scope**

Management accounting has a very wide scope incorporating many disciplines. This results in inaccuracy and other practical difficulties.

### **3 Costly**

The installation of management accounting system requires a large organization. Hence, it is very costly and only big concerns can afford to adopt it.

### **4 Evolutionary Stages**

Management accounting is still in its initial stages. Tools and techniques are not fully developed. This creates doubts about the utility of management accounting.

### **5. Opposition to Change**

Introduction of management accounting system requires a number of changes in the organization structure, rules and regulations. This rearrangement is not generally liked by the people involved.

### **6 Intuitive Decisions**

Management accounting helps in scientific decision making. Yet, because of simplicity and personal factors the management has a tendency to arrive at decisions by intuition.

### **7 Not an Alternative to Management**

Management accounting will not replace the management and administration. It is a tool of the management. Decisions are of the management and not of the management accountant.

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## **10.8 DISTINGUISH BETWEEN MANAGEMENT ACCOUNTING AND COST ACCOUNTING**

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Cost accounting and Management accounting are two modern branches of accounting. Both the systems involve presentation of accounting data for the purpose of decision making and control of day-to-day activities. Cost accounting is concerned not only with cost ascertainment, but also cost control and managerial decision making. Management accounting makes use of the cost accounting concepts, techniques and data. The functions of cost accounting and management accounting are complimentary. In cost accounting the emphasis is on cost determination while management accounting considers both the cost and revenue. Though it appears that there is overlapping of areas between cost and management accounting, the following are the differences between the two systems.

### **1 Purpose**

The main objective of cost accounting is to ascertain and control the cost of products or services. The function of management accounting is to provide information to management for efficiently performing the functions of planning, directing, and controlling.

### **2 Emphases**

Cost accounting is based on both historical and present data, whereas management accounting deals with future projections on the basis of historical and present cost data.

### **3 Principles and Procedures**

Established procedures and practices are followed in cost accounting. No such prescribed practices are followed in Management accounting. The analysis is made and the resulting conclusions are presented in reports as per the requirements of the management.

### **4 Data Used**

Cost accounting uses only quantitative information whereas management accounting uses both qualitative and quantitative information.

### **5 Scope**

Management accounting includes, financial accounting, cost accounting, budgeting, tax planning and reporting to management, whereas Cost accounting is concerned mainly with cost ascertainment and control.

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## **10.9 DISTINGUISH BETWEEN MANAGEMENT ACCOUNTING AND FINANCIAL ACCOUNTING**

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The following are the main differences between financial accounting and management accounting.



### **1. Objectives**

The main objective of financial accounting is to supply information in the form of profit and loss account and balance sheet to outside parties like shareholders, creditors, government etc. But the objective of management accounting is to provide information for the internal use of management.

### **2 Performance Analyses**

Financial accounting is concerned with the overall performance of the business. On the other hand management accounting is concerned with the departments or divisions. It report about the performance and profitability of each of them.

### **3 Data Used**

Financial accounting is mainly concerned with the recording of past events whereas management accounting is concerned with future plans and policies.

### **4. Nature**

Financial accounting is based on measurement while management accounting is based on judgment. Because of this, financial accounting is more objective and management accounting is more subjective.

### **5. Accuracy**

Accuracy is an important factor in financial accounting. But approximations are widely used in management accounting. This is because most of the information is related to the future and intended for internal use.

### **6. Legal Compulsion**

Financial accounting is compulsory for all joint stock companies but management accounting is only optional.

### **7. Monetary Transactions**

Financial accounting records only those transactions which can be expressed in terms of money. On the other hand, management accounting records not only monetary transactions but also non- monetary events, namely technical changes, government polices etc.

### **8. Control**

Financial accounting will not reveal whether plans are properly implemented. Management accounting will reveal the deviations of actual performance from plans. It will also indicate the causes for such deviations.

**Check your progress 10.01**

What are the advantages of the management accounting?

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....

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**10.10 LET US SUM UP**

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Accounting relating to management called as management accounting. Management has to take decision on day-to-day basis or long-term basis based on some information. Management accounting provides this information to management. Cost accounts provide information relating to cost but management accounting includes both cost and revenue. Financial accounting provides accounting information to the outsiders where as management accounting provides accounting information to the internal management.

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**10.11 LESSON – END ACTIVITIES**

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1. Define ‘Management accounting’.
2. Briefly explain the objectives of Management accounting.
3. Explain the scope and advantages of Management accounting.
4. Describe the limitations of Management accounting.
5. What are the functions of Management accounting?
6. Distinguish between Management accounting and cost accounting.
7. Distinguish between cost accounting and financial accounting.

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**10.12 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ 10.01**

Your answer may include the following:

1. Helps in Decision Making
2. Helps in Planning
3. Helps in Organizing
4. Facilitates Communication
5. Helps in Coordinating
6. Evaluation and Control of Performance
- 7 Interpretation of Financial Information

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**10.13 SUGGESTED READING/REFERENCES/SOURCES**

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1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
2. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
3. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
4. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications

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## **LESSON-11**

### **FINANCIAL STATEMENT ANALYSES**

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#### **Contents:**

- 11.0 Aims and objectives
- 11.1 Introduction
- 11.2 Meaning and Definition of Financial Statements
- 11.3 Nature of Financial Statements
- 11.4 Essentials of Good Financial Statements
- 11.5 Types Financial Statements
- 11.6 Importance / Functions of Financial Statements
- 11.7 Limitations of Financial Statements
- 11.8 Meaning of Financial Statements Analysis and Interpretations
- 11.9 Objectives of Analysis and Interpretations
- 11.10 Procedure for Analysis and Interpretations
- 11.11 Types of Analysis
- 11.12 Techniques / Tools of Financial Statements Analysis
- 11.13 Let us Sum Up
- 11.13 Lesson-end Activities
- 11.14 Model Answers to “Check your Progress”
- 11.15 Suggested Reading/References/Sources

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#### **11.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should be able to:

- Understand the concept of financial statements, analysis and interpretations of financial statements.
- Known the various types of financial statements,
- Explain the various techniques of Financial statement analysis

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## 11.1 INTRODUCTION

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Accounting process involves recording, classifying and summarizing various business transactions. The day-to-day transactions of a business are recorded in different subsidiary books. These transactions are posted into various ledger accounts and the balances are taken out at the end of a financial period. The aim of maintaining various records is to determine profitability from its operations and also to find out its financial position. Financial statements, essentially, are reports, presented annually and generally reflect its operating results and financial position of a concern to the external interest persons. Therefore, in order to understand better about the concern, we need to analysis and interpret these financial data and information. This lesson will explain about what is financial statement and how to analysis and interpret these financial statements meaningfully and the various tools.

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## 11.2 MEANING AND DEFINITION

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*Smith and Ashburne* , defines, ‘financial statements as ‘ the end product of financial accounting is a set of financial statements – prepared by the accountant of a business enterprise – that purport to reveal the financial position of the enterprise, the result of its recent activities, and an analysis of what has been done with earnings”

According to *American Institute of Certified Public Accountants*, “financial statements are prepared for the purpose of presenting a periodical review or report on the progress by the management and deal with [i] the Status of Investments in the business and [ii] the results achieved during the period under review.

According to the above definitions, ‘Financial statements are the outcome of preparing financial accounts and these statements reveal financial position and profitability of the concern and the utilization of retained earnings.

In simple, “Financial statements” refers to formal and original statements prepared by a business concern to disclose its financial information.

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## 11.3 NATURE OF FINANCIAL STATEMENTS

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Financial statements are prepared for the purpose of presenting a periodical review or report on progress by the management and deal with the status of investment in the business and the results achieved during the period under review. According to *American Institute of Certified Public Accountants* financial statements reflect, ‘a combination of recorded facts, accounting conventions applied affect them materially”. This implies that data exhibited in the financial statements are affected by recorded facts, accounting conventions and personal judgments. The following points explain the nature of financial statements:

### ***[1] Recorded Facts***

Record is made only of those facts which can be expressed in monetary terms. Facts which have not been recorded in the financial books are not depicted in the financial statements. Thus, the recorded facts consist of such data as the amount of cash on hand and in the bank, the amount due from customers, the cost of fixed assets, the amount payable to creditors etc. Facts which cannot be recorded in books are not disclosed by the financial statements. However, recently such facts are mentioned as footnotes to make the financial statements more meaningful and useful.

### ***[2] Accounting Conventions***

In spite of the accounting standards laid down by the various accounting bodies, management of concerns are free to choose an accounting policy suited to their concern. Accounting policies differ with regard to valuation of inventory, depreciation, research and development etc. Further provisions are made for expected losses but expected profits are ignored.

### ***[3] Personal Judgment***

Personal judgment plays a great part while dealing in various questions like method and rate of depreciation to be adopted, valuation of inventories, provision for bad and doubtful debts, amortization of fictitious assets, etc. Accountant is free to exercise his discretion on many matters on accounting.

### ***[4] Postulates***

Rupee values shown in the statements are not precise measurement of items incorporated in them. That is, these values do not represent the market or saleable value of items. Data disclosed by the financial statements are useful and meaningful only till concern survives. Thus, accountants always take some assumption and these assumptions are reflected in the financial statements.

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## **11.4 ESSENTIALS OF GOOD FINANCIAL STATEMENTS**

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The financial statements are prepared with a view to depict financial position of the concern. A proper analysis and interpretation of these statements enables a person to judge the profitability and financial strength of the business. The ideal/good financial statements should have the following characteristics:

1. Figures which are incorporated in financial statements should be readily and easily available from the books of accounts of the concern. The size of the form of financial statements should not be abnormally too large.

2. The form should not be complex in nature. The various terms used should be in simple and common language. The form should have suitable columns for additions and deductions and it must arrest and retain the attention of users.
3. Financial statements must facilitate easy comparison. In addition to the figures of previous years, it is also essential that uniformity in the form is maintained from year to year. This is for easy comparison.
4. The form and contents of the form should be designed in such a way that the attention of the readers is automatically drawn and directed to most significant items.
5. All facts should be presented in such a way that required items and figures are easily obtained for calculating various accounting ratios, to be used by the analysts.
6. The information contained in the financial statements should be such that a true and correct idea is taken about the financial position of the concern.
7. The comparable figures will make the statements more useful. The results of financial analysed should be in a way that can be compared to the previous years' statements. The comparison will enable a proper assessment for the working of the concern.

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## **11.5 VARIOUS TYPES FINANCIAL STATEMENTS**

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Generally following are the important financial statements prepared:

### ***1. Income Statements [or Profit and Loss Account]***

Income statement is prepared to determine the operational position of the concern. It is a statement of revenues earned and the expenses incurred for earning that revenue. The income statement is prepared for a particular year, generally for a year. The income statement may be prepared in the form of a Manufacturing Account to find out the cost of production, in the form of Trading Account to determine gross profit or gross loss, in the form of a Profit and Loss Account to determine net profit or net loss. A statement of Retained Earnings may also be prepared to show the distribution of profits.

### ***2. Balance Sheet***

The Balance Sheet is one of the vital financial statements depicting the financial strength of the concern. It shows on the one hand the properties that it utilizes and on the other hand the sources of those properties. The balance sheet shows all the assets owned by the concern and all the liabilities and claims it owes to owners and outsiders. The balance sheet is prepared on a particular date. The right hand side shows properties and assets. Normally, there is no particular sequence for showing various assets and liabilities. However, if any Act/ Law govern, according to that particular Act, the format for the Balance Sheet will be prepared.

### ***3. Statement of Retained Earnings***

A statement of retained earnings is also known as Profit and Loss Appropriation Account or Income Disposal Statement. As the name suggests it shows appropriations of earnings. The previous year's balance is first brought forward. The net profit during the current year is added to this balance. On the debit side, appropriations like interim dividend paid, proposed dividend on preference and equity shares capital, amounts transferred to debenture redemption fund, general reserves, etc., are shown. The balance in this account will show the amount of profit retained in hand and carried forward. The appropriation can not be more than the profits, so this account will not have a debit balances. There cannot be appropriations without profits.

### ***4. Funds Flow Statement***

The Funds Flow statement is designed to analyse the changes in the financial conditions of a business enterprise between two periods. The word "Fund" is used to denote working capital. This statement will show the sources from which the funds are received and the uses to which these have been put. This statement enables the management to have an idea about the sources of funds and their uses for various purposes. The preparation of Funds Flow statement is discussed in detail in lesson number 13.

### ***5. Cash Flow Statement***

A statement of changes in the financial position of a firm on cash basis is called Cash Flow Statement. It summarizes the causes of changes in cash position of a business enterprise between dates of two balance sheets. The preparation of Cash Flow statement is discussed in detail in lesson number 14.

### ***6. Schedules***

A number of schedules are prepared to supplement the information supplied in the form of balance sheet and income statements. The schedules are prepared to give details about theses balance sheet and income statement transactions. The Banking/Insurance companies prepare detailed schedules as specified in respective Acts. All these schedules are used as part of financial statements.

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## **11.6 IMPORTANCE/FUNCTION OF FINANCIAL STATEMENTS**

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The financial statements are a mirror which reflects the financial position and operating strength or weakness of the concern. These statements are useful to management, investors, creditors, bankers, workers, Government and public at large. ***George O. May*** points out the following major uses of financial statements:



- i. As a report of stewardship;
- ii. As a basis for fiscal policy;
- iii. To determine the legality of dividends;
- iv. As guide to wise dividend action;
- v. As a basis for the granting of credit;
- vi. As informative for prospective investors in an enterprises;
- vii. As a guide to the vale of investment already made;
- viii. As an aid to Government supervision;
- ix. As a basis for price or rate regulations;
- x. As a basis for taxation.

The utility of financial statements to different parties is discussed in details as follows:

### **1. *Management***

The financial statements are useful for assessing the efficiency of different cost centres. The management is able to exercise cost control through theses statements. The efficient and inefficient spots are brought to the notice of the management. The management is able to decide the course of action to be adopted in future.

### **2. *Creditors***

The trade creditors are to be paid in a short period. This liability is met out of current assets. The creditors will be interested in currency solvency of the concern. The calculation of current ratio and liquid ratio will enable the creditors to assess the current financial position of the concern in relation to their debts.

### **3. *Bankers***

The banker is interested to see that the loan amount is secure and the customer is also able to pay the interest regularly. The banker will analyse the balance sheet to determine financial strength of the concern and profit and loss account will also be studied to find out the earning position. A banker has a large number of customers and it is not possible to supervise their business activities. It is through the financial statements that a banker can keep a watch on the business plans and performance of its customers. These statements also help the banker to determine the amount of securities it will ask from the customers as a cover for the loans.

### **4. *Investors***

The investors include both short-term and long term investors. They are interested in the security of the principal amount of loan and regular interest payments. The investors will study the long-term solvency of the concern with the help of financial statements. The investors will not only analyse the present financial position but will also study the prospects and expansion plans of the concern. The possibility of paying back the loan amount in the space of liquidation of the concern is also taken into consideration.

## **5.     *Government***

The financial statements are used to assess tax liability of business enterprises. The Government studies economic situation of the country from these statements. These statements enable the Government to find out whether business is following various rules and regulation or not. These statements also become a base for framing and amending various laws for the regulation of business.

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### **11.7   LIMITATIONS OF FINANCIAL STATEMENTS**

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Though financial statements are relevant and useful for the concern, still they do not present a final picture of the concern. The utility of these statements is dependent upon a number of factors. The analysis and interpretation of these statements should be done very carefully; otherwise misleading conclusions may be drawn. The financial statements suffer from the following limitations:

- (i) Information shown in financial statement is not precise since it is based on practical experience and the conventions and rules developed there from.
- (ii) Financial statements do not always disclose the correct financial position of business concern as they are influenced by the personal opinions, judgment, subjective views and whims of accountants of each concern.
- (iii) Balance Sheets of a concern is a static document as it discloses the financial position of concern on a particular date. But the values shown and composition of items keep changing day-to-day. Therefore, the data and information does not disclose current realities.
- (iv) Information disclosed by profit and loss account may not be real profits as many items shown in the profit and loss account are not real but estimated.
- (v) Financial statements are dumb, because they cannot speak themselves. The statements require further detailed analysis and interpretation.
- (vi) Financial statements of one period may not be comparable as such with statements of other periods due to differences in conditions and changes in economic situations. Statements of one concern cannot be compared with those of other concern as the accounting practices differ.
- (vii) Financial statements do not disclose the contribution of man towards the efficiency of the business. The ability, energy and efficiency of the management is mainly responsible for the success of a business, the monetary value of which is not disclosed in the financial statements.

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## 11.8 MEANING OF FINANCIAL STATEMENT ANALYSIS AND INTERPRETATIONS

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The preparation of financial statements is not the end and it is only a beginning. Financial statements are prepared primarily for decision making for the various parties interested in the business concern. In order to have meaningful decisions, the statements have to be analysed and interpreted.

**Financial analysis** is the process of determining the significant operating and financial characteristics of a firm from accounting data. The Profit and Loss Account and Balance Sheet are indicators of two significant factors –Profitability and Financial Soundness. **Analysis of statement** means such a treatment of the information contained in the two statements as to afford a full diagnosis of the profitability and financial position of the firm concerned.

**Financial statement analysis** is largely a study of relationship among the various financial factors in a business as disclosed by a set of statements and a study of the trends of these factors as shown in a series of statements.

The main function of financial analysis is the pinpointing of the strength and weakness of a business undertaking by regrouping and analysis of figures contained in the financial statements, by making comparisons of various components and examining their content. The financial statements are the best media of documenting the results of managerial efforts to the owners of the business, its employees, its customers and the public at large, and thus become excellent tools of the public relations.

Financial Statement Analysis includes:

- a) Breaking financial statements into simpler ones;
- b) Regrouping;
- c) Rearranging the figures given in financial statements and
- d) Analyzing the figures.

Thus, the financial statements analysis is largely a study of relationship among various financial factors as shown by different statements.

After making analysis of the financial statements, the next step is to use mind for forming an opinion about the enterprise. This is the interpretation stage. The technique is called “Analysis and Interpretation” of financial statements. Analysis consists in breaking down a complex set of facts or figures into simple elements. Interpretation, on the other hand, consists in explaining the real significance of these simplified statements.

**Interpretation** means putting the meaning of the statements into simple terms for the benefits of interested parties. Interpretation is to explain in such a simple language the financial position and earning capacity of the company which may be understood even by a layman, who does not know accounting.

The analysis and interpretation of financial statements requires a comprehensive and intelligent understanding of their nature and limitations as well as the determination of the monetary valuation of the items. The analyst must grasp what represent sound and unsound relationship reflected by the financial statements. Interpretation is impossible without analysis. ‘Interpretation is not possible without analysis and without interpretation analysis has not value’. Analysis and interpretation act as a bridge between the art of recording and reporting financial information and the act of using this information.

In simple words, analysis refers to the process of fact finding and breaking down complex set of figures into simple components while interpretation standards for explaining the real significance of theses simplified components. Interpretation is a mental process based on analysis and criticism.

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**11.9 OBJECTIVES OF FINANCIAL STATEMENT ANALYSIS AND INTERPRETATIONS**

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The users of financial statements have definite objectives to analyse and interpret. Therefore, there are various in the objectives of interpretation by various classes of people. However, there are certain specific and common objectives which are listed below:

- a. To interpret the profitability and efficiency of various business activities with help of profit and loss account;
- b. To assess the financial position of the firm;
- c. To measure managerial efficiency and progress of the firm;
- d. To judge the solvency - short-term and long-term solvency of the business;
- e. To ascertain earning capacity in the future period;
- f. To determine future potential of the concern;
- g. To help in making future plans;
- h. To measure utilization of various assets during the period; and
- i. To compare operational efficiency of similar concerns engaged in the same industry.

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**11.10 PROCEDURE FOR ANALYSIS AND INTERPRETATIONS**

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Certain preliminary steps are required to be completed before attempting analysis and interpretation of financial statements.

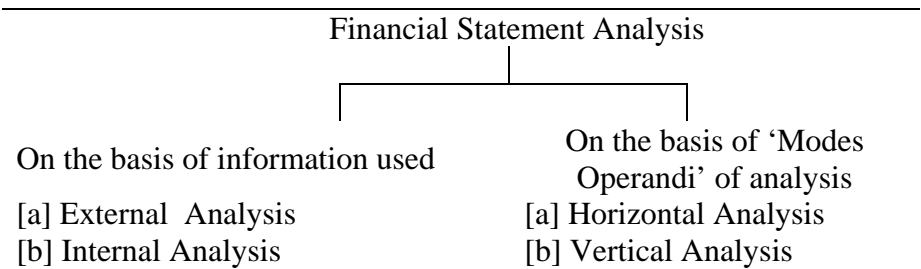
1. Ascertain the purpose and the extent of analysis and interpretation;
2. The objective of analysis of statements have to be decided as the techniques of analysis are to be selected on the basis of objectives;
3. The assumptions, principles, practices etc., followed in the preparation of the financial statements are to be ascertained to understand their significance;
4. Study the available data contained in the financial statements;
5. Additional information and data required are to be gathered, if needed;
6. The data collected has to be presented in a logical sequence by rearranging and readjusting according to objectives set out;
7. The data is to be analysed for making comparative statements, for computation of ratios and for ascertaining averages and for estimating trends;
8. Facts gathered from analysis are to be interpreted by considering the general state of the market and economy also;
9. The interpreted data and information has to be presented in a suitable form.

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**11.11 TYPES OF ANALYSIS**

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The process of financial statement analysis is of different types. The process of analysis is classified on the basis of information used and ‘modes operandi’ of analysis. The classification is as under:



**External Analysis**

This analysis is based on published financial statements of a firm. Outsiders have limited access to internal records of the concern. Therefore, they depend on published financial statements. Thus, the analysis done by outsiders namely, a creditor, suppliers, investors and government agencies is known as external analysis. This analysis serves a very limited purpose.

### **Internal Analysis**

This analysis is done on the basis of internal and unpublished records. It is done by executives or other authorized officials. It is very much useful and significant to employees and management.

### **Horizontal Analysis**

This analysis is also known as ‘dynamic’ or ‘trend’ analysis. The analysis is done by analyzing the statements of a number of years. According to **John N. Myer**, *‘the horizontal analysis consists of a study of the behaviour of each of the entities in the statement.’* Thus, under horizontal analysis we study the behaviour of each item shown in the financial statements. We examine as to what has been the periodicals trends of various items shown in the statements i.e., whether they have increased or decreased over a period of time. If the comparative statements are prepared for more than two periods, then one of the years is taken as basis to calculate the percentage of increase or decrease. Some analysts prefer to choose earlier year as basis, while some others prefer to take just the preceding year as basis. Cash Flow and Fund Flow analysis falls under this category of analysis.

### **Vertical Analysis**

Vertical analysis is also known as ‘Static Analysis’ or ‘structural analyses. This analysis is made on the basis of a single set of financial statements prepared at a particular date. Under vertical analysis, quantitative relationship is established between different items shown in a particular statement. Common-size statements are a form of vertical analysis. Different items shown in the statement are expressed as a percentage to any one item as base.

Each method of analysis provides specific type of information and in fact all these methods constitute the backbone of financial analysis.

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## **11.12 TECHNIQUES OR TOOLS OF FINANCIAL STATEMENT ANALYSIS**

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A Financial Analyst can adopt the following tools for analysis of the financial statements. These are also termed as methods or techniques of financial analysis.

1. Comparative Financial statement;
2. Common Size or measurement statements;
3. Trend Analysis;
4. Ratio Analysis ;
5. Funds Flow Analysis ;
6. Cash Flow Analysis ; and
7. Cost-Volume Profit Analysis.

**11.12.1 COMPARATIVE FINANCIAL STATEMENTS**

Comparative Financial statement is an important device of horizontal financial analysis. Financial statements are presented as on a particular date or for a particular period. But a financial analyst is interested in knowing whether there business is moving in a right direction or not. For this purpose comparative financial statements are prepared. As the very name suggest, comparative financial statements provide information to assess the direction of change in the business from the previous year[s]. Thus, theses statements render comparison between two periods of time and exhibit the magnitude and direction of historical changes in the operating results and financial status of a business. When financial statements of two or more firms are compared for drawing inferences and are called as inter-firm comparison. Generally, Balance Sheet and Income Statement are prepared in a comparative form because they are the most important statements. The comparative statement also provides for columns to indicate the change from one year to another in absolute terms and also in percentage form.

**Illustration 11.1**

From the following Profit and Loss Account and Balance Sheet of Swadeshi Ltd., for the year ended 31<sup>st</sup> December 2007 and 2008, you are required to prepare a Comparative Income Statement and a Comparative Balance Sheet.

PROFIT AND LOSS ACCOUNT				[Rs. In Lakhs]	
Particulars	2007 Rs.	2008 Rs.	Particulars	2007 Rs.	2008 Rs.
To Cost of Goods Sold	600	750	By Net Sales	800	1,000
To Operating Exps:					
Administrative Expenses	20	20			
Selling Exps.	30	40			
To Net Profit	150	190			
	800	1,000		800	1,000

BALANCE SHEET					
as on 31 <sup>st</sup> December [Rs. In Lakhs]					
Liabilities	2007 Rs.	2008 Rs.	Assets	2007 Rs.	2008 Rs.
Sundry Creditors	200	275	Cash	100	140
Tax Payable	100	150	Debtors	200	300
6 % Debentures	100	150	Stock	200	300
Equity Capital	700	700	Land & Buildings	400	370
Reserves	200	245	Plant	300	270
			Furniture	100	140
	<b>1,300</b>	<b>1,520</b>		<b>1,300</b>	<b>1,520</b>

Solution NO.11.1

Swadeshi Limited  
COMPARATIVE INCOME STATEMENT  
For the year ended December 2007 and 2008

[Rs. In Lakhs]				
Particulars	2007	2008	Absolute Increase or decrease in 2008	Percentage Increase or decrease in 2008
Net Sales	800	1,000	+ 200	+ 25
Cost of Goods Sold	600	750	- 150	+ 25
<b>Gross Profit</b>	<b>200</b>	<b>250</b>	<b>+ 50</b>	<b>+ 25</b>
<i>Operating Expenses:</i>				
Administrative Exps.	20	20	-	-
Selling Expenses	30	40	+ 10	+ 33.33
Total Operating Expenses	50	60	+ 10	+ 20
<b>Operating Profit</b>	<b>150</b>	<b>190</b>	<b>+ 40</b>	<b>+ 26.67</b>



**Swadeshi Limited**  
**COMPARATIVE BALANCE SHEET**  
**For the year ended December 2007 and 2008**

[Rs. In Lakhs]

Particulars	2007	2008	Absolute Increase [+] or Decrease [-] in 2008	Percentage Increase [+] or Decrease [-] in 2008
<b>Assets:</b>				
<b><i>Current Assets:</i></b>				
Cash	100	140	+ 40	+ 40
Debtors	200	300	+100	+ 50
Stock	200	300	+ 100	+ 50
Total Current Assets	500	740	+ 240	+ 48
<b><i>Fixed Assets:</i></b>				
Land & Buildings	400	370	- 30	- 7.50
Plant	300	270	-30	- 10
Furniture	100	140	+ 40	+ 40
Total Fixed Assets	800	780	- 20	- 2.50
<b>TOTAL ASSETS</b>	1,300	1,520	+ 220	+ 2.50
<b>Liabilities and Capital:</b>				
<b><i>Current Liabilities:</i></b>				
Sundry Creditors	200	275	+75	+ 37.50
Tax payable	100	150	+ 50	+ 50
Total Current Liabilities	300	425	+125	+41.66
<b><i>Long-term Liabilities:</i></b>				
6 % Debentures	100	150	+50	+50
Total Liabilities	400	575	+175	+43.75
<b><i>Capital &amp; Reserves:</i></b>				
Equity Capital	700	700	-	-
Reserves	200	245	+45	+22.50
Total Shareholder's Funds	900	945	+45	+5
<b>TOTAL LIABILITIES AND CAPITAL</b>	1,300	1,520	+220	+17

### 11.12.2 COMMON SIZE STATEMENT

Financial statements present absolute figures. A comparison of absolute figures could be misleading. Therefore, for better understanding and comparison, the figures are converted into percentage of some common base. The statements which report the figures as a percentage of some common base are called common size statements. It is very useful to the financial analyst as it give easy and meaningful comparison.

Generally, common size statements are common size balance sheet and income statements are prepared. In the income statement, the sales figures are taken as basis and all other figures are expressed as percentage of sales. Similarly, in the balance sheet the total assets and liabilities is taken as base and all other figures are expressed as percentage of this total. The percentages so calculated are compared with corresponding percentages in other period or other firms and meaningful conclusions are drawn.

**Illustration 11.2**

The Profit and Loss Account Akhil Kumar Ltd. are given for the years 2004 and 2005. Convert them into Common-size Income Statement and interpret the changes.

PROFIT AND LOSS ACCOUNT					
Particulars	2004 Rs.	2005 Rs.	Particulars	2004 Rs.	2005 Rs.
To Cost of Goods Sold	5,95,000	6,15,000	By Gross Sales	7,25,000	8,15,000
To Operating Exps:			Less: Sales Returns	25,000	15,000
Administrative Expenses	23,000	24,000	Net Sales	7,00,000	8,00,000
Adminst. Exps.	12,700	12,500	By Other Incomes	1,200	8,050
To Non-Operating Expenses	1,750	1,940			
To Net Profit	68,750	1,54,610			
	<b>7,01,200</b>	<b>8,08,050</b>		<b>7,01,200</b>	<b>8,08,050</b>

**Solution NO.11.2**

**Akhil Kumar Limited**  
**COMMON SIZE INCOME STATEMENT**  
**For the year ending 2004 and 2005**

Particulars	2004		2005	
	Rs.	%	Rs.	%
Net Sales	7,00,000	100.00	8,00,000	100.00
Less: Cost of Goods Sold	5,95,000	85.00	6,15,000	76.87
<b>Gross Profit</b>	<b>1,05,000</b>	<b>15.00</b>	<b>1,85,000</b>	<b>23.13</b>
Operating Expenses:				
Selling and Distribution Exps.	23,000	3.29	24,000	3.00

Administration Expenses	12,700	1.81	12,500	1.56
<b>Total Expenses</b>	<b>35,700</b>	<b>5.10</b>	<b>36,500</b>	<b>4.56</b>
Operating Income	69,300	9.90	1,48,500	18.56
Other Income	1,200	0.17	8,050	1.00
<b>Total Income</b>	<b>70,500</b>	<b>10.07</b>	<b>1,56,550</b>	<b>19.56</b>
Less: Non-Operating Expenses	1,750	0.25	1,940	0.24
<b>Net Profit during the year</b>	<b>68,750</b>	<b>9.82</b>	<b>1,54,610</b>	<b>19.32</b>

### Interpretation

1. The Gross profit ratio has improved in 2005 because the company has been able to reduce the cost of sales. The Cost of Sales which was 85 % of sales in 2004 was brought down to 76.87%.
2. The firm has been able to reduce operational expenses too, this has helped the company to increase operating profit from 9.90 % to 18.56 %.
3. Net profit ratio has almost doubled from 9.82 % to 19.32 % in just one year period.
4. Profitability of the company has improved a lot in 2005. this has been possible for two reasons, one is that the company increased the sales by Rs.1,00,000 in 2005 from 2004, the second reason is that the company has not only controlled but reduced its operating costs.

### Check your progress 11.1

The following are the Balance Sheet of Exe Ltd. and Yee Ltd. for the year ending 31<sup>st</sup> December 2005.

BALANCE SHEET as on 31 <sup>st</sup> December 2005					
Liabilities	Exe Ltd. Rs.	Yee Ltd. Rs.	Assets	Exe Ltd. Rs.	Yee Ltd. Rs.
Equity Capital	2,50,000	1,70,000	Land and Building	3,50,000	2,75,000
Pref. Share Capital	1,20,000	80,000	Plant & Machinery	2,70,000	3,00,000
Reserves	50,000	70,000	Investment [Temporary]	72,000	12,000
Loans	3,50,000	2,79,000	Book-Debts	47,500	25,000
Bills Payables	25,000	14,000	Prepaid Exps.	35,400	-
Sundry Creditors	18,000	8,000	Cash and Bank	48,690	21,000
Outstanding Exps.	8,590	4,500			
Dividend Declared	2,000	7,500			
	<b>8,23,590</b>	<b>6,33,000</b>		<b>8,23,590</b>	<b>6,33,000</b>

Present the data in such a way that proper analysis is possible.

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....

11.12.3 TREND ANALYSIS

Trend Analysis is very helpful in making a comparative study of the financial statements of several years. Under this technique, information for a number of years is taken up and one year [usually the first year] is taken as the base year. Each item of the base year is taken as 100 and on that basis; the percentages for other years are calculated. For example, if sales in the base year is Rs.10,000 and in the next year it is Rs.20,000, the trend percentage will be 100 and 200 respectively. Substitution of percentages of large amounts makes the statements brief and easily understandable.

Illustration 11.3

From the following data relating to the purchase of a firm, prepare Trend Percentages.

Year	Purchases ['00,000]
2003	1,672
2004	1,789
2005	1,873
2006	1,923
2007	2,123
2008	1,463

Solution NO.11.3

Year	Trend Percentages [%]
2003	100
2004	107
2005	112
2006	115
2007	127
2008	87.5

Thus, comparative statements, common-size statements and trend analysis present the information contained in balance sheet and income statement in a form suitable for analysis. Such presentation helps in better understanding of the financial statements. Apart from above, there are some important tools are used by the financial analyst and they are discussed in the following sections.

#### **11.12.4 RATIO ANALYSIS**

Ratio analysis is the most important tool available to financial analysts. A ratio analysis is based on ratios. A ratio is a mathematical relationship between two or more items taken from the financial statements. Ratio analysis is the process of computing, determining, and presenting the relationship of items. It also includes comparison and interpretation of ratios and using them as basis for the future projections. Ratio analysis is helpful to management and outsiders to diagnose the financial health of a business firm. The financial analysts may calculate different accounting ratios for different purposes like profitability, solvency, and activity ratios of the firm. This has been discussed in detail in the next lesson.

#### **11.12.5 FUNDS FLOW ANALYSIS**

Funds flow analysis has become an important technique in the analytical kit of financial analysts, credit granting institutions and financial managers. This is because the Balance Sheet of a business reveals its financial status at a particular point of time. It does not sharply focus those major financial transactions which have been behind the Balance Sheets changes. In order to know the purposes of these changes – sources or applications, funds flow analysis is carried out. This will help the financial analysts in making a better estimate about the company's financial position and policies.

#### **11.12.6 CASH FLOW ANALYSIS**

Cash flow analysis depicts the inflows and outflows of cash. Cash flow statement is the device for such analysis. It highlights causes which bring changes in cash position between two balance sheets like funds flow analysis.

#### **11.12.7 COST –VOLUME - PROFIT ANALYSIS**

Cost-Volume-Profit analysis is an important technique of profit planning. It studies the relationship between cost, volume of production, sales and profit. Of course, it is not strictly a financial statement analysis tool, but, it is an important technique for the management for decision –making since the data is provided by both cost and financial records. It tells the volume of sales at which the firms will break-even, the effect on profit on account of variation in output, selling price and cost, and finally, the quantity to be produced and sold to reach the target profit level.

The Ratio analysis, Cash flow and funds flow analysis and cost-volume-profit analysis has been discussed in detail the following separate lessons.

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### **11.13 LET US SUM UP**

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Financial statement analysis is nothing but study of relationship between the various financial factors in a business as disclosed by financial statements. The techniques of financial statement analysis are comparative, common size financial statements, trend analysis, ratio analysis, funds flow and cash flow statements and cost-volume-profit analysis. Comparative, common size financial statements, trend analysis are discussed in this chapter. Remaining are discussed in the following chapters in detail.

11.14 LESSON – END ACTIVITIES

1. Discuss the various types of financial statement analysis and also its tools.

11.15 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

Check Your Progress ‘Answers’ Solution No.11.01

The common-size Balance Sheet will be suitable techniques to study financial position of both the companies.

COMPARATIVE BALANCE SHEET of Exe Ltd. and Yee Ltd.  
For the year ended December 2005

Particulars	Exe Ltd.		Yee Ltd.	
	Rs.	%	Rs.	%
<b>Capital and Reserves:</b>				
Equity Capital	2,50,000	30.4	1,70,000	26.9
Pref. Share Capital	1,20,000	14.6	80,000	12.6
Reserves	50,000	6.1	70,000	11.1
	4,20,000	51.1	3,20,000	50.6
Loans	3,50,000	42.5	2,79,000	44.1
<b>Current Liabilities</b>				
Bills Payable	25,000	3.00	14,000	2.2
Sundry creditors	18,000	2.20	8,000	1.3
Outstanding Expenses	8,590	1.00	4,500	0.6
Dividend Declared	2,000	0.20	7,500	1.2
	53,590	6.40	34,000	5.3
<b>Total Liabilities</b>	8,23,590	100.00	6,33,000	100.00
<b>Asset Side</b>				
<b>Fixed Assets</b>				
Land and Buildings	3,50,000	42.5	2,75,000	43.5
Plant and Machinery	2,70,000	32.8	3,00,000	47.4
	6,20,000	75.3	5,75,000	90.9
<b>Current Assets</b>				
Investments [Temporary]	72,000	8.7	12,000	1.9
Book Debts	47,500	5.7	25,000	3.9
Prepared Expenses	35,400	4.4	-	-
Cash and Bank	48,690	5.9	21,000	3.3
	2,03,590	24.7	58,000	9.1
<b>Total Assets</b>	8,23,590	100.00	6,33,000	100.00

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**11.16 SUGGESTED READING/REFERENCES/SOURCES**

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1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
2. V.K.Saxena and C.D.Vahist – Advanced Cost and Management Accounting , Text – Sultan Cand & Sons
3. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
4. R.S.N. Pillai and Bagavathi – Management Accounting – S.Chand and Company Ltd.
5. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.

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## LESSON-12

### RATIO ANALYSIS

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#### Contents:

- 12.0 Aims and objectives
- 12.1 Introduction
- 12.2 The Concept of Ratio Analysis
- 12.3 Steps in Ratio Analysis
- 12.4 Importance of Ratio Analysis
- 12.5 Limitations of Ratio Analysis
- 12.6 Classifications of Ratios
- 12.7 Rearrangements of Financial Statements
- 12.8 Profitability Ratio
- 12.9 Financial Ratios / Solvency Ratios
- 12.10 Activity Ratios / Turnover Ratios
- 12.11 Comprehensive Illustration
- 12.12 Let us Sum Up
- 12.13 Lesson-end Activities
- 12.14 Model Answers to “Check your Progress”
- 12.15 Suggested Reading/References/Sources

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#### 12.0 AIMS AND OBJECTIVES

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After studying this lesson, you should be able to:

- Understand the concept and importance of ratio analysis.
- Work out profitability, financial and activity ratios.

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#### 12.1 INTRODUCTION

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The basic financial statements, the Balance Sheet and Profit and Loss account, are undoubtedly provides useful financial data regarding the operation of the firm. Theses, financial statements provide only a summarized view of the operations of a firm. Apart from that theses Financial Statements contain a wealth of information which, if properly analysed and interpreted, can provide valuable insights into a firm’s performance and position. For that various tools are employed. One of the various methods of financial statement analysis, as discussed in the previous lesson, is the Ratio analysis and by far



ratio analysis the most widely used tool. Ratio analysis was pioneered by Alexander Wall who presented a system of ratio analysis in the year 1909. His contention was that interpretation of financial statements can be made easier by establishing quantitative relationship between various items of financial statements. Ratio analysis is based on different ratios which are calculated from the accounting data contained in the financial statements. Different ratios are used for different purposes. Financial analysts depend to a very large extent on the use of ratios though there are other equally important tools are used. Let us in this lesson we will discuss about the concept ratio analysis and various types.

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## 12.2 THE CONCEPT OF RATIO ANALYSIS

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A Ratio is a mathematical relationship between two items expressed in a quantitative form. Arithmetically ratio is a comparison of numerator with the denominator.

Ratios can be defined as “*relationships expressed in quantitative terms, between figures which have cause and effect relationship or which are connected with each other in some manner or the other*”.

An **Accounting Ratio** can be defined as quantitative relationship between two or more items of the financial statements connected with each other.

Ratio Analysis is the process which involves computing, determining and presenting the relationship of items or groups of items of financial statements. Ratio analysis is an important and age old technique of financial analysis. The data given in the financial statements, in absolute form, are dump and are unable to communicate more purposefully. Ratios are relative form of financial data and very useful technique to check upon the efficiency, trend or progress of firms.

### Mode of Expression

Ratios may be expressed in any one or more of the following ways:

#### ***[i] In Proportion:***

In this type of expression the amounts of two items are expressed in a common denominator. In other words, it is arrived by the simple division of one number by another, for example Current Assets to Current Liabilities ratio is 2:1.

#### ***[ii] In Rate or Time or Coefficient:***

In this type of expression, a quotient obtained by dividing one item by another is taken as unit of expression. Example for this form of expression is Cost of Goods Sold divided by average stock [say 9], thus 9 times is the ratio between Cost of Goods Sold and stock.

***[iii] In Percentage:***

In this type of expression, a quotient obtained by dividing one item by another is multiplied by one hundred to show the relationship in terms of percentage. For example, the relationship between net profit and sales may be expressed as say 25 %.

These alternative methods of expressing items which are related to each other are, for purposes of financial analysis, referred to as ratio analysis. Each method of expression has a distinct advantage over the other. The analyst will select that mode which will best suit his purpose and convenience.

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## **12.3 STEPS IN RATIO ANALYSIS**

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As explained in the previous section the ratio analysis is the process of establishing and interpreting various ratios for helping the management to take certain decisions and it involves four steps:

### **Step I Selection of Relevant Information**

The first step in ratio analysis is to select relevant information from financial statements.

### **Step II Calculation of Ratios**

The second step in the ratio analysis is calculation of appropriate ratios required for decisions under consideration.

### **Step III Comparison of Calculated Ratios**

In order to access the relative meaning, the ratios, calculated are compared with the past ratios and industry ratios.

### **Step IV Interpretation and Reporting**

The final step in ratio analysis is to interpret the significance of various ratios, draw inference and to write a report.

A single ratio in itself does not convey much of the sense. To make ratios useful, they have to be further interpreted. The interpretation of the ratios can be made in the following ways:

#### ***[a] Single Absolute Ratio***

Generally speaking one cannot draw any meaningful conclusion when a single ratio is considered in isolation. But single ratios may be studied in relation to certain *rules of thumb* which are based upon well proven conventions as for example 2:1 is considered to be a Standard ratio for current assets to current liabilities.

#### ***[b] Group of Ratios***

Ratios may be interpreted by calculating a group of related ratios. A single ratio supported by other related additional ratios becomes more understandable and meaningful. For example, the ratio of current assets to current liabilities may be supported by the ratio of liquid assets to liquid liabilities to draw more dependable conclusions.

#### ***[c] Historical comparison***

When financial ratios are compared over a period of time, it gives an indication of the direction of change and reflects whether the firm's performance and financial position has improved, deteriorated or remained constant over a period of time. But while interpreting ratios from comparison over time, one has to be careful about the changes, if any, in the firm's policies and accounting procedures.

#### ***[d] Projected Ratios***

Ratios can also be calculated for future standards based upon the projected or performance financial statements. These future ratios may be taken as standard for comparison and the ratios calculated on actual financial statements can be compared with the standard ratios to find out variances, if any. Such variances help in interpreting and take corrective action for improvement in future.

#### ***[e] Inter-firm Comparison***

Ratios of one firm can also be compared with the ratios of some other selected firms in the same industry at the same point of time. This kind of comparison helps in evaluating relative financial position and performance of the firm. But while making use of such comparison one has to be very careful regarding the difference of accounting methods, policies and procedures adopted by different firms.

Based on the interpretations, the report may be prepared and may recommend specific action in the matter of the decisions, situation or may present alternatives with comparative merits or it may just state the facts and interpretation.

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## **12.4 IMPORTANCE OF RATIO ANALYSIS**

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Ratio analysis caters to the needs of various parties, mainly, shareholders, creditors, financial executives etc. Shareholders are interested with earning capacity of the firm; creditors are interested in knowing the ability of firm to meet its financial obligations; and financial executives are concerned with evolving analytical tools that will measure and compare costs, efficiency, liquidity and profitability with a view to making intelligent decisions. The importances of ratio analysis are discussed below, in brief:

### **1. Aid to measure General Efficiency**

Ratio enables the mass of accounting data to be summarized and simplified. They act as an index of the efficiency of the enterprise. As such they serve as an instrument of management control.

### **2. Aid to measure Financial Solvency**

Ratios are useful tools in the hand of management and other concerned to evaluate the firms performance over a period of time by comparing the present ratio with the past ones. They point out the firm's liquidity position to meet its short obligations and long term solvency.

### **3. Aid in Forecasting and Planning**

Ratio analysis is an invaluable aid to management in the discharge of its basic function such as planning, forecasting, control etc. The ratios that are derived after analyzing and scrutinizing the past results, helps the management to prepare budgets to formulate policies and to prepare the future plan of action etc.

### **4. Facilitates decision-making**

Ratio analysis help management in decision making from the information provided in the financial statements.

### **5. Helps in Control**

Ratio analysis also helps in making effective control of the business. Standard ratios can be based upon Performa financial statements and variance or deviations, if any, can be found by comparing the actual with the standards so as to take a corrective action at the right time. The weaknesses or other wise if any, come to the knowledge of the management which helps in effective control of the business.

### **6. Act as a Good Communication**

The financial strength and weakness of a firm are communicated in a more easy and understandable manner by the use of ratios. It plays a vital role in informing the position of and progress made by the business concern to the owners and other interested parties.

### **7. Aid in Intra Firm comparison**

Intra firm comparisons are facilitated. It is an instrument for diagnosis of financial health of an enterprise. It facilitates the management to know whether the firm's financial position is improving or deteriorating by setting a trend with the help of ratios.

### **8. Evaluation of Efficiency**

Ratio analysis is an effective instrument which, when properly used, is useful to assess important characteristics of business - liquidity, solvency, profitability etc. A study of theses aspects may enable conclusions to be drawn relating to capabilities of business.

Thus, ratios have power to speak, as figures in absolute forms shown the financial statements, are neither significant nor able to be compared and are dump.

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## 12.5 LIMITATIONS OF RATIO ANALYSIS

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Ratios are precious tools in the hands of management but the utility lies in the proper utilities of ratios. Mishandling or misuse of ratios and using them without proper context may lead the management to a wrong direction. The financial analyst should be well versed in computing ratios and proper utilization of ratios. Like all techniques of control, ratio analysis also suffers from several 'ifs and buts' and for proper computation and utilization of ratios the analyst should be aware of the limitations of ratio analysis. The following are the limiting factors which minimize or reduce the value of ratio analysis.

**1. Practical knowledge**

The analyst should have through knowledge and experience about the firm and industry.

**2. Ratios and means**

Ratios are not an end in themselves but they are means to achieve a particular purpose or end.

**3. Inter-relationship**

Ratios are inter-related and therefore a single ratio cannot convey any meaning. It has to be interpreted with reference to other related ratios to draw meaningful conclusions.

**4. Non-availability of Standards or Norms**

Ratios will be meaningful if they can be compared with standards or norms. Except for a few financial ratios, other ratios lack standards which are universally recognized.

**5. Accuracy of Financial information**

The accuracy of a ratio depends on the accuracy of a ratio depends on the accuracy of information derived from financial statements. If the statements are inaccurate, same will be the result with ratios.

**6. Consistency in preparation of financial statements**

Ratios are not substitutes to financial statements. They can be meaningful only if they are read along with information with which they are prepared. If the information is detached, ratios themselves cannot convey much useful message.

**7. Time lag**

Ratio analysis will be fruitful only if the conclusions are conveyed quickly to the management. If there is a delay, the utility of the data is diminished and the purpose itself may be defeated.

**8. Change in price level**

Ratio analysis becomes redundant during periods of heavy price fluctuations.

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12.6 CLASSIFICATIONS OF RATIOS

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Financial Ratios have been classified in several ways. A number of standpoints may be used as base for classifying the ratios. It is a matter of great surprise that no uniformity has been achieved in this regard. Different authors have classified the ratios in varying groups. To illustrate, the short-term creditors’ main interest is in the liquidity position or short-term solvency of the firm; long term creditors are more interested in the long-term solvency and profitability analysis and the analysis of the firm’s financial conditions; management is interested in evaluating every activity of the firm because they have to protect the interests of all parties. Thus, important accounting ratios among them are stated below:

**[A] CLASSIFICATION BY STATEMENTS/ TRADITIONAL CLASSIFICATION**

The traditional classification is based on those statements from which information is obtained for calculating the ratios. The ratios are classified as follows:

**1. Profit and Loss Account Ratios/Income Statement Ratios**

Theses ratios deal with the relationship between two profit and loss account items only, e.g., the ratio of gross profit to sales, or the ratio of net profit to sales. Both the items must belong to the same profit and loss account.

**2. Balance Sheet or Position Statement Ratios**

Ratios calculated on the basis of figures of the same Balance Sheets alone e.g., current ratio, quick ratio and proprietary ratio etc.

**3. Composite/ Mixed Ratios**

These ratios exhibit the relation between a profit and loss account and/or Balance sheet items, e.g., stock turnover ratio, or the ratio of total assets to sales. Etc.

**[B] CLASSIFICATION BY FUNCTION/ PURPOSE**

This type classification is based on the purpose for which analysts compute the ratios. The modern approach of classifying the ratios is according to purpose or object of analysis. Normally, ratios are used for the purposes of assessing the profitability and sound financial position. Thus, ratios according to the purpose are more meaningful. There can be several purposes which can be listed. For analysis, it is customary to group the purposes into broad headings. The following are the broad categories of accounting ratios from functional point of view:

Type of Ratios	Emphasis	Ratios
I Profitability Ratios	In relation to Sales	1. Gross Profit Ratio
	[General Profitability	2. Operating Ratio

	Ratios]	3. Operating Profit Ratio 4. Expenses Ratios 5. Net Profit Ratio
	In relation to Investments [Overall Profitability Ratios]	1. Return on Investment [ROI] 2. Return on Equity Capital 3. Return on shareholders' Funds 4. Return on Total Assets 5. Earning per share 6. Price Earning Ratio
<b>II. Solvency or Financial Ratios</b>		
	Liquidity Ratios	1. Current Ratio 2. Quick Ratio 3. Absolute Liquid Ratio
	Proprietary Ratio	1. Proprietary Ratio 2. Solvency Ratio
	Long-term solvency	1. Debt Equity Ratio 2. Fixed Assets Ratio 3. Capital Gearing Ratio
<b>III TURNOVER /ACTIVITY RATIOS</b>		
		1. Inventory Turnover Ratio 2. Stock velocity 3. Debtors Turnover Ratio 4. Debtors' Collection Period 5. Creditors' Turnover Ratio 6. Average Payment Period 7. Working Capital Turnover Ratio 8. Fixed Assets Turnover Ratio 9. Capital Turnover Ratio

The above classification, i.e. classification based on function is used in this lesson and a detailed discussion of each is made in the following pages.

12.7 REARRANGEMENT OF FINANCIAL STATEMENTS

Before discussing the above classified ratios in detail, first we should know how to rearrange the financial statements. For the purpose of analyzing the balance sheet and the profit and loss account to compute ratios, it is useful to rearrange and redraft them. In the process of rearrangement, several useful items of information emerge which facilitate the calculation of different ratios.

With the rearranged income statement, the following additional items of information are available, which are not usually found directly in the ordinary trading and profit loss account:

1. Credit Sales; 2. Materials consumed; 3. cost of production; 4. Cost of goods sold; 5. operating expenses; 6. Operating profit [Profit before interest and tax]; 7. Non-operating incomes and expenses; and 8. Profit before tax.

The following are the rearranged trading and profit and loss account with imaginary figures:

Income Statement					
Particulars	Rs.	Rs.	Particulars	Rs.	Rs.
To Opening Stock of materials	30,000		By Sales		
Add: Purchases	1,50,000		Credit Sales	5,00,000	
	1,80,000		Less: Sales Returns	20,000	
Less: Closing Stock of materials	20,000		Net Credit Sales	4,80,000	
Materials consumed		1,60,000	Cash Sales	40,000	5,20,000
To Wages		40,000			
To Manufacturing expenses		30,000			
Cost of Production		2,30,000			
Add: Opening stock of Finished Stock		80,000			
		3,10,000			
Less: Closing stock of Finished Stock		40,000			
Cost of Goods Sold		2,70,000			
To Gross profit c/d		2,50,000			
		5,20,000			5,20,000
To Operating Expenses:			By Gross Profit b/d		2,50,000
Administrative	50,000				



Expenses						
Selling Expenses	30,000					
Distribution Expenses	20,000	1,00,000				
To Operating Profit C/d		1,50,000				
		2,50,000				2,50,000
To Non-Operating Expenses:			By Operating Profit b/d			1,50,000
Interest on Debentures	20,000		By Non-Operating incomes:			
Interest on bank loans	30,000		Interest on Investments	10,000		
Goodwill written off	10,000		Profit on sale of machinery	40,000	50,000	
Loss on sale of buildings	10,000	70,000				
To Profit Before Tax c/d		1,30,000				
		2,00,000				2,00,000
To Provision for tax		30,000	By Profit before Tax b/d			1,30,000
To Net Profit c/d		1,00,000				
		1,30,000				1,30,000

The following is the rearranged Balance Sheet for Ratio Analysis, which provides the following additional information which is not usually found in an ordinary Balance Sheet:

1. Liquid Assets; 2. Current Assets; 3. Working Capital; 4. Capital employed; 5. External equities or Long-term borrowings; 6. Shareholders' funds; 7. Equity shareholders' funds or net worth or equity.

Statement of Funds [or] Position Statement		
Particulars	Rs.	Rs.
Plant and Machinery	2,00,000	
Land and Buildings	3,00,000	
<b>Fixed Assets</b>		5,00,000
Cash in hand	40,000	
Cash at bank	60,000	
Debtors	1,00,000	
<b>Liquid Assets</b>	2,00,000	

Inventories [stock of materials, Work-in-progress and Finished goods]	1,80,000	
<b>Current Assets</b>	<b>3,80,000</b>	
<i>Less:</i> Current Liabilities	<u>1,80,000</u>	
<b>WORKING CAPITAL</b>		<b>2,00,000</b>
<b>CAPITAL EMPLOYED</b>		<b>7,00,000</b>
<i>Less:</i> Long-term borrowings/External Equities:		
Debentures	1,00,000	
Long-term borrowings from banks etc.	<u>1,00,000</u>	<u>2,00,000</u>
<b>Shareholders' Funds</b>		<b>5,00,000</b>
<i>Less:</i> Preference Share Capital		<u>1,00,000</u>
Equity Shareholders' funds/ Net Worth/Equity		<b>4,00,000</b>
<i>Net worth represented by</i>		
Equity share capital	2,50,000	
Retained Earnings [Reserves & Surplus]	<u>1,50,000</u>	<u>4,00,000</u>

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## 12.8 PROFITABILITY RATIO

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The primary objective of a business undertaking is to earn profits. Profits earnings are considered essential for the survival of the business. Profit is the engine that drives the business firms. Profits to the management are the test of efficiency and a measurement of control; to the owners, a measure of worth of their investments; to the creditors, the margin of safety; to employees, a source of fringe benefits; to Government, a measure of tax paying capacity and the basis of legislative action; to customers, a hint to demand for better quality and price cuts; to an enterprise, less cumbersome source of fiancé for growth and existence and finally to the country, profits are an index of economic progress. Ability to make maximum profit from optimum utilization of resources by a business concern is termed as “profitability”. Profit is an absolute measure of earning capacity. Profitability depends upon sales, cost of utilization of resources, investments etc and a most meaningful relative term. Thus, profitability ratios are calculated to measure the overall efficiency. Generally, the profitability ratios are calculated either in relation to sales or in relation to investment. The various profitability ratios are discussed below:

### 10.08.01 GENERA PROFITABILITY RATIOS

Generally profitability ratios are related to sales. The following are the general profitability ratios:

1. Gross Profit Ratio;
2. Operating Ratio;
3. Operating Profit Ratio;
4. Expenses Ratio; and
5. Net Profit Ratio.

We shall discuss the above listed ratios in detail:

### 1. Gross Profit Ratio

Gross Profit ratio indicates the difference between sales and direct costs. It explain the relationship between gross profit and net sales. It is also known as Gross Margin or Trading margin ratio.

#### *Formula*

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

The higher the ratio is preferable; indicting higher profitability. The Gross profit ratio is expected to be adequate to cover operating expenses, fixed interest charges, dividends and transfer to reserves.

### 2. Operating Ratio

This ratio matches cost of goods sold and other operating expenses with sales. Operating ratio measures the amount of expenditure incurred in production, sales and distribution of output. It indicates operational efficiency of the firm. Lower the ratio is more is the efficiency. The ratio should be low enough to provide fair return to the shareholders and other investors.

#### *Formula*

$$\text{Operating Ratio} = \frac{\text{Cost of Goods sold} + \text{Operating Expenses}}{\text{Net Sales}} \times 100$$

Total Operating expenses here include cost of goods sold administrative expenses and selling and distribution expenses. Generally finance expenses like interest are not included under operating expenses.

Net sales mean total sales minus sales returns.

### 3. Operating Profit Ratio

It is a ratio of profit made from operating sources to the sales, usually shown as a percentage. It shows the operational efficiency of the firm and is a measure of the management's efficiency in running the routine operations of the firm.

#### *Formula*

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$$

$$\text{Operating Profit} = \text{Net Profit} + \text{Non-Operating Expenses} - \text{Non-operating Incomes}$$

[or]

$$\text{Gross Profit} + \text{Operating Expenses}$$

Operating expenses includes administration include administration, selling and distribution expenses. Finance expenses are generally excluded.

#### 4. Expenses Ratio

The expenses ratios are also known as supporting ratios to operating ratio. They indicate the efficiency with which business as a whole functions. It is better for the concern to know how it is able to save or waste over expenditure in respect of different items of expenses. Therefore, each aspect of Cost of Goods Sold and operating expenses are analysed. The formulas for some of the expenses are given below:

##### *Formula*

$$\text{Factory Expenses Ratio} = \frac{\text{Factory Expenses} \times 100}{\text{Net Sales}}$$

$$\text{Administrative Expenses Ratio} = \frac{\text{Administrative Expenses} \times 100}{\text{Net Sales}}$$

$$\text{Selling and Distribution Expenses Ratio} = \frac{\text{Selling and Distribution Expenses} \times 100}{\text{Net Sales}}$$

$$\text{Financial Expenses Ratio} = \frac{\text{Financial Expenses} \times 100}{\text{Net Sales}}$$

$$\text{Particular Expenses Ratio} = \frac{\text{Particular Expenses} \times 100}{\text{Net Sales}}$$

Similar ratios can also be calculated for each item of cost, namely, direct material expenses ratio, direct wage cost etc. where each item of cost/expense is the numerator and net sales is the denominator.

#### 5. Net Sales Ratio

It is also called net profit to sales ratio. It is a measure of management's efficiency in operating the business successfully from the owners' point of view. It indicates the return on shareholders' investments. Higher the ratio better is the operational efficiency of the business concern.

##### *Formula*

$$\text{Net Profit Ratio} = \frac{\text{Net Profit} \times 100}{\text{Net Sales}}$$

Net profit includes non operating incomes and profits. Similarly net profit is the profit after reducing non operating expenses. Provision for tax is also subtracted while determining net profits.

Illustration 12.1

Profit and Loss Accounting of Greenville Ltd. us given below:

Particulars	Rs.	Particulars	Rs.
To Opening Stock	2,00,000	By Sales	16,00,000
To Purchases	12,00,000	By Closing Stock	3,20,000
To Administration Expenses	1,20,000	By Dividend	4,000
To Selling Expenses	80,000		
To Financial Expenses	40,000		
To Loss on Sale of Assets	5,000		
To Net profits	2,79,000		
	19,24,000		19,24,000

Calculate General profitability ratios.

Solution 12.1

It is appropriate to redraft the Profit and Loss Account given before calculating profitability [general] ratios:

Particulars	Rs.	Particulars	Rs.
To Opening Stock	2,00,000	By Sales	16,00,000
To Purchases	12,00,000	By Closing Stock	3,20,000
To Gross Profit c/d	5,20,000		
	19,20,000		19,20,000
To Administration Expenses	1,20,000	By Gross Profit b/d	5,20,000
To Selling Expenses	80,000		
To Operating Profit c/d	3,20,000		
	5,20,000		5,20,000
To Financial Expenses	40,000	By Operating Profit b/d	3,20,000
To Loss on Sale of Assets	5,000	By Dividend	4,000
To Net profits	2,79,000		
	3,24,000		3,24,000

[1] Gross profit Ratio

$$\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$
$$= \frac{5,20,000}{16,00,000} \times 100 = 32.5\%$$

[2] Net profit Ratio

$$\frac{\text{Net Profit}}{\text{Net Sales}} \times 100 = \frac{2,79,000}{16,00,000} \times 100 = 17.44 \%$$

$$\text{[3] Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 = \frac{3,20,000}{16,00,000} \times 100 = 20.00 \%$$

$$\text{[4] Operating Ratio} = \frac{\text{Cost of Sales}}{\text{Net Sales}} \times 100 = \frac{10,80,000 + 2,00,000}{16,00,000} \times 100 = 80.00 \%$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= \text{Rs.16,00,000} - \text{Rs.5,20,000} \\ &= \text{Rs.10,80,000} \\ \text{Operating Expenses} &= \text{Administrative Expenses} + \text{Selling Expenses} \\ &= \text{Rs.1,20,000} + \text{Rs.80,000} \\ &= \text{Rs.2,00,000} \end{aligned}$$

Financial Expenses are generally considered as non-operating expenses.

#### [5] Expenses Ratio:

##### a. Administrative Expenses Ratio =

$$= \frac{\text{Administrative Expenses}}{\text{Net Sales}} \times 100 = \frac{1,20,000}{16,00,000} \times 100 = 7.50 \%$$

$$\text{b. Selling Expenses Ratio} = \frac{\text{Selling Expenses}}{\text{Net Sales}} \times 100 = \frac{80,000}{16,00,000} \times 100 = 5.00 \%$$

$$\text{c. Finance Expenses Ratio} = \frac{\text{Finance Expenses}}{\text{Net Sales}} \times 100 = \frac{40,000}{16,00,000} \times 100 = 2.50 \%$$

##### d. Non Operating Expenses Ratio

$$= \frac{\text{Non-Operating Expenses}}{\text{Net Sales}} \times 100 = \frac{45,000}{16,00,000} \times 100 = 2.81 \%$$

$$\begin{aligned} \text{Non-Operating Expenses} &= \text{Loss on sale of assets} + \text{Finance Expenses} \\ &= \text{Rs.5,000} + \text{Rs.40,000} = \text{Rs.45,000} \end{aligned}$$

Illustration 12.2

NSG Enterprises present you the following income statement and request you to calculate [1] Operating Ratio; [2] Expenses Ratio; [3] Operating Profit Ratio; [4] Gross Profit Ratio and [5] Net Profit Ratio.

Income Statement		
Particulars	Rs.	Rs.
Sales	8,60,000	
Less: Sales Returns	60,000	
Net Sales		8,00,000
Less: Cost of Goods Sold		3,50,000
Gross Profit		5,00,000
Add: Non-Operating Incomes:		
Profit on Sale of Investments	30,000	
Income from Investments	20,000	50,000
		4,50,000
Less: Operating Expenses:		
Administrative Expenses	40,000	
Selling Expenses	60,000	
Distribution Expenses	20,000	
Non-Operating Expenses:		
Finance Expenses	30,000	
Loss on Sale of Plant	20,000	
Provision for Income Tax	30,000	
Net Profit		3,00,000

Solution 12.2

Administrative, selling and Distribution are the operating expenses. Finance expenses are generally regarded as non-operating. Similarly provisions for tax, loss on sale of plant are also non-operating losses or expenses.

[1] Operating Ratio

=  $\frac{\text{Cost of Sales}}{\text{Net Sales}} \times 100 = \frac{3,50,000 + 40,000 + 60,000 + 20,000}{8,00,000} \times 100 = 58.75 \%$

[2] Expenses Ratio

a. Administrative Expenses Ratio =

$\frac{\text{Administrative Expenses}}{\text{Net Sales}} \times 100 = \frac{40,000}{8,00,000} \times 100 = 5.00 \%$

$$\text{b. Selling Expenses Ratio} = \frac{\text{Selling Expenses}}{\text{Net Sales}} \times 100 = \frac{60,000}{8,00,000} \times 100 = 7.50 \%$$

c. Distribution Expenses Ratio =

$$= \frac{\text{Distribution Expenses}}{\text{Net Sales}} \times 100 = \frac{20,000}{8,00,000} \times 100 = 2.50 \%$$

$$\text{d. Finance Expenses Ratio} = \frac{\text{Finance Expenses}}{\text{Net Sales}} \times 100 = \frac{30,000}{8,00,000} \times 100 = 3.75 \%$$

$$\text{3. Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 = \frac{3,30,000}{8,00,000} \times 100 = 41.25 \%$$

Operating Profit

$$\begin{aligned} &= \text{Gross profit} - \text{Operating Expenses} \\ &= \text{Rs.}4,50,000 - [40,000 + 60,000 + 20,000] \\ &= \text{Rs.}3,30,000 \end{aligned}$$

OR

$$\begin{aligned} &= \text{Net Profit} + \text{Non-operating expenses and losses} - \\ &\quad \text{Non-Operating Incomes} \\ &= \text{Rs.}3,00,000 + [30,000 + 20,000 + 30,000] - \\ &\quad [30,000 + 20,000] \\ &= \text{Rs.}3,30,000 \end{aligned}$$

4. Gross profit Ratio

$$\begin{aligned} &\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \\ &= \frac{4,50,000}{8,00,000} \times 100 = 56.25\% \end{aligned}$$

$$\text{5. Net profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 = \frac{3,00,000}{8,00,000} \times 100 = 37.50 \%$$

### 12.8.2 OVERALL PROFITABILITY RATIOS- RELATED TO INVESTMENTS

The profitability of the firm is also measured in relation to investments. The investment may refer to investments, total assets, capital employed or the owners' equity. The efficiency of an enterprise is judged by the amount of profits. But sometimes the conclusion drawn on the basis of profit-to-sales ratios may be misleading. Because it is



possible that profit in terms of sales may be sufficient but sales and/or profits with regard to capital may be inadequate. Therefore, the state of efficiency cannot not be judged by the volume of profits alone; we have to consider the size of investment along with profit. The shareholders can measure the success of a firm in terms of profit related to capital employed. The efficiency can only be judged by calculating return on capital employed or with investments. The volume of profit depends to a great extent upon the volume of investments. Investments are represented by those assets which are acquired for conducting the business operations, mainly production and sales and the size of investments [assets] certainly affects the volume of profit. The important categories of such ratios are discussed below:

1. Return on Investment [ROI]
2. Return on Shareholders' Funds
3. Return on Equity Shareholders' Funds
4. Return on Total Assets
5. Earning per share
6. Price Earning Ratio

### **1. Return on Investments [ROI][or Overall Profitability Ratio]**

It is also called as Return on Capital Employed [ROCE]. It indicates the percentage of return on the total capital employed in the business. It is calculated on the basis of the following formula:

***Formula***

$$ROI = \frac{\text{Operating Profit}}{\text{Capital Employed}} \times 100$$

The term operating profits means profit before interest and tax.

The term capital employed has been interpreted in different ways by different accountants and authors. Some of the different meanings of capital employed are given below:

- [a] Total of all assets i.e., fixed as well as current assets
- [b] Total of Fixed Assets
- [c] Total of Long-term funds employed in the business i.e.,  
[Share capital + Reserves and Surplus + Long-term loans] – [Non-business assets + Fictitious assets]
- [d] Net Working Capital + Fixed Assets

Return on investment is used to measure the operational and managerial efficiency. A comparison of ROI with that of similar firms, with that of industry and with past ratio will be helpful in determining how efficiently the long-term funds of owners and creditors being put into use. Higher the ratio, the more efficient is the use of the capital employed.

The term ‘Operating Profit’ means ‘Profit before Interest and Tax’. The term ‘Interest’ means ‘Interest on long-term borrowings’. Interest on short-term borrowings will be deducted for computing operating profit. Non-trading incomes or non-trading losses or expenses such as loss on account of will also be excluded.

## 2. Return on Shareholders Fund

This ratio determines the profitability from the shareholder’s point of view.

### *Formula*

$$\text{Return on Shareholders' Fund} = \frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Funds}} \times 100$$

The term Net Profit after Interest and Tax as used here, means net income after payment of interest and tax including net non-operating income [i.e., Non-operating income minus non-operating expenses]. It is the final income that is available for distribution as dividends to shareholders. Shareholders’ funds include both preference and equity share capital and all reserves and surplus belonging to shareholders.

## 3. Return on Equity Shareholders’ fund or Net Worth

In real sense, equity shareholders are the real owners’ of the company. They assume the highest risk in the company. Preference shareholders have a preference over equity shareholder in the payment of dividend as well as capital. Preference shareholders get a fixed rate of dividend irrespective of the quantum of profits of the company. The rate of dividend varies with the availability of profits in the case of ordinary shares only. Thus, equity shareholders are more interested in the profitability of a company and the performance of the company should be judged on the basis of the return on equity capital of the company. Return on equity capital, which is the relationship between profits of a company and its equity capital, can be calculated as:

### *Formula*

#### **Return on Equity Shareholders’ Fund**

$$= \frac{\text{Net Profit after Interest, Tax and Preference Dividend}}{\text{Equity Shareholders' Funds}} \times 100$$

The term equity shareholders funds [or] Equity or Net Worth refers to equity share capital + Reserves and Surplus + Profits – Accumulated Losses.

## 4. Return on Total Assets

This ratio is computed to know the Productivity of the Total Assets. There are two methods for computing it:

**Formula**

$$\text{Return on Total Assets} = \frac{\text{Net Profit after Tax}}{\text{Total Assets}} \times 100$$

Or

$$\text{Return on Total Assets} = \frac{\text{Net Profit after Tax} + \text{Interest}}{\text{Total Assets excluding fictitious assets}} \times 100$$

The inclusion of interest is conceptually sound because total assets have been financed from the 'pool' of funds supplied by the creditors and the owners. It will be proper to exclude fictitious assets as they represent debit balance of P/L Account, preliminary expenses etc.

**5. Earnings per Share [EPS]**

This ratio highlights the overall success of the concern from owners' point of view and it is helpful in determining market price of equity shares. It reflects upon the capacity of the concern to pay dividend to its equity shareholders. The ratio is calculated by dividing the net profits after tax and preference dividend by number of equity shares.

**Formula**

$$\text{EPS} = \frac{\text{Net Profit after Tax and preference Dividend}}{\text{Number of Equity shares}} \times 100$$

In the share market, generally, investors are accustomed to judge companies on the basis of EPS.

**6. Price-Earning Ratio [P/E Ratio]**

Price Earning ratio is the ratio between market price per equity share and earning per share. The ratio is calculated to make an estimate of appreciation in the value of a share of a company and is widely used by investors to decide whether or not to buy shares in a particular company. The ratio is calculated as:

**Formula**

$$\text{PER/ P/E Ratio} = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

Generally, higher the price-earning ratio the better it is. If the P/E ratio falls, the management should look into the causes that have resulted into the fall of this ratio.

Illustration 12.3

The following information is extracted from the books of Confident Co. Ltd. You are required to rearrange the information for Finance Analysis and calculate [1] Return on Investment [ROI] or Return on Capital Employed; [2] Return on Shareholders’ Funds [3] Return on Equity Shareholders’ Funds and [4] Return on Total Assets.

Particulars	Rs.	Particulars	Rs.
Net Sales	10,00,000	Profit & Loss Account	2,00,000
Cost of Goods sold	6,00,000	Debentures	2,50,000
Interest on Debentures	25,000	Sundry Creditors	50,000
Loss on sale of Furniture	5,000	Equity Share Capital	3,00,000
Interest on Govt. Securities	5,000	10 % Pref. Share Capital	2,00,000
Fixed Assets less Depreciation	10,75,000	Operating Expenses	1,50,000
Investment in Govt. Securities	50,000	Provision for Tax	75,000
Current Assets	5,00,000		
Reserves	4,00,000		

Solution 12.3

Particulars	Rs.	Particulars	Rs.
To Cost of Goods Sold	6,00,000	By Sales	10,00,000
To Gross Profit c/d	4,00,000		
	<b>10,00,000</b>		<b>10,00,000</b>
To Operating Expenses	1,50,000	By Gross Profit b/d	4,00,000
To Operating Profit c/d	2,50,000		
	<b>4,00,000</b>		<b>4,00,000</b>
To Interest on Debentures	25,000	By Operating Profit b/d	2,50,000
To Loss on Sale of Furniture	5,000	By Interest on Govt. Securities	5,000
To Provision for Tax	75,000		
To Net profits	1,50,000		
	<b>2,55,000</b>		<b>2,55,000</b>

Statement of Financial Position

Particulars	Rs.	Rs.
Fixed Assets [A]		10,75,000
Current Assets	5,00,000	
Less: Current Liabilities:		
Creditors	50,000	
Provision for Tax	75,000	
Working Capital [B]		3,75,000
Capital Employed [A+B]		14,50,000
Add: Investments in Govt. Securities		50,000
		15,00,000

Less: Debentures		2,50,000
<b>Shareholders Funds</b>		12,50,000
Less: Preference Share Capital		2,00,000
Equity Shareholder Funds		10,50,000
Represented by:		
Equity Share Capital	3,00,000	
Retained Earning	7,50,000	10,50,000
[4,00,000+2,00,000+1,50,000]		-

**[1] Return on Investment [or] Return on Capital Employed**

*Profit Before Interest and Tax*

$$= \frac{[Operating\ Profit]}{Capital\ Employed} \times 100 = \frac{2,50,000}{14,50,000} \times 100 = 17.24\ \%$$

**[2] Return on Shareholders’ Funds**

*Net Profit after Interest and Tax*

$$= \frac{Net\ Profit\ after\ Interest\ and\ Tax}{Shareholders'\ Funds} \times 100 = \frac{1,50,000}{12,50,000} \times 100 = 12.00\ \%$$

**[3] Return on Equity Shareholders’ Funds**

*Net Profit after Interest, Tax and Preference Dividend*

$$= \frac{Net\ Profit\ after\ Interest,\ Tax\ and\ Preference\ Dividend}{Equity\ Shareholders'\ Funds} \times 100$$

From equity shareholders’ funds of Rs.10,50,000 shown in the financial position statement, preference dividend of Rs.20,000 should be deducted because that is paid out of profits.

$$= \frac{1,50,000 - 20,000}{10,50,000 - 20,000} \times 100 = \frac{1,30,000}{10,30,000} \times 100 = 12.62\ \%$$

**[4] Return on Total Assets**

$$\frac{\text{Net Profit after Tax + Interest}}{\text{Total' Assets}} \times 100$$

$$= \frac{1,50,000 + 25,000}{10,75,000 + 5,00,000 + 50,000} \times 100 = \frac{1,75,000}{16,25,000} = 10.77 \%$$

### Illustration 12.4

Calculate the Earnings per Share from the following information:

Net Profit before Tax	Rs.10,00,000
Tax on Profits	50 %
15 % Preference Share Capital [Rs.10 each]	Rs.2,00,000
Equity Share Capital 4,700 shares of Rs.10 each	Rs.4,70,000

### Solution 12.4

#### Calculation of Net Profits after Tax and Preference Dividend

Particulars	Rs.
Net Profit before Tax	10,00,000
<b>Less:</b> Tax on Profit at 50 % [10,00,000 x 50 /100]	5,00,000
Profit After Tax	5,00,000
<b>Less:</b> Preference Dividend [2,00,000 x 15/100]	30,000
<b>Profit after Preference Dividend</b>	<b>4,70,000</b>

### Earning Per Share [EPS]

$$\frac{\text{Net Profit after Tax and Preference Dividend}}{\text{Number of Equity Shares}} = \frac{4,70,000}{4,700} = \text{Rs.100 per Share}$$

Earnings per share indicate the profits available for equity shareholders. The market price of a company’s share is more or less in consonance with EPS. A higher EPS invariable pushes up the share price in the stock exchanges, thus increasing the shareholders’ wealth.

### Illustration 12.5

The following information is obtained from the books of Bolt Enterprises Ltd.

Profit after Tax	Rs.2,77,000
Equity Dividend paid	20 %
Market price of equity shares Rs.50 per share	

The company’s share capital consists of the following:

40,000 Equity Shares of Rs.20 each

30,000 9 % Preference Shares of Rs.10 each.

Calculate Price Earning Ratio.

**Solution 12.5**

**Calculation of Earning per Share:**

Particulars	Rs.
Profit After Tax	2,77,000
<i>Less:</i> Preference Dividend [3,00,000 x 9/100]	27,000
<i>Profit after Preference Dividend</i>	2,50,000

**Earning Per Share [EPS]**

$$= \frac{\text{Net Profit after Tax and Preference Dividend}}{\text{Number of Equity Shares}} = \frac{2,50,000}{40,000} = \text{Rs.6.25 per Share}$$

**Price Earning Ratio [P/E Ratio]**

$$= \frac{\text{Market Price per Equity Share}}{\text{Earnings per Share}} = \frac{50}{6.25} = 8 \text{ times}$$

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**12.9 FINANCIAL RATIOS / SOLVENCY RATIOS**

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Financial or Solvency ratios include all those ratios which express financial position of the business. Financial position may mean differently to different persons interested in the business concern. Short term Creditors are interested in liquidity position of the business whereas long-term creditors are more concerned about debit-equity or solvency position of the concern. The proprietors/investors are more interested about their capital intactness. Thus, the term financial position generally refers to short-term and long-term solvency of the business concern, indicating safety of different interested parties. It is sound principle of finance that the short-term requirements of the funds should be met out of short-term funds and long-term requirements should be out of long-term funds. Financial ratios are calculated on the basis of items of the Balance Sheet. Therefore they are also called Balance Sheet Ratios. The significant financial ratios classified into three broad categories:

### 12.9.1 Proprietary Ratios / Overall Solvency Ratios

1. Proprietary Ratio;
2. Solvency Ratio.

### 12.9.2 Liquidity Ratios Short-term Solvency Ratio

1. Current Ratio
2. Quick Ratio
3. Cash Position Ratio [Absolute Liquid Ratio]

### 12.9.3 Long-term Solvency Ratios

1. Debt-Equity Ratio
2. Fixed Assets Ratio
3. Capital Gearing Ratio

Let us discuss the above ratios one by one in detail:

### 12.9.1 Proprietary Ratios / Overall Solvency Ratios

Proprietary ratios are related to the shareholders' stake. They are two types of overall solvency ratios. They are [1] Proprietary ratio and [2] Solvency Ratio.

#### 1. Proprietary Ratio

Proprietary ratio is also known as Equity Ratio or Shareholders' to Total Assets Ratio or Net worth to Total Assets Ratio. This ratio establishes the relationship between shareholders' funds and total assets of the firm. The components of this ratio are shareholders' fund or Proprietors' funds and Total Assets. The shareholders' funds are equity share capital, preference share capital, undistributed profits, reserves and surplus. Out of this amount, accumulated losses should be deducted. The Total assets on the other hand denote total resources of the assets.

#### *Formula*

$$\text{Proprietary ratio} = \frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}} \times 100$$

This ratio shows the general soundness of the company. As this ratio represents the relationship of owners' funds to total assets, higher the ratio or the share of the shareholders in the total capital of the company, better is the long-term solvency position of the business. This ratio indicates the extent to which the assets of the company can be lost without affecting the interest of the creditors of the company. A ratio below 50 % may be alarming for the creditors since they may have to lose in the event of company's liquidation on account of heavy losses.



2. Solvency Ratio / Total Debt Ratio

It is a ratio which relates the total tangible assets with the total borrowed funds. In a sense, it is the ‘other side of the coin’ for proprietary ratio. Simply it can be calculated as 100-proprietary ratio.

Formula

Solvency Ratio =  $\frac{\text{Total Debt}}{\text{Total Tangible Assets}} \times 100$

In this ratio, the total debt includes both short-term and long-term borrowings. It shows the proportion of assets needed to repay the debt. A higher ratio indicates greater risk and lower safety to the owners. A higher ratio also makes the firm vulnerable to business cycle and its solvency becomes suspect. Further borrowing becomes difficult for firms with a high total debt ratio. Such firms are called ‘Highly geared’.

Illustration 12.6

From the following balance sheet of a company you are required to calculate Proprietary Ratio and Solvency Ratio.

Balance Sheet as on 31 <sup>st</sup> December			
Liabilities	Rs.	Assets	Rs.
Share Capital	10,00,000	Fixed Assets	12,00,000
Fixed Liabilities	5,00,000	Current Assets	8,00,000
Current Liabilities	5,00,000		
	20,00,000		20,00,000

Solution 12.6

Proprietary ratio =  $\frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}} \times 100$

$$= \frac{\text{Shareholders' Funds}}{\text{Total' Tangible Assets}} \times 100 = \frac{10,00,000}{20,00,000} \times 100 = 50 \%$$

Solvency Ratio =  $\frac{\text{Total Debt}}{\text{Total Tangible Assets}} \times 100$

$$= \frac{\text{Total Debt}}{\text{Total' Tangible Assets}} \times 100 = \frac{5,00,000 + 5,00,000}{20,00,000} \times 100 = 50 \%$$

**Illustration 12.7**

From the balance Sheet given below calculate the Proprietary ratio and solvency Ratio.

Balance Sheet of Rose Ltd. as on 31 <sup>st</sup> December 2008			
Liabilities	Rs.	Assets	Rs.
Share Capital	6,00,000	Fixed Assets	16,50,000
Reserves and Surplus	4,50,000	Current Assets	7,50,000
Bank Overdraft	7,00,000	Investments	3,50,000
Current Liabilities	12,00,000	Preliminary Expenses	1,00,000
		Goodwill	1,00,000
	<b>29,50,000</b>		<b>29,50,000</b>

**Solution 12.7**

Shareholders' Funds = Share Capital + Reserves and Surplus  
= 6,00,000 + 4,50,000  
= Rs.10,50,000

Total Tangible Assets = Fixed Assets + Current Assets + Investments  
= 16,50,000 + 7,50,000 + 3,50,000  
= Rs.27,50,000

Total Debt = Bank Overdraft + Current Liabilities  
= 7,00,000 + 12,00,000  
= Rs.19,00,000

**Proprietary ratio** =  $\frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}} \times 100$   
$$= \frac{\text{Shareholders' Funds}}{\text{Total' Tangible Assets}} \times 100 = \frac{10,50,000}{27,50,000} \times 100 = 38.18 \%$$

**Solvency Ratio** =  $\frac{\text{Total Debt}}{\text{Total Tangible Assets}} \times 100$   
$$= \frac{\text{Total Debt}}{\text{Total' Tangible Assets}} \times 100 = \frac{19,00,000}{27,50,000} \times 100 = 69.09 \%$$

### 12.9.2 Liquidity Ratios Short-term Solvency Ratio

Liquidity refers to the ability of a concern to meet its current obligations as and when they become due. The short-term obligations of a firm can be met only when there are sufficient liquid assets. Therefore, a firm must ensure that it does not suffer from lack of liquidity or the capacity to pay its current obligations. To measure the liquidity of a firm, the following ratios are calculated:

1. Current Ratio
2. Quick Ratio
3. Cash Position Ratio [Absolute Liquid Ratio]

#### 1. Current Ratio

The ratio of current assets to current liabilities is called 'Current Ratio'. In order to measure the short-term liquidity or solvency of a concern, comparison of current assets and current liabilities is inevitable. Current ratio indicates the ability of a concern to meet its current obligations as and when they are due for payment.

#### *Formula*

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The term current assets includes sundry debtors, stock, bills receivables, bank and cash balances, prepaid expenses, income due and short-term investments.

The term current liabilities include creditors, bank overdraft, bills payable, outstanding expenses, income received in advance etc.

#### **Standard:**

Internationally accepted current ratio is 2:1 i.e., current assets shall be 2 times to current liabilities.

The ability of the current concern also depends on composition of current assets. If current assets have more of stock, debtors, other than cash and bank, it may be difficult to meet current obligations. But at the same time most of the current assets consist of bank and cash, it is easier to meet the obligations. A very high current ratio also does not indicate efficiency since it means less efficient use of funds. A high current ratio also indicates dependence on long-term sources of raising funds. Long-term funds are more expensive than current liabilities. A ratio of less than 2 indicates inadequate current assets to meet current liabilities. Ideal ratio of '2' is insisted because even if current assets are reduced to half i.e., '1' instead of '2', creditors will be able to get their dues in full. The difference between the current assets and current liabilities acts as 'Cushion' and provides flexibility for payments.

## 2. Quick Ratio / Liquid Ratio

Quick ratio also known as Acid test or Liquid Ratio is a more rigorous test of liquidity than the current ratio. Current assets include inventories and prepaid expenses which are not easily convertible into cash within a short period. Quick ratio may be defined as the relationship between quick/liquid assets and current liabilities. An asset is said to be liquid if it can be converted into cash within a short-period without a loss of value. In that sense, cash in hand and cash at bank are the most liquid assets. The other assets which can be included in the liquid assets are bills receivables, sundry debtors, marketable securities and short-term or temporary investments. Inventories cannot be termed to be a liquid asset because they cannot be converted into cash immediately without a sufficient loss of value. In the same manner, prepaid expenses are also excluded from the list of quick/liquid assets because they are not expected to be converted into cash. The quick ratio can be calculated by dividing the total of the quick assets by total current liabilities. Thus,

### *Formula*

$$\text{Quick/Liquid Ratio} = \frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$$

Sometimes, bank overdraft is not included in current liabilities while calculating quick or acid test ratio, on the argument that bank overdraft is generally a permanent way of financing and is not subject to be called on demand. In such cases, the quick ratio is found out by dividing the total quick assets by quick liabilities. [i.e., current liabilities –Bank overdraft]

### *Formula*

$$\text{Quick/Liquid Ratio} = \frac{\text{Quick or Liquid Assets}}{\text{Quick or Liquid Liabilities}}$$

Generally, a high liquidity ratio is an indication that the firm is liquid and has the ability to meet its current or liquid liabilities in time and vice versa. An increase in the quick ratio reveals that the liquidity position of the firm has deteriorated. As a convention, generally, a quick ratio of “one to one” [1:1] is considered to be satisfactory.

## 3. Absolute Liquid Ratio [Cash Position Ratio]

Although receivables [debtors and bill receivables] are generally more liquid than inventories, yet there may be doubts regarding their realization into cash immediately or in time. Hence some authorities are of the opinion that absolute liquid ratio should also be calculated together with current ratio and acid test ratio so as to exclude even receivable from the current assets and to find out the absolute liquid assets.

**Formula**

**Absolute Liquid Ratio**            =            
$$\frac{\text{Absolute Quick Assets}}{\text{Current Liabilities}}$$

Absolute liquid assets include cash in hand and at bank and marketable securities or temporary investments. Generally, 0.75:1 ratio is recommended to ensure liquidity.

**Illustration 12.8**

You are given the following information:

	Rs.
Cash	18,000
Debtors	1,42,000
Closing Stock	1,80,000
Bills Payable	27,000
Creditors	50,000
Outstanding Expenses	15,000
Taxes payable	75,000

Calculate [a] Current Ratio; [b] Liquidity Ratio; and [c] Absolute Liquidity Ratio.

**Solution 12.8**

**Current Assets**            = Cash + Debtors + Closing Stock  
                                     = 18,000+1,42,000+1,80,000  
                                     = Rs.3,40,000

**Current Liabilities**       =Bills Payable + Creditors + Outstanding Expenses + Tax payables  
                                     = 27,000+50,000+15,000+75,000  
                                     = Rs.1,67,000

**[a] Current Ratio**            = 
$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$
  
  
                                     = 
$$\frac{3,40,000}{1,67,000} = 2.036 \text{ Times}$$

**[b] Quick/Liquid Ratio**            = 
$$\frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$$
  
  
Liquid Assets                        = Current Assets – Stock and Prepaid Expenses  
   = 3,40,000-1,80,000 = Rs.1,60,000  
  
                                     = 
$$\frac{1,60,000}{1,67,000} = 0.96 \text{ Times}$$

[c] Absolute Liquid Ratio

=

Absolute Quick Assets

= Cash and Bank Balances + Marketable Securities

= Rs.18,000

=  $\frac{18,000}{1,67,000}$  0.11 Times

Absolute Quick Assets

Current Liabilities

Illustration 12.9

The following is the Balance Sheet of New India Ltd.

Balance Sheet of Rose Ltd. as on 31 <sup>st</sup> December 2008			
Liabilities		Assets	
	Rs.		Rs.
9 % Preference Share Capital	5,00,000	Goodwill	1,00,000
Equity Share Capital	10,00,000	Land & Building	6,50,000
8 % Debentures	2,00,000	Plant	8,00,000
Long-term Loan	1,00,000	Furniture & Fixtures	1,50,000
Bills Payable	60,000	Bills Receivables	70,000
Sundry Creditors	70,000	Sundry Debtors	90,000
Bank Overdraft	30,000	Bank Balance	45,000
Outstanding Expenses	5,000	Short-term Investments	25,000
		Prepaid Expenses	5,000
		Stock	30,000
	19,65,000		19,65,000

From the above Balance Sheet **calculate:**

- [a] Current Ratio
- [b] Acid-Test Ratio and
- [c] Absolute Liquidity Ratio.

Solution 12.9

Current Assets

= 70,000+90,000+45,000+25,000+5,000+30,000

= Rs.2,65,000

Current Liabilities

= 60,000+70,000+30,000+5,000

= Rs.1,65,000

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$$\begin{aligned}
 \text{[a] Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= \frac{2,65,000}{1,65,000} = 1.61 \text{ Times}
 \end{aligned}$$

$$\begin{aligned}
 \text{[b] Quick/Liquid Ratio} &= \frac{\text{Quick or Liquid Assets}}{\text{Quick or Liquid Liabilities}} \\
 \text{[Acid-test Ratio]} &
 \end{aligned}$$

$$\begin{aligned}
 \text{Liquid Assets} &= \text{Current Assets} - \text{Stock and Prepaid Expenses} \\
 &= 2,65,000 - [30,000 + 5,000] = \text{Rs. } 2,30,000
 \end{aligned}$$

Stock and Prepaid Expenses have been excluded from current assets in order to arrive at liquid assets

$$\begin{aligned}
 \text{Liquid Liabilities} &= \text{Current Liabilities} - \text{Bank Overdraft} \\
 &= 1,65,000 - 30,000 = \text{Rs. } 1,35,000
 \end{aligned}$$

While calculating liquid liabilities, Bank Overdraft has been excluded from current liabilities as it is treated as a continuing arrangement.

$$\text{Acid-Test Ratio} = \frac{2,30,000}{1,35,000} = 1.704 \text{ Times}$$

$$\begin{aligned}
 \text{[c] Absolute Liquid Ratio} &= \frac{\text{Absolute Quick Assets}}{\text{Current Liabilities}} \times 100
 \end{aligned}$$

$$\begin{aligned}
 \text{Absolute Quick Assets} &= \text{Cash and Bank Balances} + \text{Marketable Securities} \\
 &= \text{Rs. } 45,000 + \text{Rs. } 25,000 = \text{Rs. } 70,000 \\
 &= \frac{70,000}{1,65,000} \times 100 = 0.42 \text{ Times}
 \end{aligned}$$

### Illustration 12.10

From following information given to you, find out [a] Current Assets and [b] Current Liabilities.

$$\begin{aligned}
 \text{[i] Current Ratio} &= 2.5 \\
 \text{[ii] Liquid Ratio} &= 1.5 \\
 \text{[iii] Working Capital} &= \text{Rs. } 90,000.
 \end{aligned}$$

**Solution 12.10**

Working Capital = Current Assets – Current Liabilities

Current Ratio = Current Assets / Current Liabilities

= 2.5 :1

Let current liabilities be x then current assets will be 2.5x

Working Capital = 2.5x-1.0x

Rs.90,000 = 1.5 x

x = Rs.90,000 / 1.5 = Rs.60,000

[a] So Current Liabilities Rs.60,000

[b] Current Assets Rs.1,50,000 [60,000 x 2.5]

**Illustration 12.11**

The following information of a company is given:

Current Ratio -2.5:1 ; Acid-Test Ratio – 1.5:1; Current Liabilities Rs.50,000

Find out:

[a] Current Assets; [b] Liquid Assets; and [c] Inventory

**Solution 12.11**

$$\text{Current Assets} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = 2.5 = \frac{\text{Current Assets}}{50,000}$$

[a] Current Assets = 50,000 x 2.5 = Rs.1,25,000

$$\text{Acid Test Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}} = 1.5 = \frac{\text{Current Assets}}{50,000}$$

[b] Liquid Assets = 50,000 x 1.5 = Rs.75,000

[c] Inventory = Current Assets – Liquid Assets

= Rs.1,25,000-Rs.75,000

= Rs.50,000



**12.9.3 Long-term Solvency Ratios**

The long-term indebtedness of a firm includes debenture holders, financial institutions providing medium and long-term loans and other creditors. Long-term creditors are primarily interested in knowing the firm’s ability to pay regularly interest on long-term borrowings, repayment of the principal amount at the maturity and the security of their loans. Accordingly, long-term solvency ratios indicate a firm’s ability to meet the fixed interest and costs and repayment schedules associated with its long-term borrowings. The following ratios serve the purpose of determining the solvency of the concern;

- 1. Debt-Equity Ratio
- 2. Fixed Assets Ratio
- 3. Capital Gearing Ratio
- 4. Interest Coverage Ratio [Debt Service Ratio]

**1. Debt-Equity Ratio**

Debt-Equity ratio also known as External –Internal Equity Ratio is calculated to measure the relative claims of outsiders [i.e., shareholders] against the firm’s assets. This ratio indicates the relationship between the external equities or the outsiders’ funds and the internal equities or the shareholders’ funds. It may be calculated as follows:

*Formula*

*Debt-Equity Ratio* =  $\frac{\text{External Equities}}{\text{Internal Equities}}$  or  $\frac{\text{Outsiders' Funds}}{\text{Shareholders' Funds}}$

The term external equities refers to total outside liabilities and the term internal equities refers to shareholders’ funds or the tangible net worth. In case the ratio is 1 [i.e., outsiders’ funds are equal to shareholders’ funds] it is considered to be quite satisfactory.

In case debt-equity ratio is to be calculated as a long-term financial ratio, it may be calculated as follows:

*[i] Debt-Equity Ratio* =  $\frac{\text{Total Long-term Debt}}{\text{Total Long-term Funds}}$

*[ii] Debt-Equity Ratio* =  $\frac{\text{Shareholders' funds}}{\text{Total Long-term Funds}}$

*[iii] Debt-Equity Ratio* =  $\frac{\text{Total Long-term Debt}}{\text{Shareholders' funds}}$

A method [iii] is the most popular. Ratios [i] and [ii] give the proportion of long-term debt/shareholders’ funds in total long-term funds [including borrowed as well as owned funds]. While ratio [iii] indicates the proportion between shareholders’ funds [i.e., tangible net worth], and the total long-term borrowed funds.

Ratios [i] and [ii] may be taken as ideal if they are 0.5 each, while the ratio [iii] may be taken as ideal if it is 1. In other words, the investor may take debt-equity ratio as quite satisfactory if shareholders' funds and 1/3<sup>rd</sup> owned funds, may also not be considered as unsatisfactory if the business needs heavy investments in fixed assets and has an assured return on its investment e.g., in the case of public utility concerns. Thus, interpretation of the ratio depends upon the purpose of analysis, the financial policy and the nature of business of the firm.

### Illustration 12.12

From the following balance sheet of Singur Nano Industries Ltd., you are required to calculate debt equity ratio.

Balance Sheet of Singur Nano Industries Ltd.			
Liabilities		Assets	
	Rs.		Rs.
Share Capital:		Fixed Assets	1,20,000
10,000 Shares of Rs.10 each	1,00,000	Current Assets	80,000
General Reserve	12,000		
P & L A/c	8,000		
Debentures	30,000		
Current Liabilities	50,000		
	<b>2,00,000</b>		<b>2,00,000</b>

### Solution 12.12

Debt Equity ratio is a very vital ratio for financial analysis but different experts on finance attribute different meanings to it. There are four variations of the ratio in practice. From the above data, debt equity ratio is calculated under all the four variations:

$$[i] \text{ Debt-Equity Ratio} = \frac{\text{External Equities}}{\text{Internal Equities}} \text{ or } \frac{\text{Outsiders' Funds}}{\text{Shareholders' Funds}}$$

$$\begin{aligned} \text{External Equities} &= \text{Total Outside Liabilities} \\ &= \text{Rs.30,000} + \text{Rs.50,000} \\ &= \text{Rs.80,000} \end{aligned}$$

$$\begin{aligned} \text{Internal Equities} &= \text{Shareholders' Funds} \\ &= \text{Rs.1,00,000} + 12,000 + 8,000 \\ &= \text{Rs.1,20,000} \end{aligned}$$

$$\text{Debt-Equity Ratio} = \frac{\text{External Equities}}{\text{Internal Equities}} = \frac{80,000}{1,20,000} = 0.67$$

This variation of debt equity ratio shows the proportion of outsiders’ funds in retaliation to owners’ funds.

*[ii] Debt-Equity Ratio* = 
$$\frac{\text{Total Long-term Debt}}{\text{Total Long-term Funds}}$$

Total Long-term Debt = Debentures + Long-term Loans  
= Rs.30,000

Total Long-term Funds = Debentures + Share Capital + Reserves + Profits  
= 30,000+1,00,000+12,000+8,000  
= Rs.1,50,000

Debt-Equity Ratio = 
$$\frac{30,000}{1,50,000} = 0.20$$

In this variation, long-term borrowings above are shown as a proportion of total long-term funds. Short-term funds are ignored.

*[iii] Debt-Equity Ratio* = 
$$\frac{\text{Shareholders' funds}}{\text{Total Long-term Funds}}$$

Shareholders’ Funds = Share Capital + Reserves+ Profits  
=Rs.1,00,000+12,000+8,000  
= Rs.1,20,000

Total Long-term Funds = Debentures + Share Capital + Reserves + Profits  
= 30,000+1,00,000+12,000+8,000  
= Rs.1,50,000

Debt-Equity Ratio = 
$$\frac{1,20,000}{1,50,000} = 0.80$$

In this variation, total long term funds are contrasted with the owners funds.

*[iv] Debt-Equity Ratio* = 
$$\frac{\text{Total Long-term Debt}}{\text{Shareholders' funds}}$$

Long-term Debt = Debentures  
= **Rs.30,000**

Shareholders’ Funds = Share Capital + Reserves+ Profits  
=Rs.1,00,000+12,000+8,000  
= **Rs.1,20,000**

Debt-Equity Ratio = 
$$\frac{30,000}{1,20,000} = 0.25$$

This variation of debt equity ratio, long-term borrowings are shown as a proportion of owners' funds. Among all the four variations of debt-equity ratio, this last variation showing long-term debt as a proportion of owners' funds is the most popular one.

**2. Fixed Assets Ratio**

The ratio establishes the relationship between fixed assets and long-term funds. The objective of calculating this ratio is to ascertain the proportion of long-term invested in fixed assets. The ratio is calculated as below:

***Formula***

$$\text{Fixed Assets Ratio} = \frac{\text{Fixed Assets [after depreciation]}}{\text{Total Long-term Funds}}$$

The ratio should not generally be more than '1'. If the ratio is less than one it indicates that a portion of working capital has been financed by long-term funds. It is desirable in that part of working capital is core working capital and it is more or less a fixed item.

An ideal Fixed Assets Ratio is 0.67.

Fixed assets ratio of more than '1' implies that fixed assets are purchased with short-term funds, which is not a prudent policy.

Fixed assets here mean	=	Fixed assets – Depreciation
Long-term Funds	=	Share Capital + Reserves and Surplus + Long-term loans – Fictitious assets.

**3. Capital Gearing Ratio**

This ratio is also known as capitalization or leverage. It is also one of the long-term solvency ratios. It is used to analyze the capital structure of the company. The ratio establishes relationship between fixed interest and dividend bearing funds and equity shareholders funds. The capital gearing ratio is calculated with the help of the following formula.

***Formula***

$$\text{Capital Gearing Ratio} = \frac{\text{Long term loans + Debentures + Preference Share Capital}}{\text{Equity shareholders' funds}}$$

Capital gearing ratio shows the proportion of various items of long-term finance employed in the business. Its main emphasis is on indication of the proportion between owners' funds and non owners' funds. This proportion is called leverage. If the ratio is high, the capital gearing is said to be high and if the ratio is low the capital gearing is said to be low. The implication is that high gearing is trading on thin equity and low gearing is trading on thick equity. Further highly geared capital structure is the indication for under

capitalization which means that amount of capital is disproportionate to the needs measured by the volume of activity. A low gearing ratio indicates over capitalization. The aim should be to avoid both high gearing and low gearing and achieve ‘Fair capitalization’.

#### 4. Interest Cover or Fixed Charges Cover

This ratio establishes the relationship between profit before interest and tax and fixed interest charges.

**Formula**

$$\text{Interest Cover} = \frac{\text{Net Profit before interest and tax}}{\text{Fixed Interest charges}}$$

This ratio is meaningful to debenture holders and lenders of long-term loans. It highlights the ability of the concern to meet interest commitments and its capacity to raise additional funds in future. Higher the ratio better is the position of long-term creditors and the company’s risk is lesser.

**Illustration 12.13**

Balance Sheet of Ram Ltd. as at 31<sup>st</sup> December 2003 is as follows:

Balance Sheet of Ram Ltd. as at 31 <sup>st</sup> December 2003			
<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Capital	2,00,000	Fixed Assets	3,60,000
9 % Preference Share Capital	1,00,000	Stock	50,000
8 % Debentures	1,00,000	Debtors	1,10,000
Profit and Loss A/c	40,000	Bills Receivables	6,000
Creditors	90,000	Bank balance	4,000
	<b>5,30,000</b>		<b>5,30,000</b>

Find out [1] Fixed Assets Ratio and [2] Capital Gearing Ratio

**Solution 12.13**

$$[i] \text{ Fixed Assets Ratio} = \frac{\text{Fixed Assets [after depreciation]}}{\text{Total Long –term Funds}}$$

Fixed Assets = Rs.3,60,000

Long-term Funds = Share Capital + Reserves + Profits+ Debentures  
= 2,00,000+1,00,000+40,000+1,00,000  
= Rs.4,40,000

$$\text{Fixed Assets Ratio} = \frac{3,60,000}{4,40,000} = 0.81$$

The fixed assets ratio shows the long-term funds used for financing fixed assets. The ratio should not be more than 1. If it is less than 1, it shows that part of working capital has been financed by long-term funds. If it is more than one [1], it means parts of the fixed assets are financed with current funds. The former is desirable whereas the latter is dangerous which may lead to liquidity crisis.

$$[ii]\text{Capital Gearing Ratio} = \frac{\text{Long term loans} + \text{Debentures} + \text{Preference Share Capital}}{\text{Equity shareholders' funds}}$$

$$\begin{aligned} &= \text{Debentures} + \text{Preference Share Capital} \\ &= 1,00,000 + 1,00,000 \\ &= \text{Rs.}2,00,000 \end{aligned}$$

$$\begin{aligned} \text{Equity Shareholders' funds} &= \text{Share capital} + \text{Reserves} \\ &= 2,00,000 + 40,000 \\ &= \text{Rs.}2,40,000 \end{aligned}$$

$$\text{Capital Gearing Ratio} = \frac{2,00,000}{2,40,000} = 0.833$$

Capital gearing ratio refers to the proportion between fixed interest and dividend bearing funds and equity shareholders funds in the capital employed. If the fixed interest and fixed dividend bearing funds are more than equity shareholders funds the capital structure is said to be high geared. If equity shareholders funds are more the capital is said to be low geared. If the two are equal the capital structure is said to be evenly geared.

**Illustration 12.14**

Comment on the financial position of the company from the following balance sheets.

Balance Sheet of Sundarm Ltd. as at 31 <sup>st</sup> December 2008			
<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital	2,00,000	Goodwill	1,20,000
Reserves	40,000	Fixed Assets	2,80,000
Profit and Loss A/c	60,000	Stock	80,000
Secured Loans	1,60,000	Debtors	40,000
Creditors	1,00,000	Bills Receivables	20,000
Provision for Tax	40,000	Cash	60,000
	<b>6,00,000</b>		<b>6,00,000</b>

**Solution 12.14**

When comments on financial position of a company are invited, it implies a critical examination of the solvency position of the company – both short-term solvency and long-term solvency.

Short-term solvency is generally assessed on the basis of [1] Current Ratio and [2] Liquidity Ratio.

Long-term solvency is assessed on the basis of [1] Debt-equity ratio; [2] Fixed Assets Ratio; [3] Proprietary Ratio and [3] Solvency Ratio.

**[A] SHORT-TERM SOLVENCY RATIOS**

**[1] Current Ratio**

<i>Current Assets</i>	=	Stock + Debtors + Advances + Cash
	=	80,000+40,000+20,000+60,000
	=	Rs.2,00,000
<i>Current Liabilities</i>	=	Creditors + Provision for Tax
	=	1,00,000 + 40,000
	=	Rs.1,40,000

**[a] Current Ratio**                      =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Current Ratio =  $\frac{2,00,000}{1,40,000} = 1.42 \text{ Times}$

**[b] Quick/Liquid Ratio**                      =  $\frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$   
*[Acid-test Ratio]*

Liquid Assets	=	Current Assets – Stock
	=	2,00,000-80,000= Rs.1,20,000

Stock and Prepaid Expenses have been excluded from current assets in order to arrive at liquid assets

**Quick Ratio** =  $\frac{1,20,000}{1,40,000} = 0.86 \text{ Times}$

**Comment:** Current ratio should be around ‘2’ and quick ratio should be around ‘1’. On both counts, the company’s position is not upto the mark. There may be liquidity problems in the short-term. The situation needs careful watching and appropriate steps should be taken to rectify the position, when need arises.

**[B] LONG-TERM SOLVENCY RATIOS:**

**[1] Debt Equity Ratio**

$$\text{Debt-Equity Ratio} = \frac{\text{Total Long-term Debt}}{\text{Shareholders' funds}}$$

$$\text{Long-term Debt} = \text{Secured Loans} = \text{Rs.1,60,000}$$

$$\begin{aligned}\text{Shareholders' Funds} &= \text{Share Capital} + \text{Reserves} + \text{Profit \& Loss A/c} \\ &= \text{Rs.2,00,000} + 40,000 + 60,000 \\ &= \text{Rs.3,00,000}\end{aligned}$$

$$\text{Debt-Equity Ratio} = \frac{1,60,000}{3,00,000} = 0.53$$

**[2] Fixed Assets Ratio**

$$[i] \text{ Fixed Assets Ratio} = \frac{\text{Fixed Assets [after depreciation]}}{\text{Total Long-term Funds}}$$

$$\text{Fixed Assets} = \text{Rs.2,80,000}$$

$$\begin{aligned}\text{Long-term Funds} &= \text{Share Capital} + \text{secured Loans} \\ &= 3,00,000 + 1,60,000 \\ &= \text{Rs.4,60,000}\end{aligned}$$

$$\text{Fixed Assets Ratio} = \frac{2,80,000}{4,60,000} = 0.61$$

**[3] Proprietary Ratio**

$$\begin{aligned}\text{Total Tangible Assets} &= \text{Total Assets} - \text{Intangible Assets [Goodwill]} \\ &= 6,00,000 - 1,20,000 \\ &= \text{Rs.4,80,000}\end{aligned}$$

**Note:** Goodwill, being intangible assets, is reduced from the total assets.

$$\begin{aligned}\text{Total Debt} &= \text{Secured Loans} + \text{Creditors} \\ &= 1,60,000 + 1,00,000 \\ &= \text{Rs.2,60,000}\end{aligned}$$

$$\text{Proprietary ratio} = \frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}} \times 100$$



$$= \frac{\text{Shareholders' Funds}}{\text{Total' Tangible Assets}} \times 100 = \frac{3,00,000}{4,80,000} \times 100 = 62.50 \%$$

$$\text{Solvency Ratio} = \frac{\text{Total Debt}}{\text{Total Tangible Assets}} \times 100$$

$$= \frac{\text{Total Debt}}{\text{Total Tangible Assets}} \times 100 = \frac{2,60,000}{4,80,000} \times 100 = 54.17 \%$$

**Comment:**

Long-term solvency position of the company is good. Debt equity ratio of 0.53 shows negligible risk. 60 % of the long term funds are invested in fixed assets which means a reasonable position of long-term funds is used to finance the fixed portion of working capital. Proprietary and solvency ratios are comfortable position of tangible assets.

### Illustration 12.15

The following is the Balance Sheet of a Big Bang Ltd. as on 31<sup>st</sup> March:

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Share Capital	2,00,000	Land and Buildings	1,40,000
Profit and Loss Account	30,000	Plant and Machinery	3,50,000
General Reserve	40,000	Stock	2,00,000
12 % Debentures	4,20,000	Sundry Debtors	1,00,000
Sundry Creditors	1,00,000	Bills Receivables	10,000
Bills payable	50,000	Cash at Bank	40,000
	<b>8,40,000</b>		<b>8,40,000</b>

Calculate : [1] Current Ratio; [2] Quick Ratio; [3] Inventory to Working Capital; [4] Debt to Equity Ratio; [5] Proprietary Ratio; [6] Capital Gearing Ratio; and [7] Current Assets to Fixed Assets.

### Solution 12.15

#### [1] Current Ratio

$$\begin{aligned}\text{Current Assets} &= \text{Stock} + \text{Sundry Debtors} + \text{Bills Receivable} + \text{Bank} \\ &= 2,00,000 + 1,00,000 + 10,000 + 40,000 \\ &= \text{Rs.} 3,50,000 \\ \text{Current Liabilities} &= \text{Sundry Creditors} + \text{Bills Payable} \\ &= 1,00,000 + 50,000 \\ &= \text{Rs.} 1,50,000\end{aligned}$$

$$\text{[1] Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Current Ratio} = \frac{3,50,000}{1,50,000} = 2.33 : 1$$

$$\text{[2] Quick/Liquid Ratio} = \frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$$

*[Acid-test Ratio]*

$$\begin{aligned}\text{Liquid Assets} &= \text{Current Assets} - \text{Stock} \\ &= 3,50,000 - 2,00,000 = \text{Rs.} 1,50,000\end{aligned}$$

$$\text{Quick Ratio} = \frac{1,50,000}{1,50,000} = 1 : 1$$

$$\text{[3] Inventory to Working Capital Ratio} = \frac{\text{Inventory}}{\text{Working Capital}}$$

$$\begin{aligned}\text{Working capital} &= \text{Current Assets} - \text{Current Liabilities} \\ &= \text{Rs.} 3,50,000 - \text{Rs.} 1,50,000 \\ &= \text{Rs.} 2,00,000\end{aligned}$$

$$\text{Inventory to Working Capital Ratio} = \frac{2,00,000}{2,00,000} = 1 : 1$$

$$\text{[4] Debt-Equity Ratio} = \frac{\text{Total Long-term Debt}}{\text{Shareholders' funds}}$$

$$\begin{aligned}\text{Long-term Debt} &= \text{Debentures} \\ &= \text{Rs.} 4,20,000\end{aligned}$$

$$\begin{aligned}\text{Shareholders' Funds} &= \text{Share Capital} + \text{Reserves} + \text{Profit \& Loss A/c} \\ &= \text{Rs.} 2,00,000 + 40,000 + 30,000 \\ &= \text{Rs.} 2,70,000\end{aligned}$$

$$\text{Debt-Equity Ratio} = \frac{4,20,000}{2,70,000} = 1.56 : 1$$

$$\text{[5] Proprietary ratio} = \frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}}$$

$$\begin{aligned} \text{Total Tangible Assets} &= \text{Total Assets} \\ &= \text{Rs.8, 40,000} \end{aligned}$$

$$\text{Proprietary Ratio} = \frac{2,70,000}{8,40,000} = 0.32 : 1$$

$$\text{[6] Capital Gearing Ratio} = \frac{\text{Long term loans} + \text{Debentures} + \text{Preference Share Capital}}{\text{Equity shareholders' funds}}$$

$$\begin{aligned} \text{Fixed Interest bearing Securities} &= \text{Debentures} \\ &= \text{Rs.4,20,000} \end{aligned}$$

$$\text{Capital Gearing Ratio} = \frac{4,20,000}{2,70,000} = 1.55 : 1$$

$$\text{[7] Current Assets to Fixed Assets Ratio} = \frac{\text{Current Assets}}{\text{Fixed Assets}}$$

$$\begin{aligned} \text{Fixed Assets} &= \text{Land \& Buildings} + \text{Plant and Machinery} \\ &= \text{Rs.1,40,000} + \text{3,50,000} \\ &= \text{Rs.4,90,000} \end{aligned}$$

$$\text{Current Assets to Fixed Assets Ratio} = \frac{3,50,000}{4,90,000} = 0.71 : 1$$

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## 12.10 ACTIVITY RATIOS / TURNOVER RATIOS

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These ratios are also called performance ratios or efficiency ratios. Activity ratios highlight the operational efficiency of the business concern. The term operational efficiency refers to effective, profitable and rational use of resources available to the concern. In order to examine the judicious utilization of resources as well as the wisdom and farsightedness in observing the financial policies laid down in this regard certain ratios are computed and they are collectively called turnover or activity performance ratios.

The ratios comprising this category are calculated with reference to sales or Cost of Goods Sold and expressed in number of times i.e., rate of turning over or rotation. The activity ratios indicate the briskness with which the business is being carried on. Therefore, they are also called 'velocities'. Following are the activity ratios.

1. Inventory or Stock Turnover Ratio
2. Stock Turnover Period
3. Debtors Turnover Ratio
4. Debtors' Collection Period

- 5. Creditors' Turnover Ratio
- 6. Average Payment Period
- 7. Working Capital Turnover Ratio
- 8. Fixed Assets Turnover Ratio
- 9. Total Assets Turnover Ratio

**1. Inventory or Stock Turnover Ratio**

This ratio is also known as Stock Velocity. This ratio is calculated to consider the adequacy of the quantum of capital and its justification for investing in inventory. A firm must have reasonable stock in comparison to sales. It is the ratio of Cost of Goods Sold and average inventory. This ratio helps the financial manager to evaluate inventory policy. This ratio reveals the number of times finished stock is turned over during a given accounting period. This ratio is helpful in evaluating and review of inventory policy. The various ways in which Stock Turnover ratios may be calculates are as follows:

**Formula**

[i] Stock Turnover Ratio

=

Cost of Goods Sold

Average Inventory

Or

[ii] Stock Turnover Ratio

=

Net Sales

Average Inventory

Or

[iii] Stock Turnover Ratio

=

Net Sales

Average Inventory at selling price

Or

[vi] Stock Turnover Ratio

=

No. of units sold

Average no of units in stock

The first and the third are mostly in use. The second formula can be used when cost of goods sold is not available. Forth formula is used to eliminate the effect of changing prices.

**Cost of goods sold** can be ascertained as mentioned below:

[a] In case of Trading Concerns:

*Cost of Goods sold = [Opening Stock + Purchases + Direct Expenses] – Closing stock*

[b] In case of manufacturing concerns:

$$\text{Cost of Goods Sold} = [\text{Total Cost of Production} + \text{opening stock of finished goods}] - \text{Closing stock of finished goods}]$$

$$\text{Total Cost of Production} = \text{Cost of Raw materials consumed} + \text{Labour Cost} + \text{Production Overheads.}$$

In all situations where gross profit is known

$$\text{Cost of goods sold} = \text{Sales} - \text{Gross Profit}$$

**Average stock** may be taken as the average of stocks at the beginning and end of the accounting period.

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

Stock turnover ratio indicates whether the investment in inventory is optimum. The quantity of stock should be enough to meet the requirements of the business but it should not be too excessive which locks up too much capital and may also lead to different types of stock losses.

To judge the efficiency of stock turnover ratio it should be compared over a period of time. A high inventory turnover ratio indicates efficient inventory management and efficiency in business operations.

## 2. Stock Turnover Period or Inventory turnover Period or Stock Velocity

Inventory turnover ratio can be related to 'time'. The ratio can be expressed in terms of days or months.

### **Formula**

$$\text{Stock Turnover Period} = \frac{\text{Days or months in the year}}{\text{Inventory Turnover Ratio}}$$

For example, if inventory turnover is 5 times,

$$\text{Inventory turnover in days} = 365 / 5 = 73 \text{ days}$$

$$\text{Inventory turnover in months} = 12 / 5 = 2.4 \text{ months}$$

The stock velocity of 73 days or 2.4 months conveys that on average every item of stock remains in the store or 73 days or 2.4 months before it is sold or used. The general objective is to increase the stock velocity as much as possible or in effect decrease the days or months for which items remain in stock.

**Illustration 12.16**

From the following details of a trader you are required to calculate stock turnover ratio.

	Rs.
Salas	39,984
Sales Returns	380
Opening Stock of Cost	1,378
Closing Stock of Cost	1,814
Total Gross Profit for the year	8,068

**Solution 12.16**

$$\begin{aligned}
 \text{Stock Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \\
 \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\
 &= [39,984 - 380] - 8,068 \\
 &= \text{Rs.} 31,536
 \end{aligned}$$

$$\begin{aligned}
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 \text{Average Stock} &= \frac{1,378 + 1,814}{2} = \text{Rs.} 1,596 \\
 \text{Stock Turnover Ratio} &= \frac{31,536}{1,596} = 19.76 \text{ times}
 \end{aligned}$$

This ratio relates to average stock. The ratio is expected to be high to indicate efficient use of stock. A low ratio indicates ineffective use of stock and poor inventory management.

**Illustration 12.17**

Calculate stock turnover ratio and stock turnover period from the following:  
 Sales Rs.10,00,000; Gross Profit ratio 20 % ; Stock at the beginning of the year Rs.1,75,000; stock at the end of the year Rs.1,45,000.

**Solution 12.17**

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= 10,00,000 - [10,00,000 \times 20\%] \\ &= 10,00,000 - 2,00,000 = \text{Rs.}8,00,000 \end{aligned}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

$$\text{Average Stock} = \frac{1,75,000 + 1,45,000}{2} = \text{Rs.}1,60,000$$

$$\text{Stock Turnover Ratio} = \frac{8,00,000}{1,60,000} = 5 \text{ times}$$

$$\text{Stock Turnover Period} = \frac{\text{Days or months in the year}}{\text{Inventory Turnover Ratio}}$$

$$\begin{aligned} \text{Stock turnover period} &= 365 / 5 &&= 73 \text{ days} \\ &= 12 / 5 &&= 2.4 \text{ months} \end{aligned}$$

**3. Debtors Turnover Ratio**

Debtors constitute an important constituent of current assets and therefore the quality of debtors to a great extent determines a firm's liquidity. Two ratios are used by financial analysts to judge the liquidity of the firm. They are: [a] Debtors' Turnover Ratio and [b] Debtors Collection period ratio.

Debtors' turnover ratio measures the number of times the receivables are rotated in the year in terms of sales. This ratio also indicates the efficiency of credit collection and efficiency of credit policy. The ratio is helpful in determining the operational efficiency of a business concern and the effectiveness of its credit policy. It is important to maintain a reasonable quantitative relationship between receivables and sales. The Debtors Turnover Ratio is calculated as under:

**Formula**

$$\text{Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivables}}$$

The term accounts receivables include 'Trade Debtors' and 'Bills Receivables'.

The objective of this ratio is to measure the liquidity of receivables or obtaining the average period over which receivables are uncollected.

If the information relating to credit sales and average debtors is not available, the alternative is to calculate the debtors' turnover ratio is:

$$\text{Debtors Turnover Ratio} = \frac{\text{Total Sales}}{\text{Closing Debtors}}$$

However, it is to be noted that the first approach to the computation of the debtors' turnover is superior. In case of the second approach the effect is that debtors' turnover ratio is inflated.

**4. Debtors' Collection period / Average Collection period**

The ratio indicates the extent to which the debts have been collected in time. It gives average debt collection period. The ratio may be calculated by any of the following methods:

**Formula**

$$[a] \text{ Debtors Collection Period} = \frac{\text{Months[or] days in a year}}{\text{Debtors Turnover}}$$

$$[b] \text{ Debtors Collection Period} = \frac{\text{Average Accounts Receivables} \times \text{Months[or] days in a year}}{\text{Net Credit Sales for the year}}$$

$$[c] \text{ Debtors Collection Period} = \frac{\text{Accounts Receivables}}{\text{Average monthly or daily credit sales}}$$

The higher the turnover ratio and shorter the average collection period, better is the liquidity of debtors.

**Illustration 12.18**

Pink Ltd. sells goods on cash as well as on credit basis. The following information is extracted from their books of accounts for 2008:

	Rs.
Total Sales	1,00,000
Cash Sales [included in the above]	20,000
Sales Returns	7,000
Total debtors for sales as on 31 <sup>st</sup> December 2008	9,000
Bills receivables as on 31 <sup>st</sup> December 2008	2,000



You are required to calculate:

[a] Debtors/Receivable Turnover Ratio;

[b] The average Collection Period.

### Solution 12.18

$$\text{Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivables}}$$

$$\begin{aligned} \text{Credit Sales} &= \text{Total sales} - [\text{Sales Returns} + \text{Cash Sales}] \\ &= 1,00,000 - [7,000 + 20,000] \\ &= \text{Rs. } 73,000 \end{aligned}$$

Average Accounts Receivable

$$= \frac{[\text{Opening debtors} + \text{Bills Receivables}] + [\text{Closing Debtors} + \text{Bills Receivables}]}{2}$$

Since opening items are not given, closing debtors and bills are to be taken as average receivables.

$$= \text{Rs. } 9,000 + \text{Rs. } 2,000 = \text{Rs. } 11,000$$

$$\text{Debtors Turnover Ratio} = \frac{73,000}{11,000} = 6.636 \text{ times}$$

$$\text{Debtors Collection Period} = \frac{\text{Months[or] days in a year}}{\text{Debtors Turnover}}$$

$$\text{Average Collection period in days} = \frac{365}{6.636} = 55 \text{ days}$$

$$\text{Average Collection period in months} = \frac{12}{6.636} = 1.8 \text{ months}$$

Average Collection period can also be directly calculated as follows:

$$= \frac{\text{Average Accounts Receivables} \times \text{Months[or] days in a year}}{\text{Net Credit Sales for the year}}$$

$$\text{Collection period in days} = \frac{9,000 + 2,000}{73,000} \times 365 = 55 \text{ days}$$

$$\text{Collection period in month} = \frac{9,000 + 2,000}{73,000} \times 12 = 1.8 \text{ months}$$

## 5. Creditors Turnover Ratio or Accounts Payable Turnover

This ratio is also known as Accounts payable or Creditors Velocity. A business concern usually purchases raw materials, services and goods on credit. The quantum of payable of a business concern depends upon its purchases policy, the quantity of purchases and suppliers' credit policy. Longest the period of payables outstanding lesser is the problem of working capital of the firm. But the firm does not pay off its creditors within time, it will adversely affect goodwill of the business.

Creditors' turnover ratio indicates the number of times the payable rotate in a year. The term accounts payable includes sundry creditors and bills payable. Payable turnover indicates the relationship between net purchases for the whole year and total payables.

### *Formula*

$$\text{Creditors' Turnover Ratio} = \frac{\text{Net Credit Purchases}}{\text{Average Account payable}}$$

In case the details regarding credit purchases, opening and closing accounts payable have not been given, the ratio may be calculated as follows:

$$\text{Creditors' Turnover Ratio} = \frac{\text{Total Purchases}}{\text{Account payable [cl]}}$$

## 6. Average payable Period

The ratio given the average credit period enjoyed from the creditors. It may be computed any one of the following methods:

### *Formula*

$$[a] \text{ Average Payment Period} = \frac{\text{Months[or] days in a year}}{\text{Creditors Turnover}}$$

**[b] Average Payment Period**

$$= \frac{\text{Average Accounts Payable} \times \text{Months[or] days in a year}}{\text{Net Credit purchases for the year}}$$

**[c] Average Payment Period =**

$$\frac{\text{Average Accounts Payable}}{\text{Average monthly or daily credit Purchases}}$$

**[d] Average Payment Period =**

$$\frac{\text{Average Accounts Payable} \times 365}{\text{Net Credit purchases for the year}} \quad 12$$

A higher ratio indicates that creditors are not paid in time. A lower ratio indicates payment of creditors promptly. Depending on the liquidity position of the firm, the kind of payable turnover desirable can be planned.

### Illustration 12.19

From the following information calculate creditors turnover ratio and average payment period:

	Rs.
Total Purchases	4,00,000
Cash purchases [included in above]	50,000
Purchases returns	20,000
Creditors at the end	60,000
Bills Payable at the end	20,000
Reserve for discount on creditors	5,000
Take 365 days in a year	

### Solution 12.19

**Creditors' Turnover Ratio =**

$$\frac{\text{Net Credit Purchases}}{\text{Average Account payable}}$$

$$\begin{aligned} \text{Net Credit Purchases} &= \text{Total Purchases} - [\text{Cash purchases} + \text{Returns}] \\ &= 4,00,000 - [50,000 + 20,000] \\ &= \text{Rs. } 3,30,000 \end{aligned}$$

[Accounts payable include creditors and bills payable]

Average Accounts Payable

$$= \frac{[\text{Opening Creditors} + \text{Bills payable}] + [\text{Closing Creditors} + \text{Bills Payable}]}{2}$$

Since opening items are not given, closing creditors and bills are to be taken as average payable.

$$= \text{Rs.}60,000 + \text{Rs.}20,000 = \text{Rs.}80,000$$

$$\text{Creditors Turnover Ratio} = \frac{3,30,000}{80,000} = 4.13 \text{ times}$$

$$\text{Average Payment Period} = \frac{\text{Months[or] days in a year}}{\text{Creditors Turnover}}$$

$$\text{Average Payment period in days} = \frac{365}{4.13} = 88 \text{ days}$$

$$\text{Average Payment period in month} = \frac{12}{4.13} = 2.91 \text{ months}$$

Alternatively:

$$\text{Average Payment period in days} = \frac{60,000 + 20,000}{3,30,000} \times 365 = 88 \text{ days}$$

## 7. Working capital turnover Ratio

Working capital ratio measures the effective utilization of working capital. It also measures the smooth running of business or otherwise. The ratio establishes relationship between Cost of Goods Sold and working capital. Working capital turnover ratio is calculated with the help of the following formula.

### Formula

$$\text{Working capital Turnover Ratio} = \frac{\text{Cost of Goods Sold or Net Sales}}{\text{Net Working Capital}}$$

Net working capital means current assets less current liabilities.

Higher sales in comparison to working capital indicate overtrading and lower sales in comparison to working capital indicate under trading. A higher ratio is the indication of lower investment in working capital and more profit.

The different forms of working capital turnover ratios are discussed in the earlier part of this section i.e., Stock, Debtors and Creditors turnover ratios.

**Illustration 12.20**

Find out working capital turnover ratios:

	<b>Rs.</b>
Cash	10,000
Bills Receivables	5,000
Sundry Debtors	25,000
Stocks	20,000
Sundry Creditors	30,000
Cost of Sales	1,50,000

**Solution 12.20**

*Working capital Turnover Ratio* = 
$$\frac{\text{Cost of Goods Sold or [ Net Sales ]}}{\text{Net Working Capital}}$$

Cost of Goods Sold = Rs.1,50,000

Net Working capital = Current Assets – Current Liabilities  
= Rs.60,000 – Rs.30,000  
= **Rs.30,000**

Current Assets = 10,000+5,000+25,000+20,000  
= Rs.60,000

Current Liabilities = Rs.30,000

Working Capital Turnover Ratio =  $\frac{1,50,000}{30,000} = 5 \text{ times}$

**8. Fixed Assets turnover Ratio**

This ratio determines efficiency of utilization of fixed assets and profitability of a business concern. Higher the ratio more is the efficiency in utilization of fixed assets. A lower ratio is the indication of under utilization of fixed assets.

*Formula*

*Fixed Assets Turnover Ratio* = 
$$\frac{\text{Cost of Sales}}{\text{Net Fixed Assets}}$$
  
Or  
*Fixed Assets Turnover Ratio* = 
$$\frac{\text{Sales}}{\text{Net Fixed Assets}}$$

Here net fixed assets mean fixed assets minus depreciation.

The former formula which relates the fixed assets to the Cost of Goods Sold is more popular and preferable.

**Illustration 12.21**

Following is the Balance Sheet of Alpha Ltd. as on 31<sup>st</sup> December 2008:

<b>Balance Sheet of Alpha Ltd. as at 31<sup>st</sup> December 2008</b>			
<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Share Capital	8,00,000	Fixed Assets	7,00,000
Debentures	1,00,000	Stock	1,40,000
Creditors	1,00,000	Debtors	1,00,000
		Cash	60,000
	<b>10,00,000</b>		<b>10,00,000</b>

Sales for the year were Rs.14,00,000. Calculate fixed assets turnover ratio. Gross profit ratio is 20 %.

**Solution 12.21**

*Fixed Assets Turnover Ratio* = 
$$\frac{\text{Cost of Sales/Sales}}{\text{Net Fixed Assets}}$$

Gross Profit = 14,00,000 x 20% = Rs. Rs.2,80,000

Cost of Sales = Sales – Gross profit  
= Rs.14,00,000 – Rs.2,80,000  
= Rs.11,20,000

Fixed Assets = Rs.7,00,000

Fixed Assets Turnover Ratio on Cost of Goods Sold = 
$$\frac{11,20,000}{7,00,000} = 1.6 \text{ times}$$

Fixed Assets Turnover Ratio on Sales = 
$$\frac{14,00,000}{7,00,000} = 2 \text{ times}$$

Fixed Assets turnover ratio indicates the extent of utilization of fixed assets. Achieving high turnover ratio with a given amount of fixed assets indicates efficiency in management. A steadily growing fixed assets turnover ratio is the ideal.

## 9. Capital Turnover Ratio

Managerial efficiency is also calculated by establishing the relationship between Cost of Goods Sold or sales with the amount of capital invested in the business. Capital turnover ratio is calculated with the help of the following formula:

### *Formula*

$$\text{Capital Turnover Ratio} = \frac{\text{Cost of Sales}}{\text{Capital Employed}} \text{ or } \frac{\text{Sales}}{\text{Capital Employed}}$$

The second formula is more popular.

$$\begin{aligned} \text{Capital employed} &= \text{Shareholders funds} + \text{Long-term loans} \\ &\text{Or} \\ &= \text{Total assets} - \text{current liabilities} \end{aligned}$$

The small variant of the above formulas are:

### *Formula*

$$\text{Owned Capital Turnover Ratio} = \frac{\text{Cost of Sales}}{\text{Shareholders' funds}} \text{ or } \frac{\text{Sales}}{\text{Shareholders' funds}}$$

### *Formula*

$$\text{Total Capital Turnover Ratio} = \frac{\text{Cost of Sales} / \text{Sales}}{\text{Total Capital Employed}}$$

Higher ratio indicates higher efficiency and lower ratio indicates ineffective usage of capital.

### **Illustration 12.22**

From the following find out capital turnover ratio:

Sales Rs.3,20,000;

Gross profit Ratio 25 %;

Capital employed Rs.1,20,000

### **Solution 12.22**

$$\text{Capital Turnover Ratio} = \frac{\text{Cost of Sales}}{\text{Capital Employed}}$$

Cost of Goods Sold
Capital employed
Capital Turnover Ratio

=
=
=
=

Sales – Gross Profit
Rs.3,20,000 – [3,20,000 X 25 %]
Rs. 2,40,000
Rs.1,20,000

=
2 times

**Illustration 12.23**

Green Mango sells goods on cash and credit terms and also purchased goods on cash and credit terms. The following particulars are obtained from their books:

	Rs.		Rs.
Total sales	5,00,000	Cash purchases	50,000
Cash sales	40,000	Purchases returns	10,000
Sales Returns	20,000	Creditors at the end	60,000
Debtors at the end	80,000	Bills payable at the end	20,000
Bills Receivables at the end	20,000	Opening stock	50,000
Reserve for doubtful debts	1,000	Closing stock	40,000
Reserve for discount on creditors	2,000	Gross profit	1,00,000
Total purchases	3,00,000	Fixed assets	10,00,000

Calculate activity ratios [turnover ratios]

**Solution 12.23**

[1] Stock Turnover Ratio

=

Cost of Goods Sold

Average Inventory

Cost of Goods Sold

=

[Sales – Sales Returns ] - Gross Profit

[5,00,000- 20,000] -[1,00,000]

4,80,000 - 1,00,000 = Rs.3,80,000

Average Stock

=

Opening Stock + Closing Stock

2

Average Stock

=

50,000 + 40,000

2

= Rs.45,000

Stock Turnover Ratio

=

3,80,000

45,000

= 8.44 times



$$[2] \text{ Stock Turnover Period} = \frac{\text{Days or months in the year}}{\text{Inventory Turnover Ratio}}$$

$$\text{Stock turnover period} = 365 / 8.44 = 43.25 \text{ days}$$

$$[3] \text{ Fixed Assets Turnover Ratio} = \frac{\text{Cost of Sales/Sales}}{\text{Net Fixed Assets}}$$

$$\text{Fixed Assets Turnover Ratio on Cost of Goods Sold} = \frac{3,80,000}{10,00,000} = 3.8 \text{ times}$$

$$\text{Fixed Assets Turnover Ratio on Sales} = \frac{4,80,000}{10,00,000} = 0.48 \text{ times}$$

$$[4] \text{ Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivables}}$$

$$\begin{aligned} \text{Net Credit Sales} &= \text{Total sales} - [\text{Sales Returns} + \text{Cash Sales}] \\ &= 5,00,000 - [40,000 + 20,000] \\ &= \text{Rs. } 4,40,000 \end{aligned}$$

Average Accounts Receivable

$$= \frac{[\text{Opening debtors} + \text{Bills Receivables}] + [\text{Closing Debtors} + \text{Bills Receivables}]}{2}$$

Since opening items are not given, closing debtors and bills are to be taken as average receivables.

$$\begin{aligned} &= \text{Rs. } 80,000 + \text{Rs. } 20,000 = \text{Rs. } 1,00,000 \\ \text{Debtors Turnover Ratio} &= \frac{4,40,000}{1,00,000} = 4.4 \text{ times} \end{aligned}$$

$$[5] \text{ Debtors Collection Period} = \frac{\text{Months[or] days in a year}}{\text{Debtors Turnover}}$$

$$\text{Average Collection period in days} = \frac{365}{4.4} = 83 \text{ days}$$

$$\text{Average Collection period in months} = \frac{12}{4.4} = 2.73 \text{ months}$$

$$[6] \text{ Creditors' Turnover Ratio} = \frac{\text{Net Credit Purchases}}{\text{Average Account payable}}$$

$$\begin{aligned} \text{Net Credit Purchases} &= \text{Total Purchases} - [\text{Cash purchases} + \text{Returns}] \\ &= \text{Rs. } 3,00,000 - [50,000 + 10,000] \\ &= \text{Rs. } 2,40,000 \end{aligned}$$

[Accounts payable include creditors and bills payable]

Average Accounts Payable

$$= \frac{[\text{Opening Creditors} + \text{Bills payable}] + [\text{Closing Creditors} + \text{Bills Payable}]}{2}$$

Since opening items are not given, closing creditors and bills are to be taken as average payable.

$$\begin{aligned} &= \text{Rs.60,000} + \text{Rs.20,000} &&= \text{Rs.80,000} \\ \text{Creditors Turnover Ratio} &= \frac{2,40,000}{80,000} = 3 \text{ times} \end{aligned}$$

$$[7] \text{ Average Payment Period} = \frac{\text{Months[or] days in a year}}{\text{Creditors Turnover}}$$

$$\text{Average Payment period in days} = \frac{365}{3} = 122 \text{ days}$$

$$\text{Average Payment period in month} = \frac{12}{3} = 4 \text{ months}$$

**Illustration 12.24**

The following information is given about M/s. White and Rose Ltd., for the year ending December 31, 2007.

[i]	Stock turnover ratio	=	6 times
[ii]	Gross profit ratio	=	20 % on sales
[iii]	Sales for 2007	=	Rs.3,00,000
[iv]	Closing stock is Rs.10,000 more than the opening stock.		
[v]	Opening Creditors	=	Rs.20,000
[vi]	Closing Creditors	=	Rs.30,000
[vii]	Trade debtors at the end	=	Rs.60,000
[viii]	Net working capital	=	Rs.50,000

Find out :

- [a] Average stock
- [b] Purchases
- [c] Creditors turnover ratio
- [d] Average Payment period
- [e] Average Collection period
- [f] Working capital turnover ratio.

**Solution 12.24**

$$\begin{aligned}
 \text{Cost of goods sold} &= \text{Sales} - \text{Gross profit} \\
 &= \text{Rs.3,00,000} - [20 \% \text{ of Rs.3,00,000}] \\
 &= \text{Rs.2,40,000}
 \end{aligned}$$

**[a] Average Stock**

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

$$\text{Stock Turnover Ratio} \quad 6 = \frac{2,40,000}{\text{Average Stock}}$$

$$\text{Average Stock} = \text{Average Stock} = \frac{2,40,000}{6} = \text{Rs.40,000}$$

**[b] Calculation of Purchases:**

$$\begin{aligned}
 \text{Cost of goods sold} &= \text{Opening Stock} + \text{Purchases} - \text{Closing Stock} \\
 \text{Purchases} &= \text{Cost of Goods Sold} + \text{Closing Stock} - \text{Opening Stock}
 \end{aligned}$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

Since, closing stock is Rs.10,000 more than the opening stock so

$$\text{Rs.40,000} = \frac{\text{Opening stock} + [\text{Rs.10,000} + \text{Opening Stock}]}{2}$$

$$\text{Rs.80,000} = 2 \text{ Opening stock} + \text{Rs.10,000}$$

$$\text{Opening Stock} = \frac{\text{Rs.70,000}}{2} = \text{Rs.35,000}$$

$$\text{Closing Stock} = \text{Rs.35,000} + 10,000 = \text{Rs.45,000}$$

$$\text{Purchases} = \text{Rs.2,40,000} + \text{Rs.45,000} - \text{Rs.35,000} = \text{Rs.2,50,000}$$

$$\text{[] Creditors' Turnover Ratio} = \frac{\text{Net Credit Purchases}}{\text{Average Account payable}}$$

Accounts payable include creditors and bills payable

Average Accounts Payable

$$= \frac{[\text{Opening Creditors} + \text{Bills payable}] + [\text{Closing Creditors} + \text{Bills Payable}]}{2}$$

$$= \frac{\text{Rs.20,000} + \text{Rs.30,000}}{2} = \text{Rs.25,000}$$

$$\text{Creditors Turnover Ratio} = \frac{2,50,000}{25,000} = 10 \text{ times}$$

$$[d] \text{ Average Payment Period} = \frac{\text{Months[or] days in a year}}{\text{Creditors Turnover}}$$

$$\text{Average Payment period in days} = \frac{365}{10} = 37 \text{ days}$$

$$[e] \text{ Debtors Collection Period} = \frac{\text{Average Debtors} \times 365}{\text{Net Credit Sales}}$$

$$\text{Average Collection period in days} = \frac{60,000 \times 365}{3,00,000} = 73 \text{ days}$$

$$[f] \text{ Working capital Turnover Ratio} = \frac{\text{Cost of Goods Sold or Net Sales}}{\text{Net Working Capital}}$$

$$\text{Working Capital Turnover Ratio} = \frac{2,40,000}{50,000} = 4.8 \text{ times}$$

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## 12.11 COMPREHENSIVE ILLUSTRATION

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### Illustration 12.25

Given below is the summarized balance sheet and profit and loss of Satin Ltd. the as on 31<sup>st</sup> December 2007. You are required to calculate

- [1] Current Ratio; [2] Quick Ratio; [3] Fixed Assets ratio; [4] Debt-equity Ratio; [5] Proprietary Ratio; [6] Stock Turnover Ratio; [7] Fixed Assets Turnover Ratio; [8] Return on capital employed; [9] Debtors turnover ratio; [10] Creditors turnover ratio; [11] Net Profit ratio and [12] Operating ratio.

**Balance Sheet of Satin Ltd. as at 31<sup>st</sup> December 2007**

<i>Liabilities</i>		<i>Assets</i>	
	<i>Rs.</i>		<i>Rs.</i>
Issued Capital:		Land and Buildings	30,00,000
40,000 shares of Rs.100 each	40,00,000	Plant and Machinery	16,00,000
Reserves	18,00,000	Stock	29,60,000
Creditors	26,00,000	Debtors	14,20,000
Profit and Loss Account	6,00,000	Cash at Bank	6,20,000
6 % Debentures	6,00,000		
	<b>96,00,000</b>		<b>96,00,000</b>

Profit and Loss Account					
Particulars			Rs.		
To	Opening Stock	19,90,000	By	Sales	1,70,00,000
To	Purchases	1,09,05,000	By	Closing Stock	29,80,000
To	Direct Expenses	2,85,000			
To	Gross Profit c/d	68,00,000			
		1,99,80,000			1,99,80,000
To	Administrative Expenses	30,00,000	By	Gross Profit b/d	68,00,000
To	Selling & Distribution Expes.	6,00,000	By	Non-Operating	
To	Financial Expenses	3,00,000		Income	1,80,000
To	Other non-operating expenses	80,000			
To	Net profits	30,00,000			
		69,80,000			69,80,000

Solution 12.25

[ 1] Current Ratio =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Current Assets = Stock + Debtors + Cash at Bank  
= 29,60,000+14,20,000+6,20,000  
= Rs.50,00,000

Current Liabilities = Creditors  
= Rs.26,00,000

Current Ratio =  $\frac{50,00,000}{26,00,000}$  = 1.92 times

[2] Quick/Liquid Ratio =  $\frac{\text{Quick or Liquid Assets}}{\text{Current Liabilities}}$

Quick Assets = Current assets – stock and prepaid expenses  
= 50,00,000 -29,60,000  
= Rs.20,40,000

Quick Ratio =  $\frac{20,40,000}{26,00,000}$  = 0.78 times

[3] Fixed Assets Ratio =  $\frac{\text{Fixed Assets [after depreciation]}}{\text{Total Long –term Funds}}$

Fixed Assets = Land and Buildings + Plant and Machinery  
= 30,00,000+16,00,000

$$\begin{aligned}
 &= \text{Rs.46,00,000} \\
 \text{Long-term Funds} &= \text{Share capital +Reserves \& L A/c +Debentures} \\
 &= 40,00,000+18,00,000+6,00,000+6,00,000 \\
 &= \text{Rs.70,00,000} \\
 \text{Fixed Assets Ratio} &= \frac{46,00,000}{70,00,000} = 0.66 \text{ times}
 \end{aligned}$$

$$\text{[4] Debt-Equity Ratio} = \frac{\text{Total Long-term Debt}}{\text{Shareholders' funds}}$$

$$\begin{aligned}
 \text{Total Long term debt} &= \text{Debentures} \\
 &= \text{Rs.6,00,000} \\
 \text{Shareholders funds} &= \text{Share capital + Reserves + P \& L A/c} \\
 &= 40,00,000+18,00,000+6,00,000 \\
 &= \text{Rs.64,00,000} \\
 \text{Debt-Equity Ratio} &= \frac{6,00,000}{64,00,000} = 0.094 \text{ times}
 \end{aligned}$$

$$\text{[5] Proprietary ratio} = \frac{\text{Shareholders' funds}}{\text{Total Tangible Assets}}$$

$$\begin{aligned}
 \text{Total Tangible assets} &= \text{Total assets – Intangible and fictitious assets.} \\
 &= \text{Rs.96,00,000} \\
 \text{Proprietary Ratio} &= \frac{64,00,000}{96,00,000} = 0.67 \text{ times}
 \end{aligned}$$

$$\text{[6] Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

$$\begin{aligned}
 \text{Cost of Goods Sold} &= \text{Sales – Gross profit} \\
 &= 1,70,00,000 – 68,00,000 \\
 &= \text{Rs.1,02,00,000} \\
 \text{Average Stock} &= \frac{\text{Opening Stock} + \text{Closing Stock}}{2} \\
 &= \frac{19,90,000 + 29,80,000}{2} = \text{Rs.24,85,000} \\
 \text{Stock Turnover ratio} &= \frac{1,02,00,000}{24,85,000} = 4.10 \text{ times}
 \end{aligned}$$

$$\text{[7] Fixed Assets Turnover Ratio} = \frac{\text{Cost of Sales}}{\text{Net Fixed Assets}}$$

$$\text{Cost of goods sold} = \text{Rs.1,02,00,000}$$

$$\text{Fixed assets} = \text{Rs.46,00,000}$$

$$\text{Fixed Assets Turnover Ratio} = \frac{1,02,00,000}{46,00,000} = 2.22 \text{ times}$$

$$\text{[8] Return on Capital employed} = \frac{\text{Operating Profit}}{\text{Capital Employed}} \times 100$$

$$\text{Operating profit} = \text{Net profit} + \text{Non-operating expenses} + \text{interest} - \text{non-operating incomes.}$$

$$= 30,00,000 + 80,000 + 3,00,000 - 1,80,000$$

$$= \text{Rs.32,00,000}$$

$$\text{Capital employed} = \text{Share capital} + \text{Profits} + \text{Reserves} + \text{Long-term borrowings}$$

$$= 40,00,000 + 6,00,000 + 18,00,000 + 6,00,000$$

$$= \text{Rs.70,00,000}$$

$$\text{Return on Capital Employed} = \frac{32,00,000}{70,00,000} \times 100 = 45.71 \%$$

$$\text{[9] Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivables}}$$

$$\text{Debtors Turnover Ratio} = \frac{1,70,00,000}{14,20,000} = 11.97 \text{ times}$$

#### **Debtors Collection Period**

$$= \frac{\text{Average Accounts Receivables} \times \text{Months[or] days in a year}}{\text{Net Credit Sales for the year}}$$

$$\text{Debtors Collection period in months} = \frac{14,20,000}{1,70,00,000} \times 12 = 1[\text{one}] \text{ month}$$

$$\text{Debtors Collection period in days} = \frac{14,20,000}{1,70,00,000} \times 365 = 30 \text{ days}$$

$$\text{[10] Creditors' Turnover Ratio} = \frac{\text{Net Credit Purchases}}{\text{Average Account payable}}$$

$$\text{Creditors Turnover Ratio} = \frac{1,09,05,000}{26,00,000} = 4.19 \text{ times}$$

**Average Payment Period**

$$= \frac{\text{Average Accounts Payable} \times \text{Months[or] days in a year}}{\text{Net Credit purchases for the year}}$$

$$\text{Creditors' payment period in months} = \frac{26,00,000}{1,09,05,000} \times 12 = 2.86 \text{ month}$$

$$\text{Creditors' payment period in days} = \frac{26,00,000}{1,09,05,000} \times 365 = 87 \text{ days}$$

$$[11] \text{ Net Profit Ratio} = \frac{\text{Net Profit} \times 100}{\text{Net Sales}}$$

$$\text{Net Profit Ratio} = \frac{30,00,000}{1,70,00,000} \times 100 = 17.64 \%$$

$$[12] \text{ Operating Ratio} = \frac{\text{Cost of Goods sold} + \text{Operating Expenses} \times 100}{\text{Net Sales}}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Sales} - \text{Gross Profit} \\ &= 1,70,00,000 - 68,00,000 \\ &= \text{Rs.} 1,02,00,000 \end{aligned}$$

$$\begin{aligned} \text{Operating Expenses} &= \text{Administrative Expenses and selling Expenses} \\ &= 30,00,000 + 6,00,000 \\ &= \text{Rs.} 36,00,000 \end{aligned}$$

$$\text{Operation Ratio} = \frac{1,02,00,000 + 36,00,000}{1,70,00,000} \times 100 = \frac{1,38,00,000}{1,70,00,000} \times 100 = 81.17 \%$$

**Illustration 12.26**

Following is the summarized Balance Sheet of White Ltd. as at 31<sup>st</sup> December:

**Balance Sheet of White Ltd. as at 31<sup>st</sup> December**

<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
6 % Preference Share Capital	1,50,000	Goodwill	20,000
Equity Share Capital	2,50,000	Land & Buildings	2,50,000
General Reserve	20,000	Machinery	1,75,000
Profit and Loss	15,000	Furniture	10,000
5 % Debentures	1,00,000	Stock	90,000
Sundry Creditors	28,000	Sundry Debtors	21,000
Bills Payable	12,000	Cash at Bank	5,000
		Preliminary Expenses	4,000
	<b>5,75,000</b>		<b>5,75,000</b>



Other Information:

Total Sales Rs.4,00,000 ; 20 % of which is made on credit. Gross profit and Net profit [after tax] for the year ended amounted to Rs.80,000 and Rs.20,000 respectively.

Comment on the Financial condition of White Ltd.

**Solution 12.26**

**Workings:**

<b>1. Current Assets</b>	=	Stock +Debtors + Cash at Bank
	=	90,000+21,000+5,000
	=	<b>Rs.1,16,000</b>
<b>2. Current/Liquid Liabilities</b>	=	Sundry Creditors + Bills Payable
	=	28,000+12,000
	=	<b>Rs.40,000</b>
<b>3. Liquid Assets</b>	=	Sundry Debtors + Cash at bank
	=	21,000+5,000
	=	<b>Rs.26,000</b>
<b>4. Fixed Assets</b>	=	Land and Buildings +Machinery +Furniture
	=	2,50,000+1,75,000+10,000
	=	<b>Rs.4,35,000</b>
<b>5. Shareholders' Funds</b> [Proprietors' funds]	=	Equity Share Capital + Preference Share Capital + General Reserve + P / L A/c less Goodwill + preliminary Expenses]
	=	2,50,000+1,50,000+20,000+15,000- [20,000+4,000]
	=	<b>Rs.4,11,000</b>
<b>6. Total Debts/Outside Liabilities</b>	=	5 % Debentures + Current liabilities
	=	1,00,000+40,000
	=	<b>Rs.1,40,000</b>
<b>7. Equity Shareholders' Funds</b>	=	Shareholders' Funds –preference Share capital
	=	4,11,000-1,50,000
	=	<b>Rs.2,61,000</b>
<b>8. Total Assets</b>	=	Fixed Assets + Total Current Assets
	=	4,35,000+1,16,000
	=	<b>Rs.5,51,000</b>
<b>9. Cost of Goods Sold</b>	=	Sales – Gross Profit
	=	Rs.4,00,000-80,000
	=	<b>Rs.3,20,000</b>

**[A] Short-term Solvency Ratios:**

**[1] Current Ratio** 
$$= \frac{\text{Current Assets}}{\text{Current Laibilities}} = \frac{1,16,0000}{40,000} = 2.9 \text{ times}$$

**[2] Liquid Ratio** 
$$= \frac{\text{Liquid Assets}}{\text{Liquid [or] Current Laibilities}} = \frac{26,000}{40,000} = 0.65 \text{ times}$$

**[B] Long-term Solvency Ratios:**

**[3] Proprietary Ratio** 
$$= \frac{\text{Shareholders' Funds}}{\text{Total Tangible Assets}} = \frac{4,11,000}{5,51,000} = 0.75 \text{ times}$$

**[4] Solvency Ratio** 
$$= \frac{\text{Total' Debts}}{\text{Total Tangible Assets}} = \frac{1,40,000}{5,51,000} = 0.25 \text{ times}$$

**[5] Debt-Equity Ratio** 
$$= \frac{\text{Total' Long – term Debts}}{\text{Shareholders' Funds}} = \frac{1,00,000}{4,11,000} = 0.24 \text{ times}$$

**[6] Fixed Assets Ratio** 
$$= \frac{\text{Fixed Assets}}{\text{Total Long – term Funds}} = \frac{4,35,000}{5,35,000} = 0.81 \text{ times}$$

**[7] Capital Gearing Ratio** 
$$= \frac{\text{Debentures + Preference Share capital}}{\text{Equity Shareholders' Funds}} = \frac{2,50,000}{2,50,000} = 1 : 1$$

**[C] Profitability Ratios:**

**[8] Gross Profit Ratio** 
$$= \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{80,000}{4,00,000} \times 100 = 20 \%$$

[9] Net Profit Ratio

$$= \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 = \frac{20,000}{4,00,000} \times 100 = 5 \%$$

[10] Return on Shareholders' Funds

$$= \frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Funds}} \times 100 = \frac{20,000}{4,11,000} \times 100 = 4.87 \%$$

[D] Activity Ratios:

[11] Stock Turnover Ratio

$$= \frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \frac{3,20,000}{90,000} = 3.6 \text{ times}$$

[12] Debtors Turnover Ratio

$$= \frac{\text{Credit Sales}}{\text{Average Accounts Receivables}} = \frac{80,000}{21,000} = 3.81 \text{ times}$$

Debtors Collection Period

$$= \frac{365}{\text{Debtors Turnover Ratio}} = \frac{365}{3.81} = 96 \text{ days}$$

Check your progress 12.1

The following is the Balance Sheet of Dhoni Ltd. as on 31<sup>st</sup> March 2008.

Balance Sheet of Dhoni Ltd. as at 31 <sup>st</sup> December			
<i>Liabilities</i>	<i>Rs.</i>	<i>Assets</i>	<i>Rs.</i>
Equity Share Capital	1,00,000	Fixed Assets	3,60,000
7 % Preference Share Capital	20,000	Less: Depreciation	1,00,000
Reserves and Surplus	80,000		2,60,000
6 % Mortgage Debentures	1,40,000	Current Assets:	
Current Liabilities:		Cash	10,000
Creditors	12,000	Investments	30,00
Bills Payable	20,000	[Govt. Securities @ 10% interest]	
Outstanding expenses	2,000	Sundry Debtors	40,000
Taxation Provision	26,000	Stock	60,000
	<b>4,00,000</b>		<b>4,00,000</b>

Other Information:

[1] Net Sales	Rs.6,00,000
[2] Cost of Goods Sold	Rs.5,16,000
[3] Net Income before Tax	Rs.40,000
[4] Net Income after Tax	Rs.20,000

Calculate appropriate ratios from the given information.

- Notes: (a) Write your answer in the space given below.  
(b) Check your answer with the ones given at the end of this Lesson

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**12.12 LET US SUM UP**

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Accounting ratios establishes quantitative relationship between two or more items of the financial statements connected with each other and it may be expressed either in proportion or in times or at percentages. On function wise ratios can be classified into three viz., Profitability Ratios, Solvency or financial Ratios and Activity ratios.

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**12.13 LESSON – END ACTIVITIES**

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1. List out the various ratios on the basis of its function.

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**12.14 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ Solution No.12.01**

<b>1. Current Assets</b>	=	Cash+ Investments +Sundry Debtors +Stock
	=	10,000+30,000+40,000+60,000
	=	<b>Rs.1,40,000</b>
<b>2. Current Liabilities</b>	=	Creditors + Bills Payable +Outstanding Expenses +
		Taxation provision
	=	12,000+20,000+2,000+26,000
	=	<b>Rs.60,000</b>
<b>3. Liquid Assets</b>	=	Current Assets – Stock
	=	1,40,000-60,000
	=	<b>Rs.80,000</b>

<b>4. Shareholders' Funds</b>	=	Equity Share capital+ Preference Share Capital+
[Proprietary Funds]	=	Reserves & Surplus
	=	1,00,000+20,000+80,000
	=	<b>Rs.2,00,000</b>
<b>5. Total Tangible Assets</b>	=	<b>Rs.4,00,000</b>
<b>6. Gross Profit</b>	=	Sales – Cost of Goods sold
	=	6,00,000-5,16,000
	=	<b>Rs.84,000</b>
<b>7. Net Capital employed</b>	=	[Share Capital+7% Preference Share Capital +
		Reserves and Surplus+6 % Debentures] minus
		investments outside the business]
	=	[1,00,000+20,000+80,000+1,40,000]-30,000
	=	Rs.3,10,000
<b>8. Average Capital employed</b>	=	Net Capital employed at the end – ½ net profit after
		tax
	=	3,10,000-[1/2of Rs.20,000]
	=	<b>Rs.3,00,000</b>

**[A] SHORT-TERM SOLVENCY RATIOS:**

Current Assets

Current Laibilities

[1] Current Assets

=

1,40,0000

60,000

= 2.33 : 1

Liquid Assets

Liquid [or] Current Laibilities

[2] Liquid Ratio

=

80,000

60,000

= 1.33 : 1

**[B] LONG-TERM SOLVENCY RATIOS:**

Shareholders' Funds

Total Tangible Assets

[3] Proprietary Ratio

=

2,00,000

4,00,000

= 0.5 : 1

External Equities

Internal' Equities

[4] Debt-Equity Ratio

=

2,00,000

2,00,000

= 1 : 1

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**[5] Ratio of Fixed Assets to Proprietors' Funds**

$$= \frac{\text{Fixed Assets}}{\text{Shareholders' Funds}} = \frac{2,60,000}{2,00,000} = 1.3 : 1$$

$$\text{[6] Interest Coverage Ratio} = \frac{\text{Net Profit} + \text{Interest} + \text{Tax}}{\text{Fixed Interest Charges}} = \frac{48,400}{8,400} = 5.7 \text{ Times}$$

Fixed interest charges = 6 % on Debentures of Rs.1,40,000 = Rs.8,400

**[C] PROFITABILITY RATIOS:**

$$\text{[7] Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{84,000}{6,00,000} \times 100 = 14 \%$$

$$\text{[8] Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 = \frac{20,000}{6,00,000} \times 100 = 3.33 \%$$

**[9] Return on Shareholders' Funds**

$$= \frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Funds}} \times 100 = \frac{20,000}{2,00,000} \times 100 = 10 \%$$

**[10] Return on Capital Employed**

$$= \frac{\text{Net Profit} + \text{Interest} + \text{Tax}}{\text{Average Capital employed}} \times 100 = \frac{40,000 + 8,400 - 3,000 \text{ [10\% of 30,000]}}{3,00,000} \times 100 = 15.13 \%$$

As investments are excluded in the calculation of capital employed, interest on investments Rs.3,000 is deducted from net profits.

**[D] ACTIVITY RATIOS:**

**[11] Stock Turnover Ratio** 
$$= \frac{\text{Cost of Goods Sold Profit}}{\text{Average Stock}} = \frac{5,16,000}{60,000} = 8.6 \text{ times}$$

**Note:** As there is no opening stock, closing stock is taken as the average stock.

**[12] Debtors Collection Period**  
$$= \frac{\text{Average Debtors}}{\text{Net Credit Sales}} \times \text{No. of working days} = \frac{40,000}{6,00,000} \times 360 = 24 \text{ days}$$

**[D] CAPITAL STRUCTURE RATIO:**

**[7] Capital Gearing Ratio**  
$$= \frac{\text{Debentures + Preference Share capital}}{\text{Equity Shareholders' Funds}} = \frac{1,60,000}{1,80,000} = 0.89 : 1$$

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**12.15 SUGGESTED READING/REFERENCES/SOURCES**

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1. Anthony A. Atkinson, Robert S. Kaplan and Mark Young. S – Management Accounting – Pearson Education
2. V. K. Saxena and C. D. Vahist – Advanced Cost and Management Accounting , Text – Sultan Cand & Sons
3. R. K. Sharama and Shashi K. Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
4. Dr. S. N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
5. T. S. Reddy and Y. Hari Prasad Reddy – Management Accounting – Margham Publications

## UNIT - IV

This unit gives the conceptual and practical input on flow of funds

Lesson No.	Title
13	Funds Flow Analysis
14	Cash Flow Analysis

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### LESSON-13

### FUNDS FLOW ANALYSIS

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#### Contents:

- 13.0 Aims and objectives
- 13.1 Introduction
- 13.2 Concepts of Funds Flow Statement
- 13.3 Objectives of Funds Flow Statement
- 13.4 Current and Non-current items
- 13.5 Procedure for Knowing Flow of Funds
- 13.6 Funds Flow Statement Vs Income Statement and Balance Sheet
- 13.7 Importance or Uses Or Benefits Of Funds Flow Statement
- 13.8 Limitations of Funds Flow Statement
- 13.9 Steps in Preparation of Funds Flow Statement
- 13.10 Preparation of Statement of Changes in Working Capital
- 13.11 Preparation of Non-Current Accounts
- 13.12 Calculation of Funds from Operation
- 13.13 Preparation of Funds Flow Statement
- 13.14 Comprehensive Illustrations
- 13.15 Let us Sum Up
- 13.16 Lesson-end Activities
- 13.17 Model Answers to “Check your Progress”
- 13.18 Suggested Reading/References/Sources

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#### 13.0 AIMS AND OBJECTIVES

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After studying this lesson, you should able to:

- Explain the concepts of funds, funds flow, funds flow statement
- Solve the problems on Funds Flow Statement



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## 13.1 INTRODUCTION

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Every firm prepares customarily prepares its balance sheet at the end of its accounting year. It is a statement of assets and liabilities of the company, as on a particular date. The Balance Sheet reveals the financial position of the firm. However, it has limited role to play in financial analysis, as it does not present a detailed analysis. Normally, balance sheet portrays the financial position of the undertakings, the asset side showing the development of resources in various types of properties and the liability side indicating the manner in which these resources were obtained. Thus, balance Sheet is merely a static statement and it does not show the movement of funds. However, in business concerns, funds flow from different sources and similarly funds are invested in various sources of investment continuously. The study and control of this funds flow process is the one of the core objective of financial management to assess the soundness and the solvency of a business firm. Hence, another statement has become necessary to show the changes in funds during a period and explain them. The statement is called ***Funds Flow Statement***.

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## 13.2 CONCEPTS OF FUNDS FLOW ANALYSIS

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### Meaning of Fund

The term “Funds” conveys different meanings to different experts. It’s meaning spans from “Total resources of a business firm” to “Cash and near cash items”.

[a] In a ***narrow sense***, it means cash only and a funds flow statement prepared on this basis is called as ***Cash Flow Statement***.

[b] In a ***broadier sense***, the term ‘funds’ refers to money values in whatever form it may exist. Here, ‘funds’ means all financial resources, used in business whether in the form of men, materials, money, machinery and others. The statement prepared based on this broader sense is refereed as ***“Statement of Changes in Financial Position”***.

[c] In a ***popular sense***, the most acceptable meaning of the “fund” is ‘working capital’. Working capital is the excess of Current Assets over Current Liabilities. While attempting to understand the concept of Funds Flow Analysis, we shall also abide by the popular definition of funds, meaning working capital. Therefore, in this lesson, we shall generally refer to ‘funds’ as working capital and a funds flow statement as a statement of sources and application of funds.

### Concept of Flow of Funds

The term ‘Flow’ means movement and includes both ‘inflow’ and ‘outflow’. The term ‘flow of funds’ means transfer of economic values from one asset of equity to another. Flow of funds is said to have taken place when any transaction makes changes in the amount of funds available before happening of the transaction. If the effect of transaction results in the increase of funds, it is called a *source of funds* and if it results in decrease of funds, it is known as an *application of funds*.

According to the working capital concept of funds, the term ‘flow of funds’ refers to the movement of funds in the working capital. If any transaction results in the increase in working capital, it is said to be a *source or inflow of funds* and if it results in decrease of working capital, it is said to be an *application or out flow of funds*.

**Funds Flow Statement**

The Fund Flow Statement is a financial statement which reveals the methods by which the business has been financed and how it has used its funds between the opening and closing balance sheet date. Thus, a fund flow statement is a report of movement of funds explaining wherefrom working capital originates and where into the same goes during an accounting period. This statement consists of two parts – [1] Sources of funds and [2] Application of funds. The difference between the two shows the net changes in the working capital during the period. It is to be remembered that only those transactions can find place in this statement which affect the net working capital of the firm. The Fund Flow Statement is a supplement to the two principal financial statements.

In simple, the funds flow statement is a report on the movement of working capital. It explains how working capital is raised and used during an accounting period.

**Definition**

*Foulke* defines Funds Flow Statement as “A statement of Sources and Application of funds is technical device designed to analyse the changes in the financial condition of a business enterprise between two dates.”

**Various Titles**

Funds flow statement is called by various names such as “Statement of Sources and Application of Funds”, “Statement of Sources and Uses of Funds”, Statement of Changes in Financial Position”, “Where got, Where gone Statement”, “Statement of Funds Supplied and Applied”, Funds Movement Statement.

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**13.3 OBJECTIVES OF FUNDS FLOW STATEMENT**

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The main objectives of funds flow statement are:

1. To show how the resources have been obtained and used;
2. To throw light upon the most important changes that have taken place during a specific period;
3. To show how the general expansion of the business has been financed;
4. To indicate the relationship between profits from operations, distribution of dividend and raising of new capital or term loans;
5. To have an assessment of the working capital position of the concern.

13.4 CURRENT AND NON-CURRENT ITEMS

WORKING CAPITAL

Funds flow statement is based on the working capital concept of funds. However, working capital is also a debatable term. The working capital broadly classified into two on the basis of its concept. ‘Gross working capital” concept refers to the total of current assets. Another concept is “Net Working Concept”. It is the *excess of Current Assets over Current Liabilities*. Funds flow statement is generally prepared and interpreted the basis of ‘*Net Working Capital*”

CURRENT AND NON-CURRENT ACCOUNTS

To understand flow of funds, it is essential to classify various accounts and balance sheets items into current and non-current categories.

Current accounts can either be current assets or current liabilities. Current assets are those assets which in the ordinary course of business can be or will be converted into cash within a short period of normally one accounting year.

Current liabilities are those liabilities which are to be paid in the ordinary course of business within a shot period of normally one accounting year out of the current assets or the income of the business.

LIST OF CURRENT OR WORKING CAPITAL ACCOUNTS	
Current Assets	Current Liabilities
1. Cash and near cash items Cash in hand, Cash at Bank, Govt. Bonds, Fixed Deposits, Trade Investments, etc.	1. Accounts Payables Bills Payable Notes payables
2. Accounts Receivables Sundry / Trade Debtors Bills Receivables	2. Trade /Sundry Creditors
3. Inventories - Raw materials	3. Accrued or Outstanding Expenses
	4. Borrowings on Short term basis Temporary bank overdraft Short term bank loans Short term loans, advances and deposits
	5. Income received in advance

<ul style="list-style-type: none"> <li>- Work-in-Progress</li> <li>- Stores and Spares</li> <li>- Finished Goods</li> </ul>	<ul style="list-style-type: none"> <li>6. Tax payables</li> <li>7. Dividend payable</li> <li>8. Provision for Taxation, [if it does not amount to appropriation of profit]</li> </ul>
<ul style="list-style-type: none"> <li>4. Temporary or Marketable Investments</li> <li>5. Short term loans and Advances</li> <li>6. Prepaid Expenses</li> <li>7. Accrued Incomes</li> <li>8. Advances recoverable in cash <ul style="list-style-type: none"> <li>- Advances and loans to employees,</li> <li>- Advances to suppliers, etc</li> </ul> </li> </ul>	

**Provisions against Current Liabilities and Assets**

‘Provision for doubtful debts’, ‘provision for discount on creditors/debtors’, ‘provision made against trade investments’ are also current items. They reduce the respective current assets or liabilities.

**Non-Current Assets**

All assets other than the current assets can be termed as non-current assets. They include the following:

- [a] **Fixed assets** like land, buildings, machinery, furniture, loose tools, etc.
- [b] **Intangible assets** like goodwill, patents, copyrights, Trade marks etc.
- [c] **Long term investments** in shares of other companies, Govt. Bonds etc.
- [d] **Miscellaneous Expenditure** debit balance of profit and loss account, discount on issue of shares, debentures, preliminary expenses, etc.

**Non-Current Liabilities**

All those liabilities, which are not included under ‘Current Liabilities” may be termed as ‘Non-Current Liabilities”.

Equity, preference Share Capitals, Debentures, Long-term loans, Share premium account, share forfeited account, Capital Reserve Capital Redemption Reserve, Provision for depreciation against fixed assets, and all appropriation of Profits like General Reserve, Dividend Equalization Fund, Provision for Taxation, proposed Dividend etc.

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### 13.5 PROCEDURE FOR KNOWING FLOW OF FUNDS

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1. Analyse the transactions and find out the two accounts involved;
2. Make Journal Entry of the transaction;
3. Determine whether the accounts involved in the transaction are current or non-current;
4. If both the accounts involved are current i.e., either current assets or current liabilities, it does not result in the flow of funds;
5. If both the accounts involved are of non-current nature, i.e. either permanent assets or permanent liabilities, it does not result in the flow of funds;
6. If the accounts involved are such that one is a current account while the other is a non-current account, i.e., current assets and permanent liability, or current assets and fixed asset, or current liability and fixed asset or current liability and permanent liability then it results in the flow of funds.

From the above it is clear that

***[a] Any transaction between a current account and another current account does not affect funds:***

Thus

1. A transaction involving two current assets does not affect funds;
2. A transaction involving two current liabilities does not affect funds;
3. A transaction involving a current asset and a current liability does not affect funds.

***[b] Any transaction between a non-current account and another non-current account does not affect funds:***

Thus

1. A transaction involving two non-current or fixed assets does not affect funds;
2. A transaction involving two long term or non-current liabilities does not affect funds;
3. A transaction involving a non-current asset and a non-current liability does not affect funds.

***[c] Any transaction between a current account and a non-current account affect funds:***

Thus

1. A transaction involving a long term liability [non-current liability] and a current asset affect funds;
2. A transaction involving a long term liability [non-current liability] and a current liability affect funds;

3. A transaction involving a non-current assets and a current asset affect funds;
  4. A transaction involving a non-current asset and a current liability affect funds.
- From the above discussion we can come to conclusions:

*Transaction between two current items or two non current [long-term] items does not affect funds or working capital.*

*”Cross Transactions” or transaction between current and long term [non-current] assets or liabilities affect the working capital and funds.*

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### 13.6 FUNDS FLOW STATEMENT VS INCOME STATEMENT AND BALANCE SHEET

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Funds flow statement is not a substitute, competitive statement but complementary to financial statements – namely income and balance sheets. The funds statement provides additional information as regards changes in working capital, derived from financial statement at two points of time. It is a tool of management for financial analysis and helps in making decisions.

*Differences between Funds Flow Statement and Income Statement*

Funds Flow Statement		Income Statement	
1.	It highlights the changes in the financial position of a business	1.	It does not reveal the inflows and outflows of funds only depicts the items of expenses and income arrive profit or loss
2.	It is complementary to income statement	2.	Income statement is not prepared from Funds Flow statement
3.	While preparing Funds flow statement both capital and revenue items are considered	3.	Only revenue items are considered
4.	There is no prescribed format for preparing	4.	It is prepared in a prescribed format

*Differences between Funds Flow Statement and Balance Sheet*

Funds Flow Statement	Balance Sheet
1. It is a statement of changes in financial position and hence is dynamic in nature	1. It is statement of financial position on a particular date
2. It shows the sources and uses of funds in a particular period of time	2. It depicts the assets and liabilities at a particular point of time.
3. It shows only those items which cause changes in working capital	3. It shows the real and personal accounts of a business, reflected in the assets and liabilities
4. It aims at presenting flow of funds over a period	4. It aims at depicting the financial position of a business.
5. It is a tool for financial analysis, generally useful to the management.	5. It is the culmination of the accounting process of a period. It is meant for general purpose and usage of various stakeholders.
6. It is based on the date forming part of the income statement and the Balance Sheet	6. It is based on the Trail Balance and additional information relating to a firm.
7. It is prepared after the financial accounts are completed.	7. It is prepared after the income statement is completed.

**13.7 IMPORTANCE OR USES OR BENEFITS OF FUNDS FLOW STATEMENT**

Funds flow statement is an important tool in the armory of the finance manager. It helps in the planning, deployment and controlling of funds year after year. The following are the benefits or uses of funds flow statement.

1. Funds flow statement determines the financial consequences of business operations. It shows how the funds were obtained and used in the past. Financial manager can take correcting actions.
2. The management can formulate its financial policies – dividend, reserve etc. on the basis of the statement.
3. It serves as a control device, when comparing with budgeted figures. The financial manger can take remedial steps, if there is any deviation.
4. It points out the sound and weak financial position of the enterprise.
5. It points out the causes for changes in working capital.

6. It enables the Bankers, Creditors, or financial institutions in assessing the degree of risk involved in granting credit to the business.
7. The management can rearrange the firm's financing more effectively on the basis of the statement.
8. Various uses of funds can be known and after comparing them with the uses of previous years, improvement or downfall in the firm can be assessed.
9. The statement compared with the budget concerned will show to what extent the resources of the firm were used according to plan and what extent the utilization was unplanned.
10. It tells whether sources of funds are increasing or decreasing or constant.

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### **13.8 LIMITATIONS OF FUNDS FLOW STATEMENT**

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1. The Funds Flow Statement lacks originality because it is only rearrangement of data appearing in accounts books.
2. It is historical in nature. It shows what happened in the past. So, necessarily, its value is limited from the point of view of future operations.
3. It indicates Funds Flow in a summary form and it does not show various changes which take place continuously.
4. When both the aspects of a transaction are current, they are not considered.
5. When both the aspects of a transaction are non-current, even then they are not included in this statement.
6. It is not an original statement but simply a rearrangement of data in the financial statements.
7. It is a summarized presentation of figures and cannot provide information about changes on a continuous basis.
8. It also ignores transactions between long term assets and liabilities.
9. It is not generally considered as sophisticated techniques of financial analysis.

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### **13.9 STEPS IN PREPARATION OF FUNDS FLOW STATEMENT**

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Funds flow analysis consists of four steps. The output of funds flow analysis is Funds Flow Statement. Following are the steps followed in the preparation of Funds Flow Analysis:

- STEP 1: Statement of Changes in Working Capital  
STEP 2: Preparation of Non-Current Accounts  
STEP 3: Funds From Operation  
STEP 4: Funds Flow Statement



13.10 PREPARATION OF STATEMENT OF CHANGES IN WORKING CAPITAL

Working capital is the difference between current assets and current liabilities. The statement of changes in working capital is concerned with the current assets and current liabilities and alone, which are shown in the Balance Sheets of the current year and the previous year. The schedule of changes in working capital is prepared to find out the increase or decrease in working capital during the current year.

Current assets and current liabilities are taken to the Schedule of Working Capital. Each current assets and current liabilities in the period’s Balance Sheet is compared with those show in the previous period’s Balance Sheet. Then, we have to find out the changes in them on working capital. Increase or decrease in each of the current assets and current liabilities are noted.

Increase in current assets will lead to increase in working capital and vice versa. On the other hand, increase in current liabilities will lead to decrease in working capital, and vice versa.

The following are the “*Principles*” for preparation of Schedule of Changes in Working capital.

- Increase in Current Assets

- Increases Working Capital

Decrease in Current Assets

- Decreases Working Capital

Increase in Current Liabilities

- Decreases Working Capital

Decrease in Current Liabilities

- Increases Working Capital

The following is a specimen of the Work capital Statement:

SCHEDULE / STATEMENT OF CHANGES IN WORKING CAPITAL				
Particulars	Year	Year	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Cash	xxx	xxx	xxx	
Bank Balance	xxx	xxx	xxx	
Stock	xxx	xxx		xxx
Sundry Debtors	xxx	xxx		xxx
Trading Investments	xxx	xxx		xxx
Prepaid Expenses	xxx	xxx	xxx	
<b>Total [A]</b>	<b>xxx</b>	<b>xxx</b>		

<b>Current Liabilities:</b>				
Creditors	xxx	xxx	xxx	
Bills Payable	xxx	xxx		xxx
Outstanding Expenses	xxx	xxx	xxx	
Short Term Loans	xxx	xxx	xxx	
Bank Overdraft	xxx	xxx	xxx	
<b>Total [B]</b>	<b>xxx</b>	<b>xxx</b>		
<b>Working Capital [A- B]</b>	<b>xxx</b>	<b>xxx</b>	<b>xxx</b>	<b>xxx</b>
Increase/Decrease in working capital	<b>xxx</b>			<b>xxx</b>
	xxx	xxx	xxx	xxx

**Illustration 13.1**

You are given the following Balance Sheets of a Jupiter Ltd.

Particulars	31 <sup>st</sup> December	
	2007	2008
	Rs.	Rs.
<b>Assets:</b>		
Cash	30,000	47,000
Accounts Receivable	1,20,000	1,15,000
Land	50,000	66,000
Stock	80,000	90,000
	2,80,000	3,18,000
<b>Liabilities:</b>		
Accounts Payable	70,000	45,000
Capital	2,00,000	2,50,000
Retained Earning	10,000	23,000
	2,80,000	3,18,000

Prepare a Statement Showing the changes in Working Capital.

Solution 13.1:

SCHEDULE OF CHANGES IN WORKING CAPITAL

Particulars	2007	2008	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Cash	30,000	47,000	17,000	
Accounts Receivable	1,20,000	1,15,000		5000
Stock	80,000	90,000	10,000	
<b>Total [A]</b>	<b>2,30,000</b>	<b>2,52,000</b>		
<b>Current Liabilities:</b>				
Accounts Payable	70,000	45,000	25,000	
<b>Total [B]</b>	<b>70,000</b>	<b>45,000</b>		
<b>Working Capital [A- B]</b>	<b>1,60,000</b>	<b>2,07,000</b>	<b>52,000</b>	<b>5000</b>
Increase in working capital	<b>47,000</b>			<b>47,000</b>
	<b>2,07,000</b>	<b>2,07,000</b>	<b>52,000</b>	<b>52,000</b>

Illustration 13.2:

From the following figures prepare a statement of showing changes in working capital during 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	6,00,000	6,00,000	Fixed Assets	10,00,000	11,20,000
Reserves	50,000	1,80,000	<b>Less:</b> Depreciation	3,70,000	4,60,000
Profit and Loss Account	40,000	65,000		6,30,000	6,60,000
Debentures	3,00,000	2,50,000	Stock	2,40,000	3,70,000
Creditors	1,70,000	1,60,000	Book Debts	2,50,000	2,30,000
Provisions for Tax	60,000	80,000	Cash in hand	80,000	60,000
			Preliminary Expenses	20,000	15,000
	<b>12,20,000</b>	<b>13,35,000</b>		<b>12,20,000</b>	<b>13,35,000</b>

**Solution 13.2**

**Schedule of Changes in Working Capital**

Particulars	2006	2007	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Stock	2,40,000	3,70,000	1,30,000	
Book Debts	2,50,000	2,30,000		20,000
Cash in hand	80,000	60,000		20,000
<b>Total [A]</b>	<b>5,70,000</b>	<b>6,60,000</b>		
<b>Current Liabilities:</b>				
Creditors	1,70,000	1,60,000	10,000	
Provision for Tax	60,000	80,000		20,000
<b>Total [B]</b>	<b>2,30,000</b>	<b>2,40,000</b>		
<b>Working Capital [A- B]</b>	<b>3,40,000</b>	<b>4,20,000</b>	<b>1,40,000</b>	<b>60,000</b>
Increase in working capital	<b>80,000</b>			<b>80,000</b>
	<b>4,20,000</b>	<b>4,20,000</b>	<b>1,40,000</b>	<b>1,40,000</b>

**Illustration 13.3**

The following are the summarized Balance Sheets of Lotus Ltd. As at 31<sup>st</sup> December 2003 and 2004

Liabilities	2003 Rs.	2004 Rs.	Assets	2003 Rs.	2004 Rs.
<b>Capital:</b>			Fixed Assets	95,000	1,20,000
Equity Capital	1,00,000	1,00,000	Investments	-	10,000
Preference Shares	-	50,000	<b>Current Assets:</b>		
General Reserve	30,000	40,000	Stock	40,000	60,000
Profit and Loss A/c	25,000	70,000	Debtors	20,000	40,000
<b>Current Liabilities</b>			Bills Receivable	5,000	2,000
Creditors	20,000	10,000	PrepaidExpenses	5,000	18,000
Bills Payables	-	2,000	Cash	20,000	10,000
Overdraft	3,000	-	Advances	10,000	40,000
Taxation Provision	7,000	12,000			
Proposed Dividend	10,000	16,000			
	<b>1,95,000</b>	<b>3,00,000</b>		<b>1,95,000</b>	<b>3,00,000</b>

Solution 13.3

SCHEDULE OF CHANGES IN WORKING CAPITAL OF LOTUS LTD.

Particulars	2003	2004	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Stock	40,000	60,000	20,000	-
Debtors	20,000	40,000	20,000	-
Bills Receivable	5,000	2,000	-	3,000
Prepaid Expenses	5,000	18,000	13,000	-
Cash	20,000	10,000	-	10,000
Advances	10,000	40,000	30,000	-
<b>Total [A]</b>	<b>1,00,000</b>	<b>1,70,000</b>		
<b>Current Liabilities:</b>				
Creditors	20,000	10,000	10,0000	-
Bills Payable	-	2,000	-	2,000
Overdraft	3,000	-	3,000	-
Taxation Provision	7,000	12,000	-	5,000
Proposed Dividend	10,000	16,000	-	6,000
<b>Total [B]</b>	<b>40,000</b>	<b>40,000</b>		
<b>Working Capital [A- B]</b>	60,000	1,30,000	<b>96,000</b>	<b>26,000</b>
Increase/Decrease in working capital	<b>70,000</b>			<b>70,000</b>
	<b>1,30,000</b>	<b>1,30,000</b>	<b>96,000</b>	<b>96,000</b>

Check Your Progress 13.1

The Balance Sheets of Mercury Ltd. at the end of 2000 and 2001 are given below. You are required to prepare a schedule of changes in working capital:

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Share Capital	4,00,000	5,75,000	Plant	75,000	1,00,000
Creditors	1,06,000	70,000	Stock	1,21,000	1,36,000
Profit and Loss Account	14,000	31,000	Debtors	1,81,000	1,70,000
			Cash	1,43,000	2,70,000
	<b>5,20,000</b>	<b>6,76,000</b>		<b>5,20,000</b>	<b>6,76,000</b>

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....
- .....

**13.11 PREPARATION OF NON-CURRENT ACCOUNTS**

While preparing a funds flow statement, one has to analyse the given balance sheets. Items relating to current accounts, i.e., current assets and current liabilities have is shown in the schedule of changes in working capital, that part we have discussed in the previous section.

But, the non-current assets and non-current liabilities have to be further analyzed to find out the hidden information with regard to sale or purchase of non-current assets [they are respectively source and application of funds] , issue or redemption of share capital, debentures, raising or repayment of long-term loans, transfer to reserves and provisions etc.

Likewise, fixed assets account will show how much depreciation has been provided during the period. In the same way Reserves accounts are prepared to known how much is transferred from profit and loss as an appropriation. All these are mere book entries, does not involve in any funds flow. Therefore, they have to be added back to net profits in order to find out funds from operation.

Therefore, non-current Accounts are prepared [wherever necessary] to ascertain the source or application of funds and also items to be added or deducted from the net profit for calculating Funds From operation.

For example, the opening balance sheet value of a Building is Rs.1,00,000 and closing balance sheet value is Rs.90,000 and no other additional information is given. Then, Building Account being non-current item is prepared to find additional information.

Building Account			
	Rs.		Rs.
To Balance b/d	1,00,000	By Depreciation a/c	<sup>[+]</sup> 10,000*
		By Balance c/d	90,000
	<b>1,00,000</b>		<b>1,00,000</b>

\* denotes balancing figure and <sup>[+]</sup> denotes item to be added to net profits

The balancing figure represents depreciation being building is a depreciable on asset and credit side balance generally may be considered as depreciation. Depreciation being a non-fund item, while calculating funds from operation, it will added to net profits.

Consider another example, the value of plant as per opening and closing balance sheets are Rs.20, 000 and 25,000 and deprecation charged during the year is Rs.5, 000. Then we have to prepare, non-current account i.e., plant account in order to know whether there is any sources or application of funds occurred or not.

Plant Account			
	Rs.		Rs.
To Balance b/d	20,000	By Depreciation a/c	<sup>[+]</sup> 5,000
To Bank [Bal. Figure]	<sup>*[A]</sup> 10,000		
[Purchase]		By Balance c/d	25,000
	<b>30,000</b>		<b>30,000</b>

\* denotes balancing figure and <sup>[A]</sup> denotes application of funds

The balancing figure represents purchase of Plant and it is an Application of funds. Depreciation is a non-fund and accounting book entry, therefore it will be added to the net profit while calculating Funds From Operation. Thus, the opening accounts for or by comparing non-current items, sources and application of funds are found out.

Consider another example, where opening and closing Furniture and Fixtures value as per respective balance sheets are Rs.1,50,000 and Rs.1,00,000. Depreciation for the year is Rs.10,000. By preparing non-current account i.e., Furniture and Fixtures account we may find some other additional information.

Furniture and Fixtures Account			
	Rs.		Rs.
To Balance b/d	1,50,000	By Depreciation a/c	<sup>[+]</sup> 10,000
		By Bank [Bal. Fig]	<sup>[S]</sup> 40,000*
		[Sales made]	
		By Balance c/d	1,00,000
	<b>1,50,000</b>		<b>1,50,000</b>

\* denotes balancing figure and <sup>[S]</sup> denotes Sources of funds

The balancing figure represents sources of fund, as sales made during the period. Thus, the opening accounts for or by comparing non-current items, sources and application of funds are found out.

Let us consider another example of non-current liabilities item, suppose opening and closing balance of General Reserve is Rs.25,000 and 55,000. Then by preparing General Reserve Account, we will get how much amount is transferred from profit and loss account during the period.

General Reserve Account			
	Rs.		Rs.
To Balance c/d		By Balance b/d	25,000
	55,000	By Profit and Loss A/c[b.f]	[+] 30,000*
	<b>55,000</b>		<b>55,000</b>

\* denotes balancing figure and <sup>[+]</sup> denotes item to be added to net profits

The balancing figure represents how much amount transferred from profit and loss account to general reserve. It being a mere book entry, it does not involve any fund flows; it will be added back to the net profit for calculating funds from operation.

*Likewise we have to prepare non-current assets and liabilities accounts, in order to find out sources <sup>[S]</sup>or application <sup>[A]</sup>and also items to be added <sup>[+]</sup>or deducted <sup>[-]</sup> from net profits while calculating funds from operation.*

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13.12 FUNDS FROM OPERATION

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Trading profits or the profit from the operations of the business is the most important major source of funds. Sales are the main source of inflow of funds into the business as they increase current assets [cash, debtors or bills receivable] but at the same time funds flow out of business for expenses and cost of goods sold. Thus, the effect of operations will be a source of funds if inflow from sales exceeds the outflow for expenses and cost of goods sold and vice-versa. But it must be remembered that funds from operation do not necessarily mean the profit as shown by the profit and loss account of a firm, because there are many non-fund or non-operating items which may have been either debited or credited to profit and loss account like amortization of fictitious assets; appropriation of profits etc. Apart from the above, the non-fund items are those which may be operational expenses but they do not affect funds of the business e.g., depreciation which do not move out of business. Non-operating items are those which although may result in the outflow of funds but are not related to the trading operations of the business, such as loss on sale of machinery or payment of dividends.

Following are the adjustments require special attention while calculating Funds From Operation.



## **[a] ITEMS TO BE ADDED BACK TO THE NET PROFIT:**

### **i. Non-Fund Items**

Items which do not increase the current liability or decrease the current asset are non-fund items. They are in brief:

#### **[a] Depreciation and Depletion:**

Depreciation and depletion do not affect the working at all. It is usual practice in every business to write off depreciation on fixed assets which is debited to Profit and Loss Account and a corresponding credit is made in the respective asset account. In this way, it is only an accounting entry, having the effect of reducing the book value of fixed asset as well as the profit by the same amount. Thus, it affects only the fixed assets and no cash or fund flow occurred. Therefore, to nullify the effect, the amounts of depreciation and depletion already debited to Profit and Loss account are added back to the profits in order to calculate the amount of funds.

#### **[b] Amortization of Fictitious and Intangible Assets**

Amortization of certain fictitious assets in the nature of Deferred Revenue Expenditure like, preliminary expenses, Advertising Suspense Account, Discount on Issue of Shares and Debentures, Premium on Redemption of Redeemable Preference Shares or Debentures etc. are generally write off during the course of business that is, they are mere book entry debited profit and loss account and crediting respective account. Hence, there is no real cash flows involved in it. Therefore, they have to be added back to the net profits. In the same way, intangible assets like Goodwill, Trade Mark and Patents etc. are also items which are only accounting entries and do not affect the current assets or current liabilities [Funds] at all. They are, therefore, added back to the net profits.

#### **[c] Provision for Taxation**

Provision for taxation made out of current year's profit also does not affect the flow of funds. So it must be added back to profit.

### **ii. Non-Trading Charges or Losses**

Items which are not trading charges or losses are called non-trading charges or losses. They are:

#### **[a] Appropriation of Retained Earnings**

Transfer for profits to certain reserves, such as General Reserve, Dividend Equalization Reserve, Sinking Fund, Reserve for Contingencies or any other reserves; do not affect the current assets or current liabilities. So, they will be added back to the net profits.

**[b] Proposed Dividend on Shares**

Dividend is an appropriation of profits and not a charge on profit and it does not change the current assets or current liabilities. So, the current year's appropriation towards proposed dividend will be added back to profits.

**[c] Loss on Sale of Non-Current Assets**

Loss on sale of fixed assets such as Building, Machinery, Furniture or Investment which has already been debited to Profit and Loss Account, is not a business loss and does not affect the flow of funds. Therefore, it will be added back to net profits.

**iii. Items to be deducted from Net Profits:**

The non-fund and non-trading/non-business revenue receipts or income must be deducted from the net profits in order to compute the funds from operation. They are as follows:

**[a] Dividend Received or Receivable**

Although this transaction increases current assets of the firm but as it is not a trading income, it will be deducted from the net profits.

**[b] Retransfer of Excess Provisions**

Where provisions made for Taxation, Depreciation, Doubtful Debts, etc. exceed the genuine requirements; the excess amount is transferred back i.e., credited back to Profit and Loss Account. It is simply an accounting book entry and it does not create any inflow of fund. Hence, it will be deducted from net profits.

**[c] Profit on sale of Non-Current Assets**

Any profits arising out of sale of fixed assets, which have already been credited to profit and loss account, will be deducted from the net profits.

**[d] Appreciation of fixed Assets**

The appreciation amount on revaluation of fixed assets which have already been credited to Profit and Loss Account will be deducted from the profits to compute funds from operation.

**METHODS OF CALCULATING FUNDS FROM OPERATION**

There are two methods to find out the amount funds from operation and these methods of calculating funds from operation will be discussed in the following pages.

1. Statement Form;
2. Account Form.

1. Statement Form

The first method –Statement form method- generally used is to proceed from the figures of net profit or net loss as arrived from the profit and loss account already prepared. Funds from operation by this method can be calculated as under:

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	xxx	XXX
Less: Opening Balance of P & L A/c or Retained Earning	xxx	
[ as given in the Balance Sheet] OR		
Net Profit for the Year		XXX
ADD: NON-FUND and NON-OPERATING ITEMS		
which have been already debited to P & L A/c:		
1. Depreciation and Depletion	xxx	
2. Amortization of fictitious and Intangible Assets :		
Goodwill written off	xxx	
Trade Marks	xxx	
Patents	xxx	
Preliminary Expenses	xxx	
Discount on Issue of Shares etc.	xxx	
Premium on Redemption of Debentures etc.	xxx	
3. Appropriation of Retained Earnings		
Transfer to General Reserve	xxx	
Dividend Equalization Fund	xxx	
Transfer to Singing Fund	xxx	
4. Loss on Sales of any non-current [Fixed] Assets	xxx	
5. Dividends :		
Interim Dividend	xxx	
Proposed Dividend [if it is an appropriation of profit and not taken as current liability]	xxx	
6. Provision for Taxation [If it is not taken as current liability]	xxx	XXX
		XXXX
LESS:NON-FUND or NON-OPERATING ITEMS		
which have been already Credited to P & L A/c:		
1. Profit or Gain from the sales of Non-Current [fixed] assets	xxx	
2. Dividend Received	xxx	
3. Excess provision written back	xxx	
4. Profit on revaluation of Non-Current [fixed] assets	xxx	XXXX
Funds From /Lost From Operation		XXXXX

2. ACCOUNT FORM

The second method – Account form method – is prepared by rearranging and organizing profit and loss account, by considering only fund and operational items which involve funds and are related to the normal operation of the business. This balancing figure in this method will be either funds generated from operation or funds lost in operations depending upon whether the income or credit side of profit and loss account exceeds the expense or debit side of profit and loss account or vice-versa.

Alternatively, an Adjusted Profit and Loss Account may be prepared as follows and the balancing figure thus represents Funds From operation as indicated below

Adjusted Profit and Loss Account			
	Rs.		Rs.
To Depreciation	xx	By opening Bal. of P/L A/c	xx
To Goodwill written off	xx	By Dividend Received	xx
To Preliminary Expenses written off	xx	By Excess Provision written back	xx
To Discount of shares issued	xx	By <i>Funds From Operation</i>	xxxx*
To Transfer to Reserves	xx	<i>[Balancing figure]</i>	
To Loss sale of Fixed Assets	xx		
To Premium on Redemption	xx		
To Closing Bal. P & L A/c	xxx		
	<b>XXXX</b>		<b>XXXX</b>

\* denotes balancing figures

Illustration No.13.04

Calculate funds from operations from the following Profit and Loss Account.

Particulars	Rs.	Particulars	Rs.
To Expenses Paid	3,00,000	By Gross Profit	4,50,000
To Depreciation	70,000	By Gain on Sale of Land	60,000
To Loss on Sale of Machine	4,000		
To Discount	200		
To Goodwill	20,000		
To Net Profit	1,15,800		
	<b>5,10,000</b>		<b>5,10,000</b>

Solution No.13.4:

Statement showing Funds from Operation

Particulars	Rs.	Rs.
Net Profit as per Profit and Loss Account		1,15,800
<b>ADD: Items which do not decrease funds:</b>		
<i>From Operations but debited to P &amp; L A/c</i>		
Depreciation	70,000	
Loss on sale of Machine	4,000	
Goodwill written off	20,000	94,000
		2,09,800
<b>LESS: Items which do not increase funds:</b>		
Gain on Sale of Land		60,000
<b>Funds From Operation</b>		<b>1,49,800</b>

Illustration No. 13.5

Blackberry Ltd. presents the following information and you are required to calculate funds from operation.

Profit and Loss Account			
	Rs.		Rs.
To Operation Expenses	1,00,000	By Gross Profits	1,90,000
To Deprecation	40,000	By Gain on sale of Plant	20,000
To Loss on Sale of Buildings	10,000	By Dividend Income Received	10,000
To Advertisement	5,000		
Suspense Account			
To Discount Allowed	500		
To Discount on Issue of Shares written off	500		
To Goodwill written off	12,000		
To Net Profits	52,000		
	<b>2,20,000</b>		<b>2,20,000</b>

Solution No. 13.5

CALCULATION OF FUNDS FROM OPERATION- Statement Form

	Rs.	Rs.
Net Profit for the Year [as given]		52,000
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b>		
which have been already debited to P & L A/c:		
1. Depreciation	40,000	

2. Loss on sale of Buildings	10,000	
3. Advertisement Suspense Account written off	5,000	
4. Discount on Issue of shares written off	500	
5. Goodwill written off	12,000	67,500
		<b>1,19,500</b>
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b>		
which have been already Credited to P & L A/c:		
1. Profit or Gain from the sales of plant	20,000	
2. Dividend Received	10,000	30,000
<b>Funds From Operation</b>		<b>89,500</b>

#### Alternatively – Account Form

#### CALCULATION OF FUNDS FROM OPERATION- Account Form

Adjusted Profit and Loss Account			
	Rs.		Rs.
To Depreciation	40,000	By opening Bal. of P/L A/c	-
To Loss sale of Buildings	10,000	By Dividend Received	10,000
To Advertisement Suspense Account	5,000	By Gain on sale of Plant	20,000
To Discount written off	500	By <i>Funds From Operation</i>	89,500*
To Goodwill written off	12,000	<i>[Balancing figure]</i>	
To Closing Bal. P & L A/c	52,000		
	<b>1,19,500</b>		<b>1,19,500</b>

\* denotes balancing figure

#### Illustration No.13.6

From the following balance sheets and additional information given, you are required to calculate funds from operation for the year ended 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Share Capital	1,00,000	1,50,000	Land & Buildings	1,00,000	95,000
General Reserve	30,000	30,000	Plant & Machinery	80,000	90,000
Profit and Loss A/c	20,000	22,000	Stock	70,000	1,10,000
6 % Debenture	80,000	80,000	Debtors	20,000	25,000
Creditors	70,000	68,000	Investments	-	10,000

			Cash	10,000	10,000
			Goodwill	20,000	10,000
	<b>3,00,000</b>	<b>3,50,000</b>		<b>3,00,000</b>	<b>3,50,000</b>

Additional Information:

1. During 2007, dividends of Rs.15,000 were paid;
2. Depreciation written off plant and machinery amounted to Rs.6,000 and depreciation has been charged on land and buildings.

**Solution No. 13.6 [SG-FM-ill.5/6.21]**

Before preparing funds from operation, we should prepare non-current accounts in order to items to be added or deducted from net profit.

**Working Note No. 1**

<b>Land and Building Account</b>			
	<b>Rs.</b>		<b>Rs.</b>
To Balance b/d	1,00,000	By Depreciation a/c	<sup>[1+]</sup> 5,000 *
		By Balance c/d	95,000
	<b>1,00,000</b>		<b>1,00,000</b>

\*denotes balancing figure and <sup>[+]</sup> refers amount to be added to net profit.

Instead of preparing land and building account, by experience, you may able find out depreciation amount by simple subtraction [ 1,00,000 – 95,000] Rs.5,000 provided there is no other adjustment or additional information is given in your problem.

**Working Note No. 2**

<b>Plant and Machinery Account</b>			
	<b>Rs.</b>		<b>Rs.</b>
To Balance b/d	80,000	By Depreciation a/c	<sup>[2+]</sup> 6,000
To Bank [Bal. Figure] [purchases]	* <sup>[A]</sup> 16,000	By Balance c/d	90,000
	<b>96,000</b>		<b>96,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds

## CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c	22,000	2,000
<b>Less:</b> Opening Balance of P & L A/c	20,000	
Net Profit for the Year		
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
1. Depreciation on Plant and Machinery	6,000	
2. Depreciation on Land and Buildings	[1+] 5,000	36,000
2. Dividends	15,000	
4. Goodwill written off [20,000-10,000]	10,000	
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b> which have been already Credited to P & L A/c:		38,000
		-
<b>Funds From Operation</b>		<b>38,000</b>

### Check your Progress 13.2

Extracts from the Balance Sheets:

### Balance of Profit and Loss Account

On 31<sup>st</sup> December 2001      Rs.50,000

On 31<sup>st</sup> December 2002      Rs.75,000

**Additional Information:**

- |  |           |
|--|-----------|
| i. Depreciation charged on assets                          | Rs.5,000  |
| ii. Preliminary expenses written off                       | Rs.2,500  |
| iii. Amount transferred to Dividend Equalization Fund      | Rs.7,500  |
| iv. A plant having a book value of Rs.30, 000 was sold for | Rs.32,500 |
| v. Interim dividend paid                                   | Rs.5,000  |

Calculate Funds From operation

### 13.13 PREPARATION OF FUNDS FLOW STATEMENT

The above three steps i.e., statement of changes in working capital, opening of Accounts for Non-current items and calculation of funds from operation are incorporated in the preparation of funds flow statement.

Funds flow statement is a statement which indicates various sources from which funds [working capital] have been obtained during a certain period and the uses or applications to which these funds have been put during the period.



For preparing Funds Flow Statement, Sources of funds and decrease in working capital are entered on the source side. Application or uses of funds and increases in working capital are entered on the application side. This completes the preparation of funds flow statement. The specimen of Funds Flow Statement is given below:

**SPECIMEN FUNDS FLOW STATEMENT**

Sources	Rs.	Applications	Rs.
Funds From operation	xxx	Funds lost from operations	xxx
Issue of Shares	xxx	Redemption of Preference share capital	xxx
Issue of Debentures	xxx	Redemption of Debentures	xxx
Share Premium	xxx	Repayment of Loans	xxx
Long term loans borrowed	xxx	Purchase of Non-current [fixed] assets	xxx
Sale of Fixed assets	xxx	Purchases of Investments	xxx
Investments sold	xxx	Non-trading payments	xxx
Non-trading incomes – dividends etc.	xxx	Payment of Dividends <sup>#</sup>	xxx
		Payment of Tax <sup>#</sup>	xxx
Decrease in Working Capital	xxx	Increase in Working Capital	xxx
	<b>XXXX</b>		<b>XXXX</b>

**Note:** <sup>#</sup> If Payment of dividend and Tax are treated as non-current items, and then it will appear in the Sources and Application Statement otherwise it would not.

**Illustration No.13.7**

From the following balance sheets of Balky for the year ended 31<sup>st</sup> December 2000 and 2001, prepare schedule of changes in working capital and statement showing sources and application of fund:

Liabilities	2000 Rs.	2001 Rs.	Assets	2000 Rs.	2001 Rs.
Share Capital	3,00,000	4,00,000	Plant & Machinery	50,000	60,000
Sundry Creditors	1,00,000	70,000	Furniture and Fixtures	10,000	15,000
Profit and Loss A/c	15,000	30,000	Stocks	85,000	1,05,000
			Debtors	1,60,000	1,50,000
			Cash	1,10,000	1,70,000
	<b>4,15,000</b>	<b>5,00,000</b>		<b>4,15,000</b>	<b>5,00,000</b>

Solution No.13. 7

Step 1 Preparation of Schedule of Changes in Working Capital

Schedule of Changes in Working Capital				
Particulars	2000	2001	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Cash	1,10,000	1,70,000	60,000	
Debtors	1,60,000	1,50,000		10,000
Stock	85,000	1,05,000	20,000	
<b>Total [A]</b>	<b>3,55,000</b>	<b>4,25,000</b>		
<b>Current Liabilities:</b>				
Sundry Creditors	1,00,000	70,000	30,000	
<b>Total [B]</b>	<b>1,00,000</b>	<b>70,000</b>	<b>1,10,000</b>	<b>10,000</b>
<b>Working Capital [A- B]</b>	2,55,000	3,55,000		
Increase working capital	<b>1,00,000*</b>			<b>1,00,000*</b>
	<b>3,55,000</b>	<b>3,55,000</b>	<b>1,10,000</b>	<b>1,10,000</b>

\* denotes balancing Figure [which is found out by balancing]

Step 2: Preparation of Non-Current Accounts

The value of non-current items such as Plant and Machinery, Furniture and Fixtures and share capital are changed during the year. Therefore, it is desirable to prepare Account for each items, in order find out whether there is any sources or application of funds occurred or any amount to be added or deducted to the net profit to calculate the funds from operation.

Working Notes No.1

Plant and Machinery Account			
	Rs.		Rs.
To Balance b/d	50,000		
To Bank [Bal. Figure]	<sup>[A]</sup> 10,000*		
		By Balance c/d	60,000
	<b>60,000</b>		<b>60,000</b>

\*denotes balancing figure; and <sup>[A]</sup>.refers application of funds shown in the application side of Funds Flow Statement.

Working Notes No.2

Furniture and Fixtures Account			
	Rs.		Rs.
To Balance b/d	10,000	By Balance c/d	
To Bank [Bal. Figure]	<sup>[A]</sup> 5,000*		15,000
	15,000		15,000

\*denotes balancing figure; and <sup>[A]</sup>.refers application of funds shown in the application side of Funds Flow Statement.

Working Notes No.3

Share Capital Account			
	Rs.		Rs.
To Balance c/d		By Balance b/d	3,00,000
		To Bank [b.f ]	<sup>[S]</sup> 1,00,000*
	4,00,000	[Issue of shares]	
	4,00,000		4,00,000

\*denotes balancing figure; and <sup>[S]</sup>.refers application of funds shown in the sources side of Funds Flow Statement.

Step 3 Calculations of Funds From Operation

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c	30,000	15,000
Less: Opening Balance of P & L A/c	15,000	
Net Profit for the Year		
ADD: NON-FUND and NON-OPERATING ITEMS		
which have been already debited to P & L A/c:		-
LESS:NON-FUND or NON-OPERATING ITEMS		
which have been already Credited to P & L A/c:		-
Funds From Operation		15,000

**Step 4: Preparation of Funds Flow Statement**

FUNDS FLOW STATEMENT			
Sources	Rs.	Applications	Rs.
Issue of share capital	1,00,000	Purchase of Plant & Machinery	10,000 <sup>1</sup>
Funds From Operation	15,000	Purchase of Furniture and Fixtures	5,000 <sup>2</sup>
		Increase in Working capital	1,00,000
	<b>1,15,000</b>		<b>1,15,000</b>

**13.13.1 Treatment of Investments**

A firm may hold Investments either as a current asset or as fixed [non-current] asset. If the investments represent surplus funds temporarily invested in marketable securities, they are to be treated as current assets. If investments are considered as a current assets, then it will be treated only in Statement of Changes in working capital alone.

If on the other hand, investments are of a permanent nature i.e., trade investments or long term investments, they should be treated as fixed assets. If it is considered as a non-current assets, the actual sale proceeds, without considering profit or loss on sale should be taken to the Funds Flow statement as a Source of Fund[ profit or loss will be considered while preparing Funds From operation as discussed earlier] and the figure of purchase as Application of funds.

If nothing is mentioned generally, it may treated as non-current item.

**Investments are treated as Current Assets:**

**Illustration No.13.8**

Sunith Williams presents the following financial statements for 2008 and 2009. Prepare a Sources and Application of funds Statement.

Liabilities	2008 Rs.	2009 Rs.	Assets	2008 Rs.	2009 Rs.
Share Capital	2,50,000	4,00,000	Goodwill	70,000	50,000
General Reserve	70,000	1,20,000	Machinery	2,20,000	3,10,000
Profit and Loss A/c	50,000	60,000	Investments	30,000	80,000
Creditors	75,000	1,10,000	Bank	25,000	30,000
Bills Payable	10,000	15,000	Debtors	70,000	1,80,000
			Stock	40,000	55,000
	<b>4,55,000</b>	<b>7,05,000</b>		<b>4,55,000</b>	<b>7,05,000</b>

During the year investments costing Rs.30,000 were sold for Rs.27,000. A new machinery was bought for Rs.1,40,000 for cash.

**Solution No.13.8**

**If Investments are treated as Current Assets**

*Step 1 Preparation of Schedule of Changes in Working Capital*

Schedule of Changes in Working Capital				
Particulars	2008	2009	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Investments	30,000	80,000	50,000	
Bank	25,000	30,000	5,000	
Debtors	70,000	1,80,000	1,10,000	
Stock	40,000	55,000	15,000	
<b>Total [A]</b>	<b>1,65,000</b>	<b>3,45,000</b>		
<b>Current Liabilities:</b>				
Creditors	75,000	1,10,000		35,000
Bills Payable	10,000	15,000		5,000
<b>Total [B]</b>	<b>85,000</b>	<b>1,25,000</b>	<b>1,80,000</b>	<b>40,000</b>
<b>Working Capital [A- B]</b>	80,000	2,20,000		
Increase in working capital	<b>1,40,000*</b>			<b>1,40,000*</b>
	<b>2,20,000</b>	<b>2,20,000</b>	<b>1,80,000</b>	<b>1,80,000</b>

\* denotes balancing figure

*Step 2: Preparation of Non-Current Accounts*

*Working Notes No. 1*

Machinery Account			
	Rs.		Rs.
To Balance b/d	2,20,000	By Depreciation	* <sup>[+]</sup> 50,000
To Bank [Purchases-given]	1,40,000	By Balance c/d	3,10,000
	<b>3,60,000</b>		<b>3,60,000</b>

Step 3 Calculations of Funds From Operation

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	50,000	10,000
Less: Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	60,000	
Net Profit for the Year		
ADD: NON-FUND and NON-OPERATING ITEMS which have been already debited to P & L A/c:		
1. Depreciation on Machinery [as per W.N.1]	[+]50,000	
2. Transfer to General Reserve	50,000	
3. Goodwill written off	20,000	1,20,000
LESS:NON-FUND or NON-OPERATING ITEMS which have been already Credited to P & L A/c:		-
Funds From Operation		1,30,000

Step 4: Preparation of Funds Flow Statement

FUNDS FLOW STATEMENT

Sources	Rs.	Applications	Rs.
Issue of Shares	1,50,000	Purchase of Machinery	1,40,000
Funds From operation	1,30,000	Increase in Working Capital	1,40,000
	2,80,000		2,80,000

If Investments are treated as Non-Current [Fixed] Assets

In the above discussed problem, investments are treated as current assets, for the same problem let us solve the problem by considering investment as a non-current item.

*Step 1 Preparation of Schedule of Changes in Working Capital*

Schedule of Changes in Working Capital				
Particulars	2008	2009	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Bank	25,000	30,000	5,000	
Debtors	70,000	1,80,000	1,10,000	
Stock	40,000	55,000	15,000	
<b>Total [A]</b>	<b>1,35,000</b>	<b>2,65,000</b>		
<b>Current Liabilities:</b>				
Creditors	75,000	1,10,000		35,000
Bills Payable	10,000	15,000		5,000
<b>Total [B]</b>	<b>85,000</b>	<b>1,25,000</b>	<b>1,30,000</b>	<b>40,000</b>
<b>Working Capital [A- B]</b>	50,000	1,40,000		
Increase in working capital	<b>90,000*</b>			<b>90,000*</b>
	<b>1,40,000</b>	<b>1,40,000</b>	<b>1,30,000</b>	<b>1,30,000</b>

\* denotes balancing figure

*Step 2: Preparation of Non-Current Accounts*

*Working Notes No1*

Machinery Account			
	Rs.		Rs.
To Balance b/d	2,20,000	By Depreciation	<sup>[+]</sup> 50,000*
To Bank [Purchases-given]	1,40,000		
		By Balance c/d	3,10,000
	<b>3,60,000</b>		<b>3,60,000</b>

*Working Note No.2*

Investments Account			
	Rs.		Rs.
To Balance b/d	30,000	By Bank [Sold]	<sup>[s]</sup> 27,000
To Bank [Purchases]	<sup>[A]</sup> 80,000*	By P/ L A/c	<sup>[+]</sup> 3,000
		By Balance c/d	80,000
	<b>1,10,000</b>		<b>1,10,000</b>

**Note:** Investments costing Rs.30,000 were sold for Rs.27,000, therefore the loss of Rs.3,000 <sup>[+]</sup> [30,000 – 27,000] will be credited in investments account and debited in profit and loss account while finding Funds from operation. Rs.27,000 is source of funds <sup>[s]</sup>

**Step: 3 Calculation of Funds From Operation**

**CALCULATION OF FUNDS FROM OPERATION**

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	50,000	10,000
<b>Less:</b> Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	60,000	
Net Profit for the Year		
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		1,23,000
1. Depreciation on Machinery [as per W.N.1]	50,000	
2. Transfer to General Reserve	50,000	
3. Goodwill written off	20,000	
4. Loss on sale of Investments	<sup>[+]</sup> 3,000	
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b> which have been already Credited to P & L A/c:		-
<b>Funds From Operation</b>		<b>1,33,000</b>

**Step 4: Preparation of Funds Flow Statement**

**FUNDS FLOW STATEMENT**

Sources	Rs.	Applications	Rs.
Issue of Shares	1,50,000	Purchase of Machinery	1,40,000
Sale of Investments	<sup>[s]</sup> 27,000	Increase in Working Capital	90,000
Funds From operation	1,33,000	Purchase of Investments	<sup>[A]</sup> 80,000
	<b>3,10,000</b>		<b>3,10,000</b>

**13.13.2 Treatment of Tax and Dividend**

- [a] It is preferable to treat them as non-current items if nothing is specified.
- [b] If ‘*tax payable*’ or ‘*dividend payable*’ is given on the balance sheet liability side, they are to be taken as current liabilities.
- Provision for tax and proposed dividend are non-current. Once tax is assessed or dividend is declared, it becomes a liability to be paid off immediately.

**Tax and Dividend given in Different Ways**

- [i] If provision for tax and dividend are given in the adjustments alone and nothing is given in the balance sheets, the given amount is added back to the net profits while



calculating funds from operation or debited to adjusted profit and loss account. It is also shown as application in funds flow statement. It is presumed that provision is made and payment is also made immediately.

**[ii]** If provision for tax and proposed dividend are given in the balance sheets alone and nothing is mentioned in the adjustments:

The opening balance of these items can be assumed to have been paid in cash during the current year. The opening balances are shown as application of funds. The closing balances are debited to the adjusted profit and loss account i.e., added to the net profits while calculating funds from operation, as provision made in the current year.

**[iii]** If provision for tax and proposed dividend are given in the balance sheet as well as in adjustments:

It is necessary to prepare separate ledger accounts for them. From those accounts, the tax paid and dividend paid are shown as application of funds. The provisions made are shown in the debit side of adjusted profit and loss account i.e., added to the net profits while calculating funds from operation.

**[iv]** Interim dividend should be treated separately from proposed dividend. Interim dividend will appear as an application in the Funds flow statement and on the debit side of Adjusted Profit and Loss account i.e., added to the net profits while calculating Funds from operation. No adjustment is necessary for interim dividend paid if funds from operation are being determined on the basis of 'net profit for the current year before for interim dividend'.

#### **TREATMENT OF PROVISION FOR TAXATION:**

##### **Illustration No. 13.8**

The opening balance in the Provision for Taxation Account as on 1<sup>st</sup> January 2007 was Rs.30,000 and the closing balance on 31<sup>st</sup> December 2007 was Rs.40,000. The taxes paid during the year amounted to Rs.25,000. How will you deal with Provision for tax?

##### **Solution No. 13.8**

###### ***A. When Provision for taxation is treated as a current liability:***

Provision for taxation will be simply shown in the schedule of changes in working capital and it will not have any further effect on the funds flow statement.

Schedule of Changes in Working Capital

Particulars	2007	2008	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Liabilities:</b> Provision for Taxation	30,000	40,000		10,000

B. When Provision for taxation is treated as a Non-current liability [Appropriation]:

In this problem, opening and closing balance of provision for taxation and additional information is given. Therefore we have to prepare Provision for Taxation account in order to find out how much provision made during the year and/or how much tax paid during the period, as it is treated as non-current item.

1. It will not be shown in the schedule of changes in working capital;
2. Then, Provision for Taxation Account is prepared being a non-current account.

Provision for Taxation Account			
	Rs.		Rs.
To Bank [Tax paid]	[A] 25,000	By Balance b/d [opening]	30,000
[Application]		By P/L A/c [Provision made]	[+] 35,000*
By Balance b/d [Closing]	40,000		
	65,000		65,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds.

1. Provision for taxation made during the year Rs.35,000 will be added back while finding funds from operation.

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	xxx	XXX
<b>Less:</b> Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	xxx	
Net Profit for the Year		
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
Provision for taxation	35,000	

2. Taxes paid during the year Rs.25,000 is an application of funds and will appear on the application side of funds flow statement .

**FUNDS FLOW STATEMENT**

Sources	Rs.	Applications	Rs.
		Taxes paid	25,000

**Illustration No. 13.9**

The Opening and closing balance of Provision for taxation [non-current] are Rs.50,000 and Rs.75, 000 and profit and loss account [Cr] balances Rs.2,00,000 and Rs.3,00,000 respectively. There is no additional information.

**Solution No. 13. 9**

In this problem, opening and closing balance of provision for taxation alone given.. No additional information is given. Therefore, we have treat that opening balance of provision as amount of tax paid and that will be shown as application of fund.

The closing balance of provision for taxation will be treated as current year's appropriation for taxation and will be added back to the profits while finding Funds from operation.

3. Then, Provision for Taxation Account is prepared being a non-current account.

Provision for Taxation Account			
	Rs.		Rs.
To Bank [Tax paid]	[A] 50,000	By Balance b/d [opening]	50,000
[Application]		By P/L A/c [Provision made]	[+] 75,000
By Balance b/d [Closing]	75,000		
	<b>1,25,000</b>		<b>1,25,000</b>

[+] refers amount to be added to net profit and [A].refers application of funds.

4. Provision for taxation made during the year Rs.75,000 will be added back while finding funds from operation.

### CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	2,00,000	
<b>Less:</b> Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	2,00,000	
Net Profit for the Year		1,00,000
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
Provision for taxation	75,000	75,000
<b>Funds From Operation</b>		<b>1,75,000</b>

5. Taxes paid during the year Rs.25,000 is an application of funds and will appear on the application side of funds flow statement .

### FUNDS FLOW STATEMENT

Sources	Rs.	Applications	Rs.
Funds From Operation	1,75,000	Taxes paid	50,000

### 13.13.3 TREATMENT OF PROPOSED DIVIDEND:

The students may note that the treatment of proposed dividend is much similar to the provision for taxation. Like Provision for taxation, proposed dividend problems are generally of two types. They are

1. The balances of proposed dividends are given in the balance sheets alone and nothing is mentioned in the adjustments.
2. The Proposed Dividends' balances are given in the Balance Sheets along with some additional information.

**1. The Proposed Dividends' balances are given in the Balance Sheets along with some additional information.**

#### Illustration No. 13.10

Extracts from the Balance Sheets:

	31-3-2007	31-3-2008
Proposed Dividend	50,000	70,000
Profit and Loss A/c [Cr]	2,00,000	3,00,000

**Additional Information:** Dividend paid during the year is Rs.60, 000

How will you treat proposed dividend, if is considered as current liability as well as non-current liability?

**Solution No. 13.10**

**A. When Proposed Dividend is treated as a current liability:**

Proposed Dividend will be simply shown in the schedule of changes in working capital and it will not have any further effect on the funds flow statement.

Schedule of Changes in Working Capital				
Particulars	2007	2008	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Liabilities:</b>				
Proposed Dividend	50,000	70,000		20,000

**B. When Proposed Dividend is treated as a Non-current liability [Appropriation]:**

In this problem, opening and closing balance of Proposed Dividend and additional information is given. Therefore we have to prepare Proposed Dividend account in order to find out how much provision made during the year and/or how much tax paid during the period, as it is treated as non-current item.

- 1. It will not be shown in the schedule of changes in working capital;
- 2. Then, Proposed Dividend Account is prepared being a non-current account.

Proposed Dividend Account			
	Rs.		Rs.
To Bank [Dividend Distributed]	[A] 60,000	By Balance b/d [opening]	50,000
[Application]		By P/L A/c [Appropriation made]	[+]80,000*
By Balance b/d [Closing]	70,000		
	<b>1,30,000</b>		<b>1,30,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds.

- 3. Proposed Dividend made during the year Rs.80,000 will be added back while finding funds from operation.

### CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	3,00,000	
<b>Less:</b> Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	2,00,000	
Net Profit for the Year		1,00,000
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
Proposed Dividend	80,000	80,000
<b>Funds From Operation</b>		<b>1,80,000</b>

4. Taxes paid during the year Rs.25,000 is an application of funds and will appear on the application side of funds flow statement .

### FUNDS FLOW STATEMENT

Sources	Rs.	Applications	Rs.
		Dividend Distributed	60,000

2. The balances of proposed dividends are given in the balance sheets alone and nothing is mentioned in the adjustments.

#### Illustration No. 13.11

The Opening and closing balance of Proposed Dividend [non-current] are Rs.50,000 and Rs.75, 000 and profit and loss account [Cr] balances Rs.2,00,000 and Rs.3,00,000 respectively. There is no additional information.

#### Solution No. 13.11

In this problem, opening and closing balance of Proposed Dividend alone is given. No additional information is given. Therefore, we have treat that opening balance of Proposed Dividend as amount of dividend distributed and that will be shown as application of fund.

The closing balance of Proposed Dividend will be treated as current year's appropriation and will be added back to the profits while finding Funds from operation.

2. Then, Provision for Taxation Account is prepared being a non-current account.

Provision for Taxation Account			
	Rs.		Rs.
To Bank [Distributed ]	[A] 50,000	By Balance b/d [opening]	50,000
[Application]		By P/L A/c	[+] 75,000

By Balance b/d [Closing]	75,000	[Appropriation made]	
	<b>1,25,000</b>		<b>1,25,000</b>

<sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds.

3. Appropriation made for Proposed Dividend during the year is Rs.75,000 and will be added back while finding funds from operation.

#### CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	2,00,000	
<b>Less:</b> Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	2,00,000	
Net Profit for the Year		1,00,000
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
Proposed Dividend	75,000	75,000
<b>Funds From Operation</b>		<b>1,75,000</b>

4. Dividend distributed during the year Rs.50,000 is an application of funds and will appear on the application side of funds flow statement .

#### FUNDS FLOW STATEMENT

Sources	Rs.	Applications	Rs.
Funds From Operation	1,75,000	Dividend distributed	50,000

### 13.14 COMPREHENSIVE ILLUSTRATIONS

#### Illustration No. 13.12

From the following summarized Balance Sheets of Jasmine Ltd. for two years on 31<sup>st</sup> March 2002 and 2003.

Liabilities & Capital	31/03/2002 Rs.	31/03/2003 Rs.	Assets	31/03/2002 Rs.	31/03/2003 Rs.
Share Capital	10,00,000	15,00,000	Land and Buildings	5,00,000	5,00,000
Share Premium	1,00,000	1,50,000	Plant &	7,00,000	16,00,000

P/L A/c	4,00,000	7,00,000	Machinery		
Trade Creditors	2,50,000	3,00,000	Stock	1,75,000	3,00,000
Bank Overdraft	-	1,00,000	Debtors	2,25,000	3,50,000
Bills Payable	50,000	50,000	Cash	2,00,000	50,000
	<b>18,00,000</b>	<b>28,00,000</b>		<b>18,00,000</b>	<b>28,00,000</b>
Sales	18,00,000	28,00,000			

Prepare Funds Flow Statement.

**Solution No.13.12**

***Step 1 Preparation of Schedule of Changes in Working Capital***

**Schedule of Changes in Working Capital**

Particulars	31/03/2002	31/03/2003	Changes in Working Capital	
	Rs.	Rs.	Increase [Rs.]	Decrease [Rs.]
<b>Current Assets:</b>				
Stock	1,75,000	3,00,000	1,25,000	
Debtors	2,25,000	3,50,000	1,25,000	
Cash	2,00,000	50,000		1,50,000
<b>Total [A]</b>	<b>6,00,000</b>	<b>7,00,000</b>		
<b>Current Liabilities:</b>				
Trade Creditors	2,50,000	3,00,000		50,000
Bank Overdraft	-	1,00,000		1,00,000
Bills Payable	50,000	50,000	-	-
<b>Total [B]</b>	<b>3,00,000</b>	<b>4,50,000</b>	<b>2,50,000</b>	<b>3,00,000</b>
<b>Working Capital [A- B]</b>	3,00,000	2,50,000		
Decrease in working capital		<b>50,000*</b>	<b>50,000*</b>	
	<b>3,00,000</b>	<b>3,00,000</b>	<b>3,00,000</b>	<b>3,00,000</b>

\* denotes balancing Figure [which is found out by balancing]



**Step 2: Preparation of Non-Current Accounts**

Working Note: 1

There is no change in the value of Land and Buildings during the period and furthermore there is no additional information is given on Land and Buildings, therefore we presume that there is no transaction occurred during the period and hence there is no need to prepare Land and Building Account.

Working Note: 2

Plant and Machinery, Share capital and Share Premium being a non-current items, values of these items have changed during the period [i.e., between opening and closing balance sheets], we have to prepare Accounts for these items.

Working Note: 3

Plant and Machinery Account			
	Rs.		Rs.
To Balance b/d	7,00,000	By Balance c/d	
To Bank [Bal. Figure]	<sup>[A]</sup> 9,00,000*		
[Purchases]	16,00,000		16,00,000
			16,00,000

\*denotes balancing figure; and <sup>[A]</sup>.refers application of funds shown in the application side of Funds Flow Statement.

Working Note: 4

Share Capital Account			
	Rs.		Rs.
To Balance c/d		By Balance b/d	10,00,000
		By Bank [bal. fig.]	<sup>[S]</sup> 5,00,000*
	15,00,000	[issue of Shares]	
	15,00,000		15,00,000

\*denotes balancing figure; and <sup>[S]</sup>.refers application of funds shown in the Source side of Funds Flow Statement.

Working Note: 5

Share Premium Account			
	Rs.		Rs.
To Balance c/d		By Balance b/d	1,00,000
		By Bank [bal. fig.]	<sup>[S]</sup> 50,000*
	1,50,000	[on issue of Shares]	
	1,50,000		1,50,000

\*denotes balancing figure; and <sup>[S]</sup>.refers application of funds shown in the Source side of Funds Flow Statement.

Step 3 Calculation of Funds From Operation

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	7,00,000	
Less: Opening Balance of P & L A/c or Retained Earning	4,00,000	
Net Profit for the Year		3,00,000
ADD: NON-FUND and NON-OPERATING ITEMS which have been already debited to P & L A/c:		-
		3,00,000
LESS:NON-FUND or NON-OPERATING ITEMS which have been already Credited to P & L A/c:		-
Funds From Operation		3,00,000

Step 4: Preparation of Funds Flow Statement

FUNDS FLOW STATEMENT

Sources	Rs.	Applications	Rs.
Issue of Shares	5,00,000	Purchase of Plant and Machinery	9,00,000
Share Premium	50,000		
Funds From operation	3,00,000		
Decrease in Working Capital	50,000		
	9,00,000		9,00,000

**Note:** Proposed dividend has been taken as current liability  
Increase in fixed assets has been financed by the issue of shares Rs.5,50,000 [5,00,000+50,000], Funds from operation Rs.3,00,000 and working capital Rs.50,000

Illustration 13.13

From the following balance sheets of Jasmine Ltd., made out: [i] statement of Changes in Working capital and [ii] Fund Flow Statement.

Balance Sheets

Liabilities	1999 Rs.	2000 Rs.	Assets	1999 Rs.	2000 Rs.
Equity Share Capital	3,00,000	4,00,000	Goodwill	1,15,000	90,000
Redeemable Preference share capital	1,50,000	1,00,000	Land and Buildings	2,00,000	1,70,000
General Reserve	40,000	70,000	Plant	80,000	2,00,000

Profit & Loss	30,000	48,000	Debtors	1,60,000	2,00,000
Proposed Dividend	42,000	50,000	Stock	77,000	1,09,000
Creditors	55,000	83,000	Bills Receivables	20,000	30,000
Bills Payable	20,000	16,000	Cash in hand	15,000	10,000
Provision for Taxation	40,000	50,000	Cash at bank	10,000	8,000
	<b>6,77,000</b>	<b>8,17,000</b>		<b>6,77,000</b>	<b>8,17,000</b>

**Additional Information:**

- [1] Depreciation of Rs.10,000 and Rs.20,000 have been charged on Plant and Land and Buildings respectively in 2000.
- [2] A dividend of Rs.20,000 has been paid in 2000;

**Solution 13.13**

**Step 1 Preparation of Schedule of Changes in Working Capital**

Schedule of Changes in Working Capital				
Particulars	1999	2000	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
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	
Cash in hand	15,000	10,000		5,000
Cash at Bank	10,000	8,000		2,000
<b>Total [A]</b>	<b>2,82,000</b>	<b>3,57,000</b>		
<b>Current Liabilities:</b>				
Creditors	55,000	83,000		28,000
Bills Payable	20,000	16,000	4,000	
<b>Total [B]</b>	<b>75,000</b>	<b>99,000</b>		
<b>Working Capital [A- B]</b>	<b>2,07,000</b>	<b>2,58,000</b>	<b>86,000</b>	<b>35,000</b>
Increase in working capital	<b>51,000*</b>			<b>51,000*</b>
	<b>2,58,000</b>	<b>2,58,000</b>	<b>86,000</b>	<b>86,000</b>

\* denotes balancing figure

Step 2: Preparation of Non-Current Accounts

Working Note 1

Land and Buildings Account			
	Rs.		Rs.
To Balance b/d	2,00,000	By Depreciation	<sup>[+]</sup> 20,000
		By Bank [Bal. Figure]	<sup>[S]</sup> 10,000*
		[sale of Land & Buildings]	
		By Balance c/d	1,70,000
	2,00,000		2,00,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[S]</sup> refers Source of funds

Working Note 2

Plant Account			
	Rs.		Rs.
To Balance b/d	80,000	By Depreciation	<sup>[+]</sup> 10,000
To Bank [Bal. Figure]	<sup>[A]</sup> 1,30,000		
[Purchase of Plant]		By Balance c/d	2,00,000
	2,10,000		2,10,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds

Working Note 3

Proposed Dividend Account			
	Rs.		Rs.
To Bank [Dividend paid]	<sup>[A]</sup> 20,000	By Balance b/d	42,000
		By P/L A/c [current year's appropriation]	<sup>[+]</sup> 28,000*
To Balance c/d	50,000		
	70,000		70,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds

Working Note 4

Tax paid for the year 2000 is not given. Therefore, we assume that opening balance of provision is paid for the year and closing balance of the year is taken as current year's appropriation.

Provision for Taxation Account			
	Rs.		Rs.
To Bank [Tax paid]	<sup>[A]</sup> 40,000	By Balance b/d	40,000
		By P/L A/c [current year's appropriation]	<sup>[+]</sup> 50,000*
To Balance c/d	50,000		
	<b>90,000</b>		<b>90,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds

**Step 3 Calculation of Funds From Operation**

**CALCULATION OF FUNDS FROM OPERATION**

	Rs.	Rs.
Closing Balance of P & L A/c	48,000	18,000
<b>Less:</b> Opening Balance of P & L A/c [ as given in the Balance Sheet]	30,000	
Net Profit for the Year		
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
1. Depreciation on Plant	10,000	1,63,000
2. Depreciation on Buildings	20,000	
3. Proposed Dividend	28,000	
4. Provision for taxation	50,000	
5. General Reserve [70,000 - 40,000]	30,000	
6. Goodwill written off [1,15,000 – 90,000]	25,000	
<b>Funds From Operation</b>		<b>1,81,000</b>

**Step 4: Preparation of Funds Flow Statement**

**FUNDS FLOW STATEMENT**

Sources	Rs.	Applications	Rs.
Funds From operation	1,81,000	Dividend paid	20,000
Issue of Equity shares capital [4,00,000-3,00,000]	1,00,000	Redemption of Red. Pref. Share capital [1,50,000 - 1,00,000]	50,000
Sale of Land and Buildings	10,000	Tax paid	40,000
		Purchase of Plant	1,30,000
		Increase in Working capital	51,000
	<b>2,91,000</b>		<b>2,91,000</b>

**Illustration No.13.14**

Balance sheets of M/s Black and White as on 1-1-2007 and 31-12-2007 were as follows:

Liabilities	1-1-2007 Rs.	31-12-2007 Rs.	Assets	1-1-2007 Rs.	31-12-2007 Rs.
Creditors	40,000	44,000	Cash	10,000	7,000
Mrs. White’s Loan	25,000	-	Debtors	30,000	50,000
Loan From SBI Bank	40,000	50,000	Stock	35,000	25,000
Capital	1,25,000	1,53,000	Machinery	80,000	55,000
			Land	40,000	50,000
			Building	35,000	60,000
	<b>2,30,000</b>	<b>2,47,000</b>		<b>2,30,000</b>	<b>2,47,000</b>

During the year a machine costing Rs.10,000 [accumulated depreciation Rs.3,000] was sold for Rs.5,000. The provision for depreciation against machinery as on 1-1-2007 was Rs.25,000 and on 31-12-2007 Rs.40,000. Net profit for the year 2007 amounted to Rs.45,000. You are required to prepare funds flow statement.

**Solution No. 12.14**

***Step 1 Preparation of Schedule of Changes in Working Capital***

**Schedule of Changes in Working Capital**

Particulars	1-1-2007	31-12-2007	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Cash	10,000	7,000		3,000
Debtors	30,000	50,000	20,000	
Stock	35,000	25,000		10,000
<b>Total [A]</b>	<b>75,000</b>	<b>82,000</b>		
<b>Current Liabilities:</b>				
Creditors	40,000	44,000		4,000
<b>Total [B]</b>	<b>40,000</b>	<b>44,000</b>		
<b>Working Capital [A- B]</b>	35,000	38,000	<b>20,000</b>	<b>17,000</b>
Increase in working capital	<b>3,000*</b>			<b>3,000*</b>
	<b>38,000</b>	<b>38,000</b>	<b>20,000</b>	<b>20,000</b>

\* denotes balancing figure

Step 2: Preparation of Non-Current Accounts

Working Notes 1

Provision for Depreciation on Machinery Account			
	Rs.		Rs.
To Machinery a/c [Depreciation for sold machinery] – transferred	3,000	By Balance b/d By P/L A/c [current year's dep. Provision]	25,000 [+]18,000*
To Balance c/d	40,000		
	43,000		43,000

\*denotes balancing figure and <sup>[+]</sup> refers amount to be added to net profit

Working Notes 2

Before preparing Machinery account, we have to find out the cost price of machinery. The cost of machinery is:

	1-1-2007	31-12-2007
	Rs.	Rs.
Written down value of machinery [Book Value]	80,000	55,000
<b>ADD: Provision for Depreciation</b>	25,000	40,000
<b>Cost of Machinery</b>	1,05,000	95,000

Machinery Account [at cost]			
	Rs.		Rs.
To Balance b/d	1,05,000	By Bank [sale] By Provision for Deprecation –transferred By P/ L A/c By Balance c/d	<sup>[S]</sup> 5,000 3,000 [+]2,000* 95,000
	1,05,000		1,05,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[S]</sup>.refers sources of funds

Working Notes 3

Capital Account			
	Rs.		Rs.
By Drawings	<sup>[A]</sup> 17,000*	By Balance b/d By Net profits	1,25,000 45,000
By Balance c/d	1,53,000		
	1,70,000		1,70,000

\*denotes balancing figure; and <sup>[A]</sup>.refers application of funds

*Step 3 Calculation of Funds From Operation*

**CALCULATION OF FUNDS FROM OPERATION**

	<b>Rs.</b>	<b>Rs.</b>
Net Profit for the Year		45,000
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
1. Provision for Depreciation	18,000	
2. Loss on sale of Machinery	2,000	20,000
<b>Funds From Operation</b>		<b>65,000</b>

*Step 4: Preparation of Funds Flow Statement*

**FUNDS FLOW STATEMENT**

<b>Sources</b>	<b>Rs.</b>	<b>Applications</b>	<b>Rs.</b>
Funds From operation	65,000	Purchase of Land [50,000 – 40,000]	10,000
Loan from SBI Bank	10,000	Purchase of Buildings [35,000 – 60,000]	25,000
Sale of Machinery	5,000	Drawings	17,000
		Repayment of Mrs. White’s Loan	25,000
		Increase in Working Capital	3,000
	<b>80,000</b>		<b>80,000</b>

**Illustration No.13.15**

Following are the summarized balance sheets of Fire Stone Ltd. as on 31<sup>st</sup> December 2006 and 2007.

<b>Liabilities</b>	<b>2006 Rs.</b>	<b>2007 Rs.</b>	<b>Assets</b>	<b>2006 Rs.</b>	<b>2007 Rs.</b>
Share Capital	2,00,000	2,50,000	Land and Buildings	2,00,000	1,90,000
General Reserve	50,000	60,000	Machinery	1,50,000	1,69,000
Profit & Loss A/c	30,500	30,600	Stock	1,00,000	74,000
Bank Loan [long-term]	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
	<b>5,30,500</b>	<b>5,10,800</b>		<b>5,30,500</b>	<b>5,10,800</b>



Additional information supplied:

- a. Dividend of Rs.23,000 was paid;
- b. Assets of another company were purchased for a consideration of Rs.50,000 payable in shares.  
The following assets were purchased;  
Machinery Rs.25,000 and Stock Rs.20,000
- c. Machinery was further purchased for Rs.8,000.
- d. Depreciation written off against Machinery Rs.12,000.
- e. Income tax paid during the year Rs.33,000
- f. Loss on sale of machinery Rs.200 was written off to General Reserve.

Solution No.13.15

Step 1 Preparation of Schedule of Changes in Working Capital

Schedule of Changes in Working Capital

Particulars	2006	2007	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Stock	1,00,000	74,000		26,000
Sundry Debtors	80,000	64,200		15,800
Cash	500	600	100	
Bank	-	8,000	8,000	
<b>Total [A]</b>	<b>1,80,500</b>	<b>1,46,800</b>		
<b>Current Liabilities:</b>				
Sundry Creditors	1,50,000	1,35,200	14,800	
<b>Total [B]</b>	<b>1,50,000</b>	<b>1,35,200</b>		
<b>Working Capital [A- B]</b>	<b>30,500</b>	<b>11,600</b>	<b>22,900</b>	<b>41,800</b>
Decrease in working capital		<b>18,900*</b>	<b>18,900*</b>	

- denotes balancing figure

**Step 2: Preparation of Non-Current Accounts**

**Working Notes 1**

Machinery Account			
	Rs.		Rs.
To Balance b/d	1,50,000	By General Reserve [Loss]	200
To Share Capital [acquired]	#25,000	By P / L A/c	<sup>[+]</sup> 12,000
To Bank [purchases]	<sup>[A]</sup> 8,000	By Bank [sale]	<sup>[S]</sup> 1,800 *
		By Balance c/d	1,69,000
	<b>1,83,000</b>		<b>1,83,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit; <sup>[A]</sup>.refers application of funds and <sup>[S]</sup>.refers sources of funds.

# Machinery acquired in consideration of Issue of shares will not affect the flow of funds, as both are non-current items.

**Working Notes 2**

Share Capital Account			
	Rs.		Rs.
		By Balance b/d	2,00,000
		By Stock [Source of funds]	<sup>[S]</sup> 20,000
		By Machinery	25,000
To Balance c/d	2,50,000	By Goodwill	5,000*

\*denotes balancing figure; and <sup>[S]</sup>.refers Source of funds

**Note:** Share issued for Rs.50,000 whereas assets acquired for Rs.45,000 [20,000 + 25,000], the balance will be Goodwill Rs.5,000.

**Working Notes 3**

Provision for Taxation Account			
	Rs.		Rs.
To Bank [Tax paid]	<sup>[A]</sup> 33,000	By Balance b/d	30,000
		By P / L A/c	<sup>[+]</sup> 38,000*
To Balance c/d	35,000		
	<b>68,000</b>		<b>68,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup> refers application of funds

Working Notes 4

General Reserve Account			
	Rs.		Rs.
To Machinery [loss on sale]	200	By Balance b/d	50,000
		By P / L A/c	[+] 10,200*
To Balance c/d	60,000		
	68,000		68,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup> refers application of funds

Working Note 5

Issue of shares in consideration for machinery and goodwill does not affect the flow of funds [working capital] and therefore, it will not as application of funds.

Working Note 6

In the absence of specific information, the decrease in land and buildings is assumed to be depreciation [2,00,000 -,1,90,000].

Step 3 Calculation of Funds From Operation

CALCULATION OF FUNDS FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	30,500	100
Less: Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet]	30,600	
Net Profit for the Year		
ADD: NON-FUND and NON-OPERATING ITEMS		
which have been already debited to P & L A/c:		
1. Depreciation on Machinery	12,000	93,200
2. Depreciation on Land & Building [2,00,000 -,1,90,000]	10,000	
3. Provision for Taxation	38,000	
4. Transfer to General Reserve	10,200	
5. Dividend distributed	23,000	
Funds From Operation		93,300

Step 4: Preparation of Funds Flow Statement

FUNDS FLOW STATEMENT			
Sources	Rs.	Applications	Rs.
Funds From operation	93,300	Repayment of Bank Loan	70,000
Sale of Machinery	1,800	Tax paid	33,000
Issue of shares for stock	20,000	Purchase of Machinery	8,000
Decrease in Working Capital	18,900	Dividend paid	23,000
	1,34,000		1,34,000

Check your progress 13.3

Prepare a Funds Flow Statement from the following data:

Liabilities	31-12-2006 Rs.	31-12-2007 Rs.	Assets	31-12-2006 Rs.	31-12-2007 Rs.
Equity Capital	50,000	53,000	Cash	20,000	25,000
Long-term Debts	14,000	13,000	Inventories	31,000	32,000
Retained Earnings	28,000	37,000	Other Assets	8,000	7,000
Accumulated Depreciation	21,000	25,000	Accounts Receivable	24,000	27,000
Accounts Payable	20,000	21,000	Fixed Assets	50,000	58,000
	1,33,000	1,49,000		1,33,000	1,49,000

Additional Information:

- [a] Fixed assets costing Rs.12,000 were purchased for cash.
- [b] Fixed assets [original cost Rs.4,000, accumulated depreciation Rs.1,500] were sold at book value.
- [c] Depreciation for the year 2007 amounted to Rs.5,500 and duly debited to P & L A/c.
- [d] Reported income for 2007 was Rs.12,000.

Notes: (a) Write your answer in the space given below.  
(b) Check your answer with the ones given at the end of this Lesson

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13.15 LET US SUM UP

Business firms are not a static one. In every business there will be flow of funds. In order to analysis the flow of funds here, net working capital, funds flow analysis is made. In consist of four steps: preparation of schedule of changes in working capital, preparation of non-current items; computation of funds from operation and finally funds flow statement.

13.16 LESSON – END ACTIVITIES

- 1. What is funds flow statement? How it is prepared?
- 2. Distinguish between Funds Flow statement and Balance Sheet.
- 3. What do you mean by Funds From Operation? How it is computed?
- 4. The following are the Balance Sheets related to Ruby Ltd.

[Figures in thousands].

Liabilities	2003 Rs.	2004 Rs.	Assets	2003 Rs.	2004 Rs.
Share Capital	700	870	Land	80	80
Reserves & Surplus	300	390	Buildings	400	320
Debentures	440	440	Machinery	300	340
Provision for Dep.	10	56	Finished Stocks	140	120
Current Liabilities	600	640	Stock of Raw materials	160	224
			Debtors	200	370
			Patents	20	18
			Cash	800	888
			Discounts on Debentures	40	36
	2,140	2,396		2,140	2,396

Additional Information :

- [a] Net profit after tax Rs.2,00,000
- [b] Shares issued for cash Rs.1,00,000
- [c] Bonus shares issued Rs.70,000
- [d] Buildings sold Rs.28,000 [original cost Rs.80,000 written down value Rs.20,000]

Prepare a statement of sources and application of funds with necessary workings.

13.17 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

Check Your Progress – Answer 13.1  
Increase in Working Capital Rs.1, 67,000

Check your progress Answer 13.02  
Funds From operation is Rs.42,500

Check your progress Answer 13.03

Step 1 Preparation of Schedule of Changes in Working Capital

Schedule of Changes in Working Capital				
Particulars	31-12-2006	31-12-2007	Changes in Working Capital	
	Rs.	Rs.	Increase Rs.	Decrease Rs.
<b>Current Assets:</b>				
Cash	20,000	25,000	5,000	
Accounts Receivable	24,000	27,000	3,000	
Inventories	31,000	32,000	1,000	
Other assets	8,000	7,000		1,000
<b>Total [A]</b>	<b>83,000</b>	<b>91,000</b>		
<b>Current Liabilities:</b>				
Accounts Payable	20,000	21,000		1,000
<b>Total [B]</b>	<b>20,000</b>	<b>21,000</b>		
<b>Working Capital [A- B]</b>	<b>63,000</b>	<b>70,000</b>	<b>9,000</b>	<b>2,000</b>
Increase/Decrease in working capital	<b>7,000*</b>			<b>7,000*</b>
	<b>70,000</b>	<b>70,000</b>	<b>9,000</b>	<b>9,000</b>

\* denotes balancing figure  
Note: “other assets” are taken as other current assets as fixed assets are separately given.

**Step 2: Preparation of Non-Current Accounts**

**Working Notes 1**

Fixed Assets Account			
	Rs.		Rs.
To Balance b/d	50,000	By Accumulated Depre.	1,500
To Bank [Purchases]	<sup>[A]</sup> 12,000	[Dep. On sold assets]	
		By Bank [sale]	<sup>[S]</sup> 2,500*
		By Balance c/d	58,000
	<b>62,000</b>		<b>62,000</b>

\*denotes balancing figure; <sup>[A]</sup>.refers application of funds and <sup>[S]</sup> refers Source of funds

**Working Note 2**

Accumulated Depreciation Account			
	Rs.		Rs.
By Fixed Assets a/c	1,500	By Balance b/d	21,000
[Sold assets' depreciation transfer]		By P/L A/c	<sup>[+]</sup> 5,500*
By Balance c/d		[Current year's dep.]	
	25,000		
	<b>26,500</b>		<b>26,500</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit.

**Working Notes 3**

Retained Earnings Account			
	Rs.		Rs.
To Dividend [bal.fig]	<sup>[+]</sup> <sup>[A]</sup> 3,000*	By Balance b/d	28,000
		By P/L A/c [given as reported income]	12,000
By Balance C/d	37,000		
	<b>40,000</b>		<b>40,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[A]</sup>.refers application of funds

**Note:** Retained Earnings accounts as working is prepared to ascertain a missing figure like dividend, if the current year's profit is given.

*Step 3 Calculation of Funds From Operation*

**CALCULATION OF FUNDS FROM OPERATION**

	Rs.	Rs.
Closing Balance of Retained Earning	37,000	9,000
Opening Balance of Retained Earning [ as given in the Balance Sheet]	28,000	
Net Profit for the Year		
<b>ADD: NON-FUND and NON-OPERATING ITEMS</b> which have been already debited to P & L A/c:		
1. Depreciation on Fixed Assets	5,500	
2. Dividends paid	3,000	8,500
<b>Funds From Operation</b>		<b>17,500</b>

*Step 4: Preparation of Funds Flow Statement*

**FUNDS FLOW STATEMENT**

Sources	Rs.	Applications	Rs.
Funds From operation	17,500	Increase in Working Capital	7,000
Issue of Equity Shares	3,000	Repayment of Long-term debts	1,000
Sale of Fixed assets	2,500	Fixed Assets purchased	12,000
		Dividend paid	3,000
	<b>23,000</b>		<b>23,000</b>

**13.18 SUGGESTED READING/REFERENCES/SOURCES**

1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
2. V.K.Saxena and C.D.Vahist – Advanced Cost and Management Accounting , Text – Sultan Cand & Sons
3. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
4. R.S.N. Pillai and Bagavathi – Management Accounting – S.Chand and Company Ltd.
5. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
6. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications
7. Dr.R.Ramachandran and Dr. Srinivasan.R – Management Accounting – SriRam publications.



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## LESSON-14

### CASH FLOW ANALYSIS

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#### **Contents:**

- 14.0 Aims and objectives
- 14.1 Introduction
- 14.2 Meaning and Definitions
- 14.3 Uses of Cash Flow Statement
- 14.4 Comparison between Funds Flow Statement And Cash Flow Statement
- 14.5 Limitations of Cash Flow Statement
- 14.6 Preparation of Cash Flow Statement
- 14.7 Opening of Accounts for Non-Current Items
- 14.8 Computation of Cash from Operation
- 14.9 Preparation of Cash Flow Statement
- 14.10 Preparation of Cash Flow Statement [Accounting Standard 3]
- 14.11 Comprehensive Illustrations
- 14.12 Let us Sum Up
- 14.13 Lesson-end Activities
- 14.14 Model Answers to “Check your Progress”
- 14.15 Suggested Reading/References/Sources

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#### **14.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should able to:

- Understand the concept of cash flow analysis
- Solve the problems on Cash Flow Statement

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#### **14.1 INTRODUCTION**

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Cash is life blood of business as like blood to human body and thus cash plays a very important role in the entire economic life of a business. The technique of preparing Funds Flow Statement and its utility have been discussed in the preceding lesson. In this lesson we shall analyse the flow Cash. It involves preparation of Cash Flow Statement for identifying sources and applications of cash. Cash flow statement may be prepared on the basis of actual or estimated data. In the following sections, we shall explain in detail the preparation of cash flow statement, utility and limitations of cash flow analysis.

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## 14.2 MEANING

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The term “cash” here stands for cash and bank balances. The term fund – in a narrow concept, is to denote as cash. Thus cash or fund in a narrow sense, will exclude from its purview all other current assets and current liabilities as in Funds Flow Statement and it considers only cash and bank balances.

In the lesson, the term cash includes bank balances also.

“Cash Flow” means cash inflows and cash outflows – cash receipts and cash payments during a period. In other words, incoming and outgoing of cash is termed as cash flows. Movements of cash are of vital important to the management. The short term liquidity and solvency position of a firm are dependent on its cash flows.

Cash Flow Statement can be defined as, ‘A statement of changes in the financial position of firm on cash basis is called cash flow statement.’

Therefore, cash flow statement is a statement like Funds flow statement. A cash flow statement concentrates to transactions that have direct impact on cash. It deals with cash inflows and outflow of cash in a particular period. Thus, it portrays the changes in the cash position between two dates. Cash flow statement can be prepared for a year, half year, quarter or for any other duration.

The objectives of cash flow analysis are:

- i. To show the causes of changes in cash balance between two balance sheet dates;
- ii. To indicate the factors contributing to the reduction of cash balance in spite of increase in profits and vice versa.

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## 14.3 USES OF CASH FLOW STATEMENT

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A Cash Flow Statement is of primary importance to the financial management. It is an essential tool of short-term financial analysis. Its core uses are as follows:

1. Cash Flow Statement facilitates to prepare sound financial policies. It also helps to evaluate the current cash position.
2. A projected cash flow statement can be prepared in order to know the future cash position of a concern so as to enable a firm to plan and coordinate its financial operations properly.
3. It helps in taking loans from Banks and Other Financial Institutions. The repayment capacity of the firm can be inferred by going through the Cash Flow Statement.
4. It helps the management in taking short-term financial decisions.
5. The statement explains the causes for poor cash position in spite of substantial profits in a firm by throwing light on various applications of cash made by the firm.
6. It helps in short-term financial decisions relating to liquidity.

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#### **14.4 COMPARISON BETWEEN FUNDS FLOW STATEMENT AND CASH FLOW STATEMENT**

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The term 'fund' has a variety of meanings. In a narrow sense it means cash and the statement of changes in the financial position prepared on cash basis is called a cash flow statement. In the most popular sense, the term funds refers to working capital and a statement of changes in the financial position is prepared on this basis is called a Funds Flow statement. A cash flow statement is much similar to a funds flow statement as both are prepared to summaries the case of changes in the financial position of a business. However, the following are the main difference between a funds flow and a cash flow statement.

##### **Difference between Funds Flow Statement and Cash Flow Statement**

1. The Fund Flow Statement shows the causes of changes in the net working capital whereas the Cash Flow Statement shows the causes for the changes in cash.
2. Cash Flow Statement is started with the opening and closing balances of cash while there are no opening or closing balances in Funds Flow Statement.
3. Cash Flow Statement deals only with cash whereas Funds Flow statement deals with all the components of working capital.
4. Cash Flow Statement is useful for short-term financing while Funds Flow Statement is useful for long term financing.
5. Cash Flow Statement is based on cash basis of accounting while the Funds Flow Statement is based on accrual basis of accounting.
6. Cash Flow Statement depicts only the changes in cash position, while Funds Flow Statement is concerned with the changes in working capital between two balance sheet dates.
7. Cash is a part of working capital. Improvement in cash position, as indicated by Cash Flow Statement can be taken as an indicator of improved working capital position. But the reverse is not true. That is, sound Fund position may not necessarily mean sound cash position.

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#### **14.5 LIMITATIONS OF CASH FLOW STATEMENT**

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Even though cash flow statement is a useful tool of financial analysis, it suffers from some limitations, which are as follows:

1. A cash flow statement only reveals the inflow and outflow of cash. The cash balance disclosed by this statement may not depict the true liquidity position. There are controversies over a number of items like cheques, stamps, postal orders etc. is to be included in cash.

2. A Cash Flow Statement cannot be equated with the income statement. An income statement takes into account both cash and non-cash items. Hence, cash fund does not mean net income of the business.
3. Working capital being a wider concept of funds, a fund flow statement presents a more complete picture than cash flow statement.

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## **14.6 PREPARATION OF CASH FLOW STATEMENT**

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Cash Flow Statement can be prepared on the same pattern on which a Funds Flow Statement is prepared. The changes in the cash position from one period to another are computed by taking into account ‘Sources’ and ‘Applications’ of cash. The preparation of statement is based on Balance Sheets, Income Statement and other additional information. Key to preparation of Cash Flow Statement lies in realizing the fact that all items appearing on income statement are to be computed on cash basis. The measurement of Cash Flow is not the measurement of income. The Statement is divided into two parts – [i] Sources of Cash and [ii] Applications of Cash. All transactions involving inflow of cash are ‘Sources of Cash’ and all transactions resulting in outflow of cash are ‘Applications of Cash’. It is prepared in two ways: [a] Report Form and [b] Account Form. These are explained in the later sections.

Preparation of Cash Flow Statement involves three core steps:

1. Opening of Accounts for Non-Current Items
2. Calculation of cash from operation
  - i. Computation of Funds From operation
  - ii. Comparison of Current items to determine inflow or outflow of cash
  - iii. Computation of cash from operation
3. Preparation of Cash Flow Statement

Let we discuss the about said steps in detail in the following sections.

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## **14.7 OPENING OF ACCOUNTS FOR NON-CURRENT ITEMS**

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Ledger Accounts are prepared for non-current items [wherever necessary] to ascertain the inflow or outflow of cash. In the preparation of accounts for non-current items, additional information is to be considered.

For example, the values of plant [as per balance sheet] on 1<sup>st</sup> January and 31<sup>st</sup> December are Rs.50,000 and Rs.60,000 respectively. The Additional information are - sale of plant and machinery for Rs.6,000 [book value Rs.10,000] and depreciation charges during the year is Rs.10,000.

Plant and Machinery Account			
	Rs.		Rs.
To Balance b/d	50,000	By Bank [sale ]	<sup>[I]</sup> 6,000
To Bank [Bal. Figure]	* <sup>[O]</sup> 30,000	By P/L a/c [Loss]	<sup>[+]</sup> 4,000
		By P/L a/c [Depreciation]	<sup>[+]</sup> 10,000
		By Balance c/d	60,000
	<b>80,000</b>		<b>80,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

The balancing figure[\*] represent purchase of plant. It is an outflow of fund [o]. In the same way, sale of plant [I] represent sale of plant and it is an inflow of fund. The loss on sale of plant [non-current item] and depreciation are non-cash items that should be added back to net profit in order to calculate cash from operation.

Thus, by opening of accounts or by comparing non-current items, inflow and outflow of cash are found out.

## 14.8 COMPUTATION OF CASH FROM OPERATION

A business firm generates cash inflows through its normal course of business operations which is usually the most important and routine source of cash. It is the internal sources of cash. It can be computed as follows:

### *I. When all transactions are cash transactions*

It is a hypothetical situation where all expenses, incomes and revenues are paid or received in cash. In such a case, the net profit revealed by profit and loss account represents ‘Cash From operations’, the net loss represents ‘Cash out flow on account of operations’.

### *II. When all transactions are not cash transactions*

In practice income statements are prepared on accrual basis; several non cash items are shown in the income statement, credit transactions results in debtors and creditors. Opening and closing inventories are to be accounted for. In such situations, cash from operations is ascertained in three stages.

- Computation of Funds From operation
- Comparison of Current items to determine inflow or outflow of cash
- Computation of cash from operation.

**14.8.1 Computation of Funds From operation**

This is done in the same way explained in the fund flow analysis. An adjusted profit and loss account may be prepared or a statement of funds form operations can be prepared, with the net profit reveals by the profit and loss account as the starting point. Non-cash and Non-fund items are added or deducted accordingly as discussed in funds flow Statement lesson no.13.

**14.8.2 Comparison of Current items to determine inflow or outflow of cash**

The net profit shown by an income statement is on ‘Accrual basis. It is essential to convert the various items affecting the profit into ‘cash’ bases. Ascertaining funds from operation has accomplished this task to some extent by adding back to the net profit all ‘Non-cash and Non-fund’ expenses shown in profit and loss account and subtracting the Non-cash and Non-fund incomes.

The funds from operation need further adjustment to convert fully to cash basis. For this purpose all the current assets and current liabilities except cash and bank balances are to be analysed from the point of view of their impact on cash.

Comparisons of current items are necessary because of:

- a. Total sales, whether for cash or credit, increases funds and net profits but only cash sales increases the cash balance. So, changes in debtors due to credit sales have to be adjusted in the funds from operation.
- b. Total purchases, whether for cash or on credit decreases the funds and the profits. But cash purchases alone reduce cash. Changes in creditors due to credit purchases have to be adjusted in the funds from operation.
- c. All expenses incurred, whether paid for or not, decreases funds. But expenses actually paid alone decreases cash. Changes in outstanding and prepaid expenses have to be adjusted in the funds from operations.
- d. All incomes earned increases funds, whether cash is received or not. But, incomes received in cash alone can increase cash balances. Accrued incomes and incomes received in advance have to be adjusted in the funds from operation.

Then, the amount of changes should be added to or subtracted from the funds from operation on the basis of the following principles

<i>INCREASE IN CURRENT ASSETS</i>	- <i>Decrease cash</i>
<i>DECREASE IN CURRENT ASSETS</i>	- <i>Increase cash</i>
<i>INCREASE IN CURRENT LIABILITIES</i>	- <i>Increase cash</i>
<i>DECREASE IN CURRENT LIABILITIES</i>	- <i>Decrease cash</i>

**Current assets received as consideration for shares or debentures issued**

While using the above, principle, current assets received in exchange for shares or debentures issued must be omitted from the respective closing balances of the assets.

**14.8.3 Computation of cash from operation**

After making above discussed adjustments, cash from operation can be find out with the help of following either one of the formats. [a] Statement of Cash From operation or [b] Adjusted Profit and Loss Account

**STATEMENT OF CASH FROM OPERATION**

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	xxx	XXX
Less: Opening Balance of P & L A/c or Retained Earning [ as given in the Balance Sheet] OR Net Profit for the Year	xxx	
<b>ADD: NON-FUND and NON-OPERATING</b> which have been already debited to P & L A/c:		
1. Depreciation and Depletion	xxx	XXXX
2. Amortization of fictitious and Intangible Assets :		
Goodwill written off	xxx	
Trade Marks	xxx	
Patents	xxx	
Preliminary Expenses	xxx	
Discount on Issue of Shares etc.	xxx	
Premium on Redemption of Debentures etc.	xxx	
3. Apportion of Retained Earnings		
Transfer to General Reserve	xxx	
Dividend Equalization Fund	xxx	
Transfer to Singing Fund	xxx	
4. Loss on Sales of any non-current [Fixed] Assets	xxx	
5. Dividends :		
Interim Dividend	xxx	
Proposed Dividend [if it is an appropriation of and not taken as current liability]	xxx	
6. Provision for Taxation [If it is not taken as current liability]	xxx	XXX
		XXXX
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b> which have been already Credited to P & L A/c:		
1. Profit or Gain from the sales of Non-Current [fixed] Assets	xxx	

2. Dividend Received	xxx	
3. Excess provision written back	xxx	
4. Profit on revaluation of Non-Current [fixed] assets	xxx	Xxx
<b>Funds From Operation</b>		<b>XXXXX</b>
<b>ADD:</b>		
<i>Decrease in current assets</i>	xxx	
<i>Increase in Current Liabilities</i>	xxx	XXX
		XXXX
<b>LESS:</b>		
<i>Increase in current assets</i>	xxx	
<i>Decrease in Current Liabilities</i>	xxx	XXX
<b>CASH FROM OPERATIONS</b>		<b>XXXXX</b>
<b>[Cash outflow on account of operations]</b>		

[OR]

Adjusted Profit and Loss Account			
	Rs.		Rs.
To Depreciation	xx	By opening Bal. of P/L A/c	xx
To Goodwill written off	xx	By Dividend Received	xx
To Preliminary Expenses written off	xx	By Excess Provision written Back	xx
To Discount of shares Issued	xx	<b>By Funds From Operation</b>	
To Transfer to Reserves	xx	<b>[Balancing figure]</b>	XXXX
To Loss sale of Fixed Assets	xx		
To Premium on Redemption	xx		
To Closing Bal. P & L A/c	xxx		
	<b>XXXX</b>		<b>XXXX</b>
<b>Funds From Operation</b>			<b>XXXXX</b>
<b>ADD:</b>			
<i>Decrease in current assets</i>	xxx		
<i>Increase in Current Liabilities</i>	xxx		XXXX
			XXXXX
<b>LESS:</b>			
<i>Increase in current assets</i>	xxx		
<i>Decrease in Current Liabilities</i>	xxx		XXXX
<b>CASH FROM OPERATIONS</b>			<b>XXXXX</b>
<b>[Cash outflow on account of operations]</b>			



The balance obtained after the above calculations -additions and deductions can be termed as "**Cash from Operation**", if the balance obtained is positive. If the balance obtained is negative, "**Cash outflow on account of operations**".

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## **14.9 PREPARATION OF CASH FLOW STATEMENT**

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The above steps are incorporated in the preparation of cash flow statement. Opening balance of cash and bank balance and sources of cash are entered on the inflow side. Uses or application of cash and closing balance of cash and bank are entered on the outflow side. This completes the preparation of cash flow statement.

### **14.09.01 Sources of Cash/Inflow of Cash**

A business has two kinds of sources of cash.

[A] Cash from operation – which is discussed in the earlier sections and

[B] External Sources.

Apart from cash from operations, a firm can have several other sources of cash outside the organization. The external sources of cash are:

- i. *Fresh issues of shares* – Issues of shares to the public or rights shares to the existing shares holders brings in additional cash. If the issue is at premium, the cash received from the issue increases to that extent. However, issue of shares for non-cash consideration is not a source of cash.
- ii. *Issue of Debentures or Bonds* – Cash is received by issue of debentures either at par or at premium or even at discount. The actual amount received is a source of cash.
- iii. *Long term borrowings* – Borrowings on long term basis from banks or other sources is a source of cash which includes public deposits.
- iv. *Sale of fixed assets and investments* – The cash received from the sale of fixed assets like plant and machinery or buildings are a source of cash. Similarly non trading investment sold is also a source of cash.

Decrease in various current assets and increase in various current liabilities may be taken as external sources of cash, if they are not adjusted while computing cash from operation.

### **12.9.2 Application of Cash / Outflow of Cash**

Cash outflows or uses of cash or applications of cash are usually in the following forms.

- i. *Redemption of debentures and preference shares* - The amount paid for repayment of debentures or preference share capital is a cash outflow. The actual cash paid alone should be taken either including premium or excluding discount.

- ii. *Repayment of bank loans or other long term borrowings* - Repayment of loans results in cash outflow.
- iii. *Cash outflow on account of operations* – It is also to be shown as an application of cash.
- iv. *Purchase of fixed assets and long term investments* - Amount paid to acquire fixed assets like buildings, furniture, equipment and machinery are to be shown as uses of cash. Similarly amount paid to purchase non-trading investment is also an application of cash.
- v. *Payment of tax and dividend* - If they are treated as ‘non-current items’ amount paid for tax or dividend have to be shown as uses of cash. If they are treated as current liabilities, they are shown as a part of computation of cash from operations.

Increase in various current assets or decrease in various current liabilities may be shown as applications of cash, if changes in these items have not been adjusted while finding out cash from operations.

**14.9.3 Form of Cash Flow Statement**

A cash flow statement can be prepared in any one of the following forms.

**[A] Report Form**

CASH FLOW STATEMENT For The Year Ending On.....		
Particulars	Rs.	Rs.
<b>Opening Balance:</b>		
Cash	xxx	XXXX
Bank	xxx	
<b>Add: Sources of Cash:</b>		
Cash from operations	xxx	
Issues of Shares	xxx	
Issues of Debentures/ Bonds	xxx	
Sale of Fixed Assets	xxx	
Sale of Investments	xxx	
Long term loans taken etc.	xxx	
<b>Total Sources</b>		XXX
<b>Total Cash Available</b>		XXXXX
<b>Less: Applications of Cash:</b>		
Cash outflow on account of operations	xxx	
Redemption of preference shares	xxx	
Redemption of Debentures	xxx	
Loans repaid	xxx	
Tax paid	xxx	

Dividend paid etc.	xxx	
<b>Total Applications</b>	xxx	XXXX
<b>Closing Balances:*</b>		<b>XXXXXX</b>
<b>Cash</b>	xxxxx	
<b>Bank</b>	xxxxx	<b>XXXXXX</b>

Note: If there is bank overdraft at the beginning of the period or at the end of the period, it can be shown as a negative figure. All additions or reduction should be adjusted accordingly.

\* Closing balance total of cash and bank balance should tally with the balance after deducting total application balance.

**[B] Account form**

Cash flow statement may also be presented in the account form as shown below:

**CASH FLOW STATEMENT**

**For the year ended .....**

Sources/Inflow	Rs.	Rs.	Applications/Outflow/Uses	Rs.	Rs.
<b>Opening Balances:</b>			Cash outflow from operations		xxx
<b>Cash</b>			Redemption of Preference share capital		xxx
<b>Bank</b>			Redemption of Debentures		xxx
Cash From operation		xxx	Repayment of Loans		xxx
Issue of Shares		xxx	Purchase of Non-current [fixed] assets		xxx
Issue of Debentures		xxx	Purchases of Investments		xxx
Share Premium		xxx	Non-trading payments		xxx
Long term loans borrowed		xxx	Payment of Dividends		xxx
Sale of Fixed assets		xxx	Payment of Tax		xxx
Investments sold		xxx	<b>Closing Balances:</b>		
			<b>Cash</b>		
			<b>Bank</b>		
		<b>XXXX</b>			<b>XXXX</b>

**Note:** Any Bank overdraft – either opening balance or closing balance – may be shown as negative figure. Any additions or reductions have to be adjusted accordingly.

**14.10 PREPARATION OF CASH FLOW STATEMENT [ACCOUNTING STANDARD 3]**

The Accounting Standard 3 [AS 3] regarding Cash flow statement issued by the Institute of Chartered Accountant of India has been made mandatory with effect from 1<sup>st</sup> April 2001, in respect of the following firms:

- (i) Enterprises whose equity or debt securities are listed on recognized stock exchanges in India, and the enterprises that are in the process of issuing equity or debt securities that will be listed on recognized stock exchanges in India as evidenced by the board of directors' resolution in this regard.
- (ii) All other commercial, industrial and business reporting enterprises, whose turnover for the accounting period exceeds Rs.50 crores.

Securities Exchange Board of India [SEBI] has made it obligatory, from 1995, on all listed companies to prepare and issue a cash flow statement along with other financial statement periodically.

Therefore, for all listed companies and other businesses with turnover above Rs.50 crores, has to prepare Cash Flow Statement under Accounting Standard 3.

### **Meaning of Cash, Cash Equivalents**

According to AS-3 an organization should prepare a cash flow statement, as specified in AS-3, for each period and present it along with other Financial Statements. In this context, we must understand the exact meaning of cash, cash equivalents, and cash flows.

[a] **Cash** – Cash consists of cash on hand and demand deposits with banks. Demand Deposits are those deposits which are repayable by bank on demand by the depositors.

[b] **Cash Equivalents** - These are short term, highly liquid investments that are readily convertible into 'Known amounts' of cash and which are subject to an 'insignificant risk of changes in value'. An investment normally qualifies as cash equivalent only when it has a short maturity of say, three months or less from the date of acquisition. Examples of cash equivalents are treasury bills and commercial papers etc.

[c] **Cash Flows** - Cash flows are inflows and outflows of cash and cash equivalents. An 'inflow' increases the total cash and cash equivalents at the disposal of the enterprise where as cash 'outflow' decreases them. "Net Cash flow" is the difference between the cash inflows and outflows. The net cash flow may be either net cash inflow or net cash outflow.

### **Presentation of Cash Flow Statement**

According to AS – 3 'Cash flows statement' should be presented in a manner that is reports cash flows during the period classifying by operating, investing and financing activities.

#### **I. Cash Flows from Operating Activities**

The amount of cash flows arising from operating activities is a key indicator of the extent to which operations of the enterprise have generated sufficient cash flows to maintain the operating capabilities of the enterprise, pay dividends, repay borrowings, and invest without recourse to external sources of financing.

Cash flows from operating activities are primarily derived from the principal revenue generating activities of the firm. Therefore, they result from the transactions and other events that are considered for ascertaining profit or loss. Examples of cash flows from operating activities are:

- i. Cash receipts from the sale of goods and rendering of services;
- ii. Cash receipts from Royalties, fees, commission, and other revenue;
- iii. Cash payments to suppliers for good and services;
- iv. Cash payments to and on behalf of employees;
- v. Cash receipts and cash payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;
- vi. Cash payments or refunds of income taxes unless they can be specifically identified with financing and investing activities; and
- vii. Cash receipts and payments relating to future contracts, forward contracts, option contracts and swap contracts when the contracts are held for dealing or trading purposes.

## **II. Cash Flows from Investing Activities**

The separate disclosures of cash flows arising from investing activities are important because the cash flows represent the extents to which expenditure have been made for resources intended to generate future income and cash flows. Examples of cash flows arising from investing activities are:

- i. Cash payments to acquire fixed assets [including intangibles]. These payments include those relating to capitalized research and development costs and self-constructed fixed assets;
- ii. Cash receipts from disposal of fixed assets including intangibles;
- iii. Cash payments to acquire shares, warrants, or debt instruments of other enterprises and interest in joint ventures [other than receipts from those instruments considered to be cash equivalents and those held for dealing or trading proposes.];
- iv. Cash receipts from disposal of shares, warrants, or debt instruments of other enterprises and interest in joint ventures [other than receipts from those instruments considered to be cash equivalents and those held for dealing or trading purposes];
- v. Cash advances and loans made to third party [other than advances and loans made by a financial enterprises];
- vi. Cash receipts from the repayment of advances and loans made to third parties party [other than advances and loans made by a financial enterprises];

- vii. Cash payments for future contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the payments are classified as financing activities; and
- viii. Cash receipts from future contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes or the receipts are classified as financing activities.

### ***III. Cash flows from Financing Activities***

Disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds [both owners and lenders] to the firm. The following are the examples of cash flows arising from financing activities.

- a. cash proceeds from issuing shares and similar instruments;
- b. cash proceeds from issuing debentures, loans, notes, bonds, and other short term or long term borrowings;
- c. cash repayments of amount borrowed i.e., redemption of debentures or bonds etc.,
- d. cash payments to redeem preference shares; and
- e. Payment of dividend on shares and interest on borrowings.

## **PREPARATION OF A CASH FLOW STATEMENT [AS – 3] - Procedures**

### ***1. Preparation of Non-current items:***

Ledger Accounts are prepared for non-current items [wherever necessary] to ascertain the inflow or outflow of cash. In the preparation of accounts for non-current items, additional information is to be considered. [as discussed in the earlier section]

### ***2. Net Profit before Tax and Extraordinary Items***

The Cash flows associated with extraordinary items should be classified as arising from operating, investing or financing activities as appropriate and separately disclosed to enable the users to understand their nature and effect on the present and future cash flows. Therefore, these items and taxes paid or provisioned are to be added or deducted if the net profit/loss includes those items to find out the net profit before Tax and Extraordinary Items. Some of the items to be added are:

- 1. All the items which are usually debited to P/L Appropriation account like dividends, Transfer to reserves and also provision made for tax should be added back when the net profit given in the problem is after adjusting these items.
- 2. All Non-operating losses are added back to Net Profit and Non-profit and non-operating gains are reduced from Net Profit.

Illustration 14.1

Compute Net Profit before Tax and Extraordinary items from the following data:

	Rs.
P /L Appropriation account balance 1 <sup>st</sup> April 2008	8,00,000
P/L Appropriation account balance on 31 <sup>st</sup> March 2009	9,00,000
Transfer to General Reserve in 2008-09	2,40,000
Proposed dividend debited to P/L Appropriation A/c	2,50,000
Interim dividend for the year 2008-09	1,00,000
Compensation received in a law suit	2,00,000
Provision for tax as on 1 <sup>st</sup> April 2008	5,00,000
Provision for tax as on 31 <sup>st</sup> March 2009	7,00,000
Tax paid during the year	6,00,000

Solution 14.1

Working Note: [1]

Provision for Tax Account			
	Rs.		Rs.
To Bank [Tax paid] <sup>[O]</sup> .	6,00,000	By Balance B/d	5,00,000
		By P/L Account * <sup>[+]</sup>	8,00,000
To Balance C/d	7,00,000		
	13,00,000		13,00,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Computation of Net Profit before Tax and Extraordinary Items

	Rs.	Rs.
P/L Appropriation account balance on 31 <sup>st</sup> March 2009		9,00,000
P/L Appropriation account balance on 1 <sup>st</sup> April 2008		8,00,000
		<u>1,00,000</u>
ADD: Provision for Tax <sup>[I]</sup>	8,00,000	
Transfer to General reserve	2,40,000	
Proposed Dividend	2,50,000	
Interim Dividend	1,00,000	13,90,000
		<u>14,90,000</u>
Less: Compensation received in a law suit		2,00,000
Net Profit before Tax and Extraordinary items		<u>12,90,000</u>

**Illustration 14.2**

From the following details, ascertain Net Profit before Tax and Extraordinary items for the year 2008.

	2007 Rs.	2008 Rs.
General Reserve	2,00,000	3,50,000
Profit and Loss Account	1,50,000	2,40,000
Proposed Dividend	2,10,000	2,50,000
Provision for Taxation	2,00,000	2,50,000

An interim dividend of Rs.1,00,000 was paid during 2008. Income Tax paid in 2008 was Rs.1,75,000. A compensation of Rs.1,30,000 was received from Government on account of riots.

**Solution No.14.2**

**Working Note: [1]**

Provision for Tax Account			
	Rs.		Rs.
To Bank [Tax paid] <sup>[0]</sup> .	1,75,000	By Balance B/d	2,00,000
		By P/L Account * <sup>[+]</sup>	2,25,000
To Balance C/d	2,50,000		
	<b>4,25,000</b>		<b>4,25,000</b>

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit

**Computation of Net Profit before Tax and Extraordinary Items**

	Rs.	Rs.
P/L Appropriation account balance in 2008		2,40,000
P/L Appropriation account balance in 2007		1,50,000
		90,000
ADD: Provision for Tax <sup>[1]</sup>	2,25,000	
Transfer to General reserve	1,50,000	
Proposed Dividend	2,50,000	
Interim Dividend	1,00,000	7,25,000
		8,15,000
Less: Compensation received from Govt. on a/c of riots		1,30,000
Net Profit before Tax and Extraordinary items		<b>6,85,000</b>



3. *Computation of opening and Closing balances of Cash and Cash equivalents*

Cash in hand, cash at bank as demand deposits and other highly liquid short-term investments in Government bonds etc., are to be added up. Ultimately the cash flow statement has to reconcile the opening and closing balances of cash and cash equivalents with the help of cash inflows and outflows from major activities of the business.

4. *Ascertaining net cash provided [or used] by Operating activities:*

This task is carried out with the help of detailed analysis of profit and loss account, opening and closing balance sheets and selected additional information. This step will be as like calculation of cash from operation and elaborately discussed in the previous sections of this lesson.

Illustration 14.3

Ascertain operating profit before working capital changes from the following details:

	Rs.
Net profit before Tax and extraordinary items	2,00,000
Dividend received on Long term investment in shares	40,000
Interest received on Long term investment in debentures of other companies	30,000
Goodwill written off	20,000
Discount on issue of shares written off	10,000
Preliminary expenses written off	25,000
Depreciation charged on Fixed Assets	65,000
Profit on Sale of equipment	10,000
Loss on sale of Long term investments	8,000

Solution No.14.3

COMPUTATION OF OPERATING PROFIT BEFORE WORKING CAPITAL CHANGES

	Rs.	Rs.
Net profit before Tax and Extraordinary items		2,00,000
<i>Add: Adjustments for:</i>		
Goodwill written off	20,000	
Discount on issue of shares written off	10,000	
Preliminary expenses written off	25,000	
Depreciation charged on Fixed Assets	65,000	
Loss on Sale of Long Term Investments	8,000	1,28,000
		3,28,000
<i>Less: Adjustment for:</i>		
Dividend received on Long-term Investment in shares	40,000	
Interest received on Long-term Investment in Debentures and other companies	30,000	
Profit on sale of Equipment	10,000	80,000
Operating Profit Before Working Capital Changes		2,48,000

5. *Ascertaining net cash provided [or used] by Investing and Financing Activities:*

All the changes in Balance Sheets items and some of the P & L accounts items have to be analysed, taking into account the additional information and their effect on cash, by grouping them under Investing and Financing activities.

6. *Actual Preparation of Cash Flow Statement:*

Cash flow Statement is prepared by classifying all cash inflows and outflows in terms of Operating, Investing and Financing activities. The net cash inflow provided by [or used in] each of the three activities has to be separately shown.

7. *Reconciliation:*

It should be ensured that the “aggregate of net cash flows” from operating, investing and financing activities is equal to the net increase [or decrease] in cash and cash equivalents during the period.

**Format of Cash Flow Statement**

The following format is widely used format for the preparation of Cash Flow Statement.

CASH FLOW STATEMENT		
For the year .....		
	Rs.	Rs.
<b>Cash Flows from operating activities</b>		
Net Profit before Tax and Extraordinary Items	xxx	
Adjustments for:		
Depreciation	xxx	
Loss on Foreign Exchanges	xxx	
Interest Expenses	xxx	
Loss on sale of Fixed Assets	xxx	
Dividend Income	[xxx]	
Interest Income	[xxx]	
<b>Operating Profit before Working Capital Changes</b>	<b>xxxx</b>	
Adjustments for:		
Sundry Debtors	xxx	
Bills receivable	xxx	
Inventories	xxx	
Bills Payable	xxx	
<b>Cash generated from operation</b>	<b>xxxx</b>	
Less: Income Tax paid	xx	
<b>Cash before extraordinary Items</b>	<b>xxxx</b>	
Less/Add: Extraordinary Items	xxx	

<b><i>NET CASH FROM OPERATING ACTIVITIES</i></b>		<b>XXXXX</b>
<b>Cash Flow from Investing Activities:</b>		
Purchases of Fixed Assets and Investments	[xxx]	
Proceeds from Sale of Fixed Assets and Investments	xxx	
Interest received	xxx	
Dividend received	xxx	
<b><i>NET CASH FROM INVESTING ACTIVITIES</i></b>		<b>XXXXX</b>
<b>Cash flows from Financing Activities</b>		
Proceeds from issue of Share capital	xxx	
Proceeds from Long term borrowings	xxx	
Repayment of Long term Borrowings	[xxx]	
Interest paid	[xxx]	
Dividend paid	[xxx]	
<b><i>NET CASH FROM FINANCING ACTIVITIES</i></b>		<b>XXXX</b>
<b>Net Increase/Decrease in Cash and Cash Equivalents</b>		<b>XXXXX</b>
ADD: Cash and Cash Equivalents at the beginning of the period		xxx
Cash and Cash Equivalents at the beginning of the period		<b>XXXXX</b>

### 14.11 COMPREHENSIVE ILLUSTRATION

#### Illustration 14.04

From the following Balance Sheets of Arvind Ltd., you are required to prepare a cash flow statement:

<b>Liabilities</b>	<b>1999 Rs.</b>	<b>2000 Rs.</b>	<b>Assets</b>	<b>1999 Rs.</b>	<b>2000 Rs.</b>
Share Capital	4,00,000	5,00,000	Cash	60,000	94,000
Trade Creditors	1,40,000	90,000	Debtors	2,40,000	2,30,000
Profit and Loss A/c	20,000	46,000	Stock	1,60,000	1,80,000
			Land	1,00,000	1,32,000
	<b>5,60,000</b>	<b>6,36,000</b>		<b>5,60,000</b>	<b>6,36,000</b>

Solution 14.4

STATEMENT OF CASH FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	46,000	
Less: Opening Balance of P & L A/c or Retained Earning	20,000	
Net Profit for the Year		26,000
<b>ADD: NON-FUND and NON-OPERATING Funds From Operation</b>		-
<b>ADD:</b>		<b>26,000</b>
Decrease in Debtors [2,40,000 -2,30,000]	10,000	10,000
		36,000
<b>LESS:</b>		
Decrease in Creditors [1,40,000 – 90,000]	50,000	
Increase in Stock [1,80,000 – 1,60,000]	20,000	70,000
<b>Cash outflow on account of operations</b>		<b>[34,000]</b>

CASH FLOW STATEMENT

For the year ended .....

Sources/Inflow	Rs.	Rs.	Applications/Outflow/Uses	Rs.	Rs.
<b>Opening Balances:</b>			Cash outflow from operation		34,000
<b>Cash</b>		60,000	Purchase of Land [1,32,000 – 1,00,000]		32,000
Issue of shares [5,00,000 - 4,00,000]		1,00,000	<b>Closing Balances:</b>		
			<b>Cash</b>		94,000
		<b>1,60,000</b>			<b>1,60,000</b>

[Or]

Under AS -3

CASH FLOW STATEMENT [AS PER AS- 3]

For the year 2000

	Rs.	Rs.
<b>Cash Flows from operating activities</b>		
Net Profit before Tax and Extraordinary Items [46,000 – 20,000]	26,000	

Adjustments for:		
Depreciation	-	
<b>Operating Profit before Working Capital Changes</b>	<b>26,000</b>	
Adjustments for:		
Decrease in Sundry Debtors [2,40,000 – 2,30,000]	10,000	
Increase in Stock [1,80,000 -1,60,000]	[20,000]	
Decrease in Trade Creditors [1,40,000 – 90,000]	[50,000]	
<b>Cash generated from operation</b>	<b>[34,000]</b>	
Less: Income Tax paid	-	
<b>Cash before extraordinary Items</b>	<b>[34,000]</b>	
Less/Add: Extraordinary Items	-	
<b>NET CASH USED OPERATING ACTIVITIES</b>		<b>[34,000]</b>
<b>Cash Flow from Investing Activities:</b>		
Purchase of Land[1,32,000 – 1,00,000]	32,000	
<b>NET CASH USED INVESTING ACTIVITIES</b>		<b>[32,000]</b>
<b>Cash flows from Financing Activities</b>		
Proceeds from issue of Share capital [5,00,000 -4,00,000]	1,00,000	
<b>NET CASH FROM FINANCING ACTIVITIES</b>		<b>1,00,000</b>
<b>Net Increase in Cash and Cash Equivalents</b>		<b>34,000</b>
ADD: Cash and Cash Equivalents at the beginning of the period		60,000
Cash and Cash Equivalents at the beginning of the period		<b>94,000</b>

**Illustration No. 14.05**

Prepare a Cash Flow Statement from the following:

Liabilities	31-03-2006 Rs.	31-03-2007 Rs.	Assets	31-03-2006 Rs.	31-03-2007 Rs.
Share Capital	1,00,000	1,50,000	Goodwill	60,000	20,000
5 % Debentures	40,000	70,000	Fixed Assets	1,10,000	3,40,000
Retained Earnings	60,000	85,000	Stock	2,20,000	1,00,000
Bank Overdraft	70,000	90,000	Debtors	1,40,000	1,50,000
Mortgage loan	1,20,000	40,000	Trade Investments	70,000	80,000
Current liabilities	1,60,000	1,90,000	Cash in hand	10,000	15,000
Provision for Dep. Fixed Assets	60,000	80,000			
	<b>6,10,000</b>	<b>7,05,000</b>		<b>6,10,000</b>	<b>7,05,000</b>

During the year ending 31-12- 2007,

- [a] Dividend paid to shareholders was Rs.60,000;
- [b] Fixed Assets costing Rs.20, 000 were sold for Rs.5,000 thereby causing a loss of Rs.7,000 on their sale.
- [c] Shares were issued at 20 % premium which is included in the retained earnings.

Solution No.14.5

Preparation of Non-Current Accounts

Working Note 1

Fixed Assets Account			
	Rs.		Rs.
To Balance b/d	1,10,000	By Provision for Dep. A/c	8,000
To Bank [Purchases] <sup>*[O]</sup>	2,50,000	[20,000 – 5,000 – 7,000]	
		[Dep. On sold asset]	
		By Bank <sup>[I]</sup>	5,000
		By P/L A/c [Loss] <sup>[+]</sup>	7,000
		By Balance c/d	3,40,000
	3,60,000		3,60,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Working Note 2

Provision for Depreciation on Fixed Assets Account			
	Rs.		Rs.
To Fixed Assets	8,000	By Balance b/d	60,000
[Dep. On sold assets]		By Depreciation [current] *	28,000
To Balance c/d	80,000		
	88,000		88,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Adjusted Profit and Loss Account			
	Rs.		Rs.
To Goodwill written off [60,000 – 20,000]	40,000	By Balance b/d	60,000
To Dividend	60,000	By Share Premium [included In retained earnings]	10,000
To Depreciation	28,000	<b>By Funds From Operation*</b>	<b>1,50,000</b>
To Loss on sale of Fixed Assets	7,000	<b>[Balancing figure]</b>	
To Balance C/d	85,000		
	<b>2,20,000</b>		<b>2,20,000</b>
<b>Funds From Operation</b>			<b>1,50,000</b>
<b>ADD:</b>			
Increase in current liabilities [1,90,000-1,60,000]	30,000		
Decrease in stock [2,20,000 – 1,00,000]	1,20,000		1,50,000
			3,00,000
<b>LESS:</b>			
Increase in Debtors [1,50,000-1,40,000]	10,000		
Increase in Trade Investments [80,000-70,000]	10,000		20,000
<b>CASH FROM OPERATIONS</b>			<b>2,80,000</b>

Note: [1] Opening and Closing balance of retained earnings are shown in Adjusted P/L A/c since, P/L A/c balances are not given separately.

[2] Share premium is a non-current capital receipt and should be shown as a source of cash. So it is credit to Adjusted P/L A/c because it was included in retained earnings.

**CASH FLOW STATEMENT**  
**For the year ending 31<sup>st</sup> March 2007**

Sources/Inflow	Rs.	Rs.	Applications/Outflow/Uses	Rs.	Rs.
<b>Opening Balances:</b>			Mortgage loan repaid		80,000
<b>Cash</b>	10,000		Dividend paid		60,000
<b>Bank</b>	[70,000]	<b>[60,000]</b>	Fixed assets purchased		2,50,000
<b>Overdraft</b>		50,000	<b>Closing Balances:</b>		
Issue of shares [1,50,000- 1,00,000]			<b>Cash</b>	15,000	
Premium on issue of shares [50,000 x 20 %]		10,000	<b>Bank Overdraft</b>	[90,000]	<b>[75,000]</b>
Issue of Debentures [70,000 – 40,000]		30,000			
Sale of fixed		5,000			

assets					
Cash From operations		2,80,000			
		<b>3,15,000</b>			<b>3,15,000</b>

**Working Note 3**

**Calculation of Net Profit before Tax and Extraordinary Items**

	Rs.
Closing Retained Earnings	85,000
Less: Opening Retained Earnings	60,000
	25,000
ADD: Dividend	60,000
	85,000
Less: Share Premium included	10,000
Net Profit before Tax and Extraordinary Items	75,000

**CASH FLOW STATEMENT [AS- 3]**

**For the year ending 31<sup>st</sup> March 2007**

	Rs.	Rs.
<b>Cash Flows from operating activities</b>		
Net Profit before Tax and Extraordinary Items	75,000	
Adjustments for:		
Depreciation	28,000	
Goodwill written off	40,000	
Loss on sale of fixed assets	7,000	
<b>Operating Profit before Working Capital Changes</b>	<b>1,50,000</b>	
Adjustments for:		
Increase in current liabilities [1,90,000-1,60,000]	30,000	
Decrease in stock [2,20,000 – 1,00,000]	1,20,000	
Increase in Debtors [1,50,000-1,40,000]	[10,000]	
Increase in Trade Investments [80,000-70,000]	[10,000]	
<b>Cash generated from operation</b>	<b>2,80,000</b>	
Less: Income Tax paid	-	
<b>Cash before extraordinary Items</b>	<b>2,80,000</b>	
Less/Add: Extraordinary Items	-	
<b>NET FROM OPERATING ACTIVITIES</b>		<b>2,80,000</b>
<b>Cash Flow from Investing Activities:</b>		
Sale of Fixed Assets	5,000	
Purchases of Fixed Assets	[2,50,000]	



<b>NET CASH USED INVESTING ACTIVITIES</b>		<b>[2,45,000]</b>
<b>Cash flows from Financing Activities</b>		
Proceeds from issue of shares	60,000	
Proceeds from issue of Debentures	30,000	
Payment of Dividend	[60,000]	
Repayment of Mortgage Loan	[80,000]	
<b>NET CASH USED FINANCING ACTIVITIES</b>		<b>[50,000]</b>
<b>Net Decrease in Cash and Cash Equivalents</b>		<b>[15,000]</b>
ADD: Cash and Cash Equivalents at the beginning of the period		10,000
Cash and Cash Equivalents at the beginning of the period		<b>15,000</b>

**Illustration 14.6**

Balance sheets of M/s Black and White as on 1<sup>st</sup> January 2003 and 31<sup>st</sup> December 2003 were as follows:

<b>Liabilities</b>	<b>1-1-2003 Rs.</b>	<b>31-12-2003 Rs.</b>	<b>Assets</b>	<b>1-1-2003 Rs.</b>	<b>31-12-2003 Rs.</b>
Creditors	40,000	44,000	Cash	10,000	7,000
White's Loan	25,000	-	Debtors	30,000	50,000
Loan from Banks	40,000	50,000	Stock	35,000	25,000
Capital	1,25,000	1,53,000	Machinery	80,000	55,000
			Land	40,000	50,000
			Buildings	35,000	60,000
	<b>2,30,000</b>	<b>2,47,000</b>		<b>2,30,000</b>	<b>2,47,000</b>

During the year machine costing Rs.10,000 [accumulated deprecation Rs.3,000] was sold for Rs.5,000. The provision for depreciation against machinery as on 1<sup>st</sup> January was Rs.25,000 and on 31<sup>st</sup> December 2003 Rs.40,000. Net profits for the year 2003 amounted to Rs.45,000.

Prepare Cash flow Statement.

Solution No. 14.6

Preparation of Non-Current Accounts

Working Note 1

Machinery Account			
	Rs.		Rs.
To Balance b/d	80,000	By Bank [sale] <sup>[I]</sup>	5,000
		By P/L A/c [10,000-3,000-5,000] <sup>[+]</sup>	2,000
		By Depreciation [B.F]* <sup>[+]</sup>	18,000
		By Balance c/d	55,000
	80,000		80,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Working Note 2

Capital Account			
	Rs.		Rs.
By Drawings * <sup>[O]</sup> .	17,000	By Balance b/d	1,25,000
		By Net profit	45,000
To Balance c/d	1,53,000		
	1,70,000		1,70,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Computation of Cash from Operations

STATEMENT OF CASH FROM OPERATION		
	Rs.	Rs.
Net Profit for the Year		45,000
<b>ADD: NON-FUND and NON-OPERATING</b>		
which have been already debited to P & L A/c:		
Depreciation on Machinery	18,000	
Loss on Sale of Machinery	2,000	20,000
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b>		65,000
which have been already Credited to P & L A/c:	-	
<b>Funds From Operation</b>		<b>45,000</b>

<b>ADD:</b>		
Increase in Creditors [44,000 – 40,000]	4,000	
Decrease in Stock [35,000 – 25,000]	10,000	14,000
		<b>79,000</b>
<b>LESS:</b>		
Increase in Debtors [50,000 – 30,000]	20,000	20,000
<b>CASH FROM OPERATIONS</b>		<b>59,000</b>

**CASH FLOW STATEMENT**  
**For the year ended .....**

Sources/Inflow	Rs.	Rs.	Applications/Outflow/Uses	Rs.	Rs.
<b>Opening Balances:</b>			White Loans repaid		25,000
<b>Cash</b>		10,000	Drawings		17,000
Cash From operation		59,000	Land Purchased		10,000
Loan from banks		10,000	Building purchased		25,000
Sale of Machinery		5,000	<b>Closing Balances:</b>		
			<b>Cash</b>		7,000
		<b>84,000</b>			<b>84,000</b>

[OR]

**Under AS -3**

**CASH FLOW STATEMENT [AS- 3]**  
**For the year ending 31<sup>st</sup> December 2003**

	Rs.	Rs.
<b>Cash Flows from operating activities</b>		
Net Profit before Tax and Extraordinary Items	45,000	
Adjustments for:		
Depreciation	18,000	
Loss sale of Machinery	2,000	
<b><i>Operating Profit before Working Capital Changes</i></b>	<b>65,000</b>	
Adjustments for:		
Decrease in Stock	10,000	
Increase in Debtors	[20,000]	
Increase in Creditors	4,000	
<b><i>Cash generated from operation</i></b>	<b>59,000</b>	
Less: Income Tax paid	-	
<b><i>Cash before extraordinary Items</i></b>	<b>59,000</b>	
Less/Add: Extraordinary Items	-	
<b><i>NET CASH FROM OPERATING ACTIVITIES</i></b>		<b>59,000</b>
<b>Cash Flow from Investing Activities:</b>		
Sale of Machinery	5,000	
Purchases of Land	[10,000]	
Purchases of Buildings	[25,000]	

<b>NET CASH FROM INVESTING ACTIVITIES</b>		<b>[30,000]</b>
<b>Cash flows from Financing Activities</b>		
White Loans repaid	[25,000]	
Drawings	[17,000]	
Loan From Banks	10,000	
<b>NET CASH FROM FINANCING ACTIVITIES</b>		<b>[32,000]</b>
<b>Net Decrease in Cash and Cash Equivalents</b>		<b>[3,000]</b>
ADD: Cash and Cash Equivalents at the beginning of the period		10,000
Cash and Cash Equivalents at the beginning of the period		<b>7,000</b>

### Check your progress 14.1

The following shows the balances in condensed form of Pinky Ltd. for the year ended 2007 and 2008.

Liabilities	2007 Rs.	2008 Rs.	Assets	2007 Rs.	2008 Rs.
Creditors	52,000	47,500	Cash and Bank Balances	45,000	45,000
Outstanding Expenses	6,000	6,500	Debtors	38,500	26,500
8 % Debentures	45,000	35,000	Investments	50,000	32,000
Depreciation Fund	20,000	22,000	Prepaid Expenses	500	1,000
Reserves for Contingencies	30,000	30,000	Stock-in-Trade	41,000	53,000
P & L A/c	8,000	11,500	Land & Buildings	77,000	77,000
Share Capital	1,15,000	1,15,000	Machinery	24,000	33,000
	<b>2,76,000</b>	<b>2,67,500</b>		<b>2,76,000</b>	<b>2,67,500</b>

The following information is also available:

- 10 % Dividend was paid in cash.
  - New Machinery for Rs.15,000 was purchased but old machinery costing Rs.6,000 was sold for Rs.2,000 on which accumulated depreciation was Rs.3,000.
  - Rs.10,000, 8 % debentures were redeemed by purchase from open market at Rs.96 for a debenture of Rs.100.
  - Investments were sold at book value.
- Prepare a Cash Flow Statement.

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....
- .....

**14.12 LET US SUM UP**

Like funds flow statement, cash flow analysis studies about the flow of cash. In cash flow analysis, one has to follow three steps namely, - preparation of non-current items, computation of cash from operation and preparation of cash flow statement. Accounting Standard 3 gives guidelines for the preparation of cash flow statement for certain firms. Under AS 3 , cash flow comes from three sources and/or application namely – cash flows from or goes out operating, investment and financing activities. According to that cash flow statement are also prepared.

**14.13 LESSON – END ACTIVITIES**

1. Explain the meaning of ‘cash’ and ‘cash equivalents as per AS 3.
2. What is cash flow statement? State its uses.
3. Distinguish between cash flow statement and funds flow statement.
4. Describe the operating, investing and financing activities of a firm in the context of ‘cash flow statement’.
5. Mars Ltd. furnish you the following balance sheets for the years ending 31<sup>st</sup> December 2006 and 2007. You are required to prepare the cash flow statement for the year ending 2007.

Liabilities	2006 Rs.	2007 Rs.	Assets	2006 Rs.	2007 Rs.
Equity share capital	20,000	20,000	Goodwill	2,400	2,400
General Reserve	2,800	3,600	Land	8,000	7,200
P / L A/c	3,200	2,600	Building	7,400	7,200
Sundry Creditors	1,600	1,080	Investment	2,000	2,200
O/S Expenses	240	160	Inventories	6,000	4,680
Provision for tax	3,200	3,600	A/cs Receivable	4,000	4,440
Provision for Bad Debts	80	120	Bank Balance	1,320	3,040
	31,120	31,160		31,120	31,160

Following additional information has been supplied:

- a. A piece of land has also been sold for Rs.800
- b. Depreciation amounting to Rs.1,400 has been charged on buildings
- c. Provision for taxation has been made for Rs.3,800 during the year.

14.14 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

Check Your Progress ‘Answers’ 14.01

Preparation of Non-Current Accounts  
Working Note 1

Depreciation Fund Account			
	Rs.		Rs.
To Machinery a/c	3,000	By Balance b/d	20,000
[Accumulated Dep. on Sold machinery]		By Depreciation* <sup>[+]</sup>	5,000
To Balance c/d	22,000		
	25,000		25,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Working Note 2

Machinery Account			
	Rs.		Rs.
To Balance b/d	24,000	By Bank [sale] <sup>[I]</sup>	2,000
To Bank <sup>[O]</sup> .	15,000	By Dep. [on sold m/c]	3,000
		By P/L A/c [Loss] <sup>[+]</sup>	1,000
		By Balance c/d	33,000
	39,000		39,000

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[O]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Working Note 3

8 % Debentures Account			
	Rs.		Rs.
By Bank [Open market Operation]	9,600	By Balance b/d	45,000
[[45,000 -35,000] X 96/100]			
By P/L A/c <sup>[-]</sup>	400		
To Balance c/d	35,000		

\*denotes balancing figure; <sup>[+]</sup> refers amount to be added to net profit and <sup>[0]</sup>.refers application/outflow of cash <sup>[I]</sup> refers Source/Inflow of Cash

Computation of Cash From Operations

STATEMENT OF CASH FROM OPERATION

	Rs.	Rs.
Closing Balance of P & L A/c or Retained Earning	11,500	
Less: Opening Balance of P & L A/c or Retained Earning	8,000	
Net Profit for the Year	3,500	
<b>ADD: NON-FUND and NON-OPERATING</b>		
which have been already debited to P & L A/c:		
Current Year's Depreciation on Machinery	5,000	
Dividend [1,15,000 X 10 %]	11,500	
Loss on sale of machinery	1,000	21,000
		21,000
<b>LESS:NON-FUND or NON-OPERATING ITEMS</b>		
which have been already Credited to P & L A/c:		
Profit on Redemption of Debentures [10,000-9,600]	400	400
<b>Funds From Operation</b>		<b>20,600</b>
<b>ADD:</b>		
Decrease in debtors [38,500 – 26,500]	12,000	
Increase in Outstanding expenses [6,500-6,000]	500	12,500
		33,100
<b>LESS:</b>		
Increase in prepaid expenses [1,000 -500]	500	
Increase in stock [53,000 – 41,000]	12,000	
Decrease in creditors [52,000-47,500]	4,500	17,000
<b>CASH FROM OPERATIONS</b>		<b>16,100</b>

**CASH FLOW STATEMENT**  
**For the year 2008**

Sources/Inflow	Rs.	Rs.	Applications/Outflow/Uses	Rs.	Rs.
<b>Opening Balances:</b>			Machinery purchased		15,000
<b>Cash</b>		45,000	Debentures Redeemed		9,600
Machinery sold		2,000	[[45,000 -35,000] X 96/100]		
Investments sold [50,000 – 32,000]		18,000	Dividend paid[1,15,000 X 10 %]		11,500
Cash from operations		16,100	<b>Closing Balances:</b>		
			<b>Cash</b>		45,000
		<b>81,100</b>			<b>81,100</b>

**Working Note 4**

*Calculation of Net Profit before Tax and Extraordinary Items*

*Closing P/L a/c – Opening P/L A/c + Dividend paid*

11,500 -8,000 +11,500 = 15,000

**CASH FLOW STATEMENT [AS- 3]**  
**For the year .....**

	Rs.	Rs.
<b>Cash Flows from operating activities</b>		
Net Profit before Tax and Extraordinary Items	15,000	
Adjustments for:		
Depreciation	5,000	
Loss sale of machinery	1,000	
Profit on Redemption of Debentures	[400]	
<b>Operating Profit before Working Capital Changes</b>	<b>20,600</b>	
Adjustments for:		
Decrease in debtors [38,500 – 26,500]	12,000	
Increase in Outstanding expenses [6,500-6,000]	500	
Increase in prepaid expenses [1,000 -500]	[500]	
Increase in stock [53,000 – 41,000]	[12,000]	
Decrease in creditors [52,000-47,500]	[4,500]	
<b>Cash generated from operation</b>	<b>16,100</b>	
Less: Income Tax paid	-	
<b>Cash before extraordinary Items</b>	<b>16,100</b>	
Less/Add: Extraordinary Items	-	
<b>NET CASH/FROM OPERATING ACTIVITIES</b>		<b>16,100</b>



<b>Cash Flow from Investing Activities:</b>		
Sale of Machinery	2,000	
Sale of Investments	18,000	
Machinery Purchased	<u>[15,000]</u>	
<b><i>NET CASH FROM INVESTING ACTIVITIES</i></b>		<b>5,000</b>
<b>Cash flows from Financing Activities</b>		
Redemption of Debentures [[45,000 -35,000] X 96/100]	[9,600]	
Payments of Dividends	<u>[11,500]</u>	
<b><i>NET CASH USED FINANCING ACTIVITIES</i></b>		<b><u>[21,100]</u></b>
<b>Net flow of Cash and Cash Equivalents</b>		<b>-</b>
ADD: Cash and Cash Equivalents at the beginning of the period		<u>45,000</u>
Cash and Cash Equivalents at the beginning of the period		<b>45,000</b>

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**14.15 SUGGESTED READING/REFERENCES/SOURCES**

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1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
2. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
3. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
4. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications

# UNIT - V

This unit explains the conceptual framework of control and budgeting techniques of management accounting

Lesson No.	Title
15	Standard Costing
16	Variance Analysis
17	Marginal Costing
18	Budget and Budgetary Control
19	Capital Budgeting

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## LESSON-15

### STANDARD COSTING

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**Contents:**

- 15.0 Aims and Objectives
- 15.1 Introduction
- 15.2 Definition: Standard, Standard cost, standard costing
- 15.3 Advantages of standard costing
- 15.4 Limitation of standard costing
- 15.5 Applicability of standard costing
- 15.6 Setting the Standard
- 15.7 Introduction of Standard Costing System
- 15.8 Estimated Costing versus Standard Costing
- 15.9 Historical Cost and Standard Cost
- 15.10 Budgetary Control and Standard Costing
- 15.11 Standard Costing and Marginal Costing
- 15.12 Standard Costing and Standardized Costing
- 15.13 Standard Cost card
- 15.15 Let us Sum Up
- 15.15 Lesson-end Activities
- 15.16 Model Answers to “Check your Progress”
- 15.17 Suggested Reading/References/Sources

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## 15.0 AIMS AND OBJECTIVES

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- (i) To know the meaning of standard, standard cost and standard costing.
- (ii) To understand the difference between estimated costing and standard costing and also between budgetary control and standard costing.
- (iii) To study the advantages and limitation of standard costing.
- (iv) To learn the determination of standard costs.

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## 15.1 INTRODUCTION

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Cost control is a basic objective of cost accountancy. Standard costing is the most powerful system ever invented for cost control.

Historical costing or actual costing is nothing but, a record of what happened in the past. It does not provide any 'Norms' or 'Yardsticks' for cost control. The actual costs lose their relevance after that particular accounting period. But, it is necessary to plan the costs, to determine what should be the cost of a product or service. If the actual costs do not conform to what the costs should be, the reasons for the change should be assessed and appropriate action should be initiated to eliminate the causes.

Standard costing fulfills the need to compensate the shortcomings of Historical costing from the point of view of cost control. (a) It provides the norms or yardsticks in the form of standards- specifying what costs should be or yardsticks in the form of standards- specifying what cost should be (b) comparison of actual costs with standards is facilitated to ascertain variances for each element of cost. (c) The variances are further analysed for contributory reasons. Responsibility is fixed on the basis of the reasons for each variance. (d) Corrective measures are under taken to eliminate the unfavourable variances wherever possible.

Thus, standard costing is a costing technique specifically evolved to provide complete 'Infrastructure' and 'Systematic approach' for cost control.

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## 15.2 DEFINITION: STANDARD, STANDARD COST, STANDARD COSTING

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**Standard.** According to Prof. Eric L.Kohler, "Standard is a desired attainable objective, a performance, a goal, a model". Standard may be used to a predetermined rate or a predetermined amount or a predetermined cost.

**Standard Cost:** Standard cost is predetermined cost or forecast estimate of cost. I.C.M.A. Terminology defines Standard Cost as, "a predetermined cost, which is calculated from management standards of efficient operations and the relevant necessary expenditure. It may be used as a basis for price-fixing and for cost control through variance analysis". The other names for standard costs are predetermined costs, budgeted costs, projected costs, model costs, measured costs, specifications costs etc. Standard cost is a

predetermined estimate of cost to manufacture a single unit or a number of units of a product during a future period. Actual costs are compared with these standard costs.

**Standard Costing** is defined by I.C.M.A. Terminology 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”.

“Standard costing is a method of ascertaining the costs whereby statistics are prepared to show (a) the standard cost (b) the actual cost (c) the difference between these costs, which is termed the variance” says Wheldon. Thus the technique of standard cost study comprises of:

1. Pre-determination of standard costs;
2. Use of standard costs;
3. Comparison of actual cost with the standard costs;
4. Find out and analyse reasons for variances;
5. Reporting to management for proper action to maximize efficiency.

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### **15.3 ADVANTAGES OF STANDARD COSTING**

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#### **15.3.1 Cost control:**

Standard costing is universally recognized as a powerful cost control system. Controlling and reducing costs becomes a systematic practice under standard costing.

#### **15.3.2 Elimination of wastage and inefficiency:**

Wastage and inefficiency in all aspects of the manufacturing process are curtailed, reduced and eliminated over a period of time if standard costing is in continuous operation.

#### **15.3.3 Norms:**

Standard costing provides the norms and yard sticks with which the actual performance can be measured and assessed.

#### **15.3.4 Locates sources of inefficiency:**

It pin points the areas where operational inefficiency exists. It also measures the extent of the inefficiency.

#### **15.3.5 Fixing responsibility:**

Variance analysis can determine the persons responsible for each variance. Shifting or evading responsibility is not easy under this system.

#### **15.3.6 Management by exception:**

The principle of ‘management by exception can be easily followed because problem areas are highlighted by negative variances.

**15.3.7 Improvement in methods and operations:**

Standards are set on the basis of systematic study of the methods and operations. As a consequence, cost reduction is possible through improved methods and operations.

**15.3.8 Guidance for production and pricing policies:**

Standards are valuable guides to the management in the formulation of pricing policies and production decisions.

**15.3.9 Planning and Budgeting:**

Budgetary control is far more effective in conjunction with standard costing. Being predetermined costs on scientific basis, standard costs are also useful in planning the operations.

**15.3.10 Inventory valuation:**

Valuation of stocks becomes a simple process by valuing them at standard cost.

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**15.4 LIMITATION OF STANDARD COSTING**

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1. It is costly, as the setting of standards needs high technical skill.
2. Keeping of up-to-date standard is a problem. Periodic revision of standard is a costly thing.
3. Inefficient staff is incapable of operating this system.
4. Since it is difficult to set correct standards, it is difficult to ascertain correct variance.
5. Industries, which are subject to frequent changes in technological process or the quality of material or the character of labour, need a constant revision of standard. But revision of standard is more expensive.
6. For small concerns, standard costing is expensive.

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**15.5 APPLICABILITY OF STANDARD COSTING**

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Standard Costing is a control device. It is not a separate method of product costing. Any activity of recurring nature is susceptible for setting standards. The standard-cost process is mostly used to control the operating tasks. Manufacturing activities are routine and frequent and therefore easy for establishing standards.

Industries where standardized and uniform work of repetitive nature is done are suitable for introduction of standard costing. Standard costing system is of little use or no use where works vary from job to job or contract to contract.

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## **15.6 SETTING THE STANDARDS**

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While setting standard cost for operations, process or product, the following preliminaries must be gone through:

- i) There must be Standard Committee, similar to Budget Committee, in which Purchase Manager, Personnel Manager, and Production Manager are represented. The Cost Accountant coordinates the functions of the Standard Committee.
- ii) Study the existing costing system, cost records and forms in use. If necessary, review the existing system.
- iii) A technical survey of the existing methods of production should be undertaken so that accurate and reliable standards can be established.
- iv) Determine the type of standard to be used.
- v) Fix standard for each element of cost.
- vi) Determine standard costs for each product.
- vii) Fix the responsibility for setting standards.
- viii) Classify the accounts properly so that variances may be accounted for in the manner desired.
- ix) Comparison of actual costs with pre-determined standards to ascertain the deviations.
- x) Action to be taken by management to ensure that adverse variances are not repeated.

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## **15.7 INTRODUCTION OF STANDARD COSTING SYSTEM**

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Introducing standard costing in any establishment requires the fulfillment of following preliminaries.

1. Establishment of cost centres;
2. Classification and codification of accounts;
3. Determining the types of standards and their basis;
4. Determining the expected level of activity;
5. Setting standards

### **15.7.1 Establishment of cost centres**

A cost centre is a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control. The cost centres divide an entire organisation into convenient parts for costing purpose. The nature of production and operations, the organisational structure, etc. influence the process of establishing cost centres. No hard and fast rule can be laid down in this regard. Establishment of the cost centres is essential for pin pointing responsibility for variances.

### 15.7.2 Classification and codification of accounts

The need for quick collection and analysis of cost information necessitates classification and codification. Accounts are to be classified according to different items of expenses under suitable headings. Each of the headings is to be given a separate code number. The codes and symbols used in the process facilitate introduction of computerization.

### 15.7.3 Determining the types of standards and their basis

Standards can be classified into two broad categories on the basis of the length of use.

- (a) **Current standards:** These are standards which are related to current conditions, particularly of the budget period. They are for short-term use and are more suitable for control purpose. They are also more amenable for combining with budgeting.
- (b) **Basic standards:** These are long-term standards, some of them intended to be in use for even decades. They are helpful for planning long-term operations and growth. Basic standards are established for some base year and are not changed for a long period of time.

It is preferable to use both kinds of standards depending on the nature and type of activity or cost for which they are fixed. Generally, the number of basic standards may be very few and current standards are predominant in number.

#### Basic for standards

There can be significant difference in the standards set depending on the base used for them. The following are the different bases for setting standard, whether they are current standards for short-term or basic standards for long-term use.

- (a) **Ideal standards:** These standards reflect the best performance in every aspect. They are like 100 marks in a paper for students taking up examinations. What is possible under ideal circumstances in all aspects is reflected in these standards.  
They are impractical and unattainable in practice. Their utility for control purpose is negligible.
- (b) **Past performance based standards:** The actual performance attained in the past may be taken as basis and the same may be retained as standard. Such standards do not provide any incentive or challenge to the employees. They are too easy to attain. Their value from cost control point of view is minimal.
- (c) **Normal standard:** It is defined as “the average standard which, it is anticipated can be attained over a future period of time, preferably long enough to cover one trade cycle”. They are average standard reflecting the average performance over a complete trade cycle which may take three to five years. For a specific period, say a budget period, their relevance is negligible.
- (d) **Attainable high performance standards:** They are based on what can be achieved with reasonable hard work and efforts. They are based on the current conditions and capability of the workers. These standards are considered to be of great practical value because they provide sufficient incentive and challenge to the workers to attain them. Any variances from such standard are really significant because the standard which is attainable with effort is not attained.

#### **15.7.4 Determining the expected level of activity**

Capacity of operation or level of activity expected over a future period is vital in fixing current or short-term standards. When the activity level is decided on the basis of sales or production, whichever is the limiting factor; all standard can be developed with the activity level as the focal point. The purchase of material, usage of material, labour hours to be worked, etc. are solely governed by the planned level of activity.

#### **15.7.5 Setting standards**

Setting standards may also be called developing standards or establishment of standard cost because as a consequence of setting standards for various aspects, standard cost can be computed.

Setting standards is like laying a building foundation. The success of standard costing system depends on the care with which the standards are developed.

It is preferable, particularly in large firms, to establish 'Standard committee' which is responsible for determining standards in all aspects of the business and also making suitable revisions in due course. The standards committee usually consists of all the functional managers like purchase, production and sales, technical experts like Production Engineer, the General Manager and the Cost Accountant. It is the Cost Accountant's role which is crucial because he has to assign the monetary values for the different standards set by the other experts in each area or function.

The following is a brief discussion on the setting of standards for each element of cost:

##### **(1) Standards for Direct Material Cost**

Direct material standards are broadly divided into standards for usage or quantity standards and standards for material price. There may be several materials used in the production of a product. It is necessary to set standards for each of the important materials.

##### **Material usage or Quantity standards**

These standards deal with the quantity of material needed for each unit of finished product, the quality specifications and tolerances like length, breadth, strength, volume, etc. Based on the past experience, the normal loss to be expected has to be determined. Based on the expected or permitted loss, the quantity standard per unit is fixed. If two or more materials are mixed in the production, the standard proportion of each material has to be fixed.

The production manager and technical expert play the most important role in setting quantity standards. Their knowledge, experience and the shop floor situation are instrumental in deciding upon the quality and quantity of each material. The following are the usual quantity standards set.

- (a) Quantity of material per unit of finished product.
- (b) Standard loss permitted in the production process.
- (c) The proportion of different materials, if more than one material is used.
- (d) The yield expected from material.



**Material price standards:** Price standards for the material are the most difficult to set because material prices are subject to the market forces. Usually, current market price for each material, the trends observed and the forecasts of the purchasing department are the determining factors.

While fixing price standards, the other terms like trade discounts, freight, credit terms, etc., are also considered.

Material price should also include the cost of purchasing and storing including the handling costs.

It is customary to prepare a standard 'Bill of Materials' which is a list of all the direct materials to be used and incorporate therein all the standards set for each material so that it acts like a ready reckoner.

## **(2) Standards for direct labour cost**

The two major aspects for which standards are developed relating to labour are (A) Labour time and (B) Labour rate.

**(A) Labour Time Standards:** These standards represent the time to be taken by the direct labour in the production of one unit of product or performing a specific operation. It may be determined with the help of (1) Time and Motion study; (2) Technical estimates; (3) Trial runs; (4) Past experience; (5) Caliber of the workers; (6) Working conditions.

Since, human factor is involved, the cooperation of workers should be obtained by suitable briefing about the purpose and significance of the exercise.

If different kinds of labour have to perform group tasks, standards should also be fixed for labour mix or gang.

The most ticklish problem in setting the labour time standards is the provision for idle time. Idle time includes rest pauses, personal needs of the workers, etc. the care with which the idle time standards are fixed determines the level of arguments and quarrels on the production lines.

The following are the usual labour time standards etc.

- (a) Standard time to be taken for one unit of output.
- (b) Idle time permitted
- (c) Proportion of different kinds of labour where two or more kinds of workers are involved.

**(B) Labour rate standards:** Labour rates are generally governed by agreements with trade unions, the firm's wage policy and incentive systems in use. However, the following factors influence the labour rate standards: (i) Existing, labour rates; (ii) Rates paid by similar firms; (iii) Type or kind of labour needed for production and (iv) Labour laws governing the industry.

Wage rate standards differ for different grades or kinds of labour. The rate is also subject to revision whenever new agreements are concluded with the unions.

### **(3) Standards for overhead cost**

Overheads are usually segregated into fixed and variable. It is necessary to fix standard overhead rates separately for fixed overheads and variable overheads. Separate rates have to be determined for factory, office, selling and distribution overheads- both fixed and variable.

While determining the overhead rates, the factors to be considered are:

(a) Standard level of activity; (b) Number of units to be produced (c) Labour and machine hours to be worked.

Standard overhead costs – both fixed and variable should be determined. Based upon the standard output and standard hours, the overhead rates are finalized.

### **Standard output and its standard cost**

Once all the cost standards are finalised, it is possible to consolidate them in the shape of 'standard cost for standard output'.

The direct material cost per unit, direct wages per unit, fixed and variable overheads per unit can be listed out. The total of all of these represents standard cost per unit. This can be multiplied with the standard output for the budget period or a specified period to ascertain the standard cost of the standard output.

### **Standard hour**

If a single product is produced in a firm, the output can be expressed in terms of the units of that product. However, several different products may be produced and they may be measured in different units like kgs, Tons, liters, gallons, barrels, etc. Though all of these can not be expressed in terms of a single measure, it is possible to express all of them in terms of 'Time'. Time taken to produce is the common factor for all output. Production, expressed in terms of hours needed to produce them is called 'Standard hours'.

According to I.C.M.A., England, "Standard hours are a hypothetical hour which represents the amount of work which should be performed in one hour under standard conditions".

The 'Standard hour' is very useful in ascertaining overhead variances. The total output of a firm comprising different products is expressed in the form of standard hours and the fixed and variable overhead rates are set for standard hours.

### **Revision of standards**

Current or short-term standards have to be periodically revised. Long-term or basic standards may be used for longer periods. They may also need revision when the factors affecting the standard change.

Revision may be needed in all the following cases:

(a) Change in market price of materials (b) permanent change in labour rates (c) Major alterations in products or method of production or materials used (d) Basic change in product specifications or design. (e) Errors in setting of the original standards.

**Check your progress 15.1**

List out the any two advantages and two limitations of standard costing

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
- .....
- .....
- .....

**15.8 ESTIMATED COSTING AND STANDARD COSTING**

Both standards costing and estimated costing are predetermined costs. But the object of standard costing differs. The differences between these two costs are:

Estimated Cost	Standard Cost
1. It is used as statistical data, and leads to a lot of guess work.	It is scientifically used, and it is a regular system of account based upon estimation and time studies.
2. Its objects are to ascertain “What the cost will be”.	Its object is to ascertain “what the costs should be”
3. It gives importance to cost ascertainment for fixing sale price.	It is used for effective cost control and to take proper action to maximise efficiency.
4. It is used for a specific use; i.e., fixing sale price.	It is a continuous process of costing, and takes into account all the manufacturing processes.
5. It can be used where costing is in operation.	It can be used where standard costing is in operation.
6. It is not accurate. It is an approximation based on past experience.	As it is based on scientific analysis, it is more accurate than the estimated cost.

**15.9 HISTORICAL COST AND STANDARD COST**

Historical Cost	Standard Cost
1. It is an after-production-recorded cost.	It is a predetermined cost.
2. It is, actually, incurred cost.	It is an ideal cost.
3. As it relates to the past, it is not useful for cost control.	It is a future cost. It can be used for cost control.
4. It is used to ascertain the profit or the loss incurred during a period.	It is used for the measurement of operational efficiency of the enterprises.

**15.10 BUDGETARY CONTROL AND STANDARD COSTING**

Budgetary Cost	Standard Cost
1. It is extensive in its application, as it deals with the operation of department or business as a whole.	It is intensive, as it is applied to manufacturing of a product or providing a service.
2. Budgets are prepared for sales, production, cash etc.	It is determined by classifying recording and allocating expenses to cost unit.
3. It is a part of financial account, a projection of all financial accounts.	It is a part of cost account, a projection of all cost accounts.
4. Control is exercised by taking into account budgets and actuals. Variances are not revealed through accounts.	Variances are revealed through difference accounts.
5. Budgeting can be applied in parts.	It cannot be applied in parts.
6. It is more expensive and broad in nature, as it relates to production, sales, finance etc.	It is not expensive because it relates to only elements of cost.
7. Budgets can be operated with standards.	This system cannot be operated without budgets.

**15.11 STANDARD COSTING AND MARGINAL COSTING**

Standard costing is a system of accounting in which all expense: (fixed and variable) are considered for the determination of standard cost for a prescribed set of working conditions. On the other hand, marginal costing is a technique in which only variable expenses are taken to ascertain the marginal cost. Both standard costing and marginal costing are completely independent of each other and may be installed jointly. This system of joint installation may be named as Marginal Standard Costing or Standard Marginal Costing System. Variances are calculated in the same way as in standard costing system with the only difference that volume variances are absent because fixed expenses are charged in totals in each period.

**15.12 STANDARD COSTING AND STANDARDISED COSTING**

The term ‘standardised costing’ is synonymous to inform costing. Uniform costing is a system of costing under which several undertakings use the same costing principles and practices. With the help of uniform costing, several common processes of various industrial units can be standardised which will be helpful in improving the performance of inefficient units. Both standard costing and standardized costing (i.e. uniform costing) can be used for better management of industrial units.

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### 15.13 STANDARD COST CARD

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When all the standard costs have been determined, a Standard Cost Card is prepared for each product or service. The process of setting standards for materials, labour and overheads results in the establishment of the standard cost for the product. Such a cost card shows for a specified unit of production, quantity, quality and price of each type of materials to be used, the time and the rate of pay of each type of labour, the various operations the product would pass through, the recovery of overhead and the total cost. The build-up of the standard cost of each item is recorded in standard cost card. These details serve as a basis to measure the efficiency against which actual quantities and costs are compared. The type of standard cost card varies with the requirements of individual firm hence no uniform format can be prescribed.

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### 15.14 LET US SUM UP

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Standard costing is a yardstick to measure the performance of a concern. Standard performance compared with actual performance and variance is found. Standard yard for materials, both in quality and price, labour both rate and hours, overheads, sales and profit are fixed. Standard costing gives more emphasis on cost than financial information. Budgetary control extensive and deals with the operation of department as a whole.

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### 15.15 LESSON – END ACTIVITIES

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- 1 Define ‘standard cost’ and ‘standard costing’.
- 2 What are the merits of standard costing?
- 3 Explain the limitations of standard costing.
- 4 What are the difference between ‘standard cost’ and estimated cost’?
- 5 Distinguish between budgetary control and standard costing.
- 6 How do you set standards for different elements of cost?

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### 15.16 MODEL ANSWERS TO “CHECK YOUR PROGRESS”

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#### Check Your Progress ‘Answers’ 15.01

Your answer may include the following

Advantages of standard costing

**1 Cost control:** Standard costing is universally recognised as a powerful cost control system. Controlling and reducing costs becomes a systematic practice under standard costing.

**2 Elimination of wastage and inefficiency:** Wastage and inefficiency in all aspects of the manufacturing process are curtailed, reduced and eliminated over a period of time if standard costing is in continuous operation.

**3 Norms:** Standard costing provides the norms and yard sticks with which the actual performance can be measured and assessed.

**Limitations of standard costing**

1. It is costly, as the setting of standards needs high technical skill.
2. Keeping of up-to-date standard is a problem. Periodic revision of standard is a costly thing.
3. Inefficient staff is incapable of operating this system.

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**15.17 SUGGESTED READING/REFERENCES/SOURCES**

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6. Jain S.P. and Narang K.L. , Cost Accounting , Principles and Practice, Kalayani Publishers,
7. Sexena V.K. and Vashist C.D., Advanced Cost and Management Accounting – Textbook, Sultan Chand & Sons
8. Pillai. R.S.N. and Bagavathi V., Cost Accounting, S. Chand & Company Ltd.
9. Alex K., Cost Accounting, ARR publications
10. Horngren, Datar and Foster, Cost Accounting A managerial Emphasis, Pearson Education

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## LESSON-16

### VARIANCE ANALYSIS

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#### **Contents:**

- 16.0 Aims and Objectives
- 16.1 Introduction
- 16.2 Concepts of Variance Analysis
- 16.3 Favourable and Unfavourable Variances
- 16.4 Utilities of Variance Analysis
- 16.5 Analysis of Variances
- 16.6 Computation of Variances
- 16.7 Direct Material Cost Variances
- 16.8 Direct Labour Cost Variance
- 16.9 Overhead Variances
- 16.10 Sales Variance
- 16.11 Let Us Sum Up
- 16.12 Lesson-End Activities
- 16.13 Check Your Answers – Answers
- 16.14 Suggested Reading/References/Sources

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#### **16.0 AIMS AND OBJECTIVES**

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By the end of this lesson you should be able to:

- i) To understand the meaning and definition of variance analysis
- ii) To know to different kinds of material variance
- iii) To study the different type of labour variance
- iv) To learn to methods of calculation of material and labour variances

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#### **16.1 INTRODUCTION**

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Management accounting's one of the core function is to facilitate managerial control. The major aspect of managerial control is cost control. The efficiency of management, among other things, depends upon the effective control of costs. For controlling costs, management should not only know actual costs – the costs actually incurred but also

pre-determined costs – the costs which should have been incurred. Variance analysis is the process of analysing variance by sub-dividing the total variance in such a way that management can assign responsibility for off-standard performance. It, thus, involves the measurement of the deviation of actual performance from the intended performance. That is, variance analysis is a tool to measure performances and based on the principle of management by exception. In variance analysis, the attention of management is drawn not only to the monetary value of unfavourable and favourable managerial performance but also to the responsibility and causes for the same.

After the standard costs have been fixed, the next stage in the operation of standard costing is to ascertain the actual cost of each element and compare them with the standard already set. Computation and analysis of variances is the main objective of standard costing. Actual cost and the standard cost is known as the ‘cost variance’.

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## 16.2 CONCEPTS OF VARIANCE ANALYSIS

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The most significant contribution of standard costing to the science and art of management is the presentation of ‘Variances’. As a matter of fact, without determination and analysis of variances, standard costing is meaningless.

The term **variance** is derived from the very ‘to vary’ which means to differ. According to **CIMA**, England, a cost variance is ‘the difference between a standard cost and the comparable actual cost incurred during a period’. Thus, Variance represent the extent to which actual costs deviate from the ‘Norms’ or ‘Yardsticks’.

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## 16.3 FAVOURABLE AND UNFAVOURABLE VARIANCES

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Variance may be *Favourable [positive or credit] or Unfavourable [negative or adverse or debit]* depending upon whether the actual resulting cost is less or more than the standard cost.

### ***Favourable Variance [F]:***

When the actual cost incurred is less than the standard cost, the deviation is known as favourable variance. The effect of the favourable variance increases the profit. Again, favourable variance would result when the actual cost is lower than the standard cost. It is also known as positive or credit variance and viewed as savings.

### ***Unfavourable Variance [A]:***

When the actual cost incurred is more than the standard cost, there is a variance, known as Unfavourable or adverse variance. Adverse variance refers to deviation to the loss of the business. It is also known as negative or debit variance and viewed as additional costs or losses.



When the sales/ profit is greater than the standard sales/profits, it is called as favourable variance. When the sales/profit is less than the standard sales/profit, it is known as Unfavourable variance.

The favourable variance is a sign of efficiency of the organization and the Unfavourable variance is considered as a sign of inefficiency.

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#### **16.4 UTILITIES OF VARIANCE ANALYSIS**

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Merely finding out variances are not sufficient for the managerial decisions, but their analysis and finding the causes for variance is the ultimate aim to control costs. Therefore, the variances are analyzed for their causes. In short, the uses of variances are:

1. Variance analysis sub divides the total variance based on different contributory causes. This gives a clear picture of the different reasons for the overall variances.
2. The sub division of variance establishes and highlights the interrelationship between different variances.
3. Variance analysis ‘explains’ the causes for each variance. It paves way for fixing responsibility for all variances.
4. It highlights all inefficient performances and the extent of inefficiency.
5. It is powerful tool leading to cost control.
6. It enables the top management to practice ‘Management by Exception’ by focusing on the problem areas.
7. It segregates variances into controllable and uncontrollable, thereby indicating where action is warranted.
8. It acts as the basis for profit planning.
9. By revealing each and every deviation, along with the causes, variance analysis creates and nurturers ‘cost consciousness among the employees.

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#### **16.5 ANALYSIS OF VARIANCES**

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Variance Analysis is the process of analyzing variances by sub-dividing the total variance in such a way that management can assign responsibility for off-standard performance. Thus, it involves the measurement of the deviation of actual performance from the intended performance. That is, variance analysis is a tool to measure performances and based on the principles of management by exception.

According to Brown and Howard, “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.”

Thus, in variance analysis, the attention of management is drawn not only to the monetary value of unfavorable and favourable managerial performances but also to the responsibility and causes for the same.

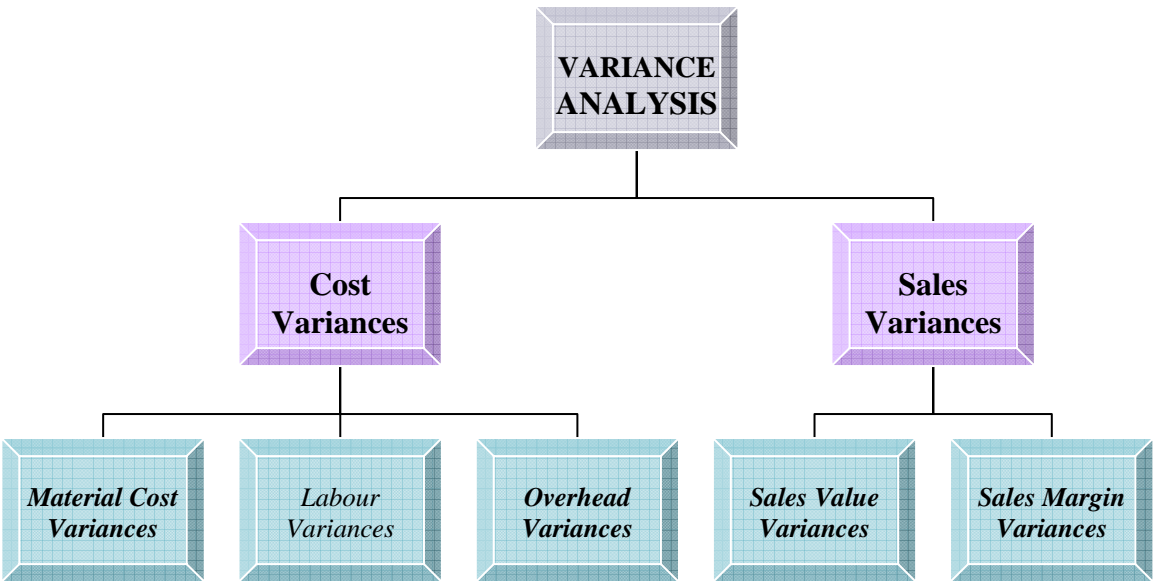
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**16.6     COMPUTATION OF VARIANCES**

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The computation and analysis of variance are the objectives of standard costing. The causes of variance are necessary to find remedial measures; and therefore a detailed study of variance analysis is essential. Variance can be broadly divided into two categories – [1] cost variances and [2] sales variances. Variances can be found out with respect to all the elements of costs i.e., direct materials, direct labour and overheads. In other words, the total cost variances is split into its component parts on the basis of elements, and each element is further subdivided to locate the responsibility of variance. The following are the common variances, which are calculated by the management. Sub-divisions of variances really have given detailed information to the management in order to control the cost.

- a.    Material cost variances;
- b.    Labour or Wage variances;
- c.    Overhead cost variances – [i] variable and [ii] fixed
- d.    Sales variances – volume or margin

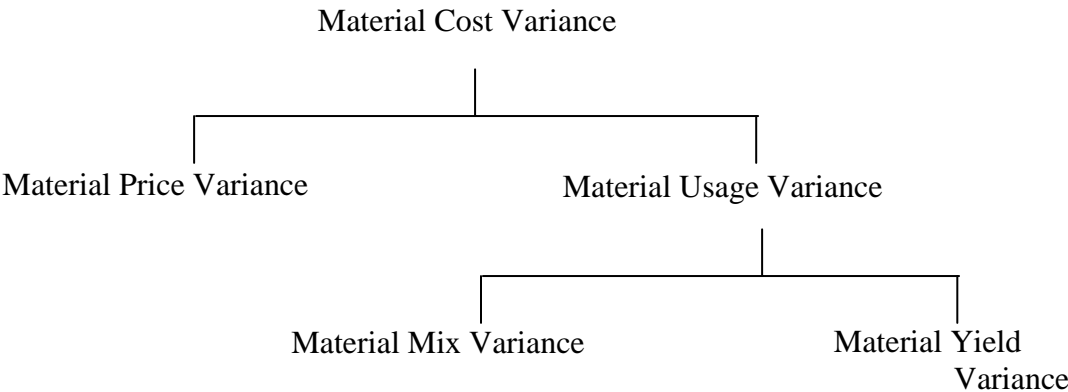


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**16.7 DIRECT MATERIAL COST VARIANCES**

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Materials form a very high percentage of total cost. Therefore, it is important to study its variances.



[a] **Direct Material Cost Variance [MCV]** is the difference between the standard costs of direct materials specified for the output achieved and the actual cost of direct materials used. The standard cost of materials is computed by multiplying the standard price with the standard quantity for actual output; and the actual cost is computed by multiplying the actual price with the actual quantity. The formula is :

$$\begin{aligned} MC\ V &= [Standard\ Cost\ of\ Materials - Actual\ cost\ of\ materials\ used] \\ &\quad [OR] \\ &= [Standard\ cost\ of\ Actual\ output - Actual\ cost] \\ &\quad [OR] \\ &= [SQ\ x\ SP] - [AQ\ x\ AP] \end{aligned}$$

Where, SQ refers Standard quantity for actual output; SP means Standard price  
AQ means Actual quantity and AP refers Actual price

If the actual cost is less than the standard cost, the variance is favourable and vice versa. MCV arises due to change in the price of the materials or a change in the usage of materials.

In order to find the exact causes for the material cost variance, the material cost variances is dividend into two. Material price and Materials usage variances are the components of MCVs. Materials usage variance is further divided into material mix variances and materials yield or material sub-usage variances. Let us discuss all these in the following sections.

**[b] Materials Price Variance [MPV]**

It is that part of material cost variance which is due to the difference between the standard price specified and the actual price paid.

$$MPV = AQ [SP-AP]$$

MPV arises due to the following reasons:

i. changes in the market prices of materials; ii. Uneconomical size of purchase orders; iii. Uneconomical transport costs; iv. Failure to obtain cash discount; and v. failure to purchase materials at proper time.

The responsibility of Material price variance is mainly of the purchase manager. However, a general increase in the prices is uncontrollable and cannot fix responsibility.

**[c] Material Usage Variance [MUV]**

It is the difference between the standard quantity specified and the actual quantity used.

$$MUV = SP [SQ-AQ]$$

MUV may arise due to carelessness in use of materials; loss due to pilferage; faculty workmanship; use of material mix other than the standard mix and defect in plant and machinery causing excessive consumption of materials.

**[d] Material Mix Usage [MMV]**

It is the part of material usage variance which arises due to change in standard and actual compositions of mix.

$$MMV = SP [RSQ - SQ]$$

where RSQ refers Revised Standard Quantity

$$RSQ = \frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \times \text{Total Actual Quantity}$$

The variance arises in industries like chemical, rubber etc. where definite proportions of different raw materials are mixed to get a product. Variations may arise due to general shortage or non-purchases of materials at the proper time.

[e] **Materials Yield Variance [MYV]**

It is part of material usage variance and it is the difference between standard yield specified and actual yield obtained.

$$MYV = [Standard\ Yield - Actual\ Yield] \times Average\ Standard\ Price\ per\ unit$$
  
$$Or$$
  
$$= [Standard\ loss\ on\ actual\ output - Actual\ Loss] \times Average\ Standard\ Price\ per\ unit$$

[f] **Materials Sub-usage Variance [MSUV]**

It is the general practice to analyze the material usage variance into mix and yield variations. However, in some cases it may not possible or convenient to calculate yield variance. For example information may not be available about units of output, in such cases; sub-usage variance is calculated on the assumption that a single job or work is the output. By computing yield variance become a problem.

$$MSUV = SP [SQ-RSQ]$$

Generally material sub-usage variance is not popular among those who use standard costing as a control system.

**Note:** The symbols “F” refers favourable variances and “A” indicates Adverse Variance.

Relationship	
MCV	= MPV + MUV
MUV	= MMV + MYV/MSUV

**Illustration No. 16.01**

Calculate material variances from the following data

	Standard	Actual
<b>Quantity</b>	400 kgs	460 Kgs.
<b>Price</b>	Rs.2 per Kg.	Rs.1.5 Per kg.
<b>Value</b>	Rs.800	Rs.690

**Solution No. 16.01**

[a] Material Cost Variance =  $[SQ \times SP] - [AQ \times AP]$   
=  $[400 \times Rs.2] - [460 \times Rs.1.5]$   
=  $Rs.800 - Rs.690 = \textbf{Rs.110 [F]}$

[b] Material Price Variance =  $AQ [SP-AP]$   
=  $460 [2-1.5] = \textbf{Rs.230 [F]}$

[c] Material usage Variance =  $SP [SQ-AQ]$   
=  $Rs.2 [400-460] = \textbf{Rs.120 [A]}$

**Relationship and Verification:**  
**MCV = MPV + MUV**  
**Rs.110 [F] = Rs.230 [F] + Rs.120 [A]**

Note: ‘A’ denotes adverse/ negative (-)variance and ‘F’ denotes favourable/ positive [+] variance.

**Illustration No. 16.2**

The standard estimate for materials to manufacture 1,000 units of a commodity is 400 kgs., at Rs.2.50 per kg.

When 2,000 units of the commodity are manufactured, it is found that 820 kgs. Of materials are consumed at Rs.2.60 per kg.

Calculate the material variances.

**Solution No. 16.2**

**Working Notes:** *Calculation of standard quantity for actual output*

To produce 1,000 units, standard materials = 400 kgs.

To produce 2,000 units, standard materials = 2,000 /1,000 X 400= **800 Kgs**

[a] Material Cost Variance	=	$[SQ \times SP] - [AQ \times AP]$
	=	$[800 \times Rs.2.5] - [820 \times Rs.2.60]$
	=	$Rs.2,000 - Rs.2,132 = \mathbf{Rs.132 [A]}$
[b] Material Price Variance	=	$AQ [SP-AP]$
	=	$820 [2.50-2.60] = \mathbf{Rs.82 [A]}$
[c] Material usage Variance	=	$SP [SQ-AQ]$
	=	$Rs.2.50 [800-820] = \mathbf{Rs.50 [A]}$

**Relationship and Verification:**  
**MCV = MPV + MUV**  
**Rs.132 [A] = Rs.82 [A] + Rs.50 [A]**

**Illustration No. 16.3**

From the following particulars, calculate material cost variance, material price variance and material usage variance.

Material purchased – 3,000 kgs at Rs.6 per kgs;

Standard quantity of material fixed for one unit of finished product – 25 kgs at Rs.4 per kg.

Opening stock – Nil and Closing Stock – 500 kgs.

Actual output during the period – 80 units

**Solution No. 16.2**

**Working Notes:** [1] Actual quantity used = Opening Stock + Purchases – Closing Stock  
= Nil + 3,000 – 500 = **2,500 kgs**

[2] *Calculation of standard quantity for actual output*

To produce one unit, standard materials = 25 kgs.

To produce 80 units, standard materials = 25/1 X 80 = **2,000 Kgs**

[a] Material Cost Variance =  $[SQ \times SP] - [AQ \times AP]$   
= [2000 X Rs.4] – [2,500 x Rs.6]  
= Rs.8,000 – Rs.15,000 =**Rs.7,000 [A]**  
[b] Material Price Variance =  $AQ [SP-AP]$   
= 2,500 [6-4] = **Rs.5,000 [A]**  
[c] Material usage Variance =  $SP [SQ-AQ]$   
Rs.4 [2,000-2,500] =**Rs.2,000 [A]**

**Relationship and Verification:**

**MCV = MPV + MUV**

**Rs.7,000 [A] = Rs.5,000[A] + Rs.2,000 [A]**

**Illustration No. 16.4**

Materials	Standard			Actual		
	Qty. Kgs.	Price Rs.	Total Rs.	Qty. Kgs.	Price Rs.	Total Rs.
<b>A</b>	500	6.00	3,000	400	6.00	2,400
<b>B</b>	400	3.75	1,500	500	3.60	1,800
<b>C</b>	300	3.00	900	400	2.80	1,120
	<b>1,200</b>			<b>1,300</b>		
<b>Less: 10 % Normal Loss</b>	120			220		
	<b>1,080</b>		<b>5,400</b>	<b>1,080</b>		<b>5,320</b>

Calculate material variances

**Solution No. 16.4**

**Working Note [1]**

Revised Standard Quantity [RSQ] <sup>[1]</sup>

$$\frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \times \text{Total Actual Quantity}$$

Materials A = 500/1200 X 1,300 = 541.67 kgs.  
 Materials B = 400/1200 X 1,300 = 433.33 kgs.  
 Materials C = 300/1200 X 1,300 = 325 kgs.

**Working Note [2]**

Standard loss for an input of 1,200 kgs is 120 kgs.

Standard loss for actual input of Rs.1,300 kgs. 1,300/1,200 X 120 = 130 Kgs <sup>[2]</sup>

Average Standard price per unit =  $\frac{\text{Total Standard Cost}}{\text{Standard output}}$   
 = Rs.5,400 / 1,080 = **Rs.5 per kg.** <sup>[3]</sup>

<b>[1] Material Cost Variance = <math>[SQ \times SP] - [AQ \times AP]</math></b>			
Material A	[500 x 6] – [400 x 6]	600 [F]	
Material B	[400 x 3.75] – [500 x 3.60]	300 [A]	
Material C	[300 x 3.00] – [400 x 2.80]	220 [A]	<b>Rs.80 [F]</b>
<b>2. Material Price Variance = <math>AQ [SP-AP]</math></b>			
Material A	400 [6- 6]	Nil	
Material B	500 [3.75 – 3.60]	75 [F]	
Material C	400 [3.00 – 2.80]	80 [F]	<b>Rs.155 [F]</b>
<b>3. Material usage Variance = <math>SP [SQ-AQ]</math></b>			
Material A	6.00 [500 – 400]	600 [F]	
Material B	3.75 [400 – 500]	375 [A]	
Material C	3.00 [300 – 400]	300 [A]	<b>Rs.75 [A]</b>
<b>4. Material Mix Variance = <math>SP [RSQ^{[1]} - AQ]</math></b>			
Material A	6.00 [541.67 – 400]	850 [F]	
Material B	3.75 [433.33 – 500]	250 [A]	
Material C	3.00 [325 – 400]	225[A]	<b>Rs.375 [F]</b>
<b>5. Material Yield Variance = Average Standard Price</b>			
per unit [Std. loss – actual loss]			
Rs.5 <sup>[3]</sup> [130 <sup>[2]</sup> -220]		Rs.450	<b>Rs.450 [A]</b>



Relationship and Verification:

MCV = MPV + MUV	=	Rs.80 [F] = Rs.155[F] + Rs.75 [F]
MUV = MMV + MYV	=	Rs.75 [F] = Rs.375 [F] + Rs.450 [A]

Illustration No. 16.5

From the following information compute material variances:

Materials	Standard			Actual		
	Qty. Kgs.	Price Rs.	Total Rs.	Qty. Kgs.	Price Rs.	Total Rs.
X	10	2	20	5	3	15
Y	20	3	60	10	6	60
Z	20	6	120	15	5	75
	50		200	30		150

Solution No. 16.5

Working Note [1]

Revised Standard Quantity [RSQ] <sup>[1]</sup>

$$\frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \times \text{Total Actual Quantity}$$

Materials X	=	10/50 X 30	=	6 kgs.
Materials Y	=	20/50 X 30	=	12 kgs.
Materials Z	=	20/50 X 30	=	12 kgs.

<b>[1] Material Cost Variance</b>		=	$\frac{[SQ \times SP] - [AQ \times AP]}{}$	<b>Total Variance</b>
Material X	—	[10 x 2] – [5 x 3]		5 [F]
Material Y	—	[20 x 3] – [10 x 6]		0
Material Z	—	[20 x 6] – [15 x 5]		45 [F]
				<b>Rs.50 [F]</b>
<b>2. Material Price Variance</b>		=	$AQ [SP-AP]$	
Material X		5 [2- 3]		5 [A]
Material Y		10 [3 - 6]		30 [A]
Material Z		15 [6 – 5]		15 [F]
				<b>Rs.20[A]</b>

<b>3. Material usage Variance = SP [SQ-AQ]</b>			
Material X	2.00 [10-5]	10 [F]	
Material Y	3.00 [20-10]	30 [F]	
Material Z	6.00 [20-15]	30 [F]	<b>Rs.70 [F]</b>
<b>4. Material Mix Variance = SP [RSQ<sup>[1]</sup> – AQ]</b>			
Material X	2.00 [6-5]	2 [F]	
Material Y	3.00 [12-10]	6 [F]	
Material Z	6.00 [12-15]	18 [A]	<b>Rs.10[A]</b>
<b>5. Material Sub-usage Variance = SP [SQ-RSQ]</b>			
Material X	2.00 [10-6]	8 [F]	
Material Y	3.00 [20-12]	24 [F]	
Material Z	6.00 [20-12]	48 [F]	<b>Rs.80 [F]</b>

**Relationship and Verification:**

MCV = MPV + MUV	=	Rs.50 [F] = Rs.20[A] + Rs.70 [F]
MUV = MMV + MSUV	=	Rs.70 [F] = Rs.10 [A] + Rs.80 [F]

**Check Your Progress 16.1 Rs/pr.7/9.18**

Calculate material variances.

Materials	SP per Kg.	Std. Mix for 12,000 titles Kg.	Actual Usage Kg.	AP per kg. Rs.
A	5	1,200	12,000	7
B	9	600	6,000	6
Actual output : 1,00,000 tiles				

- NOTES:**
- a) Write your answer in the space given below
  - b) Check your answer with the one given at the end of this lesson

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## 16.8 DIRECT LABOUR COST VARIANCE

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Labour cost variances arises because of [1] difference in actual rates and standards rates of labour and [2] variation in actual time taken by workers and the standard time allotted to them for performing a work. The labour variances are computed on the same pattern as those of material variances as calculated in the above section. One can find out the various formulae for Direct labour variances by simply putting the word 'time' in place of quantity. The various labour variances which will be analysed are as follows:

- a. Labour Cost Variance;
- b. Labour Rate Variance;
- c. Labour Time or Efficiency Variance;
- d. Labour Idle Time variances;
- e. Labour Mix or Gang Composition Variance; and
- f. Labour Yield Variance

### [a] Labour Cost Variance [LCV]

Labour cost variance is the difference between the standard wages specified and the actual wages paid.

$$\begin{aligned} LCV &= \text{Standard cost of Labour} - \text{Actual cost of labour} \\ &= [ST \times SR] - [AT \times AR] \end{aligned}$$

If the standard cost is higher, the variation is favourable and vice versa.

### [b] Labour Rate Variance [ LRV]

It is the difference between the standard rate of wages specified and the actual rate paid to the labour.

$$LRV = AT [SR-AR]$$

Labour rate variance arises due to changes in the basis wage rates; rate of difference methods of wages payment and unscheduled overtime.

### [c] Labour Efficiency Variance [LEV]

It is a part of labour cost variance. It is the difference between standard labour hours/time specified and actual labour hours spent.

$$LEV = SR [ST-AT]$$

This variance arises due to lack of proper supervision; insufficient training; poor working conditions and increase in labour grades utilized.

**[d] Labour Idle Time Variance [LITV]**

Idle time variance is due to time lost abnormally on account of strikes, lockouts, power failure, machine breakdown etc. Time wasted due to such causes on which the individual workers have not control should be separately accounted for should be shown as separate variance.

***LITV = SR X Idle Time [IT]***

It should be noted that this variance is always shows [A] adverse variance

**[e] Labour Mix Variance [LMV]**

The difference between the standard labour grade specified and the actual labour grade utilized is refereed as labour gang composition variance.

***LMV = SR [ RST – AT]*** where RST refers Revised Standard Time

**RSQ =  $\frac{\text{Standard Time}}{\text{Total Standard Time}}$  X Total Actual Time**

**[f] Labour Yield Variance [LYV]**

It is just like material yield variance and it is the difference between the standard labour output and the actual labour output or yield. It is calculated as below:

**LYV =Standard Cost per unit [Standard output for Actual mix – Actual output]**

**Note: The symbols “F” refers favourable variances and “A” indicates Adverse Variance.**

Relationship	
<b>LCV</b>	<b>= LRV + LEV</b>
<b>LEF</b>	<b>= LMV + LYV + LITV</b>

**Illustration No. 16.6**

The standard time and rate for unit components are given below:

Standard hours 20;

Standard Rate Rs.5 per hour;

Actual data and related information are as under:

Actual production 1,000 units;

Actual Hours 20,500 hours;

Actual Rate per hour Rs.4.80

Calculate [1] Labour Cost Variance; [2] Labour Efficiency Variance ; and [3] Labour Rate Variance

Solution No. 16.6

<b>[1] Labour Cost Variance</b>	=	<b><math>[ST \times SR] - [AT \times AR]</math></b>
Standard hours for actual production = 20 X 1,000 units = 20,000 hours		
	=	<b><math>[20,000 \times 5] - [20,500 \times 4.80]</math>      <b>Rs.1,600 [F]</b></b>
<b>2. Labour Rate Variance</b>	=	<b><math>AT [SR-AR]</math></b>
		<b>20,500 [5 – 4.80]      <b>Rs.4,100 [F]</b></b>
<b>3. Labour Efficiency Variance</b>	=	<b><math>SR [ST-AT]</math></b>
		<b>5 [20,000 – 20,500]      <b>Rs.2,500 [A]</b></b>

Relationship and Verification:

LCV	=	LRV + LEV	=	Rs.1,600 [F] = Rs.4,100 [F] + Rs.2,500 [A]
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Illustration No. 16.7

From the following data, calculate labour variances. Standard time per unit 2.5 hours; actual hours 2,000; Standard Wages rate Rs.2 per hour; Actual output 1,000 units. Actual wages Rs.4,500. 20 % of the actual time has been lost due to machinery break down.

Solution No. 16.7

<b>[1] Labour Cost Variance</b>	=	<b><math>[ST \times SR] - [AT \times AR]</math></b>
Standard hours for actual production = 2.5 hours X 1,000 units = 2,500 units		
Actual Rate = Actual wages / Actual hours = Rs. 4,500/ 2,000 hours = Rs.2.25		
	=	<b><math>[2,500 \times 2] - [2,000 \times 2.25]</math>      <b>Rs.500 [F]</b></b>
<b>2. Labour Rate Variance</b>	=	<b><math>AT [SR-AR]</math></b>
		<b>2,000 [2 – 2.25]      <b>Rs.500 [A]</b></b>
<b>3. Labour Efficiency Variance</b>	=	<b><math>SR [ST-AT]</math></b>
		<b>2 [2,500 – 2,000]      <b>Rs.1,000 [F]</b></b>
<b>4. Labour Idle Time Variance</b>	=	<b>Idle Hours X SR</b>
Idle hours = 20 % of Actual hours	-	20 % of 2,000      400 hours
		<b>400 X 2      <b>Rs.800 [A]</b></b>
Note: Idle time variance is part of efficiency variance		

Relationship and Verification:

LCV	=	LRV + LEV	=	Rs.500 [F] = Rs.500 [A] + Rs.1,000 [F]
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Illustration No. 16.8 RS/Pr.18/9.36

A gang of workers usually consists of 10 men, 5 women and 5 boys in a factory. They are paid at standard hourly rates of Rs.1.25, Re.0.80, and Re.0.70 respectively. In a normal working week of 40 hours, the gang is expected to produce 1,000 units of output.

In a certain week, the gang consisted of 13 men, 4 women and 3 boys. Actual wages were paid at the rate of Rs.1.20, Re.0.85 and Re.0.65 respectively. Two hours were lost due to abnormal idle time and 960 units of output were produced.

Calculate all possible labour variance.

Solution No. 16.8

Working Note [1]

Labour	Standard for 1,000 units				Actual for 960 units				
	No. of Workers and Std. labour hours		Rate Rs.	Total Rs.	No. of Workers and Std. labour hours		Rate Rs.	Total Rs.	
Men	10	X 40	400	1.25	500	13 X 40	520	1.20	624
Women	5	X 40	200	0.80	160	4 X 40	160	0.85	136
Boys	5	X 40	200	0.70	140	3 X 40	120	0.65	78
			800		800		800		838

Working Note [2]

Calculation of Idle time:

Men	=	13 X 2 hours	=	26 hours
Women	=	4 X 2 hours	=	8 hours
Boys	=	3 X 2 hours	=	6 hours
Total idle time			=	<u>40 hours</u>

Working Note [3]

Calculation of Actual Hours Worked

Men	=	520 – 26 hours	=	494 hours
Women	=	160 X 8 hours	=	152 hours
Boys	=	120 X 6 hours	=	114 hours
Total Actual hours worked			=	<u>760 hours</u>

**Working Note [4]**  
**Calculation of Standard time for actual output**

Men	=	960 /1000 X 400 hours	= 384 hours
Women	=	960 /1000 X 200 hours	= 192 hours
Boys	=	960 /1000 X 200 hours	= <u>192 hours</u>
Standard time for actual output of 960 units			= <b><u>768 hours</u></b>

**Working Note [5]**  
**Calculation of Revised Standard Time [RST]**

Men	=	760 /800 X 400 hours	= 380 hours
Women	=	760 /800 X 200 hours	= 190 hours
Boys	=	760 /800 X 200 hours	= <u>190 hours</u>
Revised Standard Time [RST]s			= <b><u>760 hours</u></b>

**Working Note [6]**  
**Calculation of Standard labour cost per unit of output**

Standard cost for 1,000 units is Rs.800  
Therefore, Standard labour rate per unit is Rs.800 / 1,000 units = Re.0.80

**Working Note [7]**  
**Calculation of standard output for actual time worked**  
For 800 hours of total standard time, the standard output is 1,000 units  
Therefore , for 760 hours of actual time worked = [1,000 /800] X 760 950 units

<b>[1] Labour Cost Variance</b>	<b>=</b>	<b><i>[ST x SR] – [AT x AR]</i></b>	<b>Rs.</b>	<b>Rs.</b>
Men		[384 x 1.25] – [520 x 1.20]	144.00	[A]
Women	—	[192 x 0.80]- [160 x 0.85]	17.60	[F]
Boys	—	[192 x 0.70]- [120 x 0.65]	56.40	F]
Total Labour Cost Variance				<b>70 [A]</b>
<b>2. Labour Rate Variance</b>	<b>=</b>	<b><i>AT [SR-AR]</i></b>		
Men		520 [1.25 – 1.20]	26	[F]
Women		160 [0.80 – 0.85]	8	[A]
Boys		120 [0.70 – 0.65]	6	[F]
Total Labour Rate Variance				<b>24 [F]</b>

<b>3.Total Labour Efficiency Variance = SR [ST-AT]</b>			
Men	1.25 [384 – 520]	170.00[A]	
Women	0.80 [192 – 160]	25.60 [F]	
Boys	0.70 [192 – 120 ]	50.40 [F]	
Total Labour Efficiency Variance			<b>94 [A]</b>
<b>4. Labour Idle Time Variance = Idle Hours X SR</b>			
Men	26 x 1.25	32.50 [A]	
Women	8 x 0.80	6.40 [A]	
Boys	6 x 0.70	4.20 [A]	
Total Labour idle Time Variance			<b>43.10 [A]</b>
<b>5. Labour Efficiency Variance = SR [ST for actual output-AT]-AT worked]</b>			
Men	1.25 [384 – 494]	137.50 [A]	
Women	0.80 [192 – 152]	32.00 [F]	
Boys	0.70 [192 – 114]	54.60 [F]	
Labour Efficiency Variance			<b>50.90 [A]</b>
<b>6. Labour Mix/Gang Variance = SR [RST-AT worked]</b>			
Men	= 1.25 [380 – 494]	142.50[A]	
Women	0.80 [190 – 152]	30.40 [F]	
Boys	0.70 [190 – 114]	53.20 [F]	
Labour Mix/Gang Variance			<b>58.90 [A]</b>
<b>7. Labour Yield Variance = <i>Standard Labour Cost per unit</i> = [Standard output for Actual time – Actual output]</b>			
	0.80 [950 – 960]	8 [F]	<b>8 [F]</b>

Relationship and Verification:

LCV = LRV + LEV	=	Rs. 70 [A] = Rs.24 [F] + Rs.94 [F]
Total LEF = ITV+ LEV	=	Rs.94 [A] = Rs. 43.10 [A]+ Rs.50.90 [A]
LEV = LMV + LYV	=	Rs. 50.90 [A] =Rs. 58.90 [A] +Rs. 8 [F]



Illustration No. 16.9

From the following data, calculate 1. labour cost variance; 2. Rate variance; 3. Efficiency variance; 4. Mix Variance and 5. Labour sub-efficiency variance.

	Standard		Actual	
	Hours	Rate Rs.	Hours	Rate Rs.
Skilled Labour	10	3.00	9,000	4.00
Semi-skilled	8	1.50	8,400	1.50
Unskilled	16	1.00	20,000	0.90

Solution No. 16.9

Working Note [1]

	Standard for one unit		Standard for 1,000 unit			Actual		
	Hours	Rate Rs.	Hours	Rate Rs.	Total Rs.	Hours	Rate Rs.	Total Rs.
Skilled Labour	10	3.00	10,000	3.00	30,000	9,000	4.00	36,000
Semi-skilled	8	1.50	8,000	1.50	12,000	8,400	1.50	12,600
Unskilled	16	1.00	16,000	1.00	16,000	20,000	0.90	18,000
Total			34,000		58,000	37,400		66,600

Working Note [2]

Calculation of Revised Standard Time

RST =  $\frac{\text{Standard Time}}{\text{Total Standard Time}} \times \text{Total Actual Time}$

Skilled =  $37,400 / 34,000 \times 10,000$  = 11,000 hours  
Semi-Skilled =  $37,400 / 34,000 \times 8,000$  = 8,800 hours  
Unskilled =  $37,400 / 34,000 \times 16,000$  = 17,600 hours

[1] Labour Cost Variance	=	$[ST \times SR] - [AT \times AR]$	Rs.	Rs.
Skilled Labour		$[10,000 \times 3] - [9,000 \times 4]$	6,000	[A]
Semi-skilled		$[8,000 \times 1.50] - [8,400 \times 1.50]$	600	[A]
Unskilled		$[16,000 \times 1.00] - [20,000 \times 0.90]$	2,000	[A]
Total Labour Cost Variance			8,600	[A]

2. Labour Rate Variance =  $AT [SR - AR]$

Skilled Labour	9,000 [3 – 4]	9,000 [A]
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Semi-skilled	8,400 [1.50 – 1.50]	0	
Unskilled	20,000 [1.00 – 0.90]	2,000 [F]	
Total Labour Rate Variance			<b>7,000 [A]</b>

**3.Total Labour Efficiency =  $SR [ST-AT]$  Variance**

Skilled Labour	3.00 [10,000 – 9,000]	3000 [F]	
Semi-skilled	1.50 [8,000– 8,400]	600 [A]	
Unskilled	1.00 [16,000 – 20,000 ]	4,000 [A]	
Total Labour Efficiency Variance			<b>1,600 [A]</b>

**4. Labour Mix/Gang Variance =  $SR [RST-AT \text{ worked}]$**

Skilled Labour	= 3.00 [11,000 – 9,000]	6,000 [F]	
Semi-skilled	1.50 [8,800– 8,400]	600 [F]	
Unskilled	1.00 [17,600 – 20,000 ]	2,400 [F]	
Labour Mix/Gang Variance			<b>4,200 [F]</b>

**7. Labour Sub-Efficiency Variance =  $SR [ST – RST]$**

Skilled Labour	3.00 [10,000 – 11,000]	3000 [A]	
Semi-skilled	1.50 [8,000– 8,800]	1,200 [A]	
Unskilled	1.00 [16,000 – 17,600 ]	1,600 [A]	
Total Sub- Efficiency Variance			<b>5,800 [A]</b>

**Relationship and Verification:**

LCV = LRV + LEV	=	Rs. 8,600[A] = Rs.7,000 [A] + Rs.1,600 [A]
LEF = LMV+ LSEV	=	Rs.1,600 [A] = Rs. 4,200 [A]+ Rs.5,800 [A]

**Check Your Progress 16.2**

From the following data, calculate labour variances  
 Budgeted labour for completing Job Blacky  
 8 skilled workers at Rs.10 per hour for 20 hours  
 12 unskilled workers at Rs.8 per hour for 20 hours  
 Actual labour for completing Job Blacky  
 12 skilled workers at Rs.11 per hour for 20 hours  
 13 unskilled workers at Rs.7 per hour for 20 hours

**NOTES:**      a) Write your answer in the space given below  
                 b) Check your answer with the one given at the end of this lesson

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**16.9 OVERHEAD VARIANCES**

As we have discussed in the earlier lessons, the term overhead includes indirect material, indirect labour and indirect expenses. Overhead variance may relate to factory, office or selling and distribution overheads. For the purposes of variance analysis we have divided overhead variance broadly into two categories viz., variable and fixed.

Before we proceed to study overhead variances and its categories, we should familiar with certain terms:

i. <b>Standard overhead Rate per unit/hour</b>	=	$\frac{\text{Budgeted Overhead}}{\text{Budgeted Output/Hours}}$
ii. <b>Standard Hours for Actual output</b>	=	$\frac{\text{Budgeted Hours}}{\text{Budgeted Output}} \times \text{Actual Output}$
iii. <b>Standard Output</b>	=	$\frac{\text{Budgeted Output}}{\text{Budgeted Hours}} \times \text{Actual Hours}$

Apart from the above technical terms related to overheads, we should familiarize certain key terms for the computation of overhead variances. They are :

<b>I</b>	<b>Recovered / Absorbed Overheads</b>
	$= \text{Standard Rate per unit} \times \text{Actual output}$
	<i>Or</i>
	$\text{Standard Rate per unit} \times \text{Standard hours for Actual output}$
<b>II</b>	<b>Budgeted Overheads</b>
	$= \text{Standard Rate per unit} \times \text{Budgeted Output}$
	<i>Or</i>
	$\text{Standard Rate per hour} \times \text{Budgeted Hours}$

<b>III</b>	<b>Standard Overheads</b>
=	<b>Standard Rate per unit X Standard hours for Actual output</b>
	<b>Or</b>
	<b>Standard Rate per hour X Actual Hours</b>
<b>IV</b>	<b>Actual Overheads</b>
=	<i>Actual Rate per Unit X Actual Output</i>
	<b>Or</b>
	<i>Actual Rate per Hour X Actual Hours</i>

The terms ‘Budgeted Overheads’ and ‘Standard Overheads’ have not been same and budgeted overheads are for budgeted time or budgeted output whereas standard overheads are for actual time or budgeted output in actual time.

**16.9.1 OVERHEAD COST VARIANCE [OCV]**

Overhead Cost Variance is the difference between the standard overhead specified i.e., recovered overheads and the actual overhead incurred.

$$OCV = \text{Recovered Overheads} - \text{Actual Overheads}$$

Overhead Cost Variance is the total of both the fixed and variable overheads variances.

**16.9.2 VARIABLE OVERHEAD VARIANCE**

Variable cost varies in proportion to the level of output, while the cost is fixed per unit. As such the standard cost per unit of these overheads remains the same irrespective of the level of output attained. As the volume does affect the variable cost per unit or per hour, the only factor leading to difference is price. The variance also will result because of the changes in the expenditure incurred.

**a. Variable Overhead Cost Variance [VOCV]**

It is the difference between standard overheads cost for actual output and the actual variable overhead incurred.

$$VOCV = \text{Recovered Variable Overheads} - \text{Actual Variable Overheads}$$

Variable overhead cost variance may be the result of expenses outstanding or prepaid and abnormal expenses like rectification of defective work, excessive spoilage, abnormal overtime etc.

**b. Variable Overhead Expenditure Variances [VOExp.V]**

It is the difference between the standard variable cost allowed for the actual time worked and the actual variable overhead incurred.

$$VOExp.V = \text{Standard Variable overheads} - \text{Actual Variable Overheads}$$

### c. Variable Overhead Efficiency Variance [VOEff. V]

It is the difference between the variable overhead recovered from the output and the standard variable overhead for actual time.

$$\text{VOEff. V} = \text{Recovered Variable Overhead} - \text{Standard Variable Overhead}$$

### Illustration No. 16.10

From the following details, calculate variable overhead variances:

Budgeted Variable overheads	Rs.1,20,000
Budgeted Output in units	20,000
Budgeted hours	60,000
Actual variable overheads	Rs.1,70,000
Actual hours	50,000
Actual output in units	22,000

### Solution No. 16.10

$$\text{Actual Overhead} = \text{Rs.}1,70,000 \text{ [given]}$$

## Working Note [1]

### Calculation of Recovered Variable Overhead

$$\text{Recovered Overhead} = \text{Actual output} \times \text{Budgeted overhead rate per unit}$$

Actual out put = 22,000 units

$$\text{Budgeted overhead Rate per unit} = \text{Budgeted overhead} / \text{Budgeted Output}$$

$$= \text{Rs.}1,20,000 / 20,000 = \text{Rs.}6$$
$$= 22,000 \times \text{Rs.}6 = \text{Rs.}1,32,000$$

## Working Note [2]

### Calculation of Standard Variable Overhead

$$\text{Standard Overhead} = \text{Actual hours worked} \times \text{Budgeted overhead Rate per hour}$$

$$\text{Budgeted overhead Rate per hour} = \text{Budgeted overhead} / \text{Budgeted hour}$$

$$= \text{Rs.} 1,20,000 / 60,000 = \text{Rs.} 2$$

$$= 50,000 \times 2 = \text{Rs.} 1,00,000$$

**[1] Variable Overhead Variance = Recovered Variable overhead – Actual VOH**

$$= \text{Rs.1,32,000} - \text{Rs.1,70,000} = \text{Rs.38,000 [A]}$$

**[2] Variable Overhead Expenditure Variance = Standard VOH – Actual VOH**

$$= 1,00,000 - \text{Rs.1,70,000} = \text{RS.70,000 [A]}$$

**[3] Variable overhead Efficiency Variance = Recovered VOH – Standard VOH**

$$= \text{Rs.1,32,000} - \text{Rs.1,00,000} = \text{Rs.32,000 [F]}$$

**Verification:**

$$\text{VOHV} = \text{VExp. V} + \text{V Eff. V} = \text{Rs.38,000 [A]} = \text{Rs.70,000 [A]} + \text{Rs.32,000 [F]}$$

### **16.9.3 FIXED OVERHEAD VARIANCE**

Fixed overhead variance depends on [a] fixed expense incurred and [b] the volume of production obtained. The volume of production depends upon [i] efficiency; [ii] the days for which the factory runs in a week [calendar variance] and [iii] capacity of the plant for production.

#### **a. Fixed Overhead Cost Variance [FOCV]**

It is the difference between the standard fixed overheads recovered on actual production and the actual fixed overhead incurred.

$$\text{FOCV} = \text{Recovered Fixed Overhead} - \text{Actual Fixed Overhead}$$

The causes for fixed overhead cost variance may be due to higher amount of fixed expenses might have been incurred compared to the budgeted expenses. It is also possible that the fixed expenses incurred are as per the budget, but the production is more or less than what was budgeted.

#### **b. Fixed Overhead Expenditure / Budget Variance [FOExp. V]**

It is the difference between the amount of fixed overheads as per the budget and the actual fixed overheads incurred.

$$\text{FOExp. V} = \text{Budgeted Fixed Overhead} - \text{Actual Fixed Overhead}$$

**c. Fixed Overhead Volume Variance [FOVol. V]**

This variance is the difference between the fixed overhead recovered on the actual output and the budgeted fixed overhead for the budgeted output. The volume variance arises due to the difference in output – Budgeted and actual.

$$\text{FOVol. V} = \text{Recovered Fixed Overhead} - \text{Budgeted Fixed Overhead}$$

The fixed overhead volume variance is analysed further into capacity and efficiency variance. Capacity variance reflects the change in volume of output due to working more or less time than the budgeted time. Efficiency variance reflects the change in volume of output due to higher or lower efficiency of the workers.

**d. Fixed Overhead Capacity Variance [FOCV]**

Capacity in terms of hours or days may vary due to sundry causes like unexpected holidays, stoppages of work due to accident, strikes, break downs, power failure, absenteeism of workers etc.

$$\text{FOCV} = \text{Standard Fixed Overhead} - \text{Budgeted Fixed Overheads}$$

**e. Fixed Overhead Efficiency Variance [FOEff. V]**

This variance reveals higher or lower work done during a budget period due to efficiency or inefficiency of the workers. Since the effect of more or less time worked on output is separated through capacity variance, the balance of the volume variance indicates the outcome of the efficiency factor.

$$\text{FOEff. V} = \text{Recovered Fixed Overhead} - \text{Standard Fixed Overheads}$$

**f. Calendar Variances**

This variance is a part of fixed overhead capacity variance. Capacity variance reveals the effect of working more or less time due to all causes. Calendar variance is restricted to the time lost or gained due to working more or less days than the schedule working days in the budget period. This variance may occur due to unscheduled holidays or working on scheduled holidays.

***Calendar Variance***

$$= \text{Standard overhead rate per day} \times \text{Excess/ Deficit days worked.}$$

This variance is favourable if the actual days worked are more than the budgeted days and vice versa.

Illustration No. 16.11

The following data relating to January is available

	Budgeted	Actual
No. of days	25	27
Man hours per month	5,000	5,400
Output in units	500	525
Fixed overheads	Rs.2,500	Rs.2,400

Calculate the fixed overhead variances for the month.

Solution No. 16.11

Working Notes

1. Actual Fixed Overhead

=

Rs.2,400
2. Recovered Fixed Overhead

=

Standard Rate per unit x Actual output

=

Rs.5 x 525 units = **Rs.2,625**
- Standard Rate per unit

=

Budgeted Overhead / Budgeted output

Rs.2,500 / 500 = Rs.5 per unit
3. Standard Fixed Overhead

=

Standard Rate per hour X Actual hours

=

Re. 0.50 X 5,400 = **Rs. 2,700**
- Standard rate per hour

=

Budgeted overhead  
Budgeted Hour

2,500 / 5,000 = Re.0.50s
4. Budgeted Overhead

=

Rs.2,500
5. Standard overhead rate per day

=

Budged overhead / Budgeted number of days

= 2,500 / 25 = **Rs.100**
6. Excess/ Deficity days

=

Budgeted Days – Actual days worked

25days – 27 days = **2 days in excess**



- 1) Fixed Overhead Cost Variance [FOCV] = Recovered Fixed Overhead – Actual Fixed Overhead  

$$2,625 - 2,400 = \text{Rs.}225[\text{F}]$$
- 2) Fixed Overhead Expenditure Variance [FOExp. V] = Budgeted Fixed Overhead – Actual Fixed Overhead  

$$2,500 - 2,400 = \text{Rs.}100[\text{F}]$$
- 3) Fixed Overhead Volume Variance [FOVol. V] = Recovered Fixed Overhead – Budgeted Fixed Overhead  

$$2,625 - 2,500 = \text{Rs.}125 [\text{F}]$$
- 4) Fixed Overhead Capacity Variance [FOCV] = Standard Fixed Overhead – Budgeted Fixed Overheads  

$$2700 - 2500 = \text{Rs.}200 [\text{F}]$$
- 5) Fixed Overhead Efficiency Variance [FOEff. V] = Recovered Fixed Overhead – Standard Fixed Overheads  

$$2625 - 2700 = \text{Rs.}75 [\text{A}]$$
- 6) Calendar Variances = Standard overhead rate per day x Excess days worked.  

$$\text{Rs. } 100 \times 2 \text{ days} = \text{Rs.}200 [\text{F}]$$

#### Illustration No. 16.12

The following information was obtained from the records of a manufacturing firm using standard costing system.

	Standard	Actual
Production	4,000 units	3,800 units
Working days	20 days	21 days
Total Overheads	Rs.52,000	Rs.51,000
Fixed Overheads	Rs.40,000	Rs.39,000
Variable Overheads	Rs.12,000	Rs.12,000

You are required to calculate overhead variances.

**Solution No. 16.12**

**Working Notes**

<b>1. Actual Overheads</b>	- [Given]		
	<b>Total</b>		Rs.51,000
	<b>Fixed</b>		Rs.39,000
	<b>Variable</b>		Rs.12,000
<b>2. Budgeted Overheads</b>	- [Given]		
	<b>Total</b>		Rs.52,000
	<b>Fixed</b>		Rs.40,000
	<b>Variable</b>		Rs.12,000
<b>3. Standard Rate per unit</b>	- Budgeted Overhead / Budgeted output		
	<b>Total</b>	52,000/4,000	Rs.13.00
	<b>Fixed</b>	40,000/4,000	Rs.10.00
	<b>Variable</b>	12,000/4,000	Rs.3.00
<b>3. Recovered Overheads</b>	- Standard Rate per unit x Actual output		
	<b>Total</b>	Rs.13.00 x 3,800 units	Rs.49,400
	<b>Fixed</b>	Rs.10.00 x 3,800 units	Rs.38,000
	<b>Variable</b>	Rs.3.00 x 3,800 units	Rs.11,400
<b>4. Standard output for Actual days</b>	- Budgeted Output /Budgeted days x actual days		
		4000 /20 X 21 = 4,200 units	
<b>5. Standard Overheads</b>	- Standard Rate per unit X Standard days for Actual output		
	<b>Fixed</b>	Rs.10 x 4,200	Rs.42,000
	<b>Variable</b>	Rs.3 x 4,200	Rs.12,600
<b>6.Excess/ Deficit days</b>	Budgeted Days – Actual days worked		
	20-21		1 day excess
<b>7. Standard Fixed overhead rate per day</b>	- Budged Fixed overhead / Budgeted number of days		
		40,000 / 20	Rs.2,000

**Variance Analysis**

1) Overhead Cost Variance	=	Recovered Overheads – Actual Overheads	
		49,400– 51,000	= <b>Rs.1,600[A]</b>
2) Variable Overhead Cost Variance [VOCV]	=	Recovered Variable Overheads – Actual Variable Overheads	
		11,400 -12,000	= <b>Rs.600 [A]</b>
3) Variable Overhead Expenditure Variances [VOExp.V]	=	Standard Variable overheads – Actual Variable Overheads	
		12,600 – 12,000	= <b>Rs.600 [F]</b>

- 4) Variable Overhead Efficiency Variance [VOEff. V]

=

Recovered Variable Overhead – Standard Variable Overhead  
  
11,400 – 12,600 = **Rs.1,200[A]**
- 5) Fixed Overhead Cost Variance [FOCV]

=

Recovered Fixed Overhead – Actual Fixed Overhead  
  
38,000 -39,000 = **Rs.1,000 [A]**
- 6) Fixed Overhead Expenditure Variance [FOExp. V]

=

Budgeted Fixed Overhead – Actual Fixed Overhead  
  
40,000 – 39,000 = **Rs.1,000 [F]**
- 7) Fixed Overhead Volume Variance [FOVol. V]

=

Recovered Fixed Overhead – Budgeted Fixed Overhead  
  
38,000 – 40,000 = **Rs.2,000 [A]**
- 8) Fixed Overhead Efficiency Variance [FOEff. V]

=

Recovered Fixed Overhead – Standard Fixed Overheads  
38,000 – 42,000 = **Rs.4,000 [A]**
- 9) Fixed Overhead Capacity Variance [ FOCV]

=

Standard Fixed Overhead – Budgeted Fixed Overheads  
  
42,000 – 40,000 = **Rs.2,000 [F]**
- 10) Calendar Variances

=

Standard overhead rate per day x Excess days worked.  
Rs.2,000 x 1 = **Rs.2,000 [F]**  
days

**Check Your Progress 16.3**

**S.V Ltd. has furnished you the following data:**

	Budgeted	Actual
Production	20,000 units	22,000 units
Working days	25 days	27 days
Fixed Overheads	Rs.30,000	Rs.31,000

- NOTES:**
- a) Write your answer in the space given below  
b) Check your answer with the one given at the end of this lesson

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**16.10 SALES VARIANCE**

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Standard costing is considered to be a system of cost variance. Costs affect profits of the business. However, sales determine the volume of profit or loss. It is therefore, very informative for the management to calculate sales variances. Therefore, business houses generally compute sales variance along with cost variances.

The variances may be on account of controllable as well as uncontrollable factors. Changes in market conditions, demand by customers etc., are beyond the control of the management. However, certain factors like non-accessibility to the buyers, lack of advertisement, submission of high priced tenders, etc., are controllable and an effort can be made to check adverse variance. The variances indicate the difference between actual sales/ profit and budgeted or standard sales/profits. The variance may be of favourable and vice versa. The sales variances can be calculated in two difference ways [1] computation to show the effect on sales value [2] computation to show the effect on profit. Thus they are broadly classified into two categories namely,

- 16.10.01      Value Method
- 16.10.02      Sales Margin or Profit method

**16.10.1 VALUE METHOD**

Sales are generally affected by two factors. The first one is selling price and the other is quantity of sales. Sales are mostly price sensitive. Any increase or decrease in selling price affects the sales volumes or quantity of sales. Selling prices and sales volumes are determined in advance taking into account all the factors affecting them. So, the sales value variances are of great significance to the sales department in assessing the meaning and reasons for change in the sales value of each product and each area, etc.,

*The important point to remember is that unlike cost variance, negative variances are favourable and vice versa in the case of sales variances.*

**A. Sales Value Variance [SVV]**

It is the difference between the budgeted total sales and the actual sales effected during the budgeted period.

***SVV = Budgeted Sales – Actual Sales***

If actual sales are more, the variance is favourable and vice versa.

The causes for sales value variances are change the selling prices; changes in the sales quantity; change in sales mix, when two or more products are sold; sales promotional measures might have yielded higher results and higher demand for the products in the market etc.

**B. Sales Price Variance [SP V]**

This variance is the variation is total sales from the budgeted sales, caused solely by the change in selling prices.

$SPV = AQ [AP - SP]$

**C. Sales Volume Variance [SVV]**

This variance is caused solely due to selling higher or lower quantity than the budgeted volume.

$SVV = SP [AQ - SQ]$

**D. Sales Mix Variances [SMV]**

Mix variances arise only when two or more products are sold. When products sold are almost similar in nature, mix variance can be computed, based on quantity, which can be expressed in common units. The method is just like in material mix variance.

$SMV = SP [RSQ - AQ]$

**E. Sales Quantity [Sub-Volume] Variance [SQV]**

It is the part of sales volume variance. It represents the differences between the sales volume variance and the sales mix variance arising on account of difference in the quantity sold.

$SQV = SP [RSQ - SQ]$

**Illustration No. 16.13**

Product	Budget		Actual	
	Qty.	Price p.u	Qty.	Price p.u
A	400	30	500	31
B	200	25	100	24

Calculate: Sales value variance; Sales price Variance; Volume variance; Mix variance and Sub-volume variance.

Solution No. 16.13

Sales Variance – Value Method				
1. Sales Value Variance [SVV]	-	Budgeted Sales – Actual Sales		
		[BQ x BP] – [AQ x AP]		
		[400x 30]	=	<b>Rs.3,500</b>
	<b>A</b>	-[500		<b>[F]</b>
		x31]		
		[200x 25]	=	<b>Rs.2,600</b>
	<b>B</b>	-[100		<b>[A]</b>
		x24]		
	<b>Total</b>			<b>Rs.900 [F]</b>
2.Sales Price Variance [SP V]	-	AQ [AP –SP]		
	<b>A</b>	500 [31-	=	<b>Rs.500 [F]</b>
		30		
	<b>B</b>	100 [24-	=	<b>Rs.100 [A]</b>
		25]		
	<b>Total</b>			<b>Rs.400 [F]</b>
3.Sales Volume Variance [SVol.V]	-	SP [AQ-SQ]		
	<b>A</b>	30 [500-	=	<b>Rs.3,000</b>
		400]		<b>[F]</b>
	<b>B</b>	25 [100-	=	<b>Rs.2,500</b>
		200]		<b>[A]</b>
	<b>Total</b>			<b>Rs.500 [F]</b>
4.Sales Mix Variances [SMV]	-	SP [AQ - RSQ]		
	<b>A</b>	30 [500-	=	<b>Rs.3,000</b>
		400]		<b>[F]</b>
	<b>B</b>	25 [100-	=	<b>Rs.2,500</b>
		200]		<b>[A]</b>
	<b>Total</b>			<b>Rs.500 [F]</b>
5.Sales Quantity [Sub-Volume] Variance [SQV]	-	SP [RSQ-SQ]		
	<b>A</b>	30 [400-	=	<b>0</b>
		400]		
	<b>B</b>	25 [200-	=	<b>0</b>
		200]		
	<b>Total</b>			<b>0</b>

Note: When total standard quantity is equal to the total actual quantity RSQ will be the same as the standard quantity. Therefore mix variance will be equal to volume variance.

### 16.10.2 PROFIT OR MARGIN METHOD

Profit Method of sales variance is the difference between the standard margins appropriate to the quantity of sales budgeted for a period and the margin between the standard cost and the actual selling price of sales effected. This variance arises because of the difference between total budgeted profit and total actual profit. Variances based on profits are the following:

#### A. Sales Margin Variance [SMV]

This variance reveals the difference between the total budgeted profit and actual profit earned.

$$SMV = [BQ \times BP] - [AQ - AP] \text{ or } \textit{Budgeted profit} - \textit{Actual Profit}$$

Where

BQ -budgeted sales quantity; BP – Budgeted profit per unit;

AQ – actual quantity sold; and AP actual price per unit.

If actual profit is more, the variance is favourable and vice versa.

#### B. Sales Margin Price Variance [SMPV]

This variance is the difference in profit due to the difference between the standard and actual price as applied to the actual quantity sold.

$$SMPV = AQ [BP-AP]$$

If the variance is negative, it is favourable and vice versa.

#### C. Sales Margin Volume Variance [SMVV]

This variance arises due the differences between the profits on the actual volume sold and the budgeted volume.

$$SMVV = BP [BQ-AQ]$$

If the variance is negative, it is favourable and vice versa.

#### D. Sales Margin Mix Variance [SMMV]

When there is variation in the mix of products sold, it causes difference in profits.

$$SMMV = BP [RSQ - AQ]$$

If the variance is negative, it is favourable and vice versa.

F. Sales Margin Quantity Variance [SMQV]

It is the result of the difference between budgeted profit and actual profit, both taken in standard ratio.

$SMQV = BP [BQ - RSQ]$

If the variance is negative, it is favourable and vice versa.

Illustration No. 16.13

From the following information, calculate sales margin variances:

Product	Budgeted Sales			Actual Sales		
	Qty. [Units]	Sales price per unit Rs.	Std. Cost per unit Rs.	Qty. [Units]	Sales price per unit Rs.	Sales Margin per unit Rs.
Alpha	600	20	12	800	24	12
Beta	400	15	9	600	12	3
	1,000			1,400		

Solution No. 16.13

Product	Budgeted Margin			Actual Margin		
	Qty. [Units]	Sales Margin per unit Rs.	Total Rs.	Qty. [Units]	Sales Margin per unit Rs.	Total Rs.
Alpha	600	[20-12] 8	4,800	800	12	9,600
Beta	400	[15-9] 6	2,400	600	3	1,800
			7,200	1,400		11,400

Sales Variance – Margin/Profit Method

$$\text{Sales Margin Variance [SMV]} = [BQ \times BP] - [AQ \times AP] \text{ or Budgeted profit} - \text{Actual Profit}$$

Alpha	4,800	-	=	Rs.4,800
	9,600			[F]
Beta	2,400	-	=	Rs.600 [A]
	1,800			
Total				Rs4,200[A]



Sales Margin Price Variance [SMPV]		-	AQ [AP –SP]		
	Alpha	800 [8-12]	=		<b>Rs.3,200[F]</b>
	Beta	600 [6-3]	=		<b>Rs.1,800[A]</b>
	<b>Total</b>				<b>Rs.1,400[F]</b>
Sales Margin Volume Variance [SMVV]		-	BP [BQ-AQ]		
	Alpha	8 [600-800]	=		<b>Rs.1,600[F]</b>
	Beta	3 [400-600]	=		<b>Rs.1,200[F]</b>
	<b>Total</b>				<b>Rs.2,800[F]</b>
RSQ =		$\frac{\text{Total Actual Quantity} \times \text{Standard Quantity}}{\text{Total Standard Quantity}}$			
	Alpha	1400/1000 X 600	=		<b>840 units</b>
	Beta	1400/1000 X 400	=		<b>560 units</b>
Sales Margin Mix Variance [SMMV]		-	BP [RSQ – AQ]		
	Alpha	12 [840-800]	=		<b>Rs.3200 [A]</b>
	Beta	3 [560-600]	=		<b>Rs.240 [F]</b>
	<b>Total</b>				<b>Rs.80 [A]</b>
Sales Margin Quantity Variance [SMQV]		-	BP [BQ- RSQ]		
	Alpha	12 [600-840]	=		<b>Rs.1,920[F]</b>
	Beta	3 [400-560]	=		<b>Rs.960 [F]</b>
	<b>Total</b>				<b>Rs.2,880[F]</b>

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16.11 LET US SUM UP

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Variance is the difference between standard and actual performance. If the standard cost is more than the actual cost, then this variance is called favourable variance else unfavourable variance. Material cost variance is the difference between standard material cost and actual material cost. Material cost variance arise due to change in price of material or change in usage of material. Labour variance is the difference between standard wage fixed and actual wage paid.

16.12 LESSON – END ACTIVITIES

1.

What is variance Analysis? What is its importance?
2.

Describe to managerial use of variance analysis.
3.

Describe variance analysis significance to the management.
4.

The standard material cost for 100 kg of chemical D is made up of:  
Chemical A: 30kgs.@ Rs.4.00 per kg.  
Chemical B: 40kgs.@ Rs.5.00 per kg.  
Chemical C: 80kgs.@ Rs.6.00 per kg.  
In a batch of 500 kgs. Of chemical D were produced from a mix of:  
Chemical A: 140 kgs. at a cost of Rs.588  
Chemical B: 220 kgs. at a cost of Rs.1,056  
Chemical C: 440 kgs. at a cost of Rs.2,860

How do the yield, mix and the price factors contribute to the variance in the actual cost per 100 kg of chemical D over the standard cost?

4) 5. From the following information calculate the Materials Mixture Variance

Materials	Standard Quantity	Actual Quantity	Standard Price per unit	Actual Price per unit
A	100	150	Rs.5	Rs.5.50
B	200	250	Rs.6	Rs.6.00
C	300	400	Rs.4	Rs.3.50

6. Calculate the material (a) cost variance (b) price variance and (c) quantity variance

	Standard			Actual		
	Qty	Rate	Amount Rs.	Qty.	Rate	Amount Rs.
A	4	100	400	2	350	700
B	2	200	400	1	200	200
C	2	400	800	3	300	900
	8		1,600	6		1,800

7. A company manufactures particular product the standard material cost of which is Rs.10per unit. The following information is obtained from the cost records.

(i) Standard mix

Material	Quantity	Rate	Amount
	units	Rs.	Rs.
A	70	10	700
B	30	5	150
	<u>100</u>		<u>850</u>
Loss 15%	15		-
	<u>85</u>		<u>850</u>

(ii) Actual results for January 1987:

Material	Quantity	Rate	Amount
	units	Rs.	Rs.
A	400	11	4,400
B	200	6	1,200
	<u>600</u>		<u>5,600</u>
Loss 15%	60		-
	<u>540</u>		<u>5,600</u>

Calculate: (1) Material price variance (2) Material mix variance (3) Material usage variance (4) Material yield variance (5) Material cost variance

8. Calculate material price variance in each of the following:

- Standard

: 2,740 units at Rs.15 each
- (a)
- Actual

: 3,000 units at Rs.17 each
- (b)
- Standard

: 5,000 units at Rs.4 each
- Actual

: 2,000 units, purchased at Rs.4.5 each

2,600 units, purchased at Rs.5 each

1,300 units, purchased at Rs.5.5. each
- (c)
- Opening stock

: Nil
- Purchase of material

: 14,600 tons at Rs.15 per ton

- Closing stock : 1,600 tons
- Standard price : Rs.16 per ton
- (d) Standard Price per k.g. of chemical ‘Y’ : Rs.400
- Stock at the beginning of the period : 200kgs.
- Purchase during the period : 800kgs at Rs.425 per kg.
- Closing stock at the end of the period : 300kgs.

9. From the following particulars calculate the revised standard quantity for each material and material mix variance:

Material	Standard quantity Kg.	Actual quantity Kg.	Standard price per unit Rs.
X	500	460	10
Y	300	480	12
Z	200	260	8

10. From the details given calculate:

- Material cost variance
- (a)
- (b) Material price variance
- (c) Material usage variance
- Quantity of material purchased - 3,000 units
- Value of materials purchased Rs.9,000
- Standard quantity of material required per ton of output 30 units
- Standard rate of materials Rs.2.50 per unit
- Opening stock of materials Nil
- Closing stock of materials 500 units
- Output during the period 80 tons

11. From the following details, calculate the variances specified:

- (a) Standard material :
  - Material A : 1,000 units Rs.10 each
  - Material B : 2,000 units ate Rs.6 each
  - Standard loss : 10%

Actual material :  
 Material A : 1,200 units at Rs.9 each  
 Material B : 2,100 units at Rs.7 each  
 Output, : 2,800 units.

Calculate material mix and yield variances.

(b) Material used :  
 A : 10,000kgs at Rs.10 per kg  
 B : 6,000kgs at Rs.20 per kg  
 Output : 14,000kgs.  
 Standard loss : 10% of input

Compute material yield variance

(c) Standard mix :  
 X : 300 units at Rs.4 each  
 Y : 400 units at Rs.3 each  
 Z : 500 units at Rs.2 each  
 Actual mix :  
 X : 500 units at Rs.5 each  
 Y : 400 units at Rs.4 each  
 Z : 300 units at Rs.3 each

Calculate material mix variance.

12. From the following details you are required to compute material usage or quantity variance in each case separately.

(a) Standard : 400 units at Rs.10 each  
 Actual : 360 units at Rs.7 each  
 (b) Standard material for one unit of output : 3-kg at Rs.10 per kg.  
 Production during March 1999 : 6,000 units of output.  
 Materials consumed : 20,400kgs at Rs.11 per kg.

(c) Standard:  
 For production of 100 articles,  
 Material 40kgs at Rs.8 per kg.  
 Actual:  
 Output 25,000 articles  
 Material used 9,200kgs at Rs.9 per kg.

(d) Standard:  
 Material A: 40%; Material B 60% at Rs.5 and Rs.10 per unit respectively.  
 Standard loss 10%  
 Actual:  
 5,000 units at Rs.4 per kg.  
 B 5,000 unit at Rs.11 per kg.  
 Output 8, 100 units.

13. From the following data compute (a) Labour cost variance (b) Labour rate variance (c) Labour efficiency variance (d) Labour mix variance.  
 Budgeted labour composition for producing 100 units.
- 20 men at Rs.1.25 per hour for 25 hour  
 30 women at Rs.1.10 per hour for 25 hours  
 Actual labour composition for producing 100 units  
 25 men at Rs. 1.50 per hour for 24 hours.  
 25 women at Rs.1.20 per hour for 25 hours.

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**16.13    MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’**

Variances	A	B	Total
Material Cost Variance	34,000[A]	9,000 [F]	25,000[A]
Material Price Variance	24,000 [A]	18,000 [F]	6,000 [A]
Material Usage Variance	10,000 [A]	9,000 [A]	19,000 [A]
Material Mix Variance	0	0	0
Material Sub-usage Variance	10,000 [A]	9,000 [A]	19,000 [A]

**Check Your Progress 16.02**

Variances	Skilled	Unskilled	Total
Labour Cost Variance	1,040 [A]	100 [F]	940[A]
Labour Rate Variance	240 [A]	260 [F]	20 [F]
Labour Efficiency Variance	800 [A]	160 [A]	960 [A]
Labour Mix Variance	400 [A]	320 [F]	80 [A]
Labour Sub-efficiency Variance	400 [A]	480 [A]	880 [A]

**Check Your Progress 16.03**

Variances	Rs.
1. Fixed overhead Variance	Rs.2,000 [F]
2. Fixed Overhead Expenditure Variance	Rs.1,000 [A]
3. Fixed Overhead Volume Variance	Rs.3,000 [F]
4. Fixed Overhead Capacity Variance	Rs.900 [A]
5. Fixed Overhead Efficiency Variance	Rs.1,500 [F]
6. Calendar Variances	Rs.2,400 [F]

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**16.14 SUGGESTED READING/REFERENCES/SOURCES**

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1. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
2. R.S.N. Pillai and Bagavathi – Management Accounting – S.Chand and Company Ltd.
3. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
4. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications

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## LESSON-17

### BUDGETS AND BUDGETARY CONTROL

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#### **Contents:**

- 17.0 Aims and objectives
- 17.1 Introduction
- 17.2 Meaning and Definitions
- 17.3 Objectives of Budgetary Control
- 17.4 Merits and Limitations of Budgetary Control
- 17.5 Installation of Budgetary Control System
- 17.6 Essentials of Sound Budgetary Control System
- 17.7 Classification of Budgets
- 17.8 Zero Base Budgeting
- 17.9 Let us Sum Up
- 17.10 Lesson-end Activities
- 17.11 Model Answers to “Check your Progress”
- 17.12 Suggested Reading/References/Sources

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#### **17.0 AIMS AND OBJECTIVES**

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In this lesson, we will discuss upon:

- i. concepts of budget, budgeting and budgetary control
- ii. how to prepare of various budgets

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#### **17.1 INTRODUCTION**

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Contemporary business globe is facing cutthroat competition, uncertainty and exposed to different types of risks. This complexity of managerial problems has led to the development of various managerial tools, techniques and procedures useful for the management in managing the business activities successfully. Budgeting is the most common, useful and widely used standard devise of planning and control. A proper planning and control are essential for an efficient management. Out of good number of tools and devises, budgeting is the most important and widely applied device to plan and control the costs. In this lesson we will discuss about the concept of budgeting, the various functional budgets and its uses and limitations.

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## 17.2 MEANING AND DEFINITIONS

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### 17.2.1 Budget

A budget is a plan of action expressed in financial terms. It is prepared for a definite period of time. It is a planned estimate of future business conditions such as the sales, cost and profit. A budget is a tool which helps the management in planning and control of business activities.

According to CIMA, England, a budget is,” a financial and /or quantitative statement, prepared and approved prior to a defined period of time, of the policy to be pursued during the period for the purpose of attaining a given objective”.

It is also defined as,” a blue print of a projected plan of action of a business for a definite period of time”.

Thus,

1. Budgets are blueprint of the desired plant of action;
2. They are means of communications;
3. They indicate the business policies;
4. They serve as declaration of policies;
5. They provide a means of coordination of the business as a whole;
6. Budgets are instrument of managerial control;
7. They are controlling tools;
8. Budgets provide yardstick for comparison;
9. They set definite goals;
10. They fix responsibilities and direct to profitable direction.

### 14.2.2. Budgeting

Budgeting refers to the process of preparing the budgets. It involves a detailed study of business environment clearly grasping the management objectives, the available resources of the enterprises and capacity of the enterprise.

Budgeting is defined by **J.Batty** as under:

“The entire process of preparing the budgets is known as budgeting”.

In the words of **Rowland and Harr**:

“Budgeting may be said to be the act of building budgets”.

Thus, budgeting refers to the management action of formulating budgets. In other words, budgeting is the process of construction of budget plans. Preparation of budget or budgeting is a planning function and their implementation is a control function. “Budgetary control” starts with budgeting and ends with control.

### 14.2.3 Budgetary Control

According to **CIMA**, England, budgetary control is, “The establishment of budgets relating the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action the objectives of that policy or to provide a basis for its revision”.

According to **J. Batty** “budgetary control is a system which uses budgets as a means of planning and controlling all aspects of producing and /or selling commodities and services”.

Thus, budgetary control is the process of determining various budgeted figures for the enterprise for the future period and then comparing the budgeted figures with the actual performance for calculating variances, if any. The budget is a means and budgetary control is the end result.

A sound Budgetary control system involves:

- 1) Establishment of budgets for each section of the organization.
- 2) Recording of actual performance.
- 3) Continuous comparison of the actual performance with the budget.
- 4) In case there is a difference between actual and budgeted performance, taking suitable remedial action.
- 5) Revision of budgets if necessary.

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## 17.3 OBJECTIVES OF BUDGETARY CONTROL

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Budgetary control is inevitable for policy formulation, planning, control and coordination. The essence of budgeting is to plan and control. Following are the main objectives of budgetary control.

1. To define the goal of the enterprise.
2. To provide long and short period plans for attaining these goals.
3. To co-ordinate the activities of different departments.
4. To operate various cost centres and departments with efficiency and economy.
5. To eliminate waste and increase the profitability.
6. To estimate capital expenditure requirements of the future.

7. To centralize the control system.
8. To correct deviations from established standards.
9. To fix the responsibility of various individuals in the organization.
10. To ensure that adequate working capital is available for the efficient operation of the business.
11. To indicate to the management as to where action is needed to solve problems without delay.

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## **17.4 MERITS AND LIMITATIONS OF BUDGETARY CONTROL**

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### **17.4.1 Advantages**

The budgetary control system helps in fixing the total for the organization as a whole and concerted efforts are made for its achievement. Budgetary control has become an essential tool of the management for controlling costs and maximizing profits. It acts as a friend, philosopher, and guide to the management. Some of the advantages of budgetary control are:

- 1) Budgetary control defines the objectives and policies of the undertaking as a whole.
- 2) It is an effective method of controlling the activities of various departments of a business unit. It fixes targets and the departments have to work efficiently to reach the targets.
- 3) It secures proper co-ordination among the activities of various departments.
- 4) It helps the management to fix up responsibility in case the performance is below expectations.
- 5) It helps the management to reduce wasteful expenditure. This leads to reduction in the cost of production.
- 6) It brings in efficiency and economy by promoting cost consciousness among the employees.
- 7) It facilitates centralized control with decentralized activity.
- 8) It acts as internal audit by a continuous evaluation of departmental results and costs.
- 9) It facilitates introduction of standard costing.
10. It aids in obtaining bank credit.
11. It helps in estimating the financial needs of the concern. Hence the possibility of under or over capitalization is eliminated.
12. It provides a basis for introducing incentive remuneration plans based on performance.
13. It helps in the smooth running of the business unit. There will be no stoppage of production on account of shortage of raw materials or working capital. The reason is that everything is planned and provided in advance.
16. It indicates to the management as to where action is needed to solve problems without delay.

**17.4.2 Limitation**

Despite the many number of good points, the budgetary control system has some limitations. Some of the limitations are discussed as follows:

1. The preparation of a budget under inflationary conditions and changing government policies is really difficult. Thus, the accurate position of the business cannot be estimated.
2. Accuracy in budgeting comes through experience. Hence it should not be relied on to much in the initial stages.
3. Budget is only a management tool. It is not a substitute for management in decision making.
4. Budgeting involves heavy expenditure, which small concerns cannot afford.
5. There will be active and passive resistance to budgetary control as it points out the efficiency or inefficiency of individuals.
6. The success of budgetary control depends upon willing co-operation and team work. This is often lacking.

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**17.5 INSTALLATION OF BUDGETARY CONTROL SYSTEM**

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While installing budgetary control system, the following are the main steps should be taken in to account:

**1. Organization chart**

There should be a well defined organization chart for budgetary control. This will show the authority and responsibility of each executive.

**2. Budget centre**

A budget centre is that part of the organization for which the budget is prepared. A budget centre may be a department, or a section of the department. (e.g., production department or purchase section). The establishment of budget centre is essential for covering all parts of the organization. The budget centers are also necessary for cost control purpose. The evaluation of performance becomes easy when different centers are established.

**3. Budget committee**

In small companies, the budget is prepared by the cost accountant. But in big companies, the budget is prepared by the committee. The budget committee consists of the chief executive or managing director, budget officers and the mangers of various departments. The managers of various departments prepare their budgets and submit them to this committee. The committee will make necessary adjustments, co-ordinate all the budgets and prepare a Master Budget.

The main functions of the committee are:

1. To receive and scrutinize all budgets.
2. To decide the policy to be followed.
3. To suggest revision of functional budgets wherever necessary.
4. To approve the finally revised budgets.
5. To prepare the Master Budget after functional budgets are approved.
6. To co-ordinate the budget programme.
7. To study variations of actual performance.
8. To recommend corrective action if and when required.

#### **4. Budget Manual**

Budget Manual is a book which contains the procedure to be followed by the executive's concerned with the budget. It guides the executives in preparing various budgets. It is the responsibility of the budget officer to prepare and maintain this manual.

The Budget Manual may contain the following particulars:

1. A brief explanation of the objectives and principles of budgetary control.
2. Duties and powers of the budget officer.
3. Functions and duties of the budget committee.
4. Budget period.
5. Accounts classification.
6. Reports, statements, forms and charts to be used.
7. Procedure to be followed for obtaining approval

#### **5. Budget Period**

The Budget Manual may contain the following particulars:

A budget period is the length of time for which a budget is prepared and employed. It may be different in the same industry or business. The budget period depends upon the following factors:

1. The type of budget-whether it is sales budget, production budget, raw material purchase budget, or capital expenditure budget. A capital budget may be for a longer period, i.e. 3 to 5 year.
2. The nature of the demand for the product.
3. The timing for the availability of finance.
4. The length of the trade cycle.

All the above factors are taken into account while fixing the budget period.

**6. Key Factor**

It is also known as limiting factor or governing factor or principal budget factor. A key factor is one which restricts the volume of production. It may arise due to the shortage of material, labour, capital, plant capacity or sales. It is a factor which affects all other budgets. Therefore the budget relating to the key factor is prepared before is prepared before other budgets are framed.

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**17.6 ESSENTIALS OF SOUND BUDGETARY CONTROL SYSTEM**

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The following are the requirements of a good budgetary control system.

- 1) Budgetary control system should have the whole-hearted support of the top management.
- 2) A budget committee should be established consisting of the budget director and the executives of various departments of the organization.
- 3) There should be proper fixation of authority and responsibility. The delegation of authority should be done in a proper way.
- 4) The budget figures should be realistic and easily attainable.
- 5) Variation between actual figures and budgeted figures should be reported promptly and clearly to the appropriate levels of management.
- 6) A good accounting system is essential to make budgeting successful.
- 7) The budget should not cost more to operate than is worth.

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**17.7 CLASSIFICATION OF BUDGETS**

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The budgets are classified according to their nature. The following are the types of budgets which are commonly used.

**Classification According to Time:**

- i     **Short period budget:** These budgets are usually for a period of one year. e.g. Cash Budget, Material Budget , etc.
- ii.   **Long period Budget:** These budgets are for a longer period say 5 to 10 years. e.g. Capital Expenditure Budget, Research & Development Budget.
- iii.   **Current Budget:** These budgets are for a very short period, say, a month or a quarter and are related to current conditions.

**Classification According to function**

A functional budget is a budget which relates to any of the functions of an organization. The following are the commonly used functional budgets.

**1. Sales budget:**

A sales budget is an estimate of expected sales during the budget period. It may be stated in terms of money or quantity or both. It contains information relating to sales, month-wise, product-wise and area-wise. Sales budget should be carefully prepared as the preparation of other budgets is dependent on it. This budget is prepared by the sales manager taking into account the following:

- |  |                                 |
|--|---------------------------------|
| 1. Past sales figures  | 2. Salesmen’s estimates         |
| 3. Plant capacity  | 4. Availability of raw material |
| 5. Seasonal fluctuations   | 6. Availability of finance      |
| 7. Competition   | 8. Others on land               |
| 9. Other factors like political conditions, government policies etc. |                                 |

**Illustration No.17.1**

Pearson Ltd., manufactures two brands of pencil Nero and Hero. The sales department of the company has three Segments, namely Students, Professionals and Kids.

The sales budget for the year ending 31<sup>st</sup> December 2006 were Nero – Students Segment 3,00,000 pencils; Professional Segment 5,62,500 pencils; Kids segment 1,80,000 pencils and 4,00,000, 6,00,000 and 20,000 pencil for Student, professional and Kids segments respectively in respect of Hero pencils. Sales prices are Rs.3 and Rs.1.20 in all segments in respect of Nero and Hero pencils.

It is estimated that by forced sales promotion the sales of Hero in Student Segment will increase by 1,75,000 pencils. It is also expected that by increasing production and arranging extensive advertisement, Kids Segment will enabled to increase the sale of Hero by 50,000 pencils.

It is recognized that the estimated sales by Professional segment represent an unsatisfactory target. It is agreed to increase both estimated by 20 %.

Prepare a Sales budget for the year 2007.

**Solution No.17.1**

**SALES BUDGET FOR 2007**

	Nero		Hero		Total Rs.
Selling Price	Rs.3		Rs.1.20		
	Quantity	Rs.	Quantity	Rs.	
<i>Students Segment</i>	3,00,000	9,00,000	5,75,000	6,90,000	15,90,000
<i>Professional Segment</i>	6,75,000	20,25,000	7,20,000	8,64,000	28,89,000
<i>Kids segment</i>	1,80,000	5,40,000	70,000	84,000	6,24,000
<b>Total</b>	<b>11,55,000</b>	<b>34,65,000</b>	<b>13,65,000</b>	<b>16,38,000</b>	<b>51,03,000</b>

**Illustration No. 17.2**

Jasmine Ltd. produces and sells three items: [a] Snow Cream; [b] Talcum Powder and [c] Cold Cream. The company has divided its market into two Zones: Zone A and Zone B. The actual figures for the previous year’s sales are as under:

	<b>Zone A</b>		<b>Zone B</b>	
	Units	Unit Price Rs.	Units	Unit Price Rs.
Snow Cream	4,00,000	12.00	2,50,000	12.00
Talcum Powder	2,50,000	15.00	3,50,000	15.00
Cold Cream	3,00,000	16.00	3,00,000	16.00

For the current year- 2008, it is estimated that sale of snow cream will go up by 10 % in Zone B and of Cold Cream by 25,000 units in Zone A.

The company plans to introduce a publicity film for talcum powder in the Television Network. The budgeted figures for talcum powder are to be increased by 20 % in both the Zones.

The price of the two creams are to be maintained but for talcum powder, a bonus cut of Re.1 will be announced.

You are required to prepare quantitative-cum financial budget for sales in the current year.



Solution No. 17.2

SALES BUDGET FOR THE YEAR 2008

Products	Show Cream		Talcum Powder		Cold Cream		Total
Sales Price	Rs.12		Rs.14 [Rs.15-Re.1]		Rs.16		
	Units	Amount Rs.	Units	Amount Rs.	Units	Amount Rs.	Amount Rs.
Zone A	4,00,000	48,00,000	3,00,000	42,00,000	3,25,000	52,00,000	1,42,00,000
Zone B	2,75,000	33,00,000	4,20,000	58,80,000	3,00,000	48,00,000	1,39,80,000
Total	6,75,000	81,00,000	7,20,000	1,00,80,000	6,25,000	1,00,00,000	2,81,80,000

2. Production Budget:

The preparation of production budget is dependent on the sales budget. Production budget is an estimate of quantity of goods that must be produced during the budget period. It may be stated in terms of money or quantity (weights, units etc.) or both. Production may be calculated as follows:

Units to production may be calculated as follows:

Units to produced = Budgeted sales + Desired closing stock- Opening stock  
This budget is prepared by the works manager by taking into account the following:  
Sales budget 2. Production capacity 3. Stock of goods to maintained 4. Decision to make or buy the component parts 5. Availability of raw materials and labour.

Illustration No. 17.3

From the following particulars, prepare a Production Budget of Jupiter Ltd., for the year ended June 30, 2008.

Product	Sales [Units]	Estimated Stock [Units]	
	[as per Sales Budget]	1 <sup>st</sup> July 2007	30 June 2008
Red	1,50,000	14,000	15,000
Yellow	1,00,000	5,000	14,500
Green	70,000	8,000	8,000

**Solution No. 17.3**

Product	Red In Units	Yellow In Units	Green In Units
Sales as per Sales Budget	1,50,000	1,00,000	70,000
<i>ADD:</i> Estimated Stock on 30 <sup>th</sup> June 2008 [Closing Stock]	15,000	14,500	8,000
	1,65,000	1,14,500	78,000
Less: Estimated Stock on 1 <sup>st</sup> July 2007 [Opening Stock]	14,000	5,000	8,000
<b>Budgeted Production</b>	<b>1,51,000</b>	<b>1,09,500</b>	<b>70,000</b>

**3. Materials Budget:**

Materials may be direct or indirect. The materials budget deals with only the direct material. Indirect materials are included in the factory overhead budget. Materials budget can be classified into two categories- Materials Requirement Budget and Materials Purchase Budget. Materials Requirement Budget is an estimate of total quantities of material required for production during the budget period. The Material purchase Budget is an estimate of quantities of raw materials to be purchased for production during the budget, the following factors must be taken into account:

- i. Raw material required for the budgeted production.
- ii. Time lag between the placing of order and the receipt of the material.
- iii. Storage facilities available.
- iv. Financial resources available.
- v. Price trends in the market.
- vi. Opening and closing stocks.

**Illustration No. 17.4**

From the following figures prepare raw materials purchase budget for January:

Product Name	Jasmine	Lotus	Sunflower	Rose
Estimated stock on 1 <sup>st</sup> January	16,000	6,000	24,000	2,000
Estimated Stock on 31 <sup>st</sup> January	20,000	8,000	28,000	4,000
Estimated Consumption	1,20,000	44,000	1,32,000	36,000
Standard Price per unit [in Re.]	0.25	0.05	0.15	0.10

Solution No. 17.4

RAW MATERIAL PROCUREMENT BUDGET FOR JANAUARY

Product Name	Jasmine	Lotus	Sunflower	Rose
Estimated Consumption	1,20,000	44,000	1,32,000	36,000
<i>Add:</i> Estimated Stock on 31 <sup>st</sup> January	20,000	8,000	28,000	4,000
	1,40,000	52,000	1,60,000	40,000
<i>Less:</i> Estimated stock on 1 <sup>st</sup> January	16,000	6,000	24,000	2,000
<i>Estimated Purchase</i>	1,24,000	46,000	1,36,000	38,000
Standard Price per unit [in Re.]	0.25	0.05	0.15	0.10
Estimated Purchase value [Rs.]	31,000	2,300	20,400	3,800

4. Direct Labour Budget:

This indicates detailed requirements of direct lab our and its cost to achieve the production target. This budget is classified into two categories namely, lab our requirement and lab our recruitment budget. The lab our requirement budget gives information regarding the different classes of lab our required for each department, their rates of pay and the hours to be spent. The lab our recruitment budget states the additional direct workers to be recruited.

1 Factory overhead Budget:

Factory overheads include indirect material, indirect lab our and indirect expenses. Factory overhead budget indicates the factory overheads to be incurred in the budget period. The expenses included in the budget are classified into fixed, variable and semi-variable expenses. Fixed expenses are estimated on the basis of past records. Variable expenses are estimated on the basis of budgeted output.

Illustration 17.5

Prepare a manufacturing overhead budget from the following data:

Budgeted output for the quarter ending 31<sup>st</sup> March 2008 is 500 units  
Budgeted fixed overheads apportioned to the division Rs.48,000 for the year 2008.  
Variable overhead is estimated to be Rs.80,000 for an annual output of 8,000 units.  
Semi-variable overhead estimated for the year is Rs.30,000 [40 % fixed and 60 % variable]

**Solution 17.5**

**MANUFACTURING OVERHEAD BUDGET  
FOR THE QUARTER ENDING 31<sup>ST</sup> March 2008**

	<b>Rs.</b>	<b>Rs.</b>
Fixed overhead [48,000 / 4]		12,000
Variable Overhead [80,000 / 8,000 x 500]		5,000
Semi-variable overhead		
Fixed [30,000 x 40 % x ¼]	3,000	
Variable [30,000 x 60 % /8,000] x 500	1,125	4,125
<b>Total Manufacturing Overheads</b>		<b>21,125</b>

**1     Administrative expenses Budget:**

The budget is an estimate of administrative expenses to be incurred in the budget period.  
E.g. rent, salaries, insurance etc.

**1     Selling and Distribution Overhead Budget:**

The budget gives an estimate of selling and distribution expenses to be incurred in the budget period. For example, Salesmen’s salary, commission, advertisement, transportation costs etc. It is prepared by the sales executive. It is closely linked with sales budget.

The following points should be considered in the preparation of this budget.

- (a)   The channels of distribution of the product (b) The advertising and sales promotion policies (c) The market area to be covered (d) The credit and collection policies (e) The mode of packing and dispatch of products to customers.

**Illustration 17.6**

You are required to construct a selling overhead budget from the details given below:

Establishment expenses of sales department	Rs.15,000
Other expenses of sales department	Rs.6,000
Advertisement	Rs.4,500
Salaries to counter salesmen	Rs.15,000.

Commission to counter salesmen at 2 % on their sales.

Commission to traveling salesmen at 5 % on their sales and out of pocket expenses at 3 % on their sales.

The following are the likely sales range for a year

Sales at Counter	Sales by Travelling Salesmen
Rs.	Rs.
1,50,000	15,000
2,00,000	20,000
2,50,000	25,000

Solution 17.06

SELLING OVERHEAD BUDGET

Particulars	Estimated Sales		
	Rs.1,65,000	Rs.2,20,000	Rs.2,75,000
<i>Fixed Selling Overheads:</i>			
Establishment expenses of sales Dept.	15,000	15,000	15,000
Other expenses of sales Dept.	6,000	6,000	6,000
Advertisement	4,500	4,500	4,500
Salaries to counter salesmen	15,000	15,000	15,000
<b>Total Fixed overhead [A]</b>	40,500	40,500	40,500
<i>Variable Selling Overheads:</i>			
Counter salesmen’s commission at 2 % on their sales	3,000	4,000	5,000
Travelling salesmen’s commission at 5 % on their sales	750	1,000	1,250
Travelling salesmen’s out of pocket expenses at 3 % on their sales	450	600	750
<b>Total Variable Overhead [B]</b>	4,200	5,600	7,000
<b>Total selling overhead [A + B]</b>	44,700	46,100	47,500

1 Capital expenditure Budget:

This budget shows the estimated expenditure on fixed assets during period. Separate budgets may be prepared for each item of assets, if necessary. For example, building budget, plant and machinery budget etc. This budget is prepared for a longer period say 5 years or 10 years. It is prepared after taking into account the following:

- a. The available capacity production capacity.
- b. Probable reallocation of existing assets.
- c. Possible improprement in production techniques.

Capital expenditure budgeting otherwise called capital budgeting will be discussed separately in following lesson numbered 19.

## 1 Cash Budget:

This budget gives an estimate of receipts and payments of cash during the budget period. It is prepared by the chief accountant. It shows the cash available and needed from time to time to meet the capital requirements of the organization. This budget is prepared in two parts – one showing an estimate of receipts and the other showing an estimate of payments. It is prepared for the following purpose:

- a. To ensure sufficient cash is available for both revenue and capital expenditure.
- b. To indicate when additional finance is required and how much.
- c. To find out whether surplus funds are available for outside investment.

Cash budget can be prepared by any of the following methods:

1. Receipts and payments method
2. The adjusted profit and loss account method.
3. The balance sheet method.

### Illustration No. 17.7

From the particulars given below prepare a Cash budget for the month June 2008:

- a. Expected Sales:  
April 2008- Rs.2,00,000; May – Rs.2,20,000 and June 2008 – Rs.1,90,000  
Credit allowed to customers is two months and 50 % of the sales of every month is on cash basis.
- b. Estimated Purchases:  
May 2008 – Rs.1,20,000 ; June 2008 – Rs.1,10,000  
40 % of the purchases of every month is on cash basis and the balance is payable in next month.
- c. Rs.2,000 is payable as rent every month.
- d. Time lag in payment of overhead is  $\frac{1}{2}$  month.  
Overhead for May Rs.12,000 and for June Rs.11,000
- e. Depreciation for the year is Rs.12,000
- f. Interest receivable on investment during June and December Rs.3,000 each.
- g. Tax payable during April 2008 Rs.10,000
- h. Estimated Cash Balance as on 1<sup>st</sup> June 2008 is Rs.42,500.

**Solution No. 17.7**

**CASH BUDGET FOR THE MONTH OF JUNE 2008**

	Rs.	Rs.
Opening Balance		42,500
<b>Receipts:</b>		
Cash Sales	95,000	
Collection from Debtors	1,00,000	
Interest on Investments	3,000	1,98,000
		2,40,500
<b>Payments:</b>		
Cash purchases	44,000	
Payment to Creditors	72,000	
Rent	2,000	
Overheads: May Rs.6,000		
June Rs.5,500	11,500	1,29,500
<b>Closing Balance</b>		<b>1,11,000</b>

Note: Depreciation is a non-cash item. Hence it is not considered.

**Illustration No. 17.8**

Pinky Ltd. expects to have Rs.37,500 cash in hand on 1<sup>st</sup> April, and require you to prepare an estimate of cash position during the three months, April, May and June. Following information is supplied to you:

	Sales Rs.	Purchases Rs.	Wages Rs.	Factory Expenses Rs.	Office Expenses Rs.	Selling Expenses Rs.
<b>February</b>	75,000	45,000	9,000	7,500	6,000	4,500
<b>March</b>	84,000	48,000	9,750	8,250	6,000	4,500
<b>April</b>	90,000	52,500	10,500	9,000	6,000	5,250
<b>May</b>	1,20,000	60,000	13,500	11,250	6,000	6,570
<b>June</b>	1,35,000	60,000	14,250	14,000	7,000	7,000

**Other Information:**

1. Period of credit allowed by suppliers 2 months.
2. 20 % of sales are for cash and period of credit allowed to customers for credit is one month.
3. Delay in payment of all expenses – 1 month.
4. Income Tax of Rs.57,500 is due to be paid on June 15<sup>th</sup>.
5. The company is to pay dividends to shareholders and bonus to workers of Rs.15,000 and Rs.22,500 respectively in the month of April.
6. Plant has been ordered to be received and paid in May. It will cost Rs.1,20,000.

**Solution No. 17.8**

**CASH BUDGET**

Particulars	April Rs.	May Rs.	June Rs.
Opening Balance	37,500	11,700	(91,050)
<b>Receipts From:</b>			
Cash Sales [20 of sales]	18,000	24,000	27,000
Collection from Debtors [80 % of the previous month sales]	67,200	72,000	96,000
<b>Total [a]</b>	1,22,700	1,07,700	31,950
<b>Payments:</b>			
Creditors [2months previous purchases]	45,000	48,000	52,500
Wages [Previous month]	9,750	10,500	13,500
Factory Expenses [Previous month]	8,250	9,000	11,250
Office Expenses [Previous month]	6,000	6,000	6,000
Selling Expenses [Previous month]	4,500	5,250	6,570
Dividend to Shareholders	15,000	-	-
Bonus to workers	22,500	-	-
Purchase of Plant	-	1,20,000	-
Income Tax	-	-	57,500
<b>Total [b]</b>	1,11,000	1,98,750	1,47,320
<b>Closing Balance [a-b]</b>	<b>11,700</b>	<b>(91,050)</b>	<b>(1,15,370)</b>

Note: The company needs overdraft facilities in May and June to the extent of Rs.91.050 and Rs.1,15,370 respectively.

**1 Master Budget:**

Finally, master budget is prepared incorporating all functional budgets. It is defined as, “the summary budget incorporating the functional budgets which is finally approved, adopted and employed,” The budget may take the form of budgeted profit and loss account and balance sheet. It contains sales, production cost, cash position, debtor, fixed assets, bills payable etc. It also shows the gross and net profits and the important accounting ratios. It has to be approved by the board of directors before it is put into operation.

**Illustration No.17.9**

A company which supplies its output on contract basis as component to an assembling firm has a contract to supply 10,000 units of its only product during 2008. The following are the budgeted expenses and revenue.



Materials		Rs.15 per unit
Wages		Rs.10 per unit
Works expenses	– Fixed	Rs.40,000
	- Variable	Rs.4 per unit
General expenses	– all fixed	Rs.60,000

Profit is 20 % on sale price.

Prepare the budget for 2008 showing the costs and profit.

**Solution No.17.9**

**MASTER BUDGET**  
**Output 10,000 units**

Particulars	Total Rs.	Per Unit Rs.
Materials	1,50,000	15.00
Wages	1,00,000	10.00
<b>Prime Cost</b>	<b>2,50,000</b>	<b>25.00</b>
ADD: Works expenses:		
Fixed	40,000	4.00
Variable	40,000	4.00
<b>Works cost</b>	<b>3,30,000</b>	<b>33.00</b>
ADD: General Expenses	60,000	6.00
<b>Total Cost</b>	<b>3,90,000</b>	<b>39.00</b>
ADD: Profit [3,90,000 X 20 /(100-20)]	97,500	9.75
<b>Sales</b>	<b>4,87,500</b>	<b>48.75</b>

**C. Classification Accounting to Flexibility:**

**1. Fixed Budget:**

Fixed budget is also called static budget. It may be defined as, “ a budget designed to remain unchanged irrespective of the level of activity actually attained ” .This budget is most suited for fixed expenses, which have no relation to the volume of output. It is ineffective for cost control purpose. It is useless for comparison with actual performance when the level of activity changes.

**2. Flexible Budget:**

Flexible budget is also called variable budget. It may be defined as, “A budget designed to change in accordance with the level of activity actually attained .”It shows estimated costs and profit at different levels of output. It facilitates comparison of actual performance with the budget at any levels of output.

To prepare flexible budget, all costs should be classified into fixed, variable and semi-variable. It is more elastic, useful and practical. It is used for the purpose of control:

This budget is used in the following cases:

- (1) Where sales cannot be accurately predicted because of the nature of business.
- (2) Where the concern is suffering from shortage of materials, lab our, plant capacity etc.
- (3) Where production during the year varies from period to period, due to the seasonal nature of the industry.
- (4) Where it is difficult to forecast the demand accurately.

**Illustration No.17.10**

Draw up a flexible budget for production at 75 % and 100 % capacity on the basis of the following data for a 50 % activity.

	Per Unit Rs.
Materials	100
Labour	50
Variable expenses [direct]	10
Administrative expenses [50 % fixed]	40,000
Selling and Distribution expenses [60 % fixed]	50,000
Present Production [50 % activity]	1,000 Units

**Solution No.17.10**

FLEXIBLE BUDGET						
Particulars	Capacity Levels					
	50 %		75 %		100 %	
	1,000 units		1,500 units		2,000 units	
	Per unit Rs.	Total Rs.	Per unit Rs.	Total Rs.	Per unit Rs.	Total Rs.
Materials	100	1,00,000	100.00	1,50,000	100.	2,00,000
Labour	50	50,000	50.00	75,000	50	1,00,000
Variable Expenses	10	10,000	10.00	15,000	10	20,000
<b>Prime Cost</b>	160	1,60,000	160.00	2,40,000	160	3,20,000
<b>Administrative Expenses:</b>						
Variable [50 %]	20	20,000	20.00	30,000	20	40,000
Fixed [50 %]	20	20,000	13.33	20,000	10	20,000
<b>Cost of Production</b>	200	2,00,000	193.33	2,90,000	190	3,80,000
<b>Selling and Distribution Expenses:</b>						
Variable [40 %]	20	20,000	20.00	30,000	20	40,000
Fixed [60 %]	30	30,000	20.00	30,000	15	30,000
<b>Total Cost</b>	<b>250</b>	<b>2,50,000</b>	<b>233.33</b>	<b>3,50,000</b>	<b>225</b>	<b>4,50,000</b>

Illustration No. 17.11

For the production of 10,000 electric automatic irons; the following are the budgeted expenses:

	Per unit Rs.
Direct Materials	60
Direct Labour	30
Variable Overheads	25
Fixed overhead [Rs.1,50,000]	15
Variable expenses [Direct]	5
Selling expenses [10 % fixed]	15
Administration expenses [Rs.50,000 rigid for all levels of production]	5
Distribution expenses [20 % fixed]	5
Total cost of sale per unit	160

Prepare a budget for the production of 6,000, 7,000 and 8,000 irons, showing distinctly the marginal cost and the total cost.

Solution No. 17.11

FLEXIBLE BUDGET

	Capacity Levels					
	6,000 units		7,000 units		8,000 units	
	Per unit	Total	Per unit	Total	Per unit	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Expenses:</i>						
Direct Materials	60.00	3,60,000	60.00	4,20,000	60.00	4,80,000
Direct Labour	30.00	1,80,000	30.00	2,10,000	30.00	2,40,000
Direct Expenses	5.00	30,0000	5.00	35,000	5.00	40,000
<i>Variable Overheads:</i>						
Production	25.00	1,50,000	25.00	1,75,000	25.00	2,00,000
Selling	13.50	81,000	13.50	94,500	13.50	1,08,000
Distribution	4.00	24,000	4.00	28,000	4.00	32,000
<i>Marginal Cost</i>	137.50	8,25,000	137.50	9,62,500	137.50	11,00,000
<i>Fixed Overheads:</i>						
Production	25.00	1,50,000	21.43	1,50,000	18.75	1,50,000
Selling	8.34	50,000	7.14	50,000	6.25	50,000
Distribution	2.50	15,000	2.14	15,000	1.88	15,000
	1.66	10,000	1.43	10,000	1.25	10,000
<i>Fixed Cost</i>	37.50	2,25,000	32.14	2,25,000	28.13	2,25,000
<b>Total Cost</b>	175.00	10,50,000	169.64	11,87,500	165.63	13,25,000

**Check Your Progress: Illustration No. 16.1**

The expenses for the production of 5,000 units in a factory are given as follows:

	Per Unit Rs.
Materials	50
Labour	20
Variable Overheads	15
Fixed overheads [Rs.50,000]	10
Administrative Overheads [5 % variable]	10
Selling expenses [20 % fixed]	6
Distribution expenses	5
Total cost of sales per unit	116

You are required to prepare a budget for the production of 7,000 units.

- NOTES:**
- a) Write your answer in the space given below
  - b) Check your answer with the one given at the end of this lesson

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**17.8 ZERO BASE BUDGET ING**

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Zero base budgeting is a management technique aimed at cost reduction and optimum utilization of resources. This technique was introduced by U.S. Department of Agriculture in 1961. Peter. A. Phyrr designed its basic frame work in 1970 and popularized its wider use in the private sector. In 1979, President Jimmy Carter issued a mandate asking for the use of ZBB throughout the federal government agencies for controlling state expenditure. The technique has become quite popular in the U.S.

**Meaning**

The traditional technique of budgeting is to take previous year’s cost levels as a base for preparing this year’s budget. This type of budgeting assumes that allocation of funds in the past was correct. In most cases, an addition is made to the previous year’s figure to allow for an increase in cost. Because of this, budgets (particularly government budgets) take an upward direction in spite of declining efficiency year after year. Thus, the inefficiencies of a previous year are carried forward in formulating the subsequent year’s budget. Managers tend to inflate their budget requests resulting in more demand for funds.

ZBB is defined as a “ a planning and budgeting process which requires each manager to justify his entire budget request in detail from scratch (hence Zero base ) and shifts the burden of proof to each manager to justify why he should spend money at all. The approach requires that all activity be analysis in decision ‘packages’ which are evaluated by systematic analysis and ranked in the order of importance”.

### **Steps in Zero- Base Budgeting**

1. **Determination of objectives:** The first step in ZBB is the clear definition of the objectives of budgeting. The objective may be to reduce expenditure on staff, to discontinue an activity or project in preference to another etc.
2. **Determination of the Extent of Application:** Whether ZBB should be introduced in all operational areas or only in some selected areas is to be decided.
3. **Identification of Decision Units:** Decision unit refers to a department, a project line to which ZBB is to be applied. Identification of such units is done in consultation with managers.
4. **Cost- Benefit Analysis:** Cost benefit analysis is undertaken for each activity of the decision unit. It provides answer to the following questions.
  - a) Is it necessary to perform the activity at all? If the answer is in the negative, there is no need for proceeding further.
  - b) How much is the actual cost and what is the actual benefit of the activity?
  - c) What is the estimated cost and estimated benefit of the activity?
  - d) If the unit is dropped, can the unit be replaced by outside agency?
5. **Preparation of budgets:** The activities and projects for which benefit is more than the cost are ranked. Priority is accorded to the most profitable projects/ activities, in the allocation of funds.

### **Advantages of ZBB**

1. It provides a systematic way to evaluate different operations and programmers. No arbitrary cuts or increase in budget estimates are made.
2. It enables the management to allocate resource according to benefit or importance.
3. It ensures that only essential programmers are undertaken and activities are performed in the best possible manner.
4. It helps in identifying and controlling wasteful expenditure.
5. Zero base budgeting does not allow some expenditure/activity simply because it was done in the past. Management is required to review activities before allowing funds for them. This promotes operational efficiency.
6. Zero base budgeting is appropriate for staff and support areas.
7. Budgeting will be related to organizational goals. Only those activities which will help in the achievement of organizational goals will be allowed.
8. It is a convenient tool in integrating the managerial functions of planning and control.

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## 17.9 LET US SUM UP

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Budget is a technique in the hands of management to control costs. Budgeting control starts with budgeting and ends with control. Every department heads are asked to prepare budget of there own departments. After the budget period the budgeted performance is compared with actual performance. It a concern unable to attain the budgeted performance, then they analyse the causes of non-attainment of budgeted performance.

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## 17.10 LESSON – END ACTIVITIES

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1. Define ‘Budget’, ‘Budgeting’ and ‘Budgetary control’.
2. Describe the objectives of budgetary control.
3. Distinguish between forecasts and budgets.
4. What are the essential requisites for successful implementation of a budgetary control system?
5. Briefly explain the different classifications of budgets.
6. What is Z.B.B? Describe the process of preparing Z.B.B.
- 7 The following figures relating to product ‘Duper’ for the quarter ending 31.3.2001 are available:

Budgeted sales	:	January 3,00,000 units
		February 2,40,000 units
		March 3,60,000 units
Stock position	:	1-1-2001 – 50% of January’s budgeted sales.
		31.3.2001 – 80,000 units
		31.1.2001 – 40% of February’s budgeted sales
		28-2-2001 – 60% of March’s budgeted sales.

You are required to prepare a production budget for the quarter ending 31.3.2001.

08. Retail Traders Ltd., manufactures two products ‘S’ and ‘T’ and sells them in tow markets ‘East’ and ‘West’, Normal sales estimates prepared by the marketing department for the year 1999 bases on the reports of regional managers are as follows:

Product S: East 12,000 units; West 20,000 units  
Product T: East 8,000 units; West 6,000 units  
Selling price: S Rs.100 per unit; T Rs.200 per unit.

A special incentive system is proposed by the director of marketing for the salesman in east zone which is expected to push up the estimated sales of ‘S’ and ‘T’ by 20% in that zone. The advertising department has finalised an intensive compaign in west zone which is estimated to get additional sales of 2,000 units and 1,500 units of products ‘S’ and ‘T’ respectively in the West Zone.

09. The expenses budgeted for production of 10,000 units in a factory are furnished below:

	Per unit
	Rs.
Materials	70
Labour	25
Variable overhead	20
Fixed overhead (Rs.1,00,000)	10
Variable expenses (Direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administration expenses (50,000)	5
Total cost per unit (to make or sell)	155

Prepare a flexible budget for the production of (a) 8,000 units and (b) 6,000 units.

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**17.11 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’ 17.01**

Total cost for 7,000 units is Rs.7,69,000 and cost per unit is Rs.109.94

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**17.12 SUGGESTED READING/REFERENCES/SOURCES**

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1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
2. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
3. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
4. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications

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## LESSON-18

### MARGINAL COSTING

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#### **Contents:**

- 18.0 Aims and objectives
- 18.1 Introduction
- 18.2 Definition of Marginal cost and Marginal Costing
- 18.3 Salient Features of Marginal Costing
- 18.4 Merits and Demerits of Marginal Costing
- 18.5 Absorption costing and Marginal Costing
- 18.6 Costs-Volume Profit Analysis
- 18.7 Some important concepts of cost-volume-profit analysis
- 18.8 Break even Analysis and Break even Point
- 18.9 Break Even Charts
- 18.10 Applications of Marginal Costing Techniques
- 18.11 Illustrations
- 18.12 Let us Sum Up
- 18.13 Lesson-end Activities
- 18.14 Model Answers to “Check your Progress”
- 18.15 Suggested Reading/References/Sources

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#### **18.0 AIMS AND OBJECTIVES**

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After studying this lesson, you should be able to:

- Define of Marginal cost and marginal costing.
- Know the cost volume profit analysis and some impotents points.
- Describe the Break even chart and types of Break even charts.
- Understand difference between Absorption costing and Marginal costing.
- Solve problems on marginal costing and application of marginal costing



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## 18.1 INTRODUCTION

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Marginal costing is not a method of cost ascertainment like job costing or contract costing. Marginal costing is a technique of costing, which may be used with other methods of costing, viz., job process. For decision-making, it is more helpful to the management. The other names for marginal costing are direct costing, differential costing, incremental costing and comparative costing.

In marginal costing, only variable items of costs are taken into account. These variable costs will change in direct relation to the change in the volume of production or change in the production by one unit. As such, variable costs are called product costs and are charged to production. Fixed costs are not allocated to cost unit; and these are charged directly to profit and loss account during the period and are called as period costs or capacity costs.

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## 18.2 DEFINITION OF MARGINAL COST AND MARGINAL COSTING

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### 18.02.01 Marginal Cost

Marginal cost means the same thing as variable cost. The term is not a new one. The accountants’ concept for marginal cost differs from economists’ concept of marginal cost. The accountant’s view on marginal cost is, “Marginal cost is the additional cost of producing an additional unit of a product.

According to *Chartered Institute of Management Accountants, London*, the term “Marginal Cost” means ‘the amount at any given volume of output by which aggregate costs are charged if the volume of outputs increased or decreased by one unit.’

On analyzing this definition we can conclude that the term, ‘Marginal cost’ refers to increase or decrease in the amount of cost on account of increase or decrease or production by a single unit. The unit may be a single article or a batch of similar articles.

With the following example, we can understand better.

A factory produces 500 fans per annum. The variable cost per fan is Rs.50. The fixed cost is Rs.10,000 per annum. Thus, the cost of producing 500 fans will be :

Variable Cost	[500 X 50]	Rs.25,000
Fixed Cost	[Constant]	<u>Rs.10,000</u>
Total cost for 500 fans		<u><b>Rs.35,000</b></u>

If production is increased by one unit, i.e., it becomes 501 fans per annum, the cost will then appear as follows:

Variable Cost	[501 X 50]	Rs.25,050
Fixed Cost	[Constant]	<u>Rs.10,000</u>
Total cost for 500 fans		<u><b>Rs.35,050</b></u>

Therefore, the marginal cost per unit is, Rs.50 [Rs.35,050 – Rs.35,000]

Thus, the marginal cost is the total variable cost because within the capacity of the firm, an increase of one unit in production or decrease in one unit of production will cause an increase or decrease in variable cost only.

The variable cost consists of direct materials, direct labour, direct expenses and variable overheads.

$$\begin{aligned}
 \text{Marginal Cost} &= \text{Total Variable Cost} \\
 &= \text{Direct Materials} + \text{Direct Labour} + \text{Direct [Variable] Expenses} + \text{Variable overheads} \\
 &= \text{Total Cost} - \text{Fixed Cost}
 \end{aligned}$$

### 18.2.2 Marginal Costing

Marginal costing is a technique where only the variable costs are considered while computing the cost of a product. The fixed costs are met against the total fund arising out of excess of selling price over the total variable cost. This fund is known '**Contribution**' in marginal costing.

According to *Chartered Institute of Management Accountants, London*, the term "Marginal Costing is a technique where, 'only the variable costs are charged to cost units, the fixed cost attributed being written off in full against the contribution for that period'".

*Batty* defines Marginal costing as, 'technique of cost accounting which pays special attention to the behaviour of costs with changes in the volume of output'.

Marginal Costing also defined as, 'the ascertainment of marginal costs and of the effect of profit of changes in volume or type of output by differentiating between fixed costs and variable costs.

From the above definitions, we can understand that marginal costing involves two things:

- [a] Ascertainment of marginal cost;
- [b] Deriving of cost-volume-profit relationship by differentiating between fixed costs and variable costs.

Marginal cost is the additional cost of producing an additional unit of a product.

Marginal cost is defined by CIMA, London as 'the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit. In practice, this is measured by the total variable costs attributable to one unit'.

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### 18.3 SALIENT FEATURES OF MARGINAL COSTING

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1. Marginal costing is a technique of control or decision making.
2. Under marginal costing the total cost is classified as fixed and variable costs.
3. Fixed costs are ascertained separately and excluded from cost of products. The fixed costs are charged to Costing Profit and Loss account. The need for apportionment and absorption of overheads does not arise at all.
4. The stock of work-in-progress and finished goods stocks are valued at variable cost. Fixed costs will not be included in valuation of the stocks.
5. Contribution is ascertained by reducing the marginal cost or variable cost from the selling price.
6. The profitability of products, departments or processes is determined on the basis of contribution.
7. Profits are ascertained by reducing the fixed cost from the contribution of all the products or departments or processes or divisions, etc.
8. The profitability of various levels of activity is ascertained by calculating cost-volume-profit analysis.

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### 18.4 MERITS AND DEMERITS OF MARGINAL COSTING

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#### *18.4.1 Merits of Marginal Costing*

Marginal costing is an important technique of managerial decision making. It is a tool for cost control and profit planning. Under mentioned are the advantages of marginal costing technique.

1. **Simplicity:** The statement prepared under marginal costing can be easily followed as it breaks up the costs as variable and fixed.
2. **Stock Valuation:** Stock valuation can be easily done and understood as it includes only the variable costs.
3. **Meaningful Reporting:** Marginal costing serves as a good basis for reporting to management. The profits are analysed from the point of view of sales rather than production.
4. **Effect of Fixed Costs:** The fixed costs are treated as period costs and are charged to P/L account directly. Thus they have practically no effect on decision making.
5. **Profit Planning:** The cost-volume-profit relationship is perfectly analysed to reveal efficiency of products, processes and departments. 'Break even point' and 'Margin of safety' are the two important concepts helpful in profit planning. Most advantageous volume and cost to maximize profits within the existing limitations can be planned.

6. **Cost Control and Cost Reduction:** Marginal costing technique is helpful in preparation of flexible budget as the costs are split into fixed and variable portions. The emphasis is laid on variable cost for control. The fixed costs are also controlled by ascertaining them separately for computing profit and for control. The constant focus on cost and volume, and their effect on profit pave way for cost reduction.
7. **Pricing Policy:** Marginal costing is immensely helpful in determination of selling prices under different situations like recession, depression, introduction of new products, etc. correct pricing policy can be developed under the marginal costing technique with the help of the cost information, revealed therein.
8. **Helpful to Management:** Marginal costing is helpful to management in exercising decisions regarding make or buy, exporting, key factor and numerous other aspects of business operations.

#### *18.4.2 Demerits of Marginal Costing*

- a. **Difficult to analyze overhead:** Separation of costs into fixed and variable is a difficult problem. In marginal costing, semi-variable or semi-fixed costs are not considered.
- b. **Time element is ignored:** Fixed costs and variable costs are different in the short run; but in the long run, all costs are variable. In the long run all costs change at varying levels of operation. When new plants and equipments are introduced, fixed costs and variable costs will vary. Therefore, it ignores time element and is not suitable for long-term decisions.
- c. **Not suitable for external reporting:** Since fixed cost is not included in total costs, full cost is not available to outsiders to judge the efficiency.
- d. **Undervaluation of Stocks:** Under marginal costing only variable costs are considered and the output as well as stocks are undervalued and profit is distorted. When there is loss of stock the insurance cover will not meet the total cost.
- e. **Automation:** In these days of automation and technical advancement, huge investment are made in heavy machinery which results in heavy amount of fixed costs. Ignoring fixed costs, in this context for decision making is not rational.
- f. **Production aspect is ignored:** Marginal costing lays too much emphasis on selling function and as such production function has been considered to be less significant. But from the business point of view both the functions are equally important.
- g. **Not applicable in all types of business:** In contract type of business and job order business, full cost of the job or the contract is to be charged. Therefore, it is difficult to apply marginal costing in these types of business.
- h. **Misleading Pricing:** Each product is shown at variable costs alone, thus, giving a misleading picture about its costs.

Thus, marginal costing, if applied alone, will not be much in use, unless it is combined with other techniques like standard costing and budgetary control.

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**18.5 ABSORPTION COSTING AND MARGINAL COSTING**

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Absorption costing is the practice of charging all costs, both fixed and variable to operations, process or products. In marginal costing, only variable costs are charged to productions.

The Institute of Cost and Management Accountants (U.K.) defines it as, “the practice of charging all costs, both variable and fixed to operations, processes or products”. This explains why this technique is also called full costing. Administrative, selling and distribution overheads as much form part of total cost as prime cost and factory burden.

**Difference between Absorption Costing and Marginal Costing**

		Absorption Costing	Marginal Costing
1.	Charging of costs	Fixed costs form part of total costs of production and distribution.	Variable costs alone form part of cost of production, and sales whereas fixed cost are charged against contribution for determination of profit.
2.	Valuation of stocks	Stocks and work-in-progress are valued at both fixed and variable costs i.e., total costs.	Stocks are valued at variable cost only.
3.	Variation in profits	When there is no sale the entire stock is carried forward and there is no trading profit or loss.	If there is no sale, the fixed overhead will be treated as loss in the absence of contribution. It is not carried forward as part of stock value.
4.	Purpose	Absorption costing is more suitable for long-term decision making and for pricing policy over long-term.	Marginal costing is more useful for short-term managerial decision making.
5.	Emphasis	Absorption costing lays emphasis on production.	Marginal costing emphasizes selling and pricing aspects.

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**18.6 COSTS-VOLUME PROFIT ANALYSIS**

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As the term itself suggests, the cost-volume-profit (CVP) analysis is the analysis of three variables, viz., cost, volume and profit. In CVP analysis, an attempt is made to measure variations of costs and profit with volume. Profit as a variable is the reflection of a number of internal and external conditions which exert influence on sales revenue and costs.

The cost volume profit analysis helps or assists the management in profit planning. In order to increase the profit, a concern must increase the output. When the output is at maximum, within the installed capacity, it adds to the contribution. In the words of Heiser, “The most significant single factor in profit planning of the average business is the relationship between the volume of business, costs and profit.” Thereby, cost volume profit analysis is the relationship among cost, volume and profit. When volume of output increases, unit cost of production decreases, and vice versa; because the fixed cost remains unaffected. When the output increases, the fixed cost per unit decreases. Therefore, profit will be more, when sales price remains constant. Generally, costs may not change in direct proportion to the volume. Thus, a small change in the volume will affect the profit.

The management is always interested in knowing that which product or product mix is most profitable, what effect a change in the volume of output will have on the cost of production and profit etc. All these problems are solved with the help of the cost-volume-profit analysis.

To know the cost volume profit relationship, a study of the following is essential:

1. Marginal cost analysis;
2. Break-even analysis;
3. Profit volume ratio;
4. Profit graph;
5. Key factor; and
6. Sales mix. etc.

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## **18.7 SOME IMPORTANT CONCEPTS OF COST-VOLUME-PROFIT ANALYSIS**

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### **18.7.1 Fixed cost**

It is the total of all those costs which are termed ‘period costs’ or ‘Time costs’. They do not depend on the volume of production and sales. They must be incurred irrespective of the actual activity or operations. Examples: Office rent, Factory rent, Manager’s salary, etc. i.e., fixed overheads.

The fixed costs do not normally change upto the full capacity of a firm. So unless otherwise mentioned, between ‘0’ and 100% of a firm’s capacity, fixed cost remain constant. Fixed costs are fixed in total but variable per unit.

### **18.7.2 Variable costs**

These are the costs which increase or decrease in proportion to the output and sales. Variable costs are called ‘Product costs’ or ‘Marginal costs. Usually they vary in direct proportion to the output. They include all the direct costs, i.e., direct material, direct wages, direct expenses and variable overheads. The variable costs vary in total but they remain constant per unit. Variable costs or marginal costs are the focal point in the application of marginal costing as a technique.

18.7.3 Contribution

Contribution is the difference between sales and marginal cost. It is the contribution towards fixed costs and profit. In marginal costing technique contribution is a very important concept as it is used to find the profitability of products, processes, departments and divisions. Practically all decision are based on and oriented towards contribution.

Contribution is different from the profit which is the net margin remaining after reducing fixed expenses from the total contribution. Contribution can be ascertained as given below:

Contribution = Selling price – Marginal cost  
Contribution = Fixed expenses + Profit  
Contribution – Fixed expenses = Profit

18.7.4 Contribution to Sales  $\left(\frac{C}{S}\right)$  (or) P/V (Profit Volume) Ratio

This is the ratio of contribution to sales. It is an important ratio analyzing the relationship between sales and contribution. A high P/V ratio indicates high profitability and low P/V ratio indicates low profitability. This ratio helps in comparison of profitability of various products. Since high P/V ratio indicates high profits, the objective of every organization should be to improve or increase the P/V ratio.  
P/V Ratio can be improved by:

- (1) Decreasing the variable cost by efficiently utilizing material, machines and men.
- (2) Selecting most profitable product mix for production and sales.
- (3) Increasing the selling price per unit.

Formula for P/V Ratio

P/V Ratio =  $\frac{\text{Contribution}}{\text{Sales}}$  =  $\frac{C}{S}$   
(or)  
=  $\frac{\text{Sales} - \text{Variable costs}}{\text{Sales}}$  =  $\frac{S - V}{S}$   
(or)  
=  $\frac{\text{Fixed costs} + \text{Profit}}{\text{Sales}}$  =  $\frac{F + P}{S}$

When two periods’ profits and sales are given, the P/V ratio is calculated as given below:

$P / V \text{ Ratio} = \frac{\text{Change in profits}}{\text{Change in sales}}$   
P/V Ratio is generally expressed as a percentage.

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## 18.8 BREAK EVEN ANALYSIS AND BREAK EVEN POINT

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Break even analysis is a method of studying relationship between revenue and costs in relation to sales volume of a business enterprise and determination of volume of sales at which total costs are equal to revenue. According to Matz Curry and Frank “a break-even analysis determines at what level cost and revenue are in equilibrium”. Thus, break even analysis refers to a system of determination of that level of activity where total sales are just equal to total costs. This level of activity is generally termed as break-even point (B.E.P.). At the break even point a business man neither earns any profit nor incurs any loss. Break even point is also called “No profit, no loss point” or “Zero profit & zero loss point”.

### Formula for calculating break even point

**Break even point (in units)**

$$= \frac{\text{Fixed expenses}}{\text{Selling price per unit} - \text{Marginal cost per unit}}$$

(or)

$$\frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

(or)

$$\frac{\text{Break even sales value}}{\text{Selling price per unit}}$$

Break even point (in rupees)

(or)

Break even sales value

Break even sales value = Break even point in units x Selling price per unit.

$$\text{(or)} = \frac{\text{Fixed cost}}{P/V \text{ Ratio}} = \frac{F}{P/V}$$

**Break even ratio:** Break even ratio is the ratio between break-even sales and actual sales of a business concern. Break even ratio is ascertained by the following formula:

$$\text{Break even ratio} = \frac{\text{Break even sales}}{\text{Actual sales}} \times 100$$



### Composite Break even point

This is the combined break even point or overall break even point of a concern calculated only when a business concern makes two or more products. The composite break-even point is calculated by the following formula:

$$\text{Composite break even point in value} = \frac{\text{Total Fixed cost}}{\text{Composite } P / V \text{ Ratio}}$$

Where total fixed cost is the total fixed cost of the business concern as a whole.

Composite P/V ratio = Individual P/V Ratio x % of each product to total sales  
Break even capacity or Capacity Break even point: This is expression of break even point as percentage of capacity.

$$\begin{aligned} \text{Capacity B.E.P.} &= \frac{\text{B.E.P. in units}}{\text{Total capacity in units}} \times 100 \\ &\text{(or)} \\ &= \frac{\text{Break even point in rupees}}{\text{Total capacity in rupees}} \times 100 \end{aligned}$$

### Margin of Safety

Break even analysis includes the concept of margin of safety. Margin of safety is the difference between actual sales and break even sales. Margin of safety is calculated in rupees, units or even in percentage form. Margin of safety indicates the value/volume of sales which directly contribute to profit, as fixed costs have already been recovered at break even point. Margin of safety is calculated by the following formula:

**Margin of Safety = Actual sales – Break even sales**

$$\text{(or)} \quad = \frac{\text{Profit}}{P / V \text{ Ratio}} = \frac{P}{P / V}$$

### Margin of Safety Ratio:

Sometimes margin of safety is expressed as a ratio. It is the ratio of margin of safety to actual sales.

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of safety}}{\text{Actual sales}} \times 100$$

### Significance of Margin of Safety

Being sales beyond break even point, it indicates the 'cushion' or 'safety margin' available to the firm in terms of sales revenue. Generally, business firms are subject to ups and downs due to competition, recession in the industry, depression in the economy, etc.

Margin of safety is the cushion available to withstand the oscillations in the business cycle. When sales start declining for any of the above reasons, the firm will not incur losses till its margin of safety is fully eroded. Thus, the firms with high margin of safety can survive ups and down in business whereas those firms operating with very thin margin of safety can succumb or capitulate when severe competition or recession is faced.

The objective of the management should always be to maximize the margin of safety, their by providing stability and safety to the firm. Margin of safety can be improved by taking the following steps:

1. Increasing production
2. Increasing selling price
3. Reducing the fixed or the variable costs or both;
4. Substituting unprofitable product with profitable one.

### **Angle of Incidence**

In graphic presentation of marginal cost data, i.e., a break-even chart, the total cost line and sales line cross each other. The point of their crossing is termed 'Break-even point'. The angle at which the sales line crosses the total cost line is called the 'Angle of incidence'.

'The bigger is the angle, the more will be the contribution and profit with every additional sale. Firms with higher P/V ratio and comparatively less variable costs have a higher angle of incidence. Such firm can magnify their profits in high demand conditions.

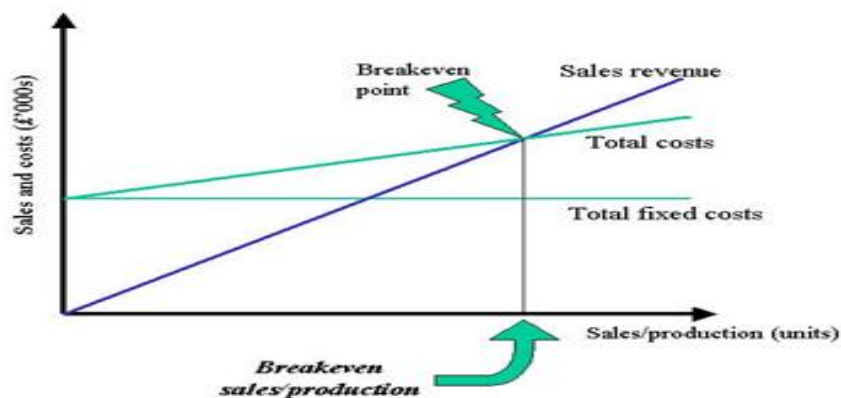
The angle of incidence at a glance can signify or reveal the ability of a firm to earn higher profits with every increase in sales.

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## **18.9 BREAK EVEN CHARTS**

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The technique of break-even analysis can be made easy with the help of graph or mathematical formula. Graphical representation of break-even point is known as the break-even chart. Dr.Vance is of the opinion that "it is a graph showing the amount of fixed variable costs and the sales revenue at different volumes of operation. It shows at what volume the firm first covers all costs with revenue of break-even". B.E.C. show the profitability or otherwise of an undertaking at various levels of activity, and indicates the point at which neither profit nor loss is made. Break-even point is known as "no profit, no loss point". So the chart is also known as break-even chart. At this point, the total costs are recovered and profit begins.



### 18.9.1 Advantage

- i) Total cost, variable cost and fixed cost can be determined.
- ii) B.E. output or sales value can be determined.
- iii) Cost, volume and profit relationship can be studied, and they are very useful to the managerial decision-making.
- iv) Inter-firm comparison is possible.
- v) It is useful for forecasting plans and profits.
- vi) The best products mix can be selected.
- vii) Total profits can be calculated.
- viii) Profitability of different levels of activity, various products or profit, i.e., plant can be known.
- ix) It is helpful for cost control.

### 18.9.2 Limitations of B.E.C.

B.E.C. is constructed under some unrealistic assumptions.

- i) Constant selling price is not true.
- ii) Detailed information cannot be known from the chart. To know all the information about fixed cost, Variable cost and Selling price, a number of charts must be drawn.
- iii) No importance is given to opening and closing stocks.
- iv) Various product mix on profits cannot be studied as the study is concerned with only one sales mix or product mix.
- v) If the business conditions change during a period, the B.E.C. becomes out of data as it assumes no change in business condition.

**18.9.3 Types of Break Even Charts**

From the point of view of methods of preparation and purpose for which the chart is prepared, break even chart may be various types. Normally, following types are most commonly used.

- (1) Simple break-even chart
- (2) Contribution break even chart
- (3) Profit break even chart
- (4) Profit chart for product-wise analysis
- (5) Cash break even chart
- (6) Control break even chart

**Check your progress 18.01**

Explain the Break even analysis and Break even point

- Notes: (a) Write your answer in the space given below.
- (b) Check your answer with the ones given at the end of this Lesson
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- .....
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**18.10 SIMPLE PROBLEMS**

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**Illustration No.18.01**

Prepare Marginal Cost Statement from the following particulars:

Variable costs: Direct Materials Rs.45,000; Direct Wages Rs.25,000; and Factory Overheads Rs.15,000.

Fixed Cost: Administrative expenses Rs.12,500; Profit Rs.52,500.

**Solution No.18.1**

**MARGINAL COST STATEMENT**

	Rs.	Rs.
Sales		1,50,000
Less: <i>Variable Costs:</i>		
Direct Materials	45,000	
Direct Labour	25,000	
Factory Overheads	15,000	85,000
<b>CONTRIBUTION</b>		<b>65,000</b>
Less: <i>Fixed Cost</i>		
Administrative expenses		12,500
<b>PROFIT</b>		<b>52,500</b>

**Illustration No.18.2**

Calculate P/V Ratio from the following  
Marginal cost [Variable cost] Rs.2,400 and Selling price Rs.3,000

**Solution No.18.2**

$$\begin{aligned} \text{P/V Ratio} &= [\text{Contribution} / \text{Sales}] \times 100 &&= [\text{Rs.3,000} - 2,400] / 3,000 \times 100 \\ &&&= \text{Rs.600} / 3,000 \times 100 = \mathbf{20\%} \end{aligned}$$

**Illustration No.18.3**

The following data are obtained from the records of a company.

	Period I	Period II
	Rs.	Rs.
Sales	80,000	90,000
Profit	10,000	14,000

Calculate Break even point.

**Solution No.18.3**

$$\begin{aligned} \text{Break even point} &= \text{Fixed Cost} / \text{P/V Ratio} \\ \text{P/V ratio} &= [\text{Changes in Profit} / \text{Changes in Sales}] \times 100 \\ &= [ (14,000 - 10,000) / (90,000 - 80,000) ] \times 100 \end{aligned}$$

$$\begin{aligned}
 &= [\text{Rs.}4,000 / \text{Rs.}10,000] \times 100 = \mathbf{40\%} \\
 \text{Fixed Cost} &= \text{Contribution} - \text{Profit} \\
 \text{Contribution} &= \text{sales of any one period} \times \text{P/V ratio} \\
 &= \text{Rs.}80,000 \times 40\% = \text{Rs.}32,000 \\
 \text{Fixed cost} &= \text{Contribution} - \text{profit of considered period} \\
 &= \text{Rs.}32,000 - 10,000 = \text{Rs.}22,000 \\
 \text{Therefore, BEP sales} &= \text{Fixed Cost} / \text{P/V Ratio} \\
 &= \text{Rs.}22,000 / 40\% = \mathbf{\text{Rs.}55,000}
 \end{aligned}$$

#### Illustration No.18.4

The following information was obtained from a company in a certain year

Sales Rs.1,00,000; Variable Costs Rs.60,000 and Fixed Costs Rs.30,000

Find the Profit Volume Ratio, Break even point, Margin of safety and Margin of Safety ratio.

#### Solution No.18.4

$$\begin{aligned}
 \text{Contribution} &= \text{Sales} - \text{Variable Cost} = \text{Rs.}1,00,000 - \text{Rs.}1,60,000 = \text{Rs.}40,000 \\
 \text{P/V ratio} &= \text{Contribution/Sales} \times 100 \quad [\text{C/S} \times 100] \\
 &= 40,000 / 1,00,000 \times 100 = \mathbf{40\%} \\
 \text{Break Even Sales} &= \text{Fixed Cost} / \text{P/V Ratio} \\
 &= \text{Rs.}30,000 / 40\% = \mathbf{\text{Rs.}75,000} \\
 \text{Margin of Safety} &= \text{Sales} - \text{Break even sales [or] Profit / P/V ratio} \\
 &= \text{Rs.}1,00,000 - \text{Rs.}75,000 = \mathbf{\text{Rs.}25,000} \\
 &\quad \text{OR} \\
 &= [1,00,000 - (60,000 + 30,000)] / 40\% = 10,000 / 40\% = \mathbf{\text{Rs.}25,000} \\
 \text{Margin of Safety Ratio} &= \text{Margin of safety} / \text{Sales} \times 100 \\
 &= \text{Rs.}25,000 / \text{Rs.}1,00,000 \times 100 = \mathbf{25\%}
 \end{aligned}$$

#### Illustration No.18.5

The fixed expenses of an industrial concern amount to Rs. 1,80,000. Its variable cost per unit is Rs.29 and selling price is Rs.44 per unit. Calculate the break even point.

**Solution No.18.5**

Contribution per unit	=	Selling price per unit – Variable cost per unit
		Rs.44 – Rs.29 = Rs.15
P/V Ratio	=	Contribution / Sales x 100
	=	Rs.15/ Rs.44 x 100 = <b>34 %</b> [approx.]
Break even point [in units]	=	Fixed cost / Contribution per unit [CPU]
	=	Rs.1,80,000 / Rs.15 = <b>12,000 units</b>
Break even Sales [in Rs.]	=	Fixed cost / P/V ratio
	=	Rs.1,80,000 / 34 % = <b>Rs.5,28,000</b>

**Illustration No.18.6**

Fill in the blanks for each of the following independent situations:

<i>Case</i>	<i>No. of units sold</i>	<i>Selling price p.u</i>	<i>Variable cost % of Sales</i>	<i>Contribution Margin</i>	<i>Fixed Cost</i>	<i>Profit</i>
		Rs.		Rs.	Rs.	Rs.
<b>A</b>	15,000	?	90	?	30,000	0
<b>B</b>	2,000	160	?	80,000	?	[2,000]
<b>C</b>	?	15	75	?	25,000	50,000

**Solution No.18.6**

**CASE A**

**MARGINAL COST STATEMENT**

	Rs.
Sales [15,000 units]	<sup>[1]</sup> 3,00,000
Less: <i>Variable Costs:[Bal. Fig]</i>	*2,70,000
<b>CONTRIBUTION</b>	<b>30,000</b>
Less: <i>Fixed Cost</i> [given]	30,000
<b>PROFIT</b> [given]	0

**Workings Note [1]**

Variable cost is 90 % of sales.

Contribution = Sales – Variable Cost – i.e, Rs.100 –Rs.90 = Rs.10

If Contribution is Rs10 , Sales will be Rs.100.

If Contribution is Rs.30,000 Sales will be – 30,000 X [100/90] = Rs.3,00,000<sup>[1]</sup>

Selling Price p.u = Rs.3,00,000 /15,000 = Rs.20

CASE B

MARGINAL COST STATEMENT	
	Rs.
Sales [2,000 x 160]	3,20,000
Less: <i>Variable Costs</i> : [Bal. Fig]	*2,40,000
<b>CONTRIBUTION</b>	<b>80,000</b>
Less: <i>Fixed Cost</i> [Bal. Fig]	*82,000
<b>LOSS</b> [given]	(2,000)

Percentage of Variable cost to Sales = [Variable Cost / Sales] x 100  
=[2,40,000 /3,20,000] x 100 = **75 %**

CASE C

MARGINAL COST STATEMENT	
	Rs.
Sales [20,000 x 15]	<sup>[2]</sup> 3,00,000
Less: <i>Variable Costs</i> : [Bal. Fig]	*2,25,000
<b>CONTRIBUTION</b>	<b>75,000</b>
Less: <i>Fixed Cost</i> [given]	25,000
<b>PROFIT</b> [given]	50,000

Working Note [2]

Variable Cost is 75 % of sales  
Therefore,. Contribution = Sales – Variable Cost – Rs.100 – Rs.75 = Rs.25  
If Contribution is Rs.25    Sales = Rs.100  
If Contribution is Rs.75,000    Sales = 75,000 X [100/25] = **Rs.3,00,000<sup>[2]</sup>**  
No. of units sold = Rs.3,00,000 / Rs.15 = 20,000 Units

Illustration No.18.7

Margin of Safety Rs.10,000 which represents 40 % of sales. P/V ratio 50 %. Calculate [a]Sales; [b] Break even sales [c] Fixed cost and [d] Profit.

Solution No.18.7

[a] Sales

Margin of Safety 40 % of sales  
If Margin of Safety is Rs.40;                      Sales will be Rs.100  
If Margin of Safety is Rs.10,000;              Sales = Rs.10,000 X [100/40]= **Rs.25,000**



[b] Break Even Sales

Break even sales = Sales – Margin of Safety  
Rs.25,000 – Rs.10,000 = **Rs.15,000**

[c] Fixed Cost

P/V Ratio = 50 %

It means contribution is Rs,50 when sales are Rs.100

Therefore, Contribution at break even sales = Break even sales x P/V Ratio  
= Rs.15,000 X 50 % = **Rs.7,500**

*Contribution – Fixed cost equal to zero at break even point, therefore[ C-FC = 0]Fixed cost is Rs.7,500.*

[d] Profit

MARGINAL COST STATEMENT

	Rs.
Sales	25,000
Less: <i>Variable Costs:[Bal. Fig]</i>	*12,500
CONTRIBUTION [S X P/V] 25,000 X 50%	<b>12,500</b>
Less: <i>Fixed Cost</i>	7,500
<b>PROFIT [Calculated]</b>	<b>*5,000</b>

Illustration No.18.8

From the following particulars calculate the Break even point

Variable cost per unit = Rs.12  
Fixed Cost = Rs.60,000  
Selling price per unit = Rs.18

Solution No.18.08

Break Even Point [in units] = Fixed Cost / Contribution per unit  
Contribution per unit = Selling price per unit – Variable cost per unit  
= Rs.18 – Rs.12 = Rs.6  
Break Even Point [in units] = Rs.60,000 / Rs.6 = **10,000 units**  
Break Even Point [in Rupees]= Fixed Cost / P/V Ratio  
P/V Ratio = [Contribution / Sales] X 100= [6/18] x100= **33.33 %**  
Break Even Point [in Rupees = [Rs.60,000 / 33.33]x 100 = **Rs.1,80,000**

**Verification:**

**MARGINAL COST STATEMENT**

	Rs.	Rs.
Sales [10,000 x 18]	18	1,80,000
Less: <i>Variable Costs</i> :[10,000 x 12]	12	1,20,000
CONTRIBUTION	6	<b>60,000</b>
Less: <i>Fixed Cost</i>		60,000
No PROFIT /LOSS		<b>0</b>

**Illustration No.18.9**

From the following data, calculate break-even point expressed in terms of units and also the new BEP, if the selling price is reduced by 10 %.  
Fixed Cost Rs.2,00,000; Variable Expenses Rs.5 per unit and Selling price per unit Rs.10

**Solution No.18.9**

Break Even Point = Fixed cost / Contribution per unit  
= Rs.2,00,000 / [10-5] = Rs.2,00,000 / Rs.5 = **40,000 units**

**If the selling price is reduced by 10 %**, the new selling price will becomes Rs.9 [10 – 1] per unit. Therefore, new contribution is, new selling price Rs.9 less variable cost [9-5] Rs.4

= Rs.2,00,000 / [9-5] = Rs.2,00,000 / Rs.4 = **50,000 units**

**Illustration No.18.10**

From the following information, calculate

- [a] Break even point
- [b] Number of units that must be sold to earn a profit of Rs.60,000 per year
- [c] Number of units that must be sold to earn a net income of 10 % on sales

Sales price	Rs.20 per unit
Variable cost	Rs.14 per unit
Fixed cost	Rs.79,200

**Solution No.18.10**

Contribution per unit [CPU] = Sales price per unit – variable costs per unit  
= Rs.20 – Rs.14 = Rs.6 per unit

P/V Ratio = Contribution / Sales x 100  
= [Rs.6 / Rs.20] x 100 = **30 %**

**[a] Break even point in units** = Fixed cost / Contribution per unit  
= 79,200 /6 = **13,200 units**

Break even sales = Fixed Cost / P/V Ratio  
= 79,200 / 30 % = **Rs.2,64,000**

**[b] Number of units to be sold to make a profit of Rs.60,000 per year:**

Required/Desired Sales = [Fixed expenses +Desired profit] / P/V Ratio  
= (79,200+60,000) / 30 % = **Rs.4,64,000**

Required/Desired sales in units = [Fixed expenses +Desired profit] / CPU  
= (79,200+60,000) / 6 = **23,200 units**

**[c] Number of units to be sold to make a net income of 10 % on sales**

If ‘x’ is number of units:

20x = Fixed cost + Variable cost+ Profit  
20x = 79,200 + 14x+2x [20 x 10 %]  
20x – 16x = 79,200  
4x = 79,200 /4 = **19,800 units**

**Check Your Progress 18.1**

[a] Calculate the break even point from the following:

Sales 1,000 units at Rs.10 each Rs.10,000

Variable cost – Rs.6 per unit

Fixed cost Rs.8,000.

[b] If the selling price is reduced to Rs.9, what is the new break even point?

**NOTES:**

a) Write your answer in the space given below

b) Check your answer with the one given at the end of this lesson

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**18.11 APPLICATIONS OF MARGINAL COSTING TECHNIQUES**

Marginal costing is the most powerful and popular technique in aid of managerial decision making. The cost-Volume-Profit Relationship has served as a key to locked storehouse of solutions to many situations. It enables the management to tackle many problems which are faced in the practical business. “All the introduction of marginal cost principles does is to give the management a fresh, and perhaps a refreshing, insight into the progress of their business.”. Now, we explain the application of the techniques of marginal costing in certain important decision making spheres in respect of the following vital areas:

- 1. Key Factor [or]Limiting Factor
- 2. Make or Buy decisions
- 3. Fixation of selling prices
- 4. Acceptance of Bulk orders or Export orders decision
- 5. Sales mix decisions etc.

The above list is not exhaustive. There are numerous situation suitable for applying the principles of marginal costing and the situations chosen above are only a few of the popular areas of application of marginal costing.

**18.11.1 Sales Mix Decisions**

In a multi product concern, a problem is faced by the management as to which product mix or sales mix will give the maximum profit. The product mix which gives the maximum profit/contribution must be selected. Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps the management in taking decisions regarding changing the ratio of product mix which gives maximum contribution, or in dropping unprofitable product line. The product which has comparatively less contribution may be reduced or discontinued.

**Illustration No.18.11**

Present the following information to show to the management: [a] the marginal product cost and the contribution per unit; [b] the total contribution and profits resulting from each of the following sales mixtures:

	Product	Per unit Rs.
Direct Materials	A	10
	B	9
Direct Wages	A	3
	B	2
Fixed expenses Rs.800		
Variable expenses are allocated to products as 100 % of direct wages.		
Selling Prices	A	20
	B	15

Sales Mixtures:

- [i] 1,000 units of Product A and 2,000 units of Product B
- [ii] 1,500 units of Product A and 1,500 units of Product B
- [iii] 2,000 units of Product A and 1,000 units of Product B

Solution No.18.11

[A] MARGINAL COST STATEMENT

	Product A Rs.	Product B Rs.
Selling Price	20	15
Less: <i>Marginal Costs:</i>		
Direct Materials	10	9
Direct wages	3	2
Variable overheads [100 %]	3	2
<i>Marginal Cost</i>	16	13
Contribution	4	2

[b] Sales Mix wise Contribution and Profits:

Particulars	Sales Mix [i]		Sales Mix [ii]		Sales Mix [iii]	
	Product A 1,000	Product B 2,000	Product A 1,500	Product B 1,500	Product A 2,000	Product B 1,000
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Contribution	A - [1,000x4] 4,000	B - [2,000 x 2] 4,000	A-[1,500 x 4] 6,000	B – [1,500 x2] 3,000	A-[2,000 x 4] 8,000	B – [1,000 x2] 2,000
Total Contribution	8,000		9,000		10,000	
Less: Fixed Cost	800		800		800	
Profit	7,200		8,200		9,200	

Therefore, the sale mix [iii] is recommended because of its highest contribution and profit among three different sales mix i.e., Product A 2,00o units and Product B 1,000 units, can be adopted.

18.11.2 Key Factor

Any factor concerned with production and/or sales which imposes ‘limits’ on the production and sales can be called ‘key factor’ or ‘key factor’ or ‘scarce factor’. It may arise due to the shortage of materials, labour, capital, plant capacity, or sales. Normally, when there is no limiting factor, the selection of the product will be on the basis of the highest P/V ratio. But, *when there are limiting factors, selection of the product will be on the basis of the highest contribution per unit of the key factor.*

The following illustration will explain the key factor analysis in a better way.

Illustration No.18.12

The following particulars are obtained from costing records of a factory.

	Product A [Per Unit]	Product B [Per Unit]
	Rs.	Rs.
Selling Price	200	500
Materials [Rs.20 per kg.]	40	160
Labour [Rs.10 per kg.]	50	100
Variable overhead	20	40
Total Fixed overheads Rs.15,000		

*Comment on the profitability of each product when:*

- [a] Raw materials is in short supply;
- [b] Production capacity is limited;
- [c] Sales quantity is limited;
- [d] Sales value is limited; and
- [e] Only 1,000 kgs. of raw materials is available for both type of products in total and maximum sales quantity of each product is 300 units.

Solution No.18.12

MARGINAL COST STATEMENT

	Product A [Per Unit]	Product B [Per Unit]
	Rs.	Rs.
Selling Price	200	500
Materials [Rs.20 per kg.]	40	160
Labour [Rs.10 per kg.]	50	100
Variable overhead	20	40
	110	300

<b>Contribution</b>	90	200
<b>[i] P/V Ratio</b>	90 / 200 x 100	200 / 500 x 100
Contribution / Sales x 100	<b>45 %</b>	<b>40 %</b>
<b>[ii] Contribution per kg. =</b>	Rs.90 / 2 kgs	Rs.200 / 8 Kgs
	<b>Rs.45</b>	<b>Rs.25</b>
<b>[iii] Contribution per hour =</b>	Rs.90 / 5 hours	Rs.200 / 10 hours
	<b>Rs.18</b>	<b>Rs.20</b>

- [a] When raw materials is in short supply, contribution per kg of Product A is higher and hence product A is more profitable.
- [b] When production capacity is limited contribution per hour of Product B is higher and hence product B is more profitable.
- [c] When sale quantity is limited, contribution per unit of Product B is higher and hence Product B is more profitable.
- [d] When sales value is limited, the P/V Ratio of the product A is higher and hence Product A is more profitable.
- [d] When raw materials as well as sales quantity are limited, the raw materials should first be used for maximum number of units of Product A, i.e. for 300 units. This will consume 600 kgs of material and the balance 400 kgs. shall be utilized for producing 50 units.[400 / 8] of Product B.

The Profit in such a case would be:

	Rs.
Contribution from 300 units of Product A [300 x 90]	27,000
Contribution from 50 units of Product B [50 x 200]	<u>10,000</u>
<b>Total Contribution</b>	37,000
Less: Fixed Overheads	<u>15,000</u>
<b>Profit</b>	<u><u>22,000</u></u>

### 18.11.3 Make or Buy Decisions

A firm may make some products, parts, or tools or sometimes it may buy the same thing from outside. The management must decide which is more profitable to the business. In a make or buy decisions, the price quoted by the outside suppliers should be compared with the marginal cost of producing the component parts. If the outside price of the component is lower than the marginal cost of producing it, it is worth buying. On the other hand, if the outside price is higher than the marginal cost, making the component, if production capacity is available, in the factory may be preferred.

**Illustration No.18.13**

A radio manufacturing company finds that while it costs Rs.6.25 to make each component X, the same is available in the market at Rs.4.85 each, with an assurance of continued supply. The breakdown of cost is:

	Rs. [for each]
Materials	2.75
Labour	1.75
Other Variable expenses	0.50
Depreciation and other fixed cost	<u>1.25</u>
	6.25

Advices the radio manufacturing company whether to make or buy?

**Solution No.18.13**

Variable [marginal] cost of manaufacaturing is Rs.5 [Rs.6.25-1.25] but the market price is Rs.4.85. If the fixed cost of Rs.1.25 is also added, it is not profitable to make the component. Because there is a profit of Re.0.15 even in variable costs, it is profitable to procure from outside.

**Illustration No.18.14**

The management of a company finds that while the cost of making a component part is Rs.10, the same is available in the market at Rs.9 with an assurance of continuous supply.

Give a suggestion whether to make or buy this part. Give your views in case the supplier reduces the price from Rs.9 to Rs.8.

The cost information is as follows:

	Rs.
Materials	3.50
Direct Labour	4.00
Other Variable expense	1.00
Fixed expenses	1.50
Total	10.00

**Solution No.18.14**

In order to make decision on whether to make or buy the component part, fixed expenses should not be considered and not added to the cost because these will be incurred even if the part is not produced. Thus, additional cost of the part alone will be considered.



	<b>Rs.</b>
Materials	3.50
Direct Labour	4.00
Other Variable expense	1.00
<b>Total</b>	<b>8.50</b>

The company should produces this part if the part is available in the market at Rs.9.00. Since, the production of every part will give the company a contribution of 50 paise. [Rs.9 –Rs.8.50]

However, the company should not manufacture the part if it is available in the market at Rs.8 because additional cost of producing the part is 50 paise [Rs.8.50 – Rs.8] more than the price at which it is available in the market.

### 18.11.4    Fixation of selling price

Product pricing is a very important function of management. One of the purposes of cost accounting is the ascertainment of cost for fixation of selling price. Marginal cost of a product represents the minimum price for that product and any sale below the marginal cost would entail a loss of cash. There are cyclic periods in business – boom, depression, recession etc. During normal circumstances, the price of a product must cover the total cost of that product plus a margin of profit. However, under certain circumstance, price has to be fixed even below the total cost. For instance, when there is a general trade depression or exploring new market or accepting additional orders, the producers has to cut the price even below the total cost of the concerned product. Under these special circumstances, the concept of marginal cost is usefully applied to fix the prices.

### Illustration No.18.15

The following details relate to Product X:

	<b>Rs.</b>	<b>Rs.</b>
Selling Price		1,200
Costs:		
Materials	600	
Labour	150	
Variable Overheads	50	
Fixed Overheads	100	900
Profit		<u><b>300</b></u>

During the forthcoming year, it is expected that material costs will increase by 10 %, wages by 33 1/3 % and other variable costs by 20 %. You are required to calculate the percentage increase in selling price of X which will maintain the firm’s contribution/sales ratio.

Solution No.18.15

STATEMENT SHOWING CONTRIBUTION AND SALES

	Current year Per unit  Rs.		Forthcoming year Per unit Rs.
Materials	600	600 + [600 x 10%]	660
Labour	150	150 + [ 150 x 33 1/3 %]	200
Variable Overheads	50	50 + [50 X 20 %]	60
Total Variable cost	800		920
Contribution	400		<sup>[1]</sup> 460
Selling Price	1,200		1,380
Increase in selling price	1,380 -1,200 =		Rs.180
Percentage of increase in selling price	180 /1,200 X 100		15 %

Working Note [1]

Contribution to Sales Ratio:

Current year    = [400/1200] x 100 = 1/3 or 33 1/3 %

Forthcoming year’s Contribution is 1/3 on sales or ½ of the Variable cost  
= 920 x ½ = **Rs.460<sup>[1]</sup>**

Illustration No.18.16

Abhinav Bindra, a ready-made cloth merchant seeks your help in fixing selling price for his only product. The following details are gathered:

	Rs.
Purchase price per shirt	30
Carriage inwards for every 1,000 shirts	1,500
Commission to the salesman per shirt	3.5
Fixed costs of his shop per annum	12,40,000

Profit required Rs.80,000 per month.  
Discount to be offered to the customers on the list price 25 %.  
He has a contract for supply of 1,00,000 pieces of the brand of shirt per annum.  
Determine the selling price per shirt based upon the above details. Show the effective price and the list price clearly.

**Solution No.18.16**

**STATEMENT SHOWING SELLING PRICE PER SHIRT**

Particulars	Per unit Rs.	Total 1,00,000 shirts Rs.
<i>Variable Costs:</i>		
Purchase price	30.00	30,00,000
Carriage inwards [1,500/1,000]	1.50	1,50,000
Salesmen’s commission	3.50	3,50,000
<b>Variable Costs</b>	<b>35.00</b>	<b>35,00,000</b>
<i>Fixed Cost per annum</i>	<i>12.40</i>	<i>12,40,000</i>
<b>Total Cost</b>	<b>47.40</b>	<b>47,40,000</b>
Required/Desired profit [80,000 x 12]	9.60	9,60,000
<b>Sales</b>	<b>57.00</b>	<b>57,00,000</b>

**Calculation of List Price**

Effective Selling price per shirt	Rs.57.00
Add: Discount to be given at 25 % on the list price or 25/75 [1/3].on effective price[ Rs.57 x 1/3]	<u>Rs.19.00</u>
<b>List Price</b>	<b><u>Rs.76.00</u></b>

List price and the discount on list price do not find place in the calculation of the selling price because effective selling price should be the basis for calculation of profit.

**18.11.5 Acceptance of Bulk orders or Export Orders**

Sometimes orders may be received from local dealers, or foreign dealers asking for a price which is below the market price. This calls for a decision to accept or reject the order. The order from a local dealer should not be accepted at a price below the market price because it will affect the normal market and goodwill of the company. On the other hand, the export order from the foreign dealer may be accepted because it will give additional contribution, as fixed costs have already been met. However, it should not affect the normal market price in the existing market.

Illustration No.18.17

Additional Order [Export]

The cost sheet of a product is given below:

	Re.	Rs.
Direct Material		5.00
Direct Labour		3.00
Factory Overhead:		
Fixed	0.50	
Variable	0.50	1.00
Administrative expenses		0.75
Selling and Distribution Expenses		
Fixed	0.25	
Variable	0.50	0.75
<b>Total Cost</b>		10.50
Selling price per unit is Rs.12.00		

The above figures are for an output of 50,000 units. The capacity for the firm is 65,000 units. A foreign customer is desirous of buying 15,000 units at a price of Rs.10 per unit. Advice the management whether the order should be accepted. What will be your advice if the order were from a local merchant?

Solution No.18.17

MARGINAL COST STATEMENT

	50,000 Units			Export 15,000 units		Total	
	Rs.	P.U. Rs.	Total Rs.	Rs.	Total Rs.	P.U. Rs.	Total Rs.
Selling Price		12.00	6,00,000	10.00	1,50,000	-	7,50,000
<b>Less: Marginal Cost</b>							
Direct Materials	5.00						
Direct Wages	3.00						
Variable overheads:							
Factory	0.50						
Selling & Dist.	0.50	9.00	4,50,000	9.00	1,35,000	9.00	5,85,000
<b>Contribution</b>		3.00	1,50,000		<b>15,000</b>		1,65,000
Less: Fixed Cost							
Admt. Expenses	0.75	37,500					
S & D	0.25	12,500	50,000		-	-	50,000
Profit			1,00,000		<b>15,000</b>		1,15,000

The order from the foreign customer will give an additional contribution of Rs.15,000. Hence, the order should be accepted because additional contribution of Rs.15,000 [Rs.1,00,000 to Rs.1,15,000] will increase the profit by this amount as fixed expenses have already been recovered from the internal market.

The order from the local merchant should not be accepted at a price of Rs.10 which is less than normal price of Rs.12. This price will affect relationship with other customers and there will be a generally tendency of reduction in the price.

### Illustration No.18.18

Two businesses SVP Ltd. and TRR Ltd., sell the same type of product in the same type of market.

Their budgeted Profit and Loss Accounts for the coming year are as follows:

	SVP Ltd		TRR Ltd.	
	Rs.	Rs.	Rs.	Rs.
Sales		1,50,000		1,50,000
Less:				
Variable Cost	1,20,000		1,00,000	
Fixed Cost	15,000	1,35,000	35,000	1,35,000
Budgeted Net profit		15,000		15,000

You are required to:

- [a] Calculate break-even point of each business
- [b] Calculate the sales volume at which each business will earn Rs.5,000 profit.
- [c] State which business is likely to earn greater profit in conditions of:
  - [i] Heavy demand for the product
  - [ii] Low demand for the product
 Briefly give your reasons.

### Solution No.18.18

		SVP Ltd	TRR Ltd.
	Sales	1,50,000	1,50,000
Less:	Variable Cost	1,20,000	1,00,000
	<b>CONTRIBUTION</b>	30,000	50,000
Less:	Fixed Cost	15,000	35,000
	<b>PROFIT</b>	15,000	15,000

---

**[a]Calculation of Break Even Point**

P/V Ratio=	$\frac{[\text{Contribution} / \text{Sales}]}{100} \times 100$	$30,000/1,50,000 \times 100$	$50,000 /1,50,000 \times 100$
		<b>20 %</b>	<b>33 1/3 %</b>
Break Even Point =	Fixed Cost / P/V Ratio	$15,000 / 20 \%$	$35,000 / 33.33 \%$
		<b>Rs.75,000</b>	<b>Rs.1,05,000</b>

**[b] Sales required to earn profit of Rs.5,000**

Desired Profit =	$\frac{\text{Desired Profit} + \text{Fixed Cost}}{\text{P/V Ratio}}$	$\frac{[5,000 + 15,000]}{20 \%}$	$\frac{[5,000+35,000]}{33 \frac{1}{3} \%}$
		<b>Rs.1,00,000</b>	<b>Rs.1,20,000</b>

**[c]**

- [i] In conditions of heavy demand, a concern with higher P/V Ratio can earn greater Profits, because of higher contribution. Thus TRR Ltd. is likely to earn greater profit.
- [ii] In conditions of low demand, a concern with lower break even point is likely to earn more profits because if will start making profits at lower level of sales. Hence, in case of low demand SVP Ltd. will make profits when its sales reach Rs.75,000, whereas TRR Ltd. will start making profits only when its sales reach the level of Rs.1,05,000.

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**18.12 LET US SUM UP**

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Marginal costing techniques is helpful to management to take decision, is in which we are considering only variable cost. Cost volume profit analysis, an attempt is made to measure variations of cost and profits with volume. Break even point is a point at which sales equal to total cost. For finding BEP, we are considering fixed cost. With the help of BEP we can find profit at desired levels.

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**18.13 LESSON – END ACTIVITIES**

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1. What are the salient features of marginal costing?
2. Distinguish between absorption costing and marginal costing by showing their major points of difference.

3. What do you understand by 'Cost volume profit' Analysis? What is its significance?
4. What is break even point? How do you calculate it?
5. Explain the meaning and significance of 'Margin of Safety'.
6. What are the limitations of break even chart? Mention the assumptions underlying a break even chart.
- 7 The following information is obtained from Ravichandran and Co. for 1993:

Sales	Rs.20,000
Variable costs	Rs.10,000
Fixed costs	Rs.6,000

- (a) Find P/V Ratio
- (b) Break even point and
- (c) Margin of safety at the current sales level.

8 From the following details find out

(a) Profit volume ratio	
(b) Break-even sales and	
(c) Margin of safety	
Sales	Rs. 1,00,000
Total cost	Rs.80,000
Fixed cost	Rs.20,000
Net profit	Rs.20,000

9 From the following information relating to Honest Ltd., you are required to find out:

- (a) P.V. Ratio
- (b) Break-even point
- (c) Profit
- (d) Margin of safety

	Rs.
Total fixed costs	4,500
Total variable costs	7,500
Total sales	15,000

10 From the following data calculate

- (a) Break even point (in units)
- (b) If sales are 10% and 15% above the break even volume. Determine the net profit.

Selling price per unit	-	Rs.10
Direct material per unit	-	Rs.3
Fixed overheads	-	Rs.10,000
Variable overhead per unit	-	Rs.2
Direct labour cost per unit	-	Rs.2

- 11 Sales Rs.1, 00,000; Profit Rs.10,000; Variable cost 70%.  
Find out

- (a) P/V Ratio
- (b) Fixed cost
- (c) Sales to earn a profit of Rs.40,000

- 12 From the following information relating to Gowtham Ltd., you are required to find out

Sales price	-	Rs. 20 per 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 year

Calculate:

- (a) Break even point in 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

- 13 From the following particulars you are required to determine:

- (a) Break even sales volume
- (b) the profit at the budgeted sales volume
- (c) The profit if actual sales drop by 10% over the budgeted sales.

Budgeted sales = Rs.18,50,000.

Particulars	Variable cost % of sales	Fixed Cost
Direct material	42.8	
Direct labour	18.4	
Factory overhead	10.6	2,89,900
Distribution overhead	6.1	68,000
General administrative overhead	5.1	56,000



14 The sales and profit for 1996 and 1997 are as follows:

	Sales	Profit
	Rs.	Rs.
1996	1,50,000	20,000
1997	1,70,000	25,000

Find out:

- (a) P/V Ratio
- (b) BEP
- (c) Sales for a profit of Rs.40,000
- (d) Profit for sales of Rs.2,50,000 and
- (e) Margin of safety at a profit of Rs.50,000

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**18.14 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check Your Progress ‘Answers’**.18.01

Break even point in Units 2,000 units

Break even sales Rs.20,000

New Break even point in Units 2,667 units

New Break even sales Rs.24,000

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**18.15 SUGGESTED READING/REFERENCES/SOURCES**

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- 1. AnthonyA. Atkinson, Robert.S.Kaplan and Mark Young.S – Management Accounting – Pearson Education
- 2. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
- 3. R.S.N. Pillai and Bagavathi – Management Accounting – S.Chand and Company Ltd.
- 4. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
- 5. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications

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## LESSON-19

### CAPITAL BUDGETING

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#### Contents:

- 19.0 Aims and Objectives
- 19.1 Introduction
- 19.2 Need for Capital Budgeting
- 19.3 Concept of Capital Budgeting
- 19.4 Features of Capital Budgeting
- 19.5 Importance of Capital Budgeting
- 19.6 Capital Budgeting Process
- 19.7 Factors Influencing Capital Budgeting Decisions
- 19.8 Types of Capital Expenditure
- 19.9 Classification of Capital Budgeting Proposals
- 19.10 Evaluation of Investment Proposals
- 19.11 Capital Budgeting Appraisal Methods
- 19.12 Comprehensive Problems
- 19.13 Let Us Sum Up
- 19.14 Lesson-End Activities
- 19.15 Check Your Answers – Answers
- 19.16 Suggested Readings

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#### 19.0 AIMS AND OBJECTIVES

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By the end of this lesson you should be able to:

- i. Understand the Concept of Capital Budgeting
- ii. Know Capital Budgeting Process
- iii. Evaluative Various Capital Budgeting projects and proposal

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## **19.1 INTRODUCTION**

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In a firm Finance manager is concerned with the financing as well as investment decisions. Financing decisions relate to determination of the amount of finance [money] required and sources from which such finance is to be raised. Another core function of Finance Manager is making investment decisions, also popularly known as Capital Budgeting decisions.

A progressive business firm always moves ahead, its fixed assets and other resources continue to expand; they have to spend on expenditures which are of capital / long term nature. Thus, Capital budgeting is the process of making investment decisions regarding capital expenditure. A capital expenditure is an expenditure incurred for acquiring or improving the fixed assets, the benefits of which are expected to be received over a number of years in future. Capital budgeting involves non-flexible long-term commitment of funds. As it involves huge amount, non-flexibility and long-term nature, we need to study in depth. In this context, this lesson will describe about capital budgeting process, its need and importance and various method of evaluating and appraising capital budgeting decisions.

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## **19.2 NEED FOR CAPITAL BUDGETING**

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Before discussing about what is capital budgeting?, we will acquaint our self why we need capital budgeting. Capital budgeting decisions are vital to any business as they include the decisions as to:

- [a] Whether or not funds should be invested in long-term projects such as setting of an industry, purchase of plant and machinery etc.
- [b] Analyse the proposal for expansion or creating additional capacities;
- [c] To decide the replacement of permanent assets;
- [d] To decide whether to invest and/ or how much to be invested in research and development.
- [e] Finally, most importantly, capital budgeting is required to make financial analysis of various proposals regarding capital investments so as to choose the best out of many alternative proposals.

For the above discussions, we are sure about that capital budgeting are vital for not only for expansion even for survival of business firms.

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### 19.3 CONCEPT OF CAPITAL BUDGETING

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#### Definition of Capital Budgeting

The term Capital budgeting is defined by several authors emphasizing different aspects, some of them are as follows:

**Charles T. Horngreen** has defined capital budgeting as, “Capital budgeting is long term planning for making and financing proposed capital outlays.”

According to **Philippatos**, “ Capital budgeting is concerned with the allocation of the firm’s scarce financial resources among the comparison of the expected future streams of earnings from a project, with the immediate and subsequent streams of expenditure for it”.

**Herold Bierman Jr. And T.R. Dyckman** defined as, “ Capital budgeting is the process of deciding whether or not to commit resources to projects whose costs and benefits are spread over several time periods”.

#### Meaning of Capital Budgeting:

From the above definitions, capital budgeting means, the process of deciding whether or not to commit resources to a particular long term expenditure whose benefits are to be realized over a period of time, longer than one year.

In simple, capital budgeting is the process in which whether to invest or not are decided. Capital budgeting is also known as Investment Decision Making, Capital Expenditure Decisions, Planning Capital Expenditure and Analysis of Capital Expenditure.

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### 19.4 FEATURES OF CAPITAL BUDGETING

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The following are the important features can be deciphered from the above definitions:

1. Capital budgeting decisions are essentially a long-term function;
2. Huge funds are invested in long-term assets;
3. The future benefits will occur to the firm over a series of years;
4. They involve the exchange of current funds for the benefits to be achieved in future;
5. They have a significant effect on the profitability of the concern;
6. They are ‘Strategic’ investment decisions; and
7. They are irreversible decisions.

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## 19.5 IMPORTANCE OF CAPITAL BUDGETING

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Capital budgeting decisions are among the most crucial and critical business decisions. It is most important single area of decision-making for the management. Unsound investment decision may prove to be fatal to the very existence of the concern. The significance of capital budgeting arises mainly due to the following:

**[1] Huge Investments:** Capital expenditure decisions generally involve large investment of funds. It is absolutely necessary that the firm should carefully plan its scarce financial investment programme so that it may get the finances at the right time and they are put to most profitable use. An opportune investment decision can give spectacular results. On the other hand, an ill-advised and incorrect decision can jeopardize the survival of even the biggest firms.

**[2] Long-term implications:** Capital expenditure decisions results in commitment of funds on long term basis. Once a project is taken up and investment is made, it is not usually possible to reverse the decision. The reversal will be at the cost of heavy loss.

**[3] Long term impact on profitability:** The capital expenditure decisions will shape the future revenue streams and the profitability of operations.

**[4] Growth and Expansion:** Business firms grow, expand, diversify and acquire stature in the industry through their capital budgeting activities. The success of capital budgeting decisions determines the future of a firm.

**[5] Cost over runs:** If not meticulously implemented, delay in completion of projects will automatically result in excess costs and heavy losses.

**[6] Multiplicity of variables:** Large number of factors affect the decisions are capital expenditure. They make the 'capital expenditure decisions' the most difficult to make.

**[7] Top Management Activity:** The metamorphic impact of capital budgeting decisions automatically thrusts them on the top management. Only senior managerial personnel can take these decisions and bear responsibility for them.

**[8] Complicacies of Investment Decisions:** The long term investment decisions are more complicated in nature. The capital budgeting decisions require an assessment of future events which are uncertain. It is really a difficult task to estimate the probable future events.

**[9] National Importance:** Investment decision taken by individual concern is of national importance because it determines employment, economic activities and economic growth.

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## 19.6 CAPITAL BUDGETING PROCESS

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Capital budgeting is a complex process as it involves decisions to the investment of current funds for the benefit to be achieved in future and the future is always uncertain. A capital budgeting process may involve a number of steps depending upon the size of the concern, nature of projects, their numbers, complexities and diversities etc. It requires a complex combination of knowledge of various disciplines for their effective administration, such as economics, finance, mathematics, economic forecasting, projection techniques and techniques of financial control. In order to tie all these elements, a financial manager must keep in mind the three dimensions of capital budgeting programme – policy, plan and programme. These three Ps constitute a sound capital budgeting programme. The following procedure may be adopted in the process of capital budgeting.

### ***[1] Identification of Investment Proposals***

The capital budgeting process begins with the identification of investment proposals. Investment opportunities have to be identified or searched for and they do not occur automatically. Investment proposals of various types may originate at different levels within a firm or outside, depending upon their nature.

### ***[2] Screening the Proposals***

Each proposal is then subjected to a preliminary screening process in order to assess whether it is technically feasible; resources required are available and the expected return are adequate to compensate for the risk involved. This stage also involves the comparison of the proposals with other projects according to criteria of the firm.

### ***[3] Evaluation of Various Proposals***

The next step in the capital budgeting process is to evaluate the profitability of various proposals. If a proposal satisfies the screening process, it is then analyzed in more detail by gathering technical, economic and other data. The methods of evaluating profitability are discussed in detail separately in the following section.

### ***[4] Establishing Priorities***

After evaluation of various proposals, the unprofitable or uneconomic proposals are rejected. The accepted proposals, i.e., profitable proposals are put in priority. It may not be possible for the firm to invest immediately in all the acceptable proposals. Thus, it is essential to rank the various proposals and to establish priorities after considering urgency, risk and profitability involved therein.

**[5]     *Final Approval***

Proposals finally selected are sent to the top management along with a detailed report, both of capital expenditure and of source of capital. If capital expenditure proposals are finally selected, funds are allocated for them. Projects are then sent to the budget committee for incorporating them in the capital budget.

**[6]     *Implementing Proposals***

After final approval, responsibilities assigned for completing the project within the given time frame and cost limit so as to avoid unnecessary delays and cost over runs. Net work techniques are used to control and monitor the implementation of the projects.

**[7]     *Performance Review***

Last but not least important step in the capital budgeting process, is an evaluation of the performance of the project, after it has been fully implemented. The evaluation is made through post completion audit by way of comparison of actual expenditure on the project with the budgeted one, and also by comparing the actual return from the investment with the anticipated return. The unfavorable variances, if any, should be looked into and the causes of the same be identified so that corrective action may be taken in future.

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**19.7 FACTORS INFLUENCING CAPITAL BUDGETING DECISIONS**

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There are many factors, both financial and non-financial influencing the capital investment decisions. The following are the important factors which are generally taken into consideration while making a capital expenditure decisions:

**[1]     *Availability of Funds***

In case a firm has unlimited funds for investment it can accept all capital investment proposals which give a rate of return higher than the minimum acceptable or cut-off rate. However, most of the firms have limited funds and therefore capital rationing has to be imposed. In such an event a firm can take only such project or projects which are within its means. In order to determine which project should be taken up on this basis, the projects should be arranged in an ascending order according to the amount of capital investment required. Then, the projects which are within the reach of the funds are selected for further analysis.

**[2]     *Minimum Rate of Return on Investment***

The management expects a minimum rate of return on the capital investment. The minimum rate of return usually decided on the basis of the cost of capital. The projects giving a yield below the desired rate of return will be rejected.

**Cu-Off Point:** The cut-off point refers to the point below which a project would not be accepted. It may in terms of Rate of Return as discussed or it may also be in terms of period.

**[3]     Return Expected from the Investment**

Capital investment decisions are made in anticipation of increased return in the future. It is therefore, very necessary to estimate the future return or benefits accruing from the investment proposals. There are two criteria available for quantifying benefits from capital budgeting decisions. They are [1] *account profit* and [2] *cash flows*. The term accounting profit is identical with income concept used in accounting. The cash flow approach for determination of benefits from a capital investment is better and cash flow criteria will be discussed in the following sections.

Following are the other factors which are affecting the capital budgeting decisions

- [4] Degree of uncertainty and risk
- [5] Urgency of the project
- [6] Legal compulsions; and
- [7] Competitors' activities.

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**19.8    TYPES OF CAPITAL EXPENDITURE**

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Capital expenditure can be divided into two categories, depending on the benefits expected from the expenditure.

**[A]     Expenditure Increases Revenue**

It is the expenditure which fetches additional income in future. It may be by way taking up production of new products or product lines, or expansion of present operations. For these, new fixed assets are required.

**[B]     Expenditure Reducing Costs**

It is expenditure which reduces the cost of production and thereby increases the profitability of existing operations like replacing old, obsolete, worn out machines with new machines. While taking such a decision the firm compares the required cash outlay for the new machine with the benefit in the form of reduction in operating costs. The firm will replace the asset only when it finds it beneficial.

There are basic differences between the two, the former has more uncertainties attached to it as compared to the later, as estimates made about revenues and cost may not be reliable. Whereas, the latter is less risky because the firm is already in the line and can make better estimate about the resultant savings.



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## 19.9 CLASSIFICATION OF CAPITAL BUDGETING PROPOSALS

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Following are the three kinds of investment proposals usually considered by the business firms:

### [1] *Independent Proposals*

These are proposals which are not interconnected. The acceptance or rejection of a proposal has no effect on the acceptance or rejection of any other proposal. Such proposals can be evaluated on the basis of the return expected and the return required by the firm/s norms of return. Proposals which satisfy the firm's 'Return Standards' can be taken up irrespective of other proposals. In other words, all those proposals which give a higher return than cut-off point are accepted and rest are rejected.

### [2] *Dependent or Contingent Proposals*

When a proposal depends on the acceptance of some other proposal, it is called a dependent proposal. For example, purchasing a specific kind of computer printer depends on the proposal to acquire a computer. In such case it is preferable to consider both the proposal simultaneously.

### [3] *Mutually Exclusive Proposals*

If acceptance of one proposal results in the automatic rejection of the other proposal or proposals, they can be termed as mutually exclusive proposals. For example two different kinds of machines may be considered for a particular task. If one of them is selected, the other machine is automatically rejected.

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## 19.10 EVALUATION OF INVESTMENT PROPOSALS

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Evaluation of capital budgeting proposals has great significance since it decides about the future and development of the concern. The objective of financial management of a firm is wealth maximization of the firm, and in order to achieve this goal, the management must select those projects which deserve first priority in terms of their profitability. Therefore, one of the important factors that influence the evaluation of capital investment proposal is profitability of the prospective investment. The risk involved in the proposal cannot be ignored because profitability and risk are directly related. While evaluating, two basic principles are kept in mind, namely the bigger benefits are always preferable to small ones and that early benefits are always better than the deferred ones. The essential property of sound evaluation technique is that it should *maximize the shareholder's wealth*. Apart from the above, the following other characteristics should also be possessed by a sound investment evaluation method.

1. Investment evaluation method should provide a means of distinguishing between acceptable and unacceptable projects.
2. It should provide clear cut ranking of the project in order of the profitability or desirability.
3. It should also solve the problem of choosing among alternative projects.
4. A sound evaluation criterion should be of acceptable and applicable to any conceivable investment projects.
5. It should emphasize upon early and bigger cash benefits in comparison to distant and smaller benefits; and
6. The method should be suitable according to the nature and size of capital project to be evaluated.

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## **19.11 CAPITAL BUDGETING APPRAISAL METHODS**

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A number of appraisal methods may be recommended for evaluating the capital investment proposals. The most important and commonly used methods are:

**[A] Traditional Methods:**

1. Pay back method;
2. Accounting Rate of Return or Average Rate of Return method

**[B] Time Adjusted or Discounted Cash Flow Methods:**

1. Net Present Value [NPV] Method;
2. Profitability Index [PI] Method; and
3. Internal Rate of Return [IRR] Method.

Each of the above said methods is explained below:

### **19.11.1 TRADITIONAL METHODS**

Traditional methods generally ignore ‘Time Value of Money’ and treat income estimated for different future periods alike. These methods have been traditionally used in business units.

#### **Pay back Period Method**

Pay back method is popularly known as pay off, or pay out method. It is defined as the number of years required to recover the initial cash outlay invested in a project.

### ***Accept or Rejection Criterion***

Management many firms use the payback period as accept or reject criterion as well as a method of ranking projects. If the payback period calculated for a project is less than the maximum payback period set by management, it would be accepted; if not, it would be rejected. As a ranking method, it gives highest ranking to the project which has shortest pay period and lowest ranking to the project with highest pay back period. Thus, if the firm has to choose among two mutually exclusive project, projects with shorter payback period will be selected.

### ***Computation of Pay Back Period***

#### ***a. When Cash inflows are uniform***

If the annual cash inflows are constant, the pay back period can be computed by dividing cash outlay [original investment] by annual cash inflows.

$$\text{i.e., Pay back period} = \frac{\text{Initial cost of Asset or Initial investment in Project}}{\text{Annual Cash Inflows}}$$

**Note:** “Annual Cash inflow” is the net income from the asset or project after tax, but before depreciation.

#### **Illustration 19.1**

Initial investment of a project is Rs.4,00,000 and its annual cash inflow is Rs.1,00,000; then pay back period will be

#### **Solution: 19.1**

= Pay Back period = Rs.4,00,000 / Rs.1,00,000 = 4 years.  
That means investment is recovered in 4 years.

#### **Illustration: 19.2**

A project Moon Costs Rs.15,60,000 and yields annually a profit of Rs.2,70,400 after depreciation of 12 % p.a. but before tax at 25 %.  
Calculate Pay-back period.

#### **Solution: 19.2**

Pay Back period method of evaluation is based on cash flows. Therefore, first we have to find annual cash flow of the project Moon.

**Calculation of Annual Cash Inflows:**

	Rs.
<b>Annual Profits after Depreciation, but before tax</b>	<b>2,70,400</b>
Less: <b>Tax at 25 %</b>	<b>67,600</b>
<b>Annual Profit, after Deprecation and Tax</b>	<b>2,02,800</b>
Add: <b>Depreciation [15,60,000 @ 12 %]</b>	<b>1,87,200</b>
<b>Annual Cash Inflows</b>	<b>3,90,000</b>

Pay back period = Initial Investment / Annual Cash Inflows

Initial Investment = Rs.15,60,000 and Annual Cash Inflows Rs.3,09,000 [as calculated above]

**Pay back period = 15,60,000 / 3,90,000 = 4 Years**

**b. When cash inflows are not uniform**

If cash inflows are not uniform, the calculation of pay back period takes a cumulative form. In such a case, the pay back period can be found out by adding up the figure of net cash inflows until the total is equal to initial investment.

For instance, if a project requires an initial investment of Rs.1,00,000 and the annual cash inflows for 5 years are Rs.30,000, Rs.40,000; Rs.25,000; Rs.20,000 and Rs.20,000 respectively, the payback period will be calculated as follows:

Year	Annual Cash Inflows Rs.	Cumulative Cash inflows Rs.
<b>1</b>	<b>30,000</b>	<b>30,000</b>
<b>2</b>	<b>40,000</b>	<b>70,000</b>
<b>3</b>	<b>25,000</b>	<i>95,000</i>
<b>4</b>	<b>20,000</b>	<i>1,15,000</i>
<b>5</b>	<b>20,000</b>	<b>1,35,000</b>

The above working show that in 3 years Rs.95,000 has been recovered. Rs.5,000 is yet to be recovered out of initial investments. In the fourth year the cash inflow is Rs.20,000. That means the pay-back period is between 3 and 4 year. Therefore, the pay back period is calculated as under:

Pay back period = 3 years +  $\frac{\text{Rs.5,000}}{\text{Rs.20,000}}$   
= **3.25 years** that is **3 years 3 months**

**Illustration 19.3**

There are two projects Alpha and Beta. The cost of the project is Rs.3,00,000 in each case. The cash inflows are as under:

Year	Cash Inflows	
	Project Alpha	Project Beta
1	1,00,000	20,000
2	1,00,000	40,000
3	1,00,000	2,40,000

Calculate Pay back period.

**Solution 19.3**

Year	Project Alpha		Project Beta	
	Cash Inflows Rs.	Cumulative Cash Inflows Rs	Cash Inflows Rs.	Cumulative Cash Inflows Rs
1	1,00,000	1,00,000	20,000	20,000
2	1,00,000	2,00,000	40,000	60,000
3	1,00,000	3,00,000	2,40,000	3,00,000

The pay back period for the both the projects are 3 years. However, Project Alpha is better compared to Project Beta because cash inflows are greater in the initial years.

**Check your Progress:**

A project cost Rs.50,000 and yields annually a profit of Rs.8,000 after depreciation at 12 % p.a. but before tax of 50 %. Calculate pay back period.

- Notes:
- a) Write your answer in the space given below.

b) Check your answer with the one given at the end of this lesson.

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Illustration 19.4

Stars Ltd. has a cut off pay back period of 3 years and 6 months. Advise the company with regard to the following exclusive investments:

Project	Total Investments Rs.	Annual Cash Inflows
Sun	45,000	15,000
Moon	80,000	24,000
Mars	80,000	20,000
Mercury	52,500	15,000
Jupiter	10,000	1,800

Solution: 19.4

Cash inflows of each project are uniform, therefore

**Pay back period** = Initial Investment / Annual Cash Inflows

Projects		Pay back Period	Rank
Sun	= 45,000/15,000	= 3 years	1
Moon	= 80,000/24,000	= 3 years and 4 months	2
Mars	= 80,000/20,000	= 4 years	
Mercury	= 52,500/15,000	= 3 years and 6 months	3
Jupiter	= 10,000/1,800	= 5 years and 7 months	

The Star Ltd.’s cut off pay back period is 3 years and 6 months. Projects Sun, Moon and Mercury may be considered as they have a shorter payback period than cut off period. Of these Project Sun has better shortest pay back period and ranked one. Therefore, it may be selected.

Illustration 19.5

Jasmine Ltd. is producing articles mostly by manual labour and is considering to replace it by a new machine. There are two alternative models Sporty and Trendy. Prepare a statement of profitability, ignoring taxes, showing the pay back period from the following information.

	Machines	
	Sporty	Trendy
Estimated Life of Machines	4 years	5 years
Cost of Machines	Rs.9,000	Rs.18,000
Estimated Savings in Scrap	Rs.500	Rs.800
Estimated Savings in Direct Wages	Rs.6,000	Rs.8,000
Additional cost of maintenance	Rs.800	Rs.1,000
Additional cost of Supervisions	Rs.1,200	Rs.1,800

**Solution No. 19.5**

**PROFITABILITY STATEMENT**

Particulars	Machines	
	Sporty	Trendy
Estimated savings in Scrap	500	800
Estimated savings in Direct wages	6,000	8,000
Total Savings [A]	6,500	8,800
Additional Cost of maintenance	800	1,000
Additional cost of supervision	1,200	1,800
Total Additional Cost [B]	2,000	2,800
Net Cash Inflow [A-B]	4,500	6,000
Pay back Period	9,000/4,500 = 2 years	18,000/6,000 = 3 years

Machine Sporty is preferred because it has a shorter pay back period.

***Merits***

The pay back period has the following merits:

1. It is easy to calculate and simple to understand;
2. It is preferred by executives who like quick answers for selection of the proposals;
3. It is useful where the business is suffering from shortage of funds as quick recovery is essential for repayment;
4. It is useful for industries subject to uncertainty, instability, or rapid technological changes.
5. It is useful where profitability is not important.

***Demerits***

The method has following disadvantages:

1. This method is delicate and rigid. A slight change in the operation cost will affect the cash inflows and the pay back period.
2. It does not take into account the life of the project, depreciation, scrap value or interest factors.
3. It completely ignores cash inflows after the pay back period.
4. The profitability of the project is completely ignored.
5. It gives more importance to liquidity as a goal of capital investment decision.
6. Lastly but most importantly it ignores the time value of money. Cash flows recovered different years are treated equally.

2. Accounting or Average Rate of Return Method

It is also known as Accounting Rate of Return because it considers the accounting concept of profit [i.e. Profit after Depreciation and tax] and not the cash flows. The project which yields the highest rate of return is selected.

The accounting rate of return may be calculated by any of the following methods:

- 1.  $ARR = \frac{\text{Average Annual Profits}}{\text{Original Investments}} \times 100$  [Or]
- 2.  $ARR = \frac{\text{Average Annual Profits}}{\text{Average Investments}} \times 100$

The term average annual profit refers to average profits after depreciation and tax over the life of the project.

The average investment can be calculated by any of the following methods:

$\text{Original Investments} / 2$  [OR]  $\text{Original Investments} - \text{Scrap Value} / 2$

Illustration 19.6

Calculate the Average Rate of Return for Projects A and B from the following:

	Project A	Project B
<b>Investments</b>	<b>Rs.20,000</b>	<b>Rs.30,000</b>
<b>Expected Life [no salvage value]</b>	<b>4 years</b>	<b>5 years</b>
<b>Projected Net Income, after Interest, depreciation and Taxes</b>		
<b>Years</b>	Project A	Project B
	Rs.	Rs.
<b>1</b>	<b>2,000</b>	<b>3,000</b>
<b>2</b>	<b>1,500</b>	<b>3,000</b>
<b>3</b>	<b>1,500</b>	<b>2,000</b>
<b>4</b>	<b>1,000</b>	<b>1,000</b>
<b>5</b>	<b>-</b>	<b>1,000</b>
<b>Total</b>	<b>6,000</b>	<b>10,000</b>

If the required rate of return is 12 % which project should be undertaken?



**Solution 19.6**

	Project A Rs.	Project B Rs.
Total Profits, after interests, depreciation and Taxes	6,000	10,000
Expected Life	4 years	5 years
Therefore, Average Profit equal to Total Profits/ Expected Life	Rs.1,500	Rs.2,000
Investments	Rs.20,000	Rs.30,000
Average Rate of Return on Original Investments	$\frac{1,500}{20,000}$ = 7.5 %	$\frac{2,000}{30,000}$ = 6.6 %
Average Rate of Return on Average Investments		
Average Investments	$\frac{20,000}{2} =$ Rs.10,000	$\frac{Rs.30,000}{2}$ Rs.15,000
	$\frac{1,500}{10,000}$ = 15 %	$\frac{2,000}{15,000}$ = 13.33 %

**Check your Progress 19.02**

Jansi Ltd. Proposes to take up a project which needs an investment of Rs.2,40,000. The net income before depreciation and tax is estimated as follows for the ensuing 5 years.

Income for the first five years are as follows: Rs.60,000, 72,000, 84,000, 96,000 and 1,20,000 respectively.

Income tax rate may be assumed as 50 % and depreciation is to be provided on straight line basis.

Calculate the Accounting Rate of Return.

- Notes:
- a) Write your answer in the space given below.
  - b) Check your answer with the one given at the end of this lesson.

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**Advantages**

The following are the merits of the Accounting Rate of Return method:

- 1. It is simple to understand and easy to calculate;
- 2. This method gives due weightage to the profitability of the project;
- 3. It takes into consideration the total earnings from the project during its life time;
- 4. Rate of return may be readily calculated with the help of accounting data.

### ***Disadvantages***

This method suffers from the following weaknesses:

1. It uses accounting profits and not the cash inflows in apprising the project;
2. It ignores the time value of the money. Profits earned in different periods are valued equally;
3. It considers only the rate of return and not the life of the project;
4. It ignores the fact that profits can be reinvested;
5. This method does not determine the fair rate of return on investment;
6. There are different methods for calculating the Accounting Rate of Return due to many concepts of investments as well as profit. Each method gives different results. This reduces the reliability of the method.

### **19.11.2 TIME ADJUSTED OR DISCOUNTED CASH FLOW METHODS**

The time adjusted cash flow method is also referred as present value method. The present value means nothing but the present value [today's value] of future money to be received. The present money of future money is calculated with discount rate. In other words, the rate at which the future cash flows are reduced to their present value is termed as discount rate. Discount rate, otherwise, called time value of money, is some interest rate which expresses the time preference for a particular future cash flow.

The discounted cash flow method is an improvement on the pay-back method as well as accounting rate of return. This method is based on the fact that future value of money will not be equal to the present value of money. That is, discounted cash flow techniques recognizes that Rupee one of today [cash outflow] is worth more than Rupee one received at a future date [cash inflows]. The time adjusted or discounted cash flow method considers both the profitability and also the time value of money. The Discounted Cash Flow Method for evaluating capital investment proposals are of three types:

#### ***1. Net Present Value [NPV] method***

This method is also known as Excess Present Value or Net Gain Method or Time Adjusted Method. In this method, cash inflows and cash outflows associated with each projects are first worked out. The present values of these cash inflows and outflows are then calculated at the rate acceptable to the management. This rate of return is considered as the cut-off rate and is generally determined on the basis of cost of capital suitably adjusted to allow for the risk element involved in the project.

After calculating present value of cash outflows and inflows, the Net Present Value [NPV] will be found out. ***Net Present Value [NPV]*** is the difference between the present value of cash inflows and the present value of cash outflows.

**Net Present Value [NPV]** = P.V. of Cash Inflows – P.V. of Cash outflows.  
 Where  $P.V = 1 / [1 + r]^n$

**Accept or Reject Criterion:**

Net Present Value is the obvious ‘accept/reject’ criterion. If the NPV is positive, then project is accepted. If NPV is negative, it should be rejected.

**Accept** = **Positive** - NPV > Zero[PV Cash Inflow > PV of Cash Outflows]  
**Reject** = **Negative** - NPV < Zero [PV Cash Inflow < PV of Cash Outflows]

**Illustration No. 19.7**

Project Pink initially costs Rs.25,000. It generates the following cash inflows:

Year	Cash Inflows Rs.	Present Value of Re.1 at 10 %
1	9,000	0.909
2	8,000	0.826
3	7,000	0.751
4	6,000	0.683
5	5,000	0.621

Taking the cut-off rate as 10 %, suggest whether the project should be accepted or not.

**Solution No. 19.7**

**COMPUTATION OF NET PRESENT VALUE**

Year	Cash Inflows Rs.	P.V. Factors @ 10 %	Present Value
1	9,000	0.909	8,181
2	8,000	0.826	6,608
3	7,000	0.751	5,257
4	6,000	0.683	4,098
5	5,000	0.621	3,105
Present Value Cash Inflows			27,249
Less: Present Value of Cash Outflows [Initial Investment ]			25,000
NET PRESENT VALUE			2,249

As Net present value is positive, the project is recommended.

**Illustration No. 19.8**

An investment of Rs.10,000 having scrap value of Rs.500. The cash inflows for the first five years of the project are Rs.4,000; Rs.4,000; Rs.3,000; Rs.3,000 and Rs.2,000 respectively.

The cost of capital is 10 %. The Present Value factors for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> years – 0.909; 0.826; 0.751; 0.683 and 0.621 respectively.

Is the investment desirable under Net Present Value method?

**Solution No. 19.8**

**STATEMENT SHOWING NET PRESENT VALUE OF INVESTMENT**

Year	Cash Inflows Rs.	P.V. Factors @ 10 %	Present Value
1	4,000	0.909	3,636
2	4,000	0.826	3,304
3	3,000	0.751	2,253
4	3,000	0.683	2,049
5	2,500	0.621	1,552
Present Value Cash Inflows			12,794
Less: Present Value of Cash Outflows [ <b>Initial Investment</b> ]			10,000
NET PRESENT VALUE			2,794

**Note:** Scrap value has to be added to the cash inflow of the last year of the investment.

The investment is desirable because of positive net present value of Rs.2,794 on the investment of Rs.10,000.

**Illustration No. 19.9**

Blocky Ltd. is considering the purchase of the two machines with the following details:

	<b>Machine I</b>	<b>Machine II</b>
Life Estimated	3 years	3 years
Cost of Investment	10,000	10,000
Cash Inflows		
1 <sup>st</sup> Year	8,000	2,000
2 <sup>nd</sup> Year	6,000	7,000
3 <sup>rd</sup> Year	4,000	10,000

You are required to suggest which machine should be preferred. Net present value method may be used and its cost of capital is 10 %.

**Solution No. 19.9**

**COMPUTATION OF NET PRESENT VALUE**

Year	PV Factor @ 10 %	Machine I		Machine II	
		Cash Inflows Rs.	Present Value Rs.	Cash Inflows Rs.	Present Value Rs.
1	0.909	8.000	7,272	2,000	1,818
2	0.826	6.000	4,956	7,000	5,782
3	0.751	4.000	3,004	10,000	7,510
Present Value of Cash Inflows			15,232	15,110	
Less: Present Value of Cash Outflows			10,000	10,000	
[Initial Investment ]					
NET PRESENT VALUE			5,232	5,110	

**Illustration No. 19.10**

The Alpha Co. Ltd., is considering the purchase of a new machine. Two alternative Machine Gamma and Delta have been suggested, each having an initial cost of Rs.4,00,000 and requiring Rs.20,000 as additional working capital at the end of 1<sup>st</sup> Year. Earnings after taxation are expected to be as follows:

Year	Cash Inflows	
	Machine Gamma Rs.	Machine Delta Rs.
1	40,000	1,20,000
2	1,20,000	1,60,000
3	1,60,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	80,000

The company has a target of return on capital of 10 % and on this basis, you are required to compare the profitability of the machines and state which alternative you consider financial preferable?

**Solution No. 19.10**

**COMPUTATION OF NET PRESENT VALUE**

Year	Discount Factor	Machine Gamma		Machine Delta	
		Cash Inflows Rs.	Present Value Rs.	Cash Inflows Rs.	Present Value Rs.
1	0.91	40,000	36,400	1,20,000	1,09,200
2	0.83	1,20,000	99,600	1,60,000	1,32,800
3	0.75	1,60,000	1,20,000	2,00,000	1,50,000
4	0.68	2,40,000	1,63,200	1,20,000	81,600
5	0.62	1,60,000	99,200	80,000	49,600
Present Value of Cash Inflows			5,18,400		5,23,200
Less: Present Value of Cash Outflows					
[Initial Investment ]					
Additional Working capital		4,00,000		4,00,000	
[20,000 X 0.91]		<u>18,200</u>	4,18,200	<u>18,200</u>	4,18,200
NET PRESENT VALUE			1,00,200		1,05,000

Machine Delta is preferable as it has a higher Net Present Value.

***Merits of the NPV Method***

The advantages of following this method of evaluation are as follows:

1. This method considers the entire economic life of the project.
2. It takes into account the objective of maximum profitability.
3. It recognizes the time value of the money.
4. This method can be applied where cash inflows are uneven.
5. It facilitates comparison between projects.

***Demerits of the NPV Method***

1. It is not easy to determine an appropriate discount rate.
2. It involves a great deal of calculation. It is more difficult to understand and operate.
3. It is very difficult to forecast the economic life of any investment exactly.
4. It may not give good results while comparing projects with unequal investment of funds.

In spite of some above mentioned weakness, generally, NPV method is highly preferable to decide about a particular project whether to accept or reject.

**2. Profitability Index [PI] or Excess Present Value [PV] Index Method**

The Profitability Index is also called “Benefit Cost [B/C] Ratio” It is the ratio of the present value of cash inflows, at the required rate of return to the initial cash outflows of the investment. The proposal is accepted if the profitability index is more than one and is rejected in case the profitability index is less than one. By computing PIs for the various projects, the financial manger can rank them in order of their respective ratio of profitability.

Profitability Index [PI] = PV of Cash Inflows / PV of Cash Outflows

**Illustration No. 19.11**

The initial cash outlay of a project is Rs.50,000. 1<sup>st</sup> year Rs.20,000; 2<sup>nd</sup> year Rs.15,000; 3<sup>rd</sup> year Rs.25,000; and 4<sup>th</sup> year Rs.10,000. Compute Profitability Index.

**Solution No. 19.11**

**COMPUTATION OF PROFITABILITY INDEX**

Year	PV Factor @ 10 %	Cash Inflows Rs.	Present Value Rs.
1	0.909	20,000	18,180
2	0.826	15,000	12,390
3	0.751	25,000	18,775
4	0.683	10,000	6,830
<b>Present Value of Cash inflows</b>			<b>56,175</b>

Total Present Value of Cash inflows Rs.56,175

Total Present Value of Cash Outflows Rs.50,000

Net Present Value [56175 -50000] Rs.5,175

Profitability Index [PI] = PV of Cash Inflows / PV of Cash Outflows  
56,175 / 50,000 = **1.1235**

**Profitability Index is higher than 1 [one], therefore, the project can be accepted.**

Net Profitability Index [PI] = NPV / PV of Cash Outflows  
= 6,175 / 50,000 = 0.1235

**Net Profitability Index is positive , therefore, the project can be accepted.**

### **Advantages and Disadvantages**

PI method is a slight modification of NPV method. The net present value method has one major drawback that it is not easy to rank projects on the basis of this method particularly when the costs of the projects differ significantly. To evaluate such projects, the profitability index method is most suitable. PI method possesses all other merits and demerits of NPV method.

### **3. Internal Rate of Return Method**

The internal rate of return is defined as, ‘the interest rate [discount rate] that equates the present value of the expected future receipts to the cost of the investment outlay’ In other words, the rate of return at which the present value of cash inflows and cash outflows are equal. The Internal Rate of Return [IRR] is found by Trial and Error method.

First, we compute the present value of the cash flows from an investment, using an arbitrarily selected discount rate. Then, we compare the present value so obtained with the investment cost. If the present value is higher than the cost figure, we try a higher discount rate and go through the procedure again. Conversely, if the present value is lower than the present value cash outflow, lower discount rate will be applied and repeat the process. The interest rate that brings about equality in cash flows is defined as Internal Rate of Return.

The rate of return is compared to the cost of capital and the project having higher difference, if they are mutually exclusive, is adopted and other one is rejected. As this determination of internal rate of return involves a number of attempts to make the present value of earnings equal to the investment, this approach is also called the Trail and Error Method.

### **Illustration No. 19.12**

A project costs Rs.80,000 and is estimated to generate cash inflows of Rs.20,000 for a project of 5 years. Ascertain the internal rate of return [IRR]

### **Solution No. 19.12**

When estimated cash inflows of a project are uniform, IRR can be calculated by locating factor in Annuity Table of any Text book.

Factor to be located  $F = I / C$  Where: F = Factor to be located  
I = Original investment  
C = Cash flow per year

Therefore = Rs.80,000 /Rs.20,000 = 4

Factor of 4 should be located in annuity Table in the line of 5 years

The discounting percentage is some where between 8 % and 6 %.

Rs.3.993 present value of annuity of Re.1 is at 8 %.

Rs.4.212 present value of annuity of Re.1 is at 6 %.

Since 3.993 is very near to Rs.4; IRR may be taken as **8%**



**Illustration No. 19.13**

Neem Ltd. is considering a project which requires investment of Rs.60,000. The cost of capital is 12 %. The net estimate cash inflows are as follows:

Year	Estimated Cash inflows Rs.
1	15,000
2	20,000
3	30,000
4	20,000

Calculate the Internal Rate of Return and decide whether the project can be taken up for implementation.

**Solution No. 19.13**

Since cash inflows are not uniform, the IRR should be calculated by the Trail and Error method. However, to get an approximate idea about the IRR rate, the factor to be located.

Factor [F] = I / C  
I = Rs.60,000; C = Rs.15,000+20,000+30,000+20,000 /4 = Rs.21,250

Therefore F = 60,000 / 21,250 = 2.8235

[ The locating factor 2.8235 in the Annuity Table in the line for 4 years , 2.914 represent 14 % and 2.798 represent 16 % . These two are the nearest rate for factor 2.8235. So IRR, may be some what between these two rates.

**COMPUATION OF INTERNAL RATE OF RETURN**

Year	Cash Inflows Rs.	PV Factor At 14 %	PV at 14 %	PV Factor At 16 %	PV at 16 %
1	15,000	0.877	13,155	0.862	12,930
2	20,000	0.769	15,380	0.742	14,840
3	30,000	0.711	20,220	0.641	19,230
4	20,000	0.635	11,840	0.552	11,040
<b>Present Value of Cash Inflows</b>			<b>60,595</b>		<b>58,040</b>

Initial Investment is Rs.60,000. Hence, Internal Rate of Return must be between 14 % to 16 % . [Rs.60,595 and Rs.58,040]. The difference comes to Rs.2,555. [60595-58040].

For a difference of Rs.2,555, difference in rate is 2 % and excess PV [60595-60000] is Rs.595.  
Therefore, IRR 14 % + [595 / 2,555] X 2 % = **14.465 %**

### **Merits of IRR Method**

1. Like all the other Discounted Cash Flow based methods, IRR also takes into account the time value of money and can be applied where the cash inflows are even or unequal.
2. It also considers the profitability of a project over its entire economic life and thus the true profitability of a project can be assessed.
3. Cost of capital or pre-determined cut-off rate is not a pre-requisite for applying IRR method. Hence, it is better than the NPV and PI methods in all those situations where determining cost of capital is difficult.
4. IRR provides for ranking of various proposal because it is a percentage return.
5. It provides for maximizing profitability.

### **Demerits of IRR Method**

1. It is a complicated method and may leads to cumbersome calculations.
2. The underlying assumption of IRR that the earnings are reinvested at IRR for the remaining life of the project is not a justifiable assumption. From this point of view, NPV and PI which assume reinvestment at cost of capital are better.
3. The results obtained through NPV or PI methods may differ from that obtained through IRR depending on the size, life and timings of the cash flows.

### ***Comparison of IRR with NPV and PI methods***

#### ***Differences:***

1. Cost of Capital or cut-off rate is determined in advance in NPV and PI. In IRR, the discounting rate is the 'unknown factor'.
2. NPV and PI strive to ascertain the amount which can be invested in a project which can earn the required rate of return. IRR ascertains the maximum interest that can be paid out of returns from the project.
3. The underlying assumption of the Discounted Cash Flow methods is that the cash inflows can be reinvested. However, NPV and PI assume the reinvestment at cost of capital rate or the cut-off rate. IRR assumes reinvestment at the IRR rate. The former is more practical and justifiable than the later.

Generally, NPV and PI are considered to be more reliable for comparative analysis of projects than the IRR method.

**19.12 COMPREHENSIVE PROBLEMS**

**Illustration No.19.14**

Ragam Limited Company is considering investing in a project requiring a capital outlay of Rs.2,00,000. Forecast of annual income after depreciation but before tax is as follows:

Year	Rs.
1	1,00,000
2	1,00,000
3	80,000
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.

- 1. Pay back period method;
- 2. Rate of Return on Original Investment;
- 3. Rate of Return on Average Investment ;
- 4. Net Present Value method taking cost of capital at 10 %; and
- 5. Excess Present Value Index.

**Solution No.19.14**

**1. Calculation of Pay back period:**

**COMPUTATION OF CASH INFLOWS AND PAY BACK PERIOD**

Year	Profit	Tax at 50 %	Profit after Tax	Depreciation	Cash Inflows	Cumulative Cash Inflows
1	2	3	[2-3] = 4	5	[4+5] = 6	7
1	1,00,000	50,000	50,000	40,000	90,000	90,000
2	1,00,000	50,000	50,000	40,000	90,000	1,80,000
3	80,000	40,000	40,000	40,000	80,000	2,60,000
4	80,000	40,000	40,000	40,000	80,000	3,40,000
5	40,000	20,000	20,000	40,000	60,000	4,00,000

Pay back period lies in between 2<sup>nd</sup> and 3<sup>rd</sup> year. Rs.1,80,000 is recovered at the end of the 2<sup>nd</sup> year. The balance of Rs.20,000 will be recovered in 20,000 / Rs.80,00 X12 equal to 3 months. Hence Pay back period is 2 years 3 months.

**2. Rate of Return on Original Investment**

Year	Net profit after Tax and Depreciation Rs.
1	50,000
2	50,000
3	40,000
4	40,000
5	20,000
<b>Total</b>	<b>2,00,000</b>

Average Annual Return = Rs.2,00,000 / 5 years = Rs.40,000

Hence, ARR on original Investment is Rs.40,000 / 2,00,000= **20 %**

**3. Rate of Return on Average Investment**

Average Investment is Rs.2,00,000 / 2 = Rs.1,00,000

Average Annual Income is Rs, 40,000 [as calculated in 2]

= Rs.40,000 / Rs.1,00,000 = **40 %**

**4. Net Present Value**

Year	Cash Inflows Rs.	Discount Factor at 10 %	Present Value Rs.
1	90,000	0.909	81,810
2	90,000	0.826	74,340
3	80,000	0.751	60,080
4	80,000	0.683	54,640
5	60,000	0.621	37,260
<b>Present Value of Cash Inflows</b>			<b>3,08,130</b>
Less: Present Value of Cash Outflows			2,00,000
<b>NET PRESENT VALUE</b>			<b>1,08,130</b>

**5. Excess Present Value:**

Profitability Index [PI] = PV of Cash Inflows / PV of Cash Outflows

= Rs.3,08,130 / Rs.2,00,000 = 1.54

**Illustration 19.15**

Veena Ltd. is considering the purchase of a machine. Two machines Alpha and Beta are available, each costing Rs.5,00,000. In comparing the profitability of those machines a discount rate of 10 % is to be used. Earnings after taxation are expected to be as follows:

Year	Cash Inflows	
	Machine Alpha	Machine Beta
	Rs.	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

Evaluate the projects using:

- 1. The pay back period;
- 2. The Accounting Rate of Return;
- 3. The Net Present Value; and
- 4. The Profitability Index.

**SOLUTION 19.15**

**1. The Pay Back Period**

Year	Machine Alpha		Machine Beta	
	Cash Inflows	Cumulative Cash Inflows	Cash Inflows	Cumulative Cash Inflows
	Rs.	Rs.	Rs.	Rs.
1	1,50,000	1,50,000	50,000	50,000
2	2,00,000	3,50,000	1,50,000	2,00,000
3	2,50,000	6,00,000	2,00,000	4,00,000
4	1,50,000	7,50,000	3,00,000	7,00,000
5	1,00,000	8,50,000	2,00,000	9,00,000

Machine Alpha’s calculation shows that in two years Rs.3,50,000 has been recovered, Rs.1,50,000 is left out. In the 3<sup>rd</sup> year cash inflow is Rs.2,50,000. Therefore pay back period is

= 2 years + [1,50,000/2,50,000 ] = **2.6 years**

Machine Beta has recovered Rs.4,00,000 in three years, the balance left out is Rs.1,00,000. Therefore Pay back period is

= 3 years + [1,00,000/3,00,000 ] = **3.333 years**

**Recommendation:**

Machine Alpha may be purchased since pay back period is less than Machine Beta under Pay back period method.

2. Accounting Rate of Return:

Machine Alpha

Total Returns Rs.8,50,000  
Average Annual Returns – Rs.8,50,000 / 5 years = Rs.1,70,000  
ARR = Rs.1,70,000 / Rs.5,00,000X 100 = 34 %

Machine Beta

Total Returns Rs.9,00,000  
Average Annual Returns – Rs.9,00,000 / 5 years = Rs.1,80,000  
ARR = Rs.1,80,000 / Rs.5,00,000X 100 = 36 %

Recommendation:

Machine Beta may be preferred as it gives a higher Average Rate of Return compared to Machine Alpha under ARR method.

3. Net Present Value

Year	PV Factor At 10 %	Machine Alpha		Machine Beta	
		Cash Inflows Rs.	Present Value of Cash Inflows Rs.	Cash Inflows Rs.	Present Value of Cash Inflows Rs.
1	0.909	1,50,000	1,36,350	50,000	45,450
2	0.826	2,00,000	1,65,200	1,50,000	1,23,900
3	0.751	2,50,000	1,87,750	2,00,000	1,50,200
4	0.683	1,50,000	1,02,450	3,00,000	2,04,900
5	0.621	1,00,000	62,100	2,00,000	1,24,200
Present Value of Cash Inflows			6,53,850		6,48,650
Less: PV of Cash Outflows			5,00,000		5,00,000
NET PRESENT VALUE [NPV]			1,53,850		1,48,650

Recommendation:

The Net present value of Machine Alpha is more than the Machine Beta. Therefore, Machine Alpha may be preferred under NPV method.

4. Profitability Index

Profitability Index = PV of Cash inflows/ PV of Cash outflow

Machine Alpha

Profitability Index of Machine Alpha = Rs.6,53,850 /5,00,000 = 1.308

**Machine Beta**

Profitability Index of Machine Beta =       Rs.6,48,650 /5,00,000 = **1.297**

**Recommendation:**

Profitability Index of Machine Alpha is more than that of Machine Beta and therefore, Machine Alpha should be preferred.

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**19.13 LET US SUM UP**

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Capital budgeting is the process of making investment decisions in the capital expenditure. The numbers of appraisal methods are applied to evaluate the capital expenditure proposals. They are broadly classified into [a] Traditional methods that includes Pay back period and Average Rate of Return method and [b] Time Adjusted Methods are – Net present Value method; Internal rate of Return method and profitability Index Methods. Each method has its own merits and demerits. However, time adjusted method of evaluation is superior in respect of time and risk factors to achieve value/ wealth maximization objective.

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**19.14 LESSON – END ACTIVITIES**

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- 1. What is capital budgeting? Explain its importance.
- 2. Enumerate the steps involved in Capital budgeting.
- 3. Critically examine various method various methods of evaluating capital expenditure.
- 4. Calculate the pay-back period for a project which requires a cash outlay of Rs.1,00,000 and generates cash inflows of Rs.25,000, Rs.35,000, Rs.30,000 and Rs.25,000 in the first, second, third and fourth years respectively.
- 5. A project costs Rs.50,000 and has a scrap value of Rs.10,000. Its stream of income before depreciation and taxes during the first five years is Rs.10,000, Rs.Rs.12,000, Rs.14,000, Rs.16,000 and Rs.20,000. Assume a 50 % tax rate and depreciation on straight line basis. Calculate the accounting rate of return.
- 6. Pink Ltd. is considering 2 mutually exclusive projects. Both requires an initial cash outlay of Rs.10,000 each and have a life of 5 years. The company’s required rate of return is 10 % and pays tax at a 50 % rate. The projects will be depreciated on a straight line basis. The net cash flows before taxes expected to be generated by the projects are as follows:

	Years				
	1	2	3	4	5
Project I [Rs.]	4,000	4,000	4,000	4,000	4,000
Project II [Rs.]	6,000	3,000	2,000	5,000	5,000

Calculate Net present value of each project. Advice the company as to which project should be accepted and why?

7. Sashank Ltd. is considering the purchase of a machine. Two machines A and B are available, each costing Rs.50,000. In comparing the profitability of these machines, a discount rate of 10 % is to be used. Earnings after taxation [but before depreciation] are expected to be as follows:

Year	Cash Flows	
	Machine A	Machine B
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000

Evaluate the prospects using:

- [i] Pay back period;
- [ii] The net present value and Profitability Index
- [iii] The accounting rate of return.

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**19.15 MODEL ANSWERS TO “CHECK YOUR PROGRESS”**

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**Check your Progress ‘Answer’: 19.01**

**19.1 Annual Cash Inflows Rs.1,00,000; Pay back period 5 years.**

**19.2 Check your Progress ‘Answers’ 19.02**

Average Income for 5 years Rs.19,200; ARR on original investment 8 % and ARR on Average Investment is 16 %.

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**19.16 SUGGESTED READING/REFERENCES/SOURCES**

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1. R.K. Sharama and Shashi K.Gupta – Management Accounting, Principles and Practice – Kalyani Publishers
2. Dr.S.N. Mahehwari – Principles of Management Accounting – Sultan chand & Sons.
3. T.S.Reddy and Y.Hari Prasad Reddy – Management Accounting – Margham Publications
4. R.S.N. Pillai and Bagavathi – Management Accounting – S.Chand and Company Ltd.