

# **COST ACCOUNTANCY**

**BLOCK : IV - VI**

Dr. B. R. AMBEDKAR OPEN UNIVERSITY  
HYDERABAD  
2003

BRAOU



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HYDERABAD**

**2003**

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380  
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Dr. B.R. Ambedkar Open University, Hyderabad, A.P. India. **Dr. B.R.A.O.U. LIBRARY**

First Published                      1985  
Second Revised Edition            1992  
Third Revised Edition              1995  
Fourth Revised Edition             2003

Acc. No... 114910  
Date... 15.4.2005  
Call No... 380  
COM

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Lr. No.142 / Dr. BRAOU / DMP / PTG / E.No. 45 / JO 624 / 2003-04 / dated 21.7. 03 / Copies 2000

Printed at : Graphica Printers & Binders, Hyderabad.

## PREFACE

This book deals with the topics in Cost Accountancy included in the syllabus for the Third Year B.Com. i.e., programme offered by the Dr.B.R.Ambedkar Open University. These topics generally cover the 'core' area of the subject to be studied in the Third Year of the Three Year Degree Course in Commerce (B.Com. i.e.;). The syllabus for the sake of convenience is divided into Blocks, each of which comprises a number of Units. Each Block generally covers a specific area of the subject. The units are prepared by specialists in accordance with a format so designed as to enable the student to study and understand them without much difficulty. Each unit begins with aims and objectives followed by contents. At the end of each unit, model examination questions are given to test the student's comprehension of the subject matter. Technical terms with which the student may not generally be familiar are given at the end of each unit under the head "Glossary".

Cost Accountancy is a powerful managerial tool for decision making and control. In view of the practical use of the knowledge of Cost Accountancy to the students of Commerce. Cost Accountancy is offered as one of the optional courses in B.Com., Third year.

The course material for the sake of convenience is divided into 6 blocks, which are further divided into 28 units. Block one deals with the fundamental aspects of Cost Accountancy i.e., nature, scope, etc. The second block covers the important components of material and labour cost. While the third block is devoted to a detailed discussion on overheads. Block four deals with methods of costing and the cost control techniques are discussed under block five. Finally, the last block presents typical revisionary problems relating to blocks II-V in order to equip the student better.

The University hopes that this material will help the student to get acquainted with the principal issues in Cost Accountancy, which make for its distinctiveness and significance.

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**BLOCK - IV :**  
**METHODS OF COSTING**

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## **UNIT-16: INTRODUCTION TO METHODS OF COSTING**

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### **Contents**

- 16.0 Aims and Objectives
- 16.1 Introduction
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### **16.0 AIMS AND OBJECTIVES**

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The aim of this unit is to explain the various methods of costing used in different industries for the ascertainment of cost of production. It discusses the features and relative merits and limitations of each method of costing and their application to various industries.

After reading this unit you will be able to :

- explain distinctive features of each method of costing.
- understand , the application of each of these costing method to various categories of industries and,
- identify relative merits and demerits of each method of costing.

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### **16.1 INTRODUCTION**

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There are different methods of costing which have been designed to suit the needs of individual businesses. Unit Costing, Job Costing, Contract Costing Process Costing and Operating Costing are the principal methods adopted by different business enterprises as per their requirements, The basic principles underlying these methods are the same for all of them. All these methods are intended to collect and analyse the expenditure according to the elements of costs and to determine the cost for each cost centre of cost unit. The basic criterion for choosing a particular method of costing is the nature of the manufacturing operation carried out or the service rendered by the concern.

In this lesson, we shall briefly discuss the features, merits and limitations of different costing methods. In the lessons that follow a detailed discussion of each method of costing is given.

## 16.2 UNIT COSTING

This is a method of costing which can be adopted in the industries having continuous production, the units of which are identical and standardised. In other words, it is a method of costing by the units of production. It is a simple method having the total cost is divided by the number of units produced to determine the unit cost. An important characteristic of unit costing is the repetitiveness with which the same unit or output is produced throughout the operation. Accounting and control, therefore, can be related to the unit of the output as such.

In unit costing it is possible to have more than one unit, each different in size or finish. Unit costing can be operated so long as there are common phases at the end of which a common identical unit of output is the outcome.

### Features of Unit Costing

The following are important features of Unit Costing.

- i) Unit costing is adopted in undertakings engaged in the production of one type of product or a few grades of the same product.
- ii) This method is largely used where there is continuous production the units of which are identical. The ultimate unit at the end of manufacturing is homogeneous.
- iii) Units can be measured by a common unit. Costs are collected periodically and the cost of unit can be known at any point of time by dividing the total costs by the number of units produced. When several stages or operations are involved before the end product is reached, there is a fair degree of homogeneity and uniformity even in respect of the stage wise output in the system.
- iv) Services, facilities and inputs required either at the beginning or at interim stages of operation are common to the total output of each phase of operation including the final phase of manufacturing.
- v) There is a specific conversion ratio between the inputs and output or the ultimate units at interphase points as well as in the finishing stage.
- vi) The ultimate unit needs to be easily identifiable or measurable in units or in quantity or in recognizable and measurable service units.
- vii) Overhead rates are generally charged at a predetermined rate. This method is applicable to industries like fisheries, timber manufacturing, plantation industry, brick kilns, cement works, breweries, etc. Unit costing can also be applied to a foundry or extrusion plant turning out different products.

### Merits

- i) It is a simple method and the computation unit cost is easy.
- ii) It is highly useful to industries like collieries, breweries, sugar mills, etc.
- iii) Charging of costs to the production is easy under this method. For example, if there is one product, the raw-materials consumed can be directly charged to production.

### Limitations

The limitations of unit costing are as here under:

- i) This method is suited to industries on which the units are homogeneous or can be measured by a common unit. It cannot be applied to industries which are characterised by a series of processes of production of joint-products and by-products.

- ii) In unit costing, the treatment of stock is difficult.
- iii) Unit costing does not provide for effective managerial control.

### Check Your Progress - 1

1. Where do you apply Unit Costing ?

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## 16.3 JOB COSTING

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In Job Costing as its name indicates, the job is taken as the unit or cost centre. The jobs may be repetitive or unique. The jobs need not be identical. But jobs are to be clearly demarcated so the expenditure on each job can be minimised. The job can be small or large, single or a combination of a number of jobs; The main principle underlying this method is that there should be a fair degree of identification of a task or job starting from the input stage till the end of it.

Job costing is appropriate for jobbing factories, assembly and sub-assembly job operations. In job costing, each job or order is given a separate job order number. Usually, there is complete departmentalisation of the factory. Direct material cost, direct labour cost and direct expenditure are charged directly to the cost centre or the job order. Indirect expenditure is collected by service departments and apportioned to the concerned departments. The production department overheads are allocated to job orders on suitable bases such as direct labour hour and machine hour.

### Features

The main features of job costing are summarised as here under:

- i) The production is always against the customer's orders and not for stock and sale. Each job is characterised by a set of features and therefore needs special attention. Each job is taken as a separate cost unit and a separate job account is opened for it in the work-in-process ledger.
- ii) The production planning department prepares a suitable design for each product or job when an order is received. It estimates the requirements of materials, tools, etc., for each order and plans the operations needed for executing the job.
- iii) It is necessary to prepare a job order. It should contain instructions to various departments, besides detailed information regarding the quantity to be manufactured, details of materials, operations, etc.
- iv) The costing department allots a separate number to each job and opens a job cost sheet for it. A job cost sheet is prepared separately for each job regardless of the time taken for its completion. As amounts are expended in connection with the job, entries are made in this sheet.
- v) After the job is completed, the job account and the Work-in-Process Ledger are closed by transfer to the finished goods ledger.
- vi) Responsibility for accounting at the shop floor and at the middle management level can be easily traced to the number of jobs completed, their quality and costs.

- vii) Averaging of costs of approximations between different jobs is not needed, which is helpful in achieving accuracy and reliability of costs.

The following are the advantages of job costing:

- i) Job costing presents a detailed analysis of material cost, labour cost and overhead cost. As the job cost is available daily, weekly, or by -weekly, and so on, it enables the management to watch the behaviour of different costs and to control the operations and improve the efficiency.
- ii) Under this method, the management would be able to know which of the jobs are more profitable, which of them less profitable and which are incurring losses.
- iii) It helps in the planning of future production, since it provides a basis for estimating the cost of similar jobs. After a job is completed, the actuals can be compared with the estimates for the purpose of controlling costs.
- iv) The adoption of predetermined overhead rates in job costing necessitates the use of budgetary control of overheads with all its advantages.
- v) Job costing is helpful to the identification of spoilage and defective work and to the fixing of the responsibility on departments or individuals which enables the management to take effective steps for minimising spoilage and defective works.
- vi) Since Job Costing provides cost data, the management can determine the contract price based on the cost-plus formula.

### Limitations

The limitations of Job Costing are as here under:

- i) It involves a great deal of clerical work such as the recording of the cost of materials issued, cost of labour engaged and overheads chargeable to each job. This adds to the cost and makes it expensive.
- ii) As the recording of a large numbers of transactions takes place almost every day, errors of recording may occur.
- iii) Job costing does not provide for the control of costs unless it is used with the estimated or standard costing system.
- iv) Determination of predetermined overhead rates may involve the budgeting of overhead expenses. But budgetary control would not complete since it may not be extended to labour, material and selling and distribution expenses.

**Batch Costing :** This is an extension of job costing. A batch may represent a number of small order passed through the factory in batch, Each batch is treated as a unit of cost and separately costed. The cost per unit is determined by dividing the cost of the batch by the number of units etc., produced in a batch. This method is mainly applied in biscuits manufacturing, pharmaceutical industries.

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## 16.4 CONTRACT COSTING

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Contract costing is another method of costing which deals with the ascertainment of the cost of a contract, methods of control, appraisal and improvement which aims at the most efficient contract management. Contract costing is also known as Terminal costing, the work, 'terminal', signifying a finality.

Contract costing is applied to industries engaged in building or other construction work like roads, projects, dams, ships, and firms engaged in the erection of heavy plant and machinery.

There are many similarities between job costing and contract costing, since the contract is a special type of job. Under both these methods, the unit of the task is the centre of cost collection, cost ascertainment and cost control. However, there are certain distinctions between job costing and contract costing. They are as here under :

- i) In a contract, large resources are predominant and are deployed on the individual contract. It is not so in the case of a job because many common resources of a specialised nature are procured and deployed for use in a number of jobs.
- ii) Usually, there are many jobs undertaken in a job-order factory. In contrast, contracts or projects handled by a firm or factory are relatively few.
- iii) Since there are a few elements of cost, the problems pertaining to the collection, analysis, apportionment and allocation as well as control of costs are not as many in contract or terminal costing as in job costing.
- iv) Jobs are usually located or performed within the factory premises. Contracts are generally location-bound, making site operation an important element in contract costing control and management.
- v) The control system in job costing can be standardised by work and methods study, time planning, controlling machine operation, idle time and so on. In a contract the control device needs to be worked out individually for the different phases based directly on the unique requirement of the contract.

### Features

The features of contract costing are to some extent, special or peculiar to the system. The important features are as here under:

- i) Each contract is taken as a project. Hence, it is necessary to have a feasibility report as well as a detailed project report. Usually, the first component of such a report is the selection of site and its preparation. The contract or project has to be executed at a given site.
- ii) A large number of facilities are required in huge quantities for the efficient execution of a contract. These facilities include manpower, management, services, utilities, etc.
- iii) While selecting these facilities, balancing has to be made between the size of investment and its returns.
- iv) Time is the essence of all major contracts and projects.
- v) The phasing of a project in viable components is highly essential. Various categories of technical services are often involved as part of the project contract.
- vi) The treatment of plant and equipment has to be specially suited to the needs of the contract taking into consideration their requirement for the project and the utilisation.

### Merits

- i) Contract costing is easier than job costing as most of the expenditure is directly, charged to the contract.
- ii) In contract costing, there is no need for maintaining separate books for cost accounting, as the financial books can be recast to provide sufficient information for costing purpose. For every contract a separate account will be opened in the ledger and the contract will be debited with all direct expenditure and with a proportionate share of indirect expenditure.

- iii) A contract is required to be completed by a particular date failing which penalties are levied. As such the contractor prepares a time schedule for the execution of the entire work so that the work can progress systematically and abnormal expenditure like idle machinery, idle time etc., can be avoided.
- iv) It is desirable under the contract costing method to calculate the standard cost at various levels of construction; and comparison of such calculation with the standard costs will help in controlling and reducing the cost.

The basic limitation of contract is that it is applicable to building and construction operations only.

### Check Your Progress - 2

1. What are the features of Contract Costing?

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## 16.5 PROCESS COSTING

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Process Costing is also a method of costing in which the product passes through a series of operations or processes till it is completed. The output of each process directly passes into the next process till the end-product is achieved. In process costing the unit of cost is the process while in job or batch costing each order, job, or batch is the unit around which costs calculated.

Process costing is suitable for industries where the final product is the result of a series of processes following one another till the completion of the end-product. The principal industries adopting process costing include chemicals, refineries coal washeries, zinc melting, soap making, leather, timber, etc. An important feature of the industries using process costing is that the raw-materials are gradually converted into finished products through different processing stages.

### Features

The salient features of process costing are as here under:

- i) The production process is continuous and the end-product is the result of a series of processes. The finished product of one process becomes the raw material for the next process.
- ii) The products are homogeneous and the units produced are identical and standardised.
- iii) The sequence of operations for the processing of production is specific and pre-determined.
- iv) Costs are collected process wise and the cost of the unit at the end of manufacturing process can be known easily and readily.
- v) By-products or joint products arise at one or in several processes in the course of manufacture.
- vi) In most of the processing industries, the manufacturing process is continuous with or without pre-fixed targets and the job is largely a function of time.
- vii) Since the output of one process of department is usually the raw material of a successive process or department, the pricing principles and methods have to be decided for inter-process transfers.

## Merits

The following are the advantages of process costing :

- i) Process costing makes it possible to compute the cost periodically, say, at the end of a month, quarter, etc.
- ii) This method is simpler and easy compared to job costing. It involves relatively less clerical effort and expenses.
- iii) As the budgeted figures and actual are available for each process, managerial control is comparatively easy and effective.
- iv) Under this method, the volume of documents and the statistics is much less than in the case of job or batch costing.
- v) In this method the computation of average cost is easy, if the products are homogeneous.

## Limitations

Process costing has the following disadvantages:

- i) This method sets forth the average cost for a unit. But the average cost is not of much use for the purpose of detailed analysis and the evaluation of operational efficiency. Further, since the units are not fully homogeneous, the average costs are not always accurate.
- ii) Since costs are available on a historical basis, they are not of much use to managerial control.
- iii) In the case of production of joint products, apportionment of joint costs among various products becomes difficult under process costing.
- iv) For valuation of work-in-, process, estimation is involved for determining the stage of completion which reduces the accuracy of cost figures.

## Check Your Progress - 3

1. What are the merits of Process Costing ?

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## 16.6 OPERATING COSTING

Operating costing method is suitable for industries which render services as distinct from those which manufacture goods. This is applied in transport undertakings, power supply companies, services, hospitals, hotels etc., This method is used to ascertain the cost of services rendered. For this purpose operating cost sheet is prepared for each operation. There is usually a compound unit in such undertakings, eg. tonne-kilometer (transport undertakings) Kilowatt- hour (power supply), and patient day (hospitals).

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## 16.7 OPERATION COSTING

This costing method aims at ascertaining the costs of each operation in place of each Process. On this method the assumption is that output is achieved through a number of different operations.

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## 16.8 MULTIPLE COSTING

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Applying more than one costing method to a product is known as 'Multiple Costing'. This method is used in those concerns or industries where the nature of the product is complex, such as motor cars, aeroplanes etc., On such cases costs are accumulated for different components making the final product and then totalled to ascertain the total cost of the product.

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## 16.9 SUMMING-UP

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For ascertaining the cost of production/ or service, various methods of costing are employed. The suitability of each method of costing depends on various consideration. It primarily depends on the manufacturing process and also on the methods of measuring the departmental and finished products. Basically, there are two methods of costing, viz., a) job costing and b) process costing. Job costing is suitable for industries manufacturing different products or executing different jobs for different customers according to different specifications. Process costing is suitable for industries when production is continuous and units are identical. All other methods of costing are improvements, extensions or combinations of the above two basic methods.

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## 16.10 CHECK YOUR PROGRESS: MODEL ANSWERS

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1.1 Unit costing is applied in mines, quarries, oil drilling, cement works, brick works etc.

2.1 The features of Contract Costing are as follows

- i) Each contract is taken as a project.
- ii) The Contracts may be completed in more than one year.
- iii) Sub-Contracts may be employed.
- iv) The Contract price is normally estimated in advance.
- v) Plant and equipment may be purchased or hired

3.1 The following are the merits of Process Costing:

- i) The Computation of average cost is easier.
  - ii) The cost can be calculated periodically
  - iii) The clerical efforts and costs are lows.
  - iv) Effective control over production can easily be exercised.
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## 16.11 MODEL EXAMINATION QUESTIONS

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A. Answer the following in about 30 lines each

1. Discuss briefly, different methods of costing and their application to different industries with suitable examples.
2. What are the features of process costing and explain its merits and limitation.
3. What is job costing ? What are its features? How it is different from batch costing.

**B. Answer the following in about 15 lines each**

1. Explain the features of unit costing.
2. What are advantages of job costing?
3. Indicate the features of process costing.
4. State the merits of contract costing.
5. Write a note on operating costing.

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**16.12 RECOMMENDED BOOKS**

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- |    |                       |   |  |
|----|-----------------------|---|--|
| 1. | S.P.Jain & K.L.Narang | : | Advanced Cost Accounting                   |
| 2. | P.K.Ghosh             | : | Cost Accounting                            |
| 3. | N.K.Prasad            | : | Principles and Practice of Cost Accounting |
| 4. | H.J.Wheldon           | : | Cost Accounting and Costing Methods        |
| 5. | Blocker &weltuer      | : | Cost Accounting                            |
| 6. | Shyamal Benerjee      | : | Cost Accountancy                           |

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**16.13 GLOSSARY**

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- |                          |   |  |
|--------------------------|---|--|
| <b>Unit Costing</b>      | : | Unit Costing is a method of costing by the units of production.  |
| <b>Contract Costing</b>  | : | Contract Costing is a method of costing which deals with the ascertainment of the cost of a contract.                  |
| <b>Process Costing</b>   | : | Process Costing is a method of costing in which the product passes through a series of processes till it is completed. |
| <b>Operating Costing</b> | : | Operating Costing is a method of costing which is used to ascertain the cost of services rendered.                     |

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# UNIT-17 : UNIT COSTING

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- 17.0 Aims and Objectives
- 17.1 Introduction
- 17.2 Definition
- 17.3 Main Features and Application
- 17.4 Cost Records
- 17.5 Preparation of Cost Sheet, Production Account and Tenders
- 17.6 Illustration
- 17.7 Summing-Up
- 17.8 Check Your Progress : Model Answers
- 17.9 Model Examination Questions
- 17.10 Recommended Books
- 17.11 Glossary

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## 17.0 AIMS AND OBJECTIVES

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The aim of this unit is to explain the definition and meaning of unit costing, its main features and application to various Industries. Preparation of cost statement to ascertain total cost and the cost per unit and preparation of Quotations or Tenders.

After reading the unit, you will be able to :

- explain the meaning of unit costing
- identify the main features of unit costing and its application to various industries
- identify the sources from which cost data are collected and
- prepare Cost Sheet, Quotations or Tenders

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## 17.1 INTRODUCTION

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It has been pointed in the foregoing section that the various procedures adopted for measurement of production have resulted in different methods of costing. Business units differ not only in size, but also in the nature of production. As such, they have to adopt different procedures for measuring their production. Accordingly, their methods of costing should be different.

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## 17.2 DEFINITION

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Unit costing also known as 'Single or Output Costing', is defined as a method of costing applied to ascertain the cost per unit of production where standard products are manufactured. In the words of J.R. Batliboi, 'Single or Output cost system is used in business where a standard product is turned out it is desired to find out the cost of a basic unit of production'.

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## 17.3 MAIN FEATURES AND APPLICATION

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The main features or the working characteristics of this method are :

- i) Production should be uniform and a continuous affair ;
- ii) The units of production should be identical;
- iii) The cost units should be physical and natural.

Therefore, this method is applicable to industries like collieries , cement works, iron foundries, paper mills, brick works, quarries, flour mills, textile mills etc. The cost units are per unit, ton, per metre, per lb, per thousand, etc.

The main object of this method is to find out the total cost of the product, the cost per unit of output , and analyse the expenses by its nature, to classify them and to find out how each element of the cost contributes to the total cost of product.

### Check your progress - 1

1. State the main features of Unit Costing

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## 17.4 COST RECORDS AND COST ACCUMULATION

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The Unit Costing method does not demand elaborate cost records, by accumulation of cost under each head of expenditure is necessary for ascertaining the total cost of each element. Under this system, the relevant cost data are collected from various records, (e.g., Materials Abstract, Wages Abstract, Time Records and( Cost Ledgers), are totalled and divided by the number of units produced to find out the cost per unit. This does not involve any special problem and also does not, require a separate set of records for cost accounting . the financial accounts themselves can be made in such a way as to furnish all the necessary information regarding the materials used (as regards both quantity and value) direct labour, direct expenses and indirect expenses for each period.

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## 17.5 PREPARATION OF COST SHEET, PRODUCTION ACCOUNT AND TENDERS

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### A. COST SHEET :

According to ICMA, London, "Cost Sheet is a document which provides for the assembly of the detailed cost of centre or a cost unit". It is periodical document which is prepared weekly, fortnightly, monthly or quarterly. Cost sheets are prepared for the use of management to

- i) fix the selling price of the product,
- ii) compare the costs of any two periods, and
- iii) to ascertain the efficiency, if any, in production.

The total cost is divided into Prime Cost, Factory Cost Office Cost, and Cost of Production. The cost sheet presents the total as well as per unit production during that period. The cost sheet can be drawn up with as many details regarding costs as may be required .

## Non-Cost Expenses :

The following expenses are excluded from the computation of total cost:

Sale/Purchase of fixed assets, loss / profit on sale of fixed assets, goodwill and preliminary expenses written off, expenses of raising finance like premium / discount on issue of shares / debentures, brokerage, under writing commission, cash discount interest on debentures and bank loans, interest or rent received, reserves, income- tax, dividends, bonus, donations, charity etc.

### SPECIMEN - I

Cost Sheet for March, 2002

(Output 1000 Tonnees)

Particulars	Cost per Ton	Total Cost
Direct Materials :	Rs.	Rs.
Opening Stock of Raw Materials      xxx		
Add : Purchase of Raw Materials      xxx		
		xxxx
Less : Closing Stock of Raw Materials   xxx		
Cost of materials consumed	xx	xxx
Direct Labour	xx	xxx
Direct or Chargeable Expenses	xx	xxx
(a) Prime Cost	xx	xxx
Works overhead or Factory overhead	xx	xx
(b) Works Cost	xx	xxx
Office and Administration Overhead	xx	xxx
(c) Cost of Production	xxx	xxx
Selling and Distribution Overhead	xx	xxx
(d) Cost of Sales	xxx	xxxx
Profit	xxx	xxx
(e) Selling Price	xxx	xxxx

**Cost statements :** Where a statement is prepared to show the total cost and the profit or loss, but where it is not desired to find out cost per item of expense, the statement so prepared is the Statement of Cost. With this statement, the cost per unit can be ascertained by dividing the total cost by the number of units produced. In some statements, percentages of component costs are to be reckoned on the basis of total cost : e.g. percentage of Prime Cost and its components on the total cost, percentage of Factory Overhead on the Total cost, etc., Similarly, percentage of Gross Profit or Net Profit on turnover, can also be worked out for the purpose of cost control through cost comparison.

**Different types of Cost Statements :** The following are the different types of cost statements:

- i) The statement in which percentages of components of cost are reckoned on the total basis;



Dr **PRODUCTION ACCOUNT FOR THE PERIOD...** Cr

Particulass	Amount (Rs)	Particulars	Amount (Rs)
To Direct Materials	xxx	By Prime Cost c/d	xxxx
To Direct Labour	xxx		
To Direct Expenses	xx		
	<u>xxxx</u>		<u>xxxx</u>
To Prime Cost b/d	xxxx	By Cost of Goods	
To Works Overheads	xx	Manufactured c/d	xxxx
To Opening Work in Progress	xx		
Less: Closing Work in Progress	xxxx		
Less: Sale of Scrap	xx		
	<u>xxxx</u>		<u>xxxx</u>
To Cost of Goods Manufactured	xxxx	By Sales	xxxxx
To Opening Stock of Finished Goods	xxx	By Closing Stock of Finished Goods	xxx
To Gross Profit c / d	xxx		
	xxx		
	<u>xxxxx</u>		<u>xxxxx</u>
To Administrative Overheads	xxx	By Gross Profitb /d	xxx
To Selling and Distribution Overheads	xxx		
To Net Profit	xxx		
	<u>xxx</u>		<u>xxx</u>

**C. QUOTATIONS OR TENDERS**

Quotations or tenders are prepared on the basis of the calculation made by using estimated costs. The working takes the form of a "Cost Sheet". This cost sheet includes material cost, labour cost, and other overheads which may be charged as a percentage of direct wages or works cost. However, wherever it is possible, the overhea charge of the basis of 'machine-hour rate' or labour hour rate should be preferred. Further, the anticipated cost, if added to expected profit gives the tender price. Great care has to be exercised in drawing up an estimated cost sheet because any slight error in the calculation may upset profit planning, while liberal provisions for costs may take away competitiveness of the tender .

Generally ,the expected profit is expressed as a percentage of cost of sales. In such cases the amount of profit can be arrived at through the following formule :

(a) Profit as a percentage of cost = % of profit x Cost

(b) Profit as a percentage of sales =  $\frac{\text{Profit}}{1 - \% \text{ of Profit}} \times \text{Cost}$

## Check your progress - 2

1. What is the need for preparing Production Account?

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

## 17.6 ILLUSTRATIONS

*Illustration.1* : Present the following information in a statement showing (1) Material consumed, (2) Prime cost, (3) Factory cost, (4) Cost of production, (5) Total cost, and (6) Net profit.

Particulars	Rs.
Stock of raw materials on 1-1-2001	24,000
Stock of raw materials on 31-12 2001	31,000
Purchase of raw materials	92,000
Drawing office salaries	3,200
Counting house salaries	6,000
Carriage inwards	2,300
Bad debts written off	2,000
Rent and Taxes(factory)	4,200
Rent and Taxes(Office)	1,500
Carriage outwards	2,100
Productive wages	60,500
Depreciation on plant and machinery	3,200
Depreciation on office furniture	150
Gas and Water (factory)	800
Gas and Water (office)	300
Travellers' salaries and commissions	2,400
Advertisement and samples	2,000
Maintenance of delivery van	2,000
Rent of warehouse	1,800
Printing & Stationery	1,200
Telephone charges (factory)	800
Telephone charges (office)	1,200
Sales	2,72,500

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**Solution***Statement of cost for the year ending 31 st of December 2001*

Particulars	Rs.	Rs.
Stock of raw materials on 1-1-2001	24,000	
Add purchase or raw materials	92,000	
Add carriage inwards	2,300	
	1,18,300	
Less Stock of raw materials 1-12-2001	31,400	
(1) Materials consumed		86,900
Productive wages		60,500
(2) Prime Cost		1,47,400
<u>Factory Overheads :</u>		
Drawing office salaries	3,200	
Rent and taxes(factory)	4,200	
Deperciation of plant& machinery	3,200	
Gas and water (factory)	800	
Telephone charges (factory)	800	
		12,200
(3) Factory Cost		1,59,600
<u>Office Overheads :</u>		
Counting house salaries	6,000	
Rent and taxes (office)	1,500	
Depereciation on office furniture	150	
Gas and water (office)	3,00	
Printing and stationery	1,200	
Telephone charges (office)	1,200	
		10,350
(4) Cost of Production		1,69,950
<u>Selling and Distribution Overheads :</u>		
Bad debts	2,000	
Travellers Salaries and commission	2,400	
Advertisement and samples	2,000	
Carriage out wards	2,100	
Maintenance of delivery van	2,000	
Rent of warehouse	1,800	
		12,300
(5) Cost of Sales		1,82,250
(6) Net Profit		90,250
<b>Sales</b>		<b>2,72,500</b>

### Illustration 2

The following particulars have been extracted from the accounts of Electric Motors Company Limited for the year ended 31st March 2002

	Rs.
Opening Stock of raw materials	25,000
Purchase of raw materials	6,00,000
carriage incurred on the above mentioned	30,000
Labour	3,50,000
Works overhead	98,000
Administrative overhead	74,585
Closing stock of raw materials	37,500

Prepare a statement of cost and work out what price the company should quote for a motor which it is estimated, will require raw materials of the value of Rs. 2,750 and wages of Rs. 2,000, so that it would yield a profit of 20% on the selling price ?

### Solution

*The Electric Motors Manufacturing Company Limited  
Statement of cost for the year ended 31st March 2002*

Particulars	Rs.	Rs.
Opening stock of raw materials	25,000	
Purchases	6,00,000	
Carriage on purchases	30,000	
	<u>6,55,000</u>	
Less: Closing stock of raw materials	37,500	
Materials consumed		6,17,500
Labour		3,50,000
Prime Cost		<u>9,67,500</u>
Works overhead		98,000
Work Cost		<u>10,65,000</u>
Administrative overheads		74,585
Cost of Production		<u>11,40,585</u>

(1) Percentage of works overhead to wages - 28%

(2) Percentage of administrative overhead to works cost - 7%

*Quotation or Tender for a Motor Car*

	Rs.
Materials	2,750
Wages	2,000
	4,750
	Prime Cost
Works Overhead - 28% of wages	560
Works Cost	5,310
Establishment - 7% on works cost	372
	5,682
	Cost of Production
Profit - 20% on selling price	1,420.50
	7,102.50
	Selling Price

**Illustration 3**

*A company's records show the following particulars during the year 2001*

*Production and Sale of 100 units*

	Rs.
Materials	13,000
Labour	7,000
Direct charges	1,000
Works on cost	7,000
Office on cost	2,800
Selling on cost	3,200
Profit	5,000
	39,000
Sales	

The company wants to produce 500 units for the year 2002 . Prepare a cost sheet for the same, after taking into account the following information :

- i) 40% of work on cost directly fluctuates with production.
- ii) 70% of selling on cost directly fluctuates with sales .
- iii) Labour charges to be reduced by 20%
- iv) Fixed work on cost to be increased by Rs. 3,000.
- v) Office oncost and fixed selling oncost to show an increase of 25% .  
No other charges are anticipated .

**Solution**

*Cost Sheet for the manufacture of 500 units during the your 2002*

Particulars	Rs.
Materials : Rs. 13,000x5	65,000
Labour : Rs. 7,000 x 5- 20%	28,000
Charges : Rs. 1,000 x 5	5,000
	98,000
Prime Cost	

Add : Works oncost :		
5(40% of Rs. 7,000)+(60%of Rs.7,000)+Rs.3,000		<u>21,200</u>
	Work Cost	<u>1,19,200</u>
Add : Office oncost:		
Rs. 2,800 + 25% of Rs. 2,800		<u>3,500</u>
	Office Cost	<u>1,22,700</u>
Add : Selling oncost:		
5(70% of Rs. 3,200) + (25%of 30% of Rs. 3,200)=		
	(11,200 + 1,200)	12,400
	Total Cost	1,35,100
	Profit	<u>19,868</u>
	Selling Price	<u>1,54,968</u>

(Note : Calculations are made to the nearest rupee)

#### Illustration 4

During the month of December 2001 16,000 units of standard product were manufactured out of which 13,500 units were sold at Rs. 8 per unit. The value of raw material consumed was Rs. 60,000 and the direct wages paid amounted to Rs. 16,480 . The factory expenses were allocated to production at machine hour rate which for that month was Rs. 5 per hour and 1,200 machine hours were worked during the month.

The office expenses were charged @ 20% on the works cost and the selling expenses @ 25 paise per unit.

Prepare a cost sheet showing (a) cost per unit, and (b) profit for the month.

Solution

*Cost sheet for December 2001 (output : 16,000units)*

Particulars	Total Cost	Cost per Unit
	Rs.	Rs.
Raw materials	<u>60,000</u>	<u>3,750</u>
Direct wages	16,480	1,030
Prime Cost	<u>76,480</u>	<u>4,780</u>
Works overhead (1,200 hours@ Rs.5per hours	6,000	0,375
Works Cost	<u>82,480</u>	<u>5,155</u>
Office overhead(20% on Works Cost)	16,496	1,030
Cost of Production	<u>98,976</u>	<u>6,185</u>
Cost of production of 13,500 units @ Rs. 6.185 per unit	83,497.50	6.185
Selling overhead @ 25 paise per unit sold	3,375.00	0.250
Cost of Sales	<u>86,872.50</u>	<u>6.435</u>
Profit	<u>21,127,50</u>	<u>1.565</u>
Selling Price @ Rs.8 per unit	<u>1,08,000.00</u>	<u>8.000</u>

**Illustration 5 :**

From the following particulars, prepare a cost sheet showing the comparative cost per ton both the period :

	Three months ended	
	31-3-2002	30-6-2002
Productive Wages	72,000	98,000
Administration	12,000	12,000
Raw Materials	36,000	49,000
Taxes & Insurance (factory)	750	750
Light and Water	1,000	1,000
Direct Expenses	9,000	12,500
Depreciation	2,000	2,000
Factory Rent	15,000	1,500
Unproductive Labour	30,000	41,000
Factory Repairs	3,000	4,500
	<u>1,67,250</u>	<u>2,22,250</u>

The tonnage produced in the two quarters was 12,000 and 16,000 tons respectively.

**Solution**

*Cost Sheet*

Three Months ended 31-3-2002 12,000 ton		Particulars	Three months ended 30-6-2002 16,000 tons	
Total Rs.	Cost per ton Rs.		Total Rs.	Cost per ton Rs.
36,000	3.00	Raw Materials	49,000	3.06
32,000	6.00	Productive Wages	98,000	6.06
9,000	0.75	Direct Expenses	12,500	0.78
<u>1,17,000</u>	<u>9.75</u>	Prime Cost	<u>1,59,500</u>	<u>9.97</u>
30,000	2.50	Unproductive Labour	41,000	2.56
1,500	0.13	Factory Rent	1,500	0.09
3,000	0.25	Factory Repairs	4,500	0.28
1,000	0.08	Light and Water	1,000	0.06
2,000	0.17	Depreciation	2,000	0.13
750	0.06	Taxes and Insurance	750	0.05
<u>1,55,250</u>	<u>12.94</u>	Work cost	<u>2,10,250</u>	<u>13.14</u>
12,000	1.00	Administration Expenses	12,000	0.75
<u>1,67,250</u>	<u>13.94</u>	Cost of Production	<u>2,22,250</u>	<u>13.89</u>

**Illustration : 6:** From the following particulars, make out a monthly Cost of Coke and By Products :

Coal	: 5,000 tonnes @ Rs. 12=50 per tonne
Coke produced and sold	: 3,505 tonnes @ Rs. 24 Per tonne
Tar Produced and sold	200 tonnes @ Rs. 48 per tonne.
Sulphur Produced } and sold	: 50 tonnes @ Rs. 180 per tonne
Benzol Produced and sold	: 48 tonnes @ Rs 75 per tonne
Raw Materials used	: Rs. 3,900
Wages paid	9,600
Repairs and Renewals	9,000
Salaries and other charges	5,000

**Solution** Statement of Coke and By Products Statement of Cost and Profit

	Quantity (Tonus)	Amount (Rs.)
Coal Used	5,000	62,500
cost of raw materials used		3,900
Wages paid		9,600
Repairs and renewals,		9,000
Salaries and Other charges		5,000
Cost of Production of Main and by product}		<u>90,000</u>
<u>Less: Value of by- product :</u>	Rs.	
Tar	9,600	
Sulphur	9,000	
Benzol	<u>3,600</u>	<u>22,200</u>
Cost of Coke:		<u>67,800</u>
Profit .		<u>16,320</u>
	Sales (3,500@Rs, 24)	<u>84,120.</u>

**Illustration : 7** The following details have been extracted from the cost records of MRPLtd :

<u>Stock of Raw Materials :</u>	Rs,
On 1-1-2001	75,000
On 31-12-2001	91,500
Direct Wages	52,500
Indirect Wages	2,750
Sales	2,11,000

**Work- In-Progress :**

On 1-1-2001	28,000
On 31-12-2001	35,000
Raw Materials purchased	66,000
Factory rent, rate and power	15,000
Depreciation on plant and machinery	3,500
Carriage on purchases	1,500
Carriage on Sales	2,500
Advertising	3,500
Office rent and taxes	2,500
Salesmen Wages and commission	6,500

**Stock of Finished goods:**

On 1-1-2001	54,000
On 31-12-2001	31,000

Prepare a Production Account giving the maximum break - up of Costs and Profit.

**Solution**

**MRP Ltd.**

Production Account for the Year ended 31-12-2001			
Dr.	Amount	Particulars	Cr.
Particulars	(Rs.)		(Rs.)
To Raw Materials Consummed:		By Prime Cost C/d	1,03,500
Opening Stock of materials	75,000		
(+) Materials Purchased	66,000		
(+) Carriage on Purchases	1,500		
	<u>1,42,500</u>		
(-) Closing Stock of materials	91,500		
	<u>51,000</u>		
To Direct wages.	52,500		
	<u>1,03,500</u>		<u>1,03,500</u>
To Prime Cost b/d.	1,03,500	By Cost of goods	
To Indirect wages	2,750	manufactured c/d	1,17,750
To Factory rent, rate and power	15,000		
To Depreciation on plant and machinery	3,500		
	<u>1,24,750</u>		

<b>(+) Opening Stock of Work-in</b>		
Progress	28,000	
	<u>1,52,750</u>	
<b>(-) Closing Stock of Work-in-</b>		
Progress	35,000	
	1,17,750	1,17,750
To Cost of goods manufactured		By Sales
b / d	1,17,750	2,11,000
To Opening Stock of finished		By Closing Stock of finished
goods	54,000	31,000
To Gross Profit c / d	70,250	
	<u>2,42,000</u>	<u>2,42,000</u>
To Office rent and		By Gross Profit b /d.
taxes	2,500	70,250
To Advertising	3,500	
To Carriage on sales	2,500	
To Salesmen Wages		
and Commission	6,500	
To Net Profit	55,250	
	<u>70,250</u>	<u>70,250</u>

## 17.7 SUMMING -UP

Unit Costing method is applied to ascertain the cost per unit of production. This method of costing is applied to those industries whose production is uniform and continuous. The units of production should be identical and the cost units should be physical. The relevant cost data are collected from various records, such as, material abstract, wages abstract, time records and cost ledgers. Cost Sheet is prepared in a statement form to ascertain the cost of sales and the cost per unit. Quotations or Tenders are prepared on the basis of the calculation made by using estimated costs.

## 17.8 CHECK YOUR PROGRESS : MODEL ANSWERS

1.1 The main features of unit costing are :

Production should be uniform and a continuous affair.

The units of production should be identical.

The cost units should be physical and natural.

2.1 The purpose of preparing product account is to ascertain the cost of goods manufactured and gross profit.

## 17.9 MODEL EXAMINARION QUESTIONS

### A. Answer the following in about 30 lines each.

1. what are main features of unit costing? Name the undertaking to which they are most suited.
2. What is Cost Sheet ? prepare a Cost sheet for a Brick Manufacturing with imaginery figures Industry

### B. Answer the following questions in about 15 lines each.

3. What is cost statement ? How it is different from cost sheet ?
4. Select an article in common use, describe the material, labour and overhead expenses which enter into its cost of production and prepare a cost of production and prepare a cost sheet in the proper form.
5. What is Quotation? How do you prepare it?

### EXERCISES :

1. From the following particulars you are required to prepare a statement showing :

- i) The cost of materials consumed
- ii) Prime cost
- iii) work cost
- iv) Total cost
- v) Percentage of works oncost to Wages

On the 1st April ,2001

Stock of raw materials	Rs. 33,280
Stock of finished goods	72,800

On the 31st of March ,2002

Stock of raw materials	Rs. 35,360
Stock of finished goods	78,000
Purchase of raw materials	7,59,200
Sale of finished goods	15,39,200
Productive wages	5,16,880
Works overhead charges	1,29,220
Office and general charges	70,000

(Ans. Cost of Sales Rs. 14,68,020)

2. A factory produces 100 units of a commodity.

The cost of production is :	Rs.
Direct materials	10,000
Direct wages	5,000
Direct expenses	1,000
Factory overheads	6,500
Administration Overheads	3,480

If profit of 25% on sales is to be realised, what would be the selling price of each unit of the commodity?

(Ans : Rs. 346.40)

3. Following are the particulars for the production of 2,000 sewing machines of Usha Engineering Company Limited for the year 2001

	Rs.
Cost of materials	1,60,000
Wages	2,40,000
Manufacturing expenses	1,00,000
Depreciation	1,20,000
Rent, rates and insurance	20,000
Selling expenses	60,000
General expenses	40,000
Sales	8,00,000

The company plans to manufacture 3,000 sewing machines during 2002. You are required to submit a statement showing the price at which machines could be sold so as to show a profit of 10% on the selling price. The following additional information is supplied to you :

- a) Price of materials is expected to rise by 20% .
- b) Wage rates are expected to show an increase of 5%
- c) Manufacturing expenses will rise in proportion to the combined cost of materials and wages.
- d) Selling expenses per unit will remain the same.
- e) Other expenses will remain unaffected by the rise in output.

(Ans: Selling price per sewing machine : Rs. 408.33)

4. From the under- mentioned particulars of Anjaneya Brick works Limited, Hyderabad, you are required to prepare a month cost sheet of bricks made in the month of January 2002 showing the cost and profit per 1,000 bricks :

Materials	Rs.
Coal	31,500
Royalty	5,550
Stores	15,000
<b>Labour</b>	
Direct	15,000
Brick making	50,000

**Overheads**

- Works - 25% on prime cost
- Office - 10% on works cost
- Production per month - 74,00,000bricks
- Sales per month Rs. 27.50 - 70,00,000 bricks
- Stock on 1st January 2002 - 2,00,000 bricks
- Stock on 31st January 2002 - 6,00,000 bricks

You have to assume that the stock was valued at the same rate per 1,000 bricks as the production for January 2002

- (ans: 1) Cost per 1,000 bricks - Rs. 21.75  
 2) Profit per 1,000 bricks - Rs.5.75)

5. From the following information prepare cost sheet of M / s ABC enterprises for the year ending March 2002.

<u>Stock of Materials :</u>	Rs.
– Opening	1,88,000
– Closing	2,00,000
Materials Purchased during the year	8,32,000
Direct wages	2,38,400
Salaries.	40,000
Indirect Wages.	16,000
Freight:	
– Inward.	32,000
– Outward	20,000
Cash discount allowed	14,000
Baddebts written off	18,800
Repairs to Plant & Machinery	42,400
Rent, Rates and Taxes.	
– Factory	12,000
– Office	6,400
Travelling Expenses	12,400
Salaries of Salesman	33,600
Depreciation :	
– On Plant & Machinery	28,400
– On Furniture	2,400
Director's Fees	24,000
Factory Lighting	48,000
Fuel for boiler	64,000
General Charges	24,800
Managers Salary (1 / 5 th Factory and remaining Office)	48,000

Ans: [ Total Cost: Rs. 15,31,600 ]

Note : Cash Discount is non-Cost item.

6. Prepare a Cost Sheet From the following data. Also show the Cost per ton:

Direct Materials:

(a) 500 tons @ Rs. 50 per ton

(b) 100 tons @ Rs.30 per ton

Direct labour

(a) 80 Skilled men @ Rs 3per dayfor 25 days

(b) 40 unskilled men @ Rs 2per day for 25 days.

Direct Expens:

Special equipment Rs. 3,000

Special colours Rs. 1,000

Works Overhead :

Variable 100% on direct wages

Fixed @ 60% on direct wages.

Administrative Overhead @ 10% of works Cost and Selling and distribution Overhead @ 15% On works Cost. 400 tons of end product was manufactured and Rs. 800 was realised from the sale of scrap.

Ans: [Cost per ton: Rs. 162=50]

7. The following extract of Costing in for mation relates to Commodity 'A' for the year ending 30-6-2002:

	Rs.
Purchase of saw mateials	1,20,000
Works Overheads	48,000
Direct wages	1,00,000
Carriage on purchases	1,440
<u>Stock (1st-July, 2001)</u>	
– Raw materials	20,000
– Finished products (1,000 tons)	16,000
<u>Stock ( 30 the June, 2002) :</u>	
_ Raw materials	22,240
_ Finished products ( 2,000 tons)	32,000
Work-in - Progress( 1st July, 2001)	4,800
Work-in -Progress ( 30th June, 2002)	16,000
Sals	3,00,000

Selling and distribution overheads : Re. 1per unit sold, procution during the Year: 16,000 tons.

Prepare production Account.

Ans: [ Net Profit : Rs. 45, 000]

8. The pen manufacturing company is producing two types of pens a) 'Delux' and b) 'popular'. The Manufacturing cost for the year ending on the 31st of March 2002 were as follows :

	Rs.
Direct Materials	2,00,000
Direct Wages	1,12,000
Production Overheads	48,000
	3,60,000

It is ascertained that:

- i) Direct materials in respect of 'Deluxe' type are cost wise as much as these of 'popular' type.
- ii) Direct wages in respect of 'Popular' type were 60% of those for the 'Deluxe' type.
- iii) Production overhead was 30 paise per pen for both types.
- iv) Administration overhead for each type was 200 percent of Direct Labour,
- v) Selling overhead cost was 25 paise per pen for both the types.
- vi) Production during the year was:  
 'Deluxe' type - 40 000 pens of which 36,000 were sold ;  
 'Popular' type - 1,12,000 pens of which 1,00 000 were sold.
- vii) Selling prices were Rs. 7 per pen of 'Deluxe' type and Rs. 5 per pen of 'popular' type.

Prepare a statement showing the total cost per pen of each type and the profit made on each type of pen.

	Cost per pen	Profit per pen
Ans : 1) Deluxe-	Rs.5.55	Rs.1.45
2) Popular-	Rs.3.35	Rs. 1.65

### 17.10 RECOMMENDED BOOKS

- |                                 |   |
|---------------------------------|---|
| 1. H.J. Wheldon                 | Cost Accounting and Costing Methods.        |
| 2. Blocker & Weltmer            | Cost Accounting.                            |
| 3. S.P.Jain & K.L.Narang        | Advanced Cost Accounting.                   |
| 4. B.K. Bhar                    | Cost Accounting Methods and Problems.       |
| 5. B.M.Lall Nigam & G.L. Sharma | Cost Accounting Principles and Application. |
| 6. D.K.Mittal & Luv Mittal:     | Cost Accounting                             |

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## 17.11 GLOSSARY

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- Cost Sheet** : Cost Sheet is a document which provides for assembly of the detailed costs of a centre or a cost unit.
- Cost Statement** : Where a statement is prepared to show the total cost and the profit or loss, but where it is not desired to find out cost per item of expenses, the statement so prepared is the "Statement of Cost"
- Tenders / Quotations** : It is a method of cost sheet used to prepare the estimated costs and the price of a product.
- Unit Costing** : It is a method of costing applied to ascertain the cost per unit of production where standard products are manufactured.
- Production Account** : It is an account prepared on double entry principles for the purpose of ascertaining cost of goods manufactured and gross profit.

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# UNIT - 18 : JOB AND BATCH COSTING

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## Contents

- 18.0 Aims and Objectives
- 18.1 Introduction
- 18.2 Definition
- 18.3 Distinction between Unit Costing and Job Costing
- 18.4 Application of Job Costing
- 18.5 Salient features of Job Costing
- 18.6 Accounting Treatment in Job Costing
- 18.7 Preparation of Job, Cost sheet / Job Account
- 18.8 Advantages and Disadvantages of Job Costing
- 18.9 Batch Costing
- 18.10 Summing-Up
- 18.11 Check Your Progress : Model Answers
- 18.12 Model Examination Questions
- 18.13 Recommended Books
- 18.14 Glossary

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## 18. 0 AIMS AND OBJECTIVES

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This unit explains the meaning and essentials of job costing . The industries to which job costing could be applied, preparation of job accounts, to ascertain the cost of each job and work in progress. It covers the relative advantages and disadvantages of job costing and the meaning of Batch costing, and its application to various Industries.

After reading this unit, you will be able to:

- Understand the meaning and essentials of job costing.
- Distinguish between unit and job costing.
- Understand its application, features and accounting for costs in job costing.
- State the advantages and disadvantages of job costing.
- Explain the meaning and application of batch costing.

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## 18. 1 INTRODUCTION

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Industries which manufacture products or render services against specific orders, as distinct from continuous production for stock of sales , use job costing or job order method of cost accounting. This method is also known as Specific Order Costing or Lot Costing. An outstanding feature of job costing is that through the treating of the job as the cost it becomes an extension of single / output costing.

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## 18.2 DEFINITION OF JOB COSTING

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Job costing may be defined as a system of costing in which the elements of cost are accumulated separately for each job or work order undertaken by an organisation. It is also described as job Order Costing or Job Cost Accounting. This system is usually adopted by concerns engaged in Job order type of production, or servicing, where a specific job is done for a stipulated price (e.g. printing, machine tools manufacture, foundries, manufacture of special types of equipment, design engineering, general engineering and repairing works, etc.)

The primary purpose of job costing is to bring together all the costs incurred for completing a job. Besides, it also ensures that there is proper control over costs incurred, that jobs are completed in time and that information is available at regular interval about the jobs completed and the progress made.

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## 18.3 DISTINCTION BETWEEN UNIT COSTING AND JOB COSTING

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Unit costing is the method of costing used when cost units are identical. Identical cost units should have identical costs and this concept of equality of costs is the basic feature of unit costing.

Job costing is quite distinct from unit costing. Job costing is the method of costing the non-standard jobs, generally made according to customers' specification. In the case of job costing, the products manufactured are clearly distinguishable from one another unlike in unit costing, where the cost units are identical. In job costing, products are made according to the individual customer's specifications, unlike in unit costing where the products produced by the manufacturer according to his own specifications are offered to the customers. Usually, the costs of each job are accounted for separately in Job Costing, whereas in the case of unit costing, the total costs divided by the number of units of output, will give the cost of each unit. Job costing is followed in such industries as printing, building contracting, foundries, and machine tools, and unit costing is followed in industries such as dairies, quarries, sugar, yarn, coal, and cement.

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## 18.4 APPLICATION OF JOB COSTING

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The industries to which job costing is applied must possess the following features.

- i) Production is always against the customer's order and non for stock.
- ii) Each job has its own characteristics and therefore needs special treatment.
- iii) There is not uniformity in the flow of production from department to department. The nature of the job determined the departments through which the job should be processed.
- iv) Work-in-process differs from period to period according to the number of jobs in hand. Thus the cost is ascertained for each job separately.

### Check your progress - 1

1. State the industries in which Job Costing is applied.

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## 18.5 SALIENT FEATURES OF JOB COSTING

The following are the important features or essentials of job costing:

a) **Job Order Number** : Since job costing lays emphasis on the accumulation of costs proceed with a specified job, orders, a number must be assigned to each job.

b) **Production Order** : A production order is a written order to the foreman to proceed with a specified job, This is an important control document prepared by the Production Planning Department and approval by the management. Jobs can be worked on and products turned out only on the basis of specific production or work orders. Two types of such orders are usually made, viz., (i) Production order for stock and (ii) Production order for supply.

For any job, the cost involved is estimated and on the basis of this estimate, the price is quoted to the customers. If the job is accepted, a Production Order is prepared by the Planning Department. It is in the form of instructions issued to the foreman to proceed with the manufacture of the product. It forms the authority for starting the work. It contains all the information regarding the production.

c) **Bill of Material** : A bill of material is a list of all the materials and parts required for a job. It provides particulars of stores required and serves as an advance intimation to the store-keeper who has to issue materials on the basis of this bill rather than on a separate requisition. The bill of material is prepared by the Production Planning Department. The foreman receives a copy of the bill of material, along with the production order. He is thereby authorised to call for and receive the materials. A separate list is prepared for special tools which may be needed for a job. It is known as 'Tool List.'

d) **Job Card or Job Cost Sheet** : The most important document prepared in job costing is the job card or job cost sheet. It is prepared for each job order and all costs relating to the job are recorded on it. The cost of direct materials as well as that of direct labour is entered in the job card directly from cost records, and the manufacturing overheads are added on the basis of the predetermined rates. The following is the format of a Job Card :

JOB CARD (For large jobs)				
Description of Job :			Job No. :	
Customer :			Sales Order No.:	
Date of Completion :			Prod. Order No. :	
Date	Ref.	Particulars	Cost (Rs.)	
			Details	Total
		Materials		
		Labour		
		Factory Overhead		
		Administration		
		Selling and Distribution Overheads		

## ESTIMATES

Ref.	Materials Rs.	Labour Rs.	Factory Overhead Rs.	Admn Overhead Rs.	Selling Overhead Rs.	Total Rs.

The sources of cost recorded in the card are as hereunder :

- i) **Materials** : The bill of material or stores requisitions generally provide the necessary cost information as regards the direct materials issued for specific jobs.
- ii) **Labour** : The information regarding direct labour working on particular jobs can be drawn from the card issued to each workman. Wages paid for indirect labour forms part of the factory overhead.
- iii) **Factory Overhead** : Under job order costing, the factory as a whole is treated as one cost centres for accumulating manufacturing expenses, or two or more cost centres (departments, operations or machines) are set up for overhead cost accounting. In the latter case, different overhead recovery rates are determined for the respective cost centres . The factory overhead costs are charged to various jobs on the basis of one or more predetermined rates.
- iv) **Administrative Overhead** : Office and administrative overheads may be charged to jobs on the basis of a pre-determined rate. A better method is to apportion each item of administrative overhead between production and selling overheads before determining the respective overhead absorption rates. In this case the administrative overhead is recovered along with the factory and selling overheads.
- v) **Selling and Distribution Overhead** : These expenses are added to the cost of sales. Given the selling price, the difference between the total cost and selling price is the profit (or loss) .In cost-plus costing, the selling price is determined by adding to the cost a fixed or a proportionate amount as margin of profit.
- e) **Completion of Job** : On the completion of a job, a completion report is sent to the costing department. The expenditure under each element of cost is totalled and the total job cost is ascertained. The actual cost is compared with the estimated cost so as to ascertain the efficiency or inefficiency of the operation.
- f) **Profit or Loss on the Job** : It is determined by comparing the actual expenditure or cost with the price obtained.

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### 18.6 ACCOUNTING TREATMENT IN JOB COSTING

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In job costing, the costs of various jobs on hand are accounted for as here under :

- i) In job costing, the distinction between direct and indirect costs is emphasized to a greater extent than is necessary in process cost accounting.

- i) Order are issued and costs are accounted for, each lot of products manufactured. These orders are controlled by a work-in-process account which direct costs and indirect costs or burden incurred on the orders.
- iii) The work -in-process account is used to record the cost of products manufactured and inventories of unfinished work.
- iv) Direct costs are charged to work-in -process account and are entered on the cost sheets of production orders.
- v) Indirect costs or manufacturing expenses are charged to the departmental accounts and do not appear as such in the work-in-process account or on the cost sheets of the production orders.
- vi) The amount of applied indirect cost, also known as applied manufacturing expenses, to be borne by each order, is determined. Such an amount is entered on the cost sheet and charged to the work-in- process account by crediting the off setting account for 'Applied Indirect Cost ', or Applied Factory Burden'.

### Accounting for Work-in-Process

The value of work-in-process at any time is shown by the balance of the Work-in-process Account' which is maintained in the cost ledger. It is periodically debited with the direct and indirect manufacturing costs and credited with the total cost of completed jobs ,indicated in the job cost sheets, a summary of completed jobs may be prepared at intervals of a month or so,from which the cost of jobs completed may be drawn and credited to work-in-process account. The balance of work-in-process account, which represents the cost of job not yet completed may be verified by aggregating the total costs till then entered in the relevant job cost sheets.

**Job Ticket :** Sometimes, the progress of different jobs may be ascertained with the help of a job ticket' issued for each job order by the Production Control Department. The ticket consists of detachable portions relating to different operations. A specimen form of the job ticket is given below.

#### JOB TICKET

JOB NO.365	
Description :	Date :
Customer :	
Date Required :	
(Performed)	
Operation No.4	Quantity :
Completed on :	
Checked by :	
Job No. 365	
(Performed)	
Operation No 3	Quantity :
Completed on :	
Checked by :	

Job No.365

(Performed)

Operation No. 2

Completed on :

Quantity :

Checked by ;

Job No. 365

(Performed)

Operation No. 1

Completed on :

Quantity :

Checked by :

A job ticket is used when the job order involves a number of operations. A portion of the job ticket is detached and sent to the Production Control Department on the completion of each operation. This is helpful to the controlling of the schedule of production.

To ensure that jobs are completed by the agreed date, it is often found convenient to use a progress 'Advice' which notifies the stage reached in executing a job and where necessary, it also serves as an intimation for inspection and approval of the work done till then.

**Service Orders :** In a manufacturing Organisation certain jobs are required to be undertaken for the maintenance of Service Departments in the factory. The costs involved in those jobs are really overhead expenses. Such costs may be accumulated separately for proper allocation to various cost centres. Special Service Orders are issued for such jobs with a serial number known as standing order number given to each of them.

The procedure for the costing in the case of jobs under service orders is practically the same as in the case of production job orders.

## 18.7 PREPARATION OF JOB COST SHEET / JOB ACCOUNT

The preparation of job cost sheet may be illustrated as follows:

### Illustration. 1

A factory uses job costing. The following cost data are obtained from its books for year ending on the 31st of December, 2001

	Rs.
Direct Material	60,000
Direct Wages	50,000
Factory Overhead	30,000
Administrative Overhead	28,000
Selling and Distribution Overhead	35,000
Profit	47,000

In 2002 the factory receives an order for a number of jobs. It is estimated that the materials required will amount to Rs. 80,000 and wages to Rs. 50,000 for executing the order. What should be the price for these jobs if the factory intends to earn profit on sales at a predetermined rate assuming that the selling and distribution overhead has gone up by 10 percent? The factory recovers the factory overhead as a percentage of direct wages and administration, and the selling and distribution overhead as percentage of works cost.

**Solution :**

For quoting the selling price for the jobs to be undertaken, it is necessary to ascertain first the relation between different element of cost incurred in 2001 for this purpose, the cost sheet has to be prepared on the following lines.

**Cost Sheet for 2001**

	Rs.	Rs.
Direct Mateial	60,000	
Direct Wages	<u>50,000</u>	
Prime Cost		1,10,000
Factory Overhead (60 percent of direct wages )		30,000
Works Cost		<u>1,40,000</u>
Administrative Overhead (20 percent of Works Cost)		28,000
Cost of Production		<u>1,68,000</u>
Selling and Distribution Overhead (25 percent of Works Cost)		35,000
Cost of Sales		<u>2,03,000</u>
Profit (18.8 percent on sales)		47,000
Selling Price		<u><u>2,50,000</u></u>

**Quotation for job order No ——— for 2002**

	Rs.	Rs.
Direct Material	80,000	
Direct Wages	<u>50,000</u>	
Prime Cost		1,30,000
Factory Overhead(60 percent of direct wages)		30,000
Work Cost		<u>1,60,000</u>
Administrative Overhead (20 percent of works cost)		32,000
Cost of Production		<u>1,92,000</u>
Selling and Distribution Overhead (25 % + 10% of 25%) of works Cost		44,000
Cost of Sales		<u>2,36,000</u>
Profit (18.8 percent on sales = 23.15 percent on cost sales)		54,640
Selling Price		<u><u>2,90,640</u></u>

**Illustration : 2** The information given below has been taken from the cost records of an engineering works in respect of Job No. 786:

Materials Rs : 4,010

Wages: Department 'A' - 60 hours @ Rs.3per hour

Department 'B' - 40 hours @ Rs. 2 per hour

Department 'c' - 20 hours @ Rs. 5 per hour

Overhead expenses are as follows :

Variable : Department 'A' -Rs. 5,000 for 5,000 labour hours

Department 'B' - Rs. 3,000 for 1,500 labour hours.

Department 'C' - Rs.2,000 for 500 labour

Fixed: Rs. 20,000 for 10,000 working hours.

Caluclate the cost of Job No. 786 and price for the job to give a profit of 25% on the selling price.

**Solution**

**Job Cost Sheet for Job No. 786**

Particulars		Amount (Rs.)
Materials Rs.		4,010
Wages :		
Dept: 'A'	60 hours @ Rs. 3=180	
Dept, 'B' :	40 hours @ Rs. 2=80	
Dept. 'C' :	20 hours @ Rs. 5=100	
		360
Overhead Expenses :		
Variable:	Dept 'A' : 5,000/5,000 x 60=60	
	Dept 'B' : 3,000/1,500 x 40=80	
	Dept 'C' : 2,000/500 x 20 = 80	
		220
Fixed: (60+ 40+20) = 120 hours @ Rs.2		
i.e.	20,000/10,000 x 120	240
Total Cost		4,830
Add : 25% Profit on Selling (4,830 x 25/75 Price)		1,610
Selling Price		6,440

**Illustration – 3** From the following particulars, prepare job accounts in the subsidiary books for the month of December, 2001 ;

i) Balances on the 1st of December, 2001:

	Rs.	Rs.
Materials	10,000	
Work-in-Progress:		
	Rs.	
Job No.200	8,000	
Job No.202	4,600	
Job No.205	2,400	<u>15,000</u>
Cost Ledger Control a/c		<u>25,000</u>

ii) Transactions during December, 2001 are :

		Rs.
Purchase of Materials		9,000
Contribution to E.S.I		9,900
Contribution to staff P.F.		1,300
Materials Issued:	Direct	7,000
	Indirect	1,000
Wages Paid :	Direct	34,000
	Indirect	10,000
Indirect Expenses		4,200
Now jobs taken up are :		
Nos. 206,207 and 208		

iii) An analysis of direct materials and direct wages showed the following allocations :

JobNo.	Direct Material	Direct Wages
	Rs	Rs.
200	-	4,000
202	400	6,000
205	1,200	8,000
206	2,000	7,000
207	18,000	5,000
208	1,600	4,000
	<u>7,000</u>	<u>34,000</u>

Materials returned to stores from job No. 206 amount to Rs. 100.

iv) The selling prices of the jobs completed during the period are as here under:

Job No.	Rs.
200	19,000
202	16,000
206	15,000

It is the policy of the factory to recover factory overhead at 50 per cent of direct wages. Ignore Administrative Overhead and Selling and Distribution Overhead.

**Solution**

Dr.	Job No. 200 A/c		Cr.
	Rs.		Rs.
To Balance b/d	8,000	By Cost of Sales	14,000
To Labour	4,000		
To Factory Overhead	2,000		
	<u>14,000</u>		<u>14,000</u>
To Cost of Sales	14,000	By Sales	19,000
To Profit	5,000		
	<u>19,000</u>		<u>19,000</u>

Dr.	Job No. 202 A/c		Cr.
	Rs.		Rs.
To Balance b/d	4,600	By Cost of Sales	14,000
To Materials	400		
To Labour	6,000		
To Factory Overhead	3,000		
	<u>14,000</u>		<u>14,000</u>
To Cost of Sales	14,000	By Sales	16,000
To Profit	2,000		
	<u>16,000</u>		<u>16,000</u>

Dr.	Job No. 205 A/c		Cr.
	Rs.		Rs.
To Balance b/d	2,400	By Balance c/d	15,600
To Materials	1,200		
To Labour	8,000		
To Factory Overhead	4,000		
	<u>15,600</u>		<u>15,600</u>

Dr.	Job No. 206 A/c		Cr.
	Rs.		Rs.
To Materials	2,000	By Returns	100
To Labour	7,000	By Cost of Sales	12,400
To Factory Overhead	3,500		
	<u>12,500</u>		<u>12,500</u>

To Cost of sales	12,400	By Sales	15,000
To Profit	2,600		
	<u>15,000</u>		<u>15,000</u>

Dr.	Job No. 207 A/c		Cr.
	Rs.		Rs.
To Materials	1,800	By Balance c/d	9,300
To Labour	5,000		
To Factory	2,500		
	<u>9,300</u>		<u>9,300</u>

Dr.	Job No. 208 A/c		Cr.
	Rs.		Rs.
To Materials	1,600	By Balance c/d	7,600
To Labour	4,000		
To Factory Overhead	2,000		
	<u>7,600</u>		<u>7,600</u>

#### Notes

i) Jobs completed:

Job No	Cost incurred	Rs.
	Rs.	Rs.
200	14,000	
202	14,000	
206	<u>12,400</u>	40,400

Credit to work-in Progress a/c : Rs.40,400

ii) Jobs to be completed :

Job No	Cost incurred	Rs.
	Rs.	Rs.
205	15,600	
207	9,300	
208	<u>7,600</u>	32,500

Balance in the Work-in -Progress a/c : Rs.32,500

### 18.8 ADVANTAGES AND DISADVANTAGES OF JOB COSTING

#### Advantages of Job Costing

The advantages of job order cost accounting are as here under:

- i) It provides a detailed analysis of the cost of materials, wages and overheads classified by functions, departments and nature of expenses, which enables the management to

determine the operating efficiency of different factors of production, production centres and functional units.

- ii) It enables the management to ascertain which job is more profitable than other, which is less profitable and which is incurring losses.
- iii) It provides a basis for estimating the cost of similar jobs taken up in future and thus help in future production planning.
- iv) Pre-determination of overhead rates in job costing necessitates the application of a system of budgetary control of overheads with all its advantages.
- v) Identification of spoilage and defectives with respective production orders and departments may enable the management to take effective steps in reducing these to the minimum.
- vi) The detailed cost records of the past period can be used for statistical purposes in the determination of cost trends of different types of jobs and their relative efficiencies.
- vii) Efficiency of operations can be controlled by comparing the actual costs against the estimates made while submitting the tender for jobs or giving quotations. In special cases (e.g., Government Contracts). The selling price is dependent upon the actual costs incurred. The producer is allowed a margin of profit (fixed or proportionate to costs) over and above the actual cost of production. These contracts are known as cost-plus contracts. Job costing provides accurate cost data for such purpose.

### **Disadvantages of Job Costing**

The disadvantages of job order cost accounting are as here under:

- i) It involves a great deal of clerical work in recording daily the cost of materials issued, wages expended and overheads chargeable to each job or work order. It adds to the cost of cost accounting and also increases the chances for the committing of errors.
- ii) Determination of overhead rates may involve budgeting of overhead expenses and the basis of overhead apportionment and absorption, but such budgeting is incomplete, since it is applied to material, labour expenses only. The advantages of budgeting are considerably reduced by doing so.
- iii) Job costing is based on historical costs. In historical costing, costs of a job or product are ascertained after it has been manufactured/ completed. Job costing does not facilitate control of cost unless it is used as per standard or estimated costing.
- iv) Job cost information can be quite useful for the estimation of future costs only after careful adjustment for variations likely to arise over time as well as for any difference in the size of order.

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## **18.9 BATCH COSTING**

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Batch costing is a modified method of job costing. Job costing refers to costing of Jobs that are executed against specific order whereas, in batch costing items are manufactured for stock. a finished product may revise different components for assembly and may be manufactured in economical batch lots. When orders are received from batches consisting of a predetermined quantity of each type of product. Batch costing method is adopted in such cases to calculate the cost of each such batch. Cost per unit is ascertained by dividing the total cost of a batch by number of items produced in that batch. This method of costing applied in pharmaceutical and Chemical Industries, where units are produced in batches.

Determination of the economic lot size is important in industries where batch costing is employed. The need for determining economic lot size arises as (i) every time a component/product is to be made, setting-up of the tools is involved. Because of this some loss in production time will be there. Therefore, maximum number of units are produced once the machine is set in order to reduce the cost per unit.

ii) such large production at one run will lead to accumulation of inventory and the costs related thereto.

iii) Thus, there is a quantity for which reduced cost of production is just offset by, Costs of carrying the quantity in inventory. The determination of most economical batch quantity requires consideration of many related factors of costs and economies. The following factors influence the decision in this respect :

- a) Set-up cost
- b) Manufacturing cost
- c) Interest on capital
- d) Storage cost and
- e) Rate of consumption

The formula to be used for calculation of economic lot size is

$$E.B.Q = \sqrt{\frac{2As}{C}}$$

where, E.B.Q = Economic Batch Quantity

A = Annual Requirement in units

S = Setting-up Costs

C = Carrying Cost per unit of Production P.A.

Illustration: 4 Compute the economic batch quantity for a company using batch with the following information.

Annual demand for the component =	2000 units
Set-up cost per batch	Rs.120
Annual Rate of Interest	6 %
Cost of manufacture per unit	Rs.6

Solution:  $E.B.Q = \sqrt{\frac{2As}{C}}$

where, A = 2000 units

S = Rs.120

C = 6% of Rs. 6

$$E.B.Q = \sqrt{2 \times 2000 \times 120 / 0.36} = 1,155 \text{ Units.}$$

### Illustration :5

Annual demand	=	40,000 units
Setting up Cost	=	Rs, 100 per unit
Interest	=	@ 10% p.a.
Cost of storage per unit	=	50 paise
Cost of manufacturing	=	Rs.30 per unit.

### Solution :

$$E.B.Q = \sqrt{\frac{2As}{C}}$$

where, A= 40,000 units

S= Rs, 100

C = (10% of Rs.30) + 0.50

$$E B Q = \sqrt{2 \times 40,000 \times 100 / 3.50} = 1,512 \text{ Units.}$$

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## 18.10 SUMMING - UP

Job costing is a system of costing in which the elements of costs are accumulated separately for each job or work order undertaken. The primary purpose of job costing is to bring together all the costs incurred for completing a job. The method of costing is applied to those industries which produce / prepare goods against the order of customers but not for stock. Goods are produced and supplied as per the specifications an each job in distinctive and differ from one another and needs special treatment. Batch costing is a method of aggregating the costs by batches or runs or production, where the cost of production is accumulated per batch separately and the unit cost arrived at by dividing the total cost by the number of units produced in each batch. The economical lot size is determined by taking into account, the setting, - up cost, manufacturing cost, interest on capital, storage cost and rate of consumption.

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## 18.11 CHECK YOUR PROGRESS MODEL ANSWERS

1. I. Job Costing method is applied to those industries which possess the following features :
- The production is always against the customers order and not for stock.
  - each job has its own characteristics and differ from others and needs special treatment.
  - There is no uniformity in the flow of production from deparment to départment.
  - The work in progress differs from period to period according to the number of jobs on hand.

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## 18.12 MODEL EXAMINATION QUESTIONS

- A. Answer the following in about 30 lines each.
1. Define job costing, what are its features and the industries to which it is applicable?
  2. How are the costs accounted for in job costing? State the advantages and limitations of job costing.

**B. Answer the following in a bout 15 lines each.**

1. Distinguish between unit costing and job costing.
2. How is work-in-progress accounted for in job costing.
3. What is batch costing and state the industries to which it is applied?

**EXERCISES**

1. Submit Quotation for a job which requires direct material cost of Rs. 20,000, direct labours Rs. 25,000 and direct factory expenses Rs. 5,000

The job passes through three machines:

Machine 'X' for 10 hours, Machine 'Y' for 20 hours and Machine 'Z' for 5 hours. The Machine Hous Rate for the three machines is Rs. 50 ,Rs.60 and Rs. 100 per hour respectively. Office Overheads are 20% of Prime Cost, Selling Overheds are 10% of Cost of Production. The Production intends to earn a profit of 20 % on the Quotation Price. Prepare a Job Cost Sheet

( Ans : Quotation price= Rs. 85,525)

2. The following in formation is extracted from Job ledger in respect of Job No. 2850

Materials = Rs. 3,400

Wages @ Rs. 2=50 for 80 hours

Variable Overheads incurred for all jobs Rs. 5,000 for 4,000 labour hours.

Find the profit if the job is billed for Rs. 4,200

(Ans: Profit Rs. 500).

3. From the following particulars , draw up a job cost sheet for job No.XYZ .

Materials Rs. 14.00

Direct wages - 30 hours at  
40 paise each 12.00

Department A - 10 hours

B- 8 hours

C- 12 hours

Prime Cost 26.00

Plus 25% on Prime Cost ~~6.50~~

32.50

An analysis of the previous year's profit and loss account shows the following:

- i) Materials used Rs. 80,000
- ii) Direct wages  
Department A 10,000  
B 5,000  
C 8,000
- iii) Factory overheads  
A 3,000  
B 4,000  
C 3,000
- 44 iv) Selling costs 50,000

4. Ambica Co., Ltd., has calculated the selling price of their product as follows :

	Rs.	Rs.
Materials	24,000	
Direct Wages:	20 hour at	
Rs. 2.00 per hour	40.00	
Department 1	1-10 hours	
"    2	6 hours	
"    3	4 hours	
Prime Cost	64.00	
Plus 50% on Prime cost	<u>22.00</u>	86.00

An analysis of the previous year 's Profit and Account shows the following :

	Rs.
i) Materials	35,000
ii) Direct Wages	
Department 1	10,000
"    2	12,000
"    3	8,000
iii) Factory Overhead	
Department 1	5,000
"    2	3,000
"    3	3,000
iv) Selling and Distribution overheads :	12,200

You are required to (a) draw up a job cost sheet ; (b) calculate and enter the revised cost using the previous years' s figures as basis and (c) add to the total job cost 10% for profit and give the final selling price,

5. The following information for the year ending on December 31 ,2001 is obtained from the books and records of X co. :

	Completed Jobs	Work-in- progress
	Rs.	Rs,
<b>Raw Materials supplied :</b>		
From stores	90,000	30,000
Wages	1,00,000	40,000
Chargeable expenses	10,000	4,000
Material transferred to		
Work-in-progress	2,000	2,000
Material returned to stores	1,000	-

Factory overhead is 80 percent of wages and office overhead is 25 percent of factory cost.

The value of the executed jobs during 2001 was Rs. 4,10,000. Prepare (i) Consolidated completed job account showing the profit made or loss incurred on the jobs and also (ii) Consolidated work-in-progress

6. Compute the E.B.Q. for a company using Batch Costing from the following data.

Annual demand for Components = 6,400 units

Setting up and order processing cost = Rs,100

Cost of manufacturing one unit = Rs. 40

Rate of interest per annum = 20%

(Ans: E B Q: 400 units)

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### 18.13 RECOMMENDED BOOKS

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- |    |                               |   |
|----|-------------------------------|---|
| 1. | H.J. Wheldon                  | Cost Accounting and Costing Methods.        |
| 2. | Blocker & Weltner             | Cost Accounting                             |
| 3. | S.P. Jain & K.L. Narang       | Advanced Cost Accounting.                   |
| 4. | B.K. Bhar                     | Cost Accounting Methods and Problems.       |
| 5. | B.M. Lall Nigam & G.L. Sharma | Cost Accounting Principles and Application. |
| 6. | PT Pattan Shetty & DR Palekar | Cost Accounting: A Basic Approach           |
| 7. | D.K. Mittal & Luv Mittal :    | Cost Accounting.                            |
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### 18.14 GLOSSARY

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- |                          |   |   |
|--------------------------|---|---|
| <b>Job Cost Sheet</b>    | : | Cost sheet showing the total cost of a job.   |
| <b>Job- Ticket</b>       | : | Intended to show the progress of work done on the job.                                  |
| <b>Non-standard Jobs</b> | : | Jobs involving work which offers from one job to another.                               |
| <b>Progress Index</b>    | : | A report stating the stage of work completed in respect of job and awaiting inspection. |
| <b>Batch Costing</b>     | : | Batch Costing is a method of costing used to calculate the cost of each batch.          |

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## UNIT - 19 : CONTRACT COSTING

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- 19.0 Aims and Objectives
- 19.1 Introduction
- 19.2 Salient Features of Contract Costing
- 19.3 Contract Accounting
- 19.4 Cost and Profit on a Contract
- 19.5 Profit on Incomplete Contracts
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### 19.0 AIMS AND OBJECTIVES

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This unit aims at explaining the main features of contract costing, the procedure for accounting of costs on contracts and the method of computing profit on incomplete contracts.

Once you complete this unit, you will be able to:

- \* Identify the salient features of contract costing
- \* Prepare contract account,
- \* Compute profit on incomplete contracts.

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### 19.1 INTRODUCTION

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Contract costing is a form of specific-order costing. It is similar to job costing where the unit of cost is a single contract. A contract may be described as an agreement whereby one person called the Contractor, who undertakes to carry out a work according to the specific requirements of a customer called the Contractee. The consideration (the amount agreed to be paid by the contractee) for the contract is called the Contract Price. This method of contract costing is adopted by firms engaged in construction work like the construction of roads, bridges, buildings, etc. It could also be used/ adopted where production is discontinuous and the output heterogeneous like ship building, motion pictures and manufacture of specialised electrical and mechanical equipment. Contract costing is also called Terminal Costing because it relates to works which are definitely terminable.

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### 19.2 SALIENT FEATURES OF CONTRACT COSTING

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The following are the salient features of contract costing:

**Materials:** Materials used for a contract may be either drawn from the stores or purchased specifically from outside for that particular contract. Materials purchased directly or supplied

from the stores are charged direct to that contract a/c. Sometimes materials are transferred from one contract to another. The contract receiving the materials is debited and the contract giving the materials is credited. If any materials are returned from the contract site to the stores or supplied, they will be credited to that contract account. If any surplus material is sold, the amount received is credited to the contract account and the profit or loss on account of sale is transferred to the Profit and Loss Account. Sometimes the contractee may supply certain materials from his own stock to be utilised for the contract. Such materials should not be debited to the contract account. Materials unused at the end of the contract will be credited to the contract account.

**Labour :** All labour engaged at the contract site should be treated as direct labour and charged direct to the contract concerned. Wherever possible, a separate wage sheet should be prepared for each contract. The labour which cannot be charged directly to the contract is booked as indirect labour.

**Direct Expenses :** All expenses other than cost of material and wages are charged direct to the individual contracts as and when they are incurred.

**Overhead Expenses :** These are the expenses which cannot be directly charged to contracts. They are distributed on several contracts on some equitable basis.

Accrued expenses, both direct, and indirect also to be charged to the concerned contract account and as outstanding expenses on the liability side of the Balance Sheet.

**Plant :** There are different methods in use for charging contracts for the use of plant, tools and machinery.

The cost of plant and machinery issued to a contract is charged to the particular contract. After completion of the contracts the residual book value of the plant and machinery is credited to the contract account. If a plant is transferred from one contract to another or is transferred to the store, the plant so transferred or sold is to be valued and credit given to the contract concerned.

Another method of charging plant costs to contracts is on the basis of hourly rates determined for each plant. The rate is calculated by dividing the operating expenses of the plant (including depreciation) by the total estimated working hours of the plant. A contract is charged according to the hours of plant-time utilised by the contract.

If a plant specifically purchased for a contract is sold, the sale value is credited to the contract account concerned, the profit or loss on sale being credited to the Profit and Loss a/c.

If a contract is not completed by the end of the accounting period, the plant and machinery should be valued and credited to the contract account to find out the cost of the contract on date.

When plant is hired for use in the contract, the hire charges (rent) are debited to the contract account.

**Sub-Contract :** When a part of the work undertaken by a contractor is given to another contractor, sub-contracting arises. Sub-contracting takes place when it is not possible for the main contractor to carry out specialised types of jobs or when it is profitable to get the work done through sub-contracting. It may also arise when the main contractor considers that it would speed up the completion of work by sub-contracting a portion of the contract. The payment made for the sub-contract is taken as a direct charge to the concerned contract.

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### 19.3 CONTRACT ACCOUNT

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In Contract Costing each contract is considered a cost unit and is allotted a distinguishing number. A separate contract account is maintained for each contract in the General or Contract Ledger. The specimen copy of which is given on the next page.

Specimen Contract Account		Contract Account for the year ended.....	
Dr.		Cr.	
	Rs.		Rs.
To Materials sent to site	xxx	By Materials returned to stores	xxx
“ Wages Paid      xxx		“ Meterials transferred to other	
“ (+) Outstanding   xxx	xxx	contracts	xxx
“ Direct expenses	xxx	“ Closing stock of Material	xxx
“Architects fees	xxx		
“ Establishment charges	xxx	“ Work-in -Progress :	
“ Depreciation on plant	xxx	Work Certified	xxx
“ Notional Profit c/d	xxx	Work not yet Certified	xxx
	xxx		xxx
To Profit & Loss Account	xxx	By Notional Profit b/d	xxx
“ Work -in-Progress(Reserve)	xxx		
	xxx		xxx

#### 19.4 COST AND PROFIT ON A CONTRACT

A contractor undertakes to execute the contract on the basis of the agreed contract price. This price is payable either in lumpsum after the completion of the contract or in instalments according to the progress of the work done. In case of a small contract which can be completed during the accounting period the contract price is credited to the contract account, and profit or loss (being the difference between the two sides of the account) is ascertained. However, in case of contracts running for long periods of time, the contractor having spent his resources on executing the contract cannot wait until the completion of the contract to receive the contract price. In such cases a provision is usually made for a payment of contract price in instalments from time to time based upon the satisfactory progress of the work. These instalments will be paid on the basis of a certificate issued by the architect, surveyour or engineer as regards the value of the work done. The value of work done as certified by the contractor or his architect is known as certified work or work certified. However, in many cases the whole amount of the certified work will not be paid immediately but a percentage thereof will be retained by the contractee until some time after the certification. Such sums retained by the contractee is called retention money. The object of the retention money is to safeguard the interests of the contractee in case the work is faulty or penalties become payable on account of late completion of the contract. etc.

If the work done has not been certified, the contractee would not make any advance on it. Such work which has been done but not certified is called 'work uncertified.' work certified and work uncertified will appear on the credit side of the contract account as work-in-progress.

One of the following methods may be adopted for certified work and cash received against it :

- (i) With the value of certified work the contractee account is debited and the concerned contract account is credited. The cash account is debited and the contractee account credited with the amount of cash received.

(ii) With the amount of cash received the contractee's account is debited; a new account, 'Retention Money Account.' is debited with the amount retained by the contractee and the contract account concerned is credited with the value of certified works.

(iii) The contract account is credited with the value of certified work. Whenever any amount is received from the contractee the cash account is debited and the contractee's account is credited until the contract is completed. The amounts received from the contractee are shown as advance payments and are deducted from the work-in progress item in the Balance Sheet when the contract is completed, the contractee's account is debited with the contract price and the contract account is credited.

## 19.5 PROFIT ON INCOMPLETE CONTRACTS

If a contract has been started and completed in the same financial accounting period, there is no problem in calculating its operation results. But large contracts take number of years to complete. Therefore, their costs can be found only when they are completed. If a contract is incomplete, a portion of the contract price (i.e., the retention money) may be still outstanding from the contractee with the result, that is not possible to know the profit or loss till the contract is completed and the full contract price paid. Strictly speaking, profit or loss on contracts should be brought into account only when the contracts are complete. But this procedure leads to considerable fluctuations in the yearly profits of the contractor. Therefore, it is desirable to take into account a reasonable proportion of the estimated profit on incompleting contracts. The method of estimation of profit on incomplete contracts largely depends upon the stage of completion of the contract at the end of the accounting year. Some of the methods followed are as here under :

(a) For contracts which have been only just commenced with the result that only a very small portion of the work is completed, no profit need be taken since it would be too early to estimate any profit with any reasonable degree of accuracy.

(b) For contracts which have progressed sufficiently profit estimation is done as under Firstly, the notional profit of the contract is ascertained. The notional profit is ascertained by deducting the cost of the work certified from the value of work certified. The cost of work certified is found by deducting the cost of uncertified work from the total cost of work done. Only a portion of the notional profit is taken to the Profit and Loss account, the balance being carried forward as a provision against future losses, increase in costs and other contingencies. Conventionally, 1/3 of the notional profit is taken if the work is more than 1/4 completed but less than half; and 2/3 of the notional profit is taken if only half or more than half of the work is completed. To be more cautious, this profit (1/3 or 2/3 of Notional Profit) is further reduced in the ratio of the cash received to the value of work certified, if the cash paid is less than the value of the work certified.

(c) For contracts which are almost complete, profit is ascertained by deducting the total cost of contract (total cost to-date plus additional expenditure estimated to complete the contract) from the contract price. A portion of the estimated profit is credited to the Profit and Loss Account.

Generally, the amount of profit to be credited to the Profit and Loss Account is ascertained by using any of the following formulae :

$$a) \text{ Estimated Profit } \times \frac{\text{Work Certified}}{\text{Contract Price}}$$

$$b) \text{ Estimated Profit } \times \frac{\text{Work Certified}}{\text{Contract Price}} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

- c) Estimated Profit  $\times \frac{\text{Cost of Work to - Date}}{\text{Estimated Total Cost}}$
- d) Estimated Profit  $\times \frac{\text{Cost of Work to - Date}}{\text{Estimated Total Cost}} \times \frac{\text{Cash Received}}{\text{Work Certified}}$

### Work-in-progress

Incomplete contract is also called work-in-progress. The expenditure incurred on incompleting contracts should be shown on the assets side of the Balance Sheet under the heading, work-in-progress. If any profit is taken in respect of the incompleting contract, the work-in-progress should include such profit also. Valuation of work-in-progress may be done by adopting one of the two following bases :

i) Value of work-in-progress = Cost of work certified plus Cost of uncertified work plus Profit transferred to the Profit and Loss Account.

ii) Value of work-in-progress = Value of work certified plus Cost of uncertified work minus Portion of the estimated profit not transferred to the Profit and Loss Account (i.e., Profit in reserve)

### Illustration : 1

The following particulars relate to a contract which began on 1-1-2002

	Rs.		Rs.
Contract Price	5,00,000	Materials returned	1,600
Plant	30,000	Materials on hand 31-12-2002	3,700
Materials 22,000	1,70,600	Plant on hand 31-12-2002	
Wages	1,54,130		
Overheads	14,570	Value of work certified	3,90,000
Uncertified work	9,000	Cash received	3,51,000

Prepare the contract account and show the value of work-in-progress as it would appear in the Balance Sheet at the end of the year.

### Solution

Dr.	Contract Account		Cr.
	Rs.		Rs.
To Materials	1,70,600	By Materials returned	1,600
" Wages	1,54,130	" Materials at the end	3,700
" Plant	30,000	" Plant at the end	22,000
" Overheads	14,570	" W-I-P a/c :	
" Notional Profit c/d	57,000	– Certified work value	3,90,000
		– Cost of uncertified work	9,000
	<u>4,26,300</u>		<u>4,26,300</u>
To Profit & Loss a/c	34,200*	By Notional Profit b/d	57,000
" W-I- P a/c (Reserve)	22,800		
	<u>57,000</u>		<u>57,000</u>

$$* 57,000 \times \frac{2}{3} \times \frac{3,51,000}{3,90,000} = \text{Rs. } 34,200$$

## Value of Work-in-Progress

I. Method: W.I.P. = Cost of certified work and uncertified work plus profit transferred to Profit & Loss a/c

$$1,70,600 + 1,54,130 + 30,000 + 14,570 (1,600 + 3,700 + 22,000) + 34,200$$

$$= 3,69,200 - 27,300 + 34,200$$

$$= \text{Rs. } 3,76,200$$

II. Method : W.I.P. = value of certified work plus cost of uncertified work minus profit in reserve :

	Rs.
Value of certified work	3,90,000
Cost of uncertified work	9,000
	3,99,000
(-) Profit in reserve	22,800
	3,76,200

Cash received on account of incomplete contract should be shown in the Balance Sheet as a deduction from the work- in-progress. The Work-in-Progress account may appear as follows :

Dr.	Work -in-Progress Account	Cr.
	Rs.	Rs.
To Contract a/c:		By contract a/c (reserve) 22,800
Certified work(value)	3,90,000	By Balance c/d 3,76,200
Uncertified work(cost)	9,000	
	3,99,000	3,99,000

## Escalation Clause

This is one of the conditions usually incorporated in the contract agreement to safeguard the contractor against any likely changes in prices or utilisation of materials and labour .This clause is particularly necessary where the prices of certain materials fluctuate frequently where changes in wages rates or labour time or quantity of material required cannot be properly estimated, This clause enables the contractor to claim a higher contract price in case the price of material , labour ,etc., increase beyond a specified point. There may also be a De-escalation or Reverse Clause to provide for any future decrease in price to benefit the contractee.

### Check your progress \_ 1

1. From the following information suggest the amount of profit that may be taken on contract A. to P & L A/c. which has been completed nearly 70% :

	Rs.
Total cost of the contract to date	3,83,000
Cost of contract not yet certified	23,000
Value of contract certified	4,20,000
Cash received to date	3,78,000

## 19.6 COST - PLUS CONTRACTS

The Cost-plus contract is a contract in which the price of the contract is determined by adding a stipulated profit to the cost of the contract. These contracts are used where the probable cost of the contract cannot be estimated with a reasonable degree of accuracy at the time of undertaking the work. In the cases where the work spreads over a long period of time and where prices of material labour, etc., are liable to fluctuate the cost-plus contracts prove advantageous for both the contractor and the contractee. These contracts protect the contractor from the risk of incurring loss on the contract, because all costs incurred, are recovered. They provide protection through the escalation clause, the work of offering tenders and quotations is simplified for him. The contractee can know, how much he is paying for the costs and how much is profit to the contractor. Purchase risks are eliminated so far as the purchase price is concerned.

There are certain disadvantages of Cost-plus contracts. There is no encouragement for efficiency on the part of the contractor. The customer cannot know the final price to be paid by him until the whole work is completed. For the inefficiency of the contractor he has not only to bear a high cost but also to pay correspondingly higher profits. The cost-plus control system is used in case of Government contracts (PWD Works), and other works where the contract period cannot be estimated with a reasonable degree of accuracy.

### Illustration - 2

The following was the expenditure on a contract for Rs. 6,00,000 which commenced in January, 2002

	Rs.
Materials	1,20,000
Wages	1,64,000
Plant	20,000
Overheads	8,600

Cash received on account of the contract to the 31st of December, 2002 was Rs. 2,40,000 being 80% of the work certified. The value of the material in hand was Rs. 10,000 the plant had undergone 20% depreciation,

Prepare the Contract Account.

Solution :

Dr.	Contract Account		Cr.
	Rs.		Rs.
To Materials	1,20,000	By Materials on hand	10,000
" Wages	1,64,000	By Plant on hand	
" Plant	20,000	(20,000 - 20%)	16,000
" Overheads	8,600	" Work-in Progress :	
" Notional Profit c/d	13,400	Certified work	3,00,000
	<u>3,26,000</u>		<u>3,26,000</u>

To Profit & Loss a/c	7,147	By Notional Profit b/d	13,400
" Reserve transferred to W-I-P a/c	<u>6,253</u>		<u>13,400</u>
	<u>13,400</u>		<u>13,400</u>

Cash received = Rs. 2,40,000 = 80% work certified.

work certified = Rs. 2,40,000 x 100/80 = Rs. 3,00,000

Profit that is taken to P&L. A/c =

Notional Profit x 2/3 x Cash received / Work certified

= 13,400 x 2/3 x 80/100 = Rs. 7,147.

### Illustration : 3

A Contractor undertook a contract for Rs. 2,50,000, The following is the information concerning the contract during the year 2002 :

	Rs.
Materials sent to site	85,349
Labour engaged on site	74,375
Plant installed at site (cost)	15,000
Direct expenses	3,167
Establishment charges	4,126
Materials returned to Stores	549
Works certified	1,95,000
Cost of work not certified	4,500
Materials at site on 31-12-2002	1,883
Wages accrued on 31-12-2002	2,640
Value of plant on 31-12-2002	11,000
Cash received from contractee	1,80,000

Prepare the contract account and the contractee account and show-how-the work -in-progress will appear in the Balance Sheet of the contractor on 31-12-2002.

### Solution :

Dr.	Contract Account for the year ended 31-12-2002		Cr.
	Rs.		Rs.
To Materials	85,349	By Materials returned	549
" Labour	74,375	By Materials on hand	1,883
" Direct expenses	3,167	By Plant on hand	11,000
" Plant	15,000	By Work-in-Progress a/c	
" Establishment charges	4,126	- Certified work	1,95,000
" Wages accrued	2,640	- Uncertified work	4,500
" Notional Profit c/d	28,275		
	<u>2,12,932</u>		<u>2,12,932</u>

To Profit & Loss a/c	17,400	By Notional Profit b/d	28,275
" Reserve transfer to " W-I-P a/c	10,875		
	<u>28,275</u>		<u>28,275</u>

Profit to be taken to P & L A/c =  $28,275 \times \frac{2}{3} = 1,80,000 / 1,95,000 \text{ Rs.} = 17,400$

Dr.	Contractee's Account		Cr.
	Rs.		Rs.
Dec. 31 To Bal.c/d	1,80,000	Dec. 31	
		By Bank	1,80,000
	<u>1,80,000</u>		<u>1,80,000</u>

**Balance Sheet as on 31-12-2002**

<u>Liabilities</u>	Rs.	<u>Assets</u>	Rs.	Rs.
Profit & Loss a/c	17,400	Plant	15,000	
Outstanding wages	2,640	(-) Dep.	<u>4,000</u>	11,000
		Materials on hand		1,883
		Work -in-Progress:		
		Certified work	1,95,000	
		Uncertified work	<u>4,500</u>	
			1,99,500	
		(-) Reserve	<u>10,875</u>	
			1,88,625	
		(-) Cash received	<u>1,80,000</u>	8,625

**Illustration : 4**

The following data is extracted from the books of M/s. Aswani Constructions Ltd., for the year ended 31st March, 2002, relating to the construction of a residential building "BHARANI". The contract work was commenced on 1st April, 2001 and the contract price is Rs. 20,00,000.

Material purchased	.....	2,40,000
Material transferred from other sites	....	30,000
Wages paid during the year	.....	4,80,000
Wages accrued	.....	20,000
Administrative expenses	.....	1,40,000
Machinery purchased	.....	1,60,000

A supervisor with a monthly salary of Rs. 16,000 has spent half of his time on this contract. Materials lying on the site as on 31st March, 2002 were worth Rs. 28,000. Machinery purchased was used for this contract for 73 days, The estimated life of the machine is 5 years and its scrap value is Rs. 10,000. By the end of the year, Rs. 13,35,000 worth of the contract was completed. However, work certified was of the value of Rs. 10,00,000 and Rs. 9,00,000 has been received on account. prepare the contract account for the year ended 31st March, 2002.

**SOLUTION :**

**In the Contract Ledger of M/s. Aswini Constructions Ltd.,**

Dr.	BHARANI Building Contract Account		Cr.
	Rs.		Rs.
To Material purchased	2,40,000	By Material at site	28,000
To Material from other sites	30,000	By Plant (after depreciation)	
To Wages	4,80,000	(Rs. 160,000-10000/5 x 73/365) =	1,54,000
To Wages accrued	20,000	By Work-in-Progress :	
To Administrative expenses	1,40,000	– Work certified	10,00,000
To Machinery	1,60,000	– Work uncertified	3,35,000
To Supervisor Salary (50% of 16,000x12)	96,000		
To Notional Profit c/d	3,51,000		
	<u>15,17,000</u>		<u>15,17,000</u>
To P&L a/c	2,10,600	By Notional Profit b/d	3,51,000
To Reserve a/c	1,40,400		
	<u>3,51,000</u>		<u>3,51,000</u>

Profit transferred to the P & L Account is ascertained as follows :

Notional Profit x 2/3 x Cash received / Work certified

**Illustration : 5**

M/s. Shravani Constructions Co., undertook a contract for the construction of a building on 1st April, 2001 at a contract price of Rs. 25,00,000. The following details are collected from the books of the company for the year ended 31 st March, 2002 :

	Rs.
Materials purchased	4,00,000
Materials issued from stores	50,000
Wages paid	1,50,000
Plant installed at site	2,00,000
Direct expenses	1,00,000
Establishment charges	25,000
Cash received from the contractee (being 80% of work certified)	10,00,000

Cost of work done but not certified	.....	2,50,000
Materials returned to stores	.....	25,000
Materials at site(31-3-2002)	.....	10,000
Value of plant(31-3-2002)	.....	1,50,000
Wages outstanding	.....	30,000
Ditect expenses outstanding	.....	40,000

Prepare contract account.

**SOLUTION :**

**In the Contract Ledger of M/s .Shravani Construction Co.**

Dr.	Contract Account for the year ended 31-3-2002		Cr.
	Rs.		
To Material purchased	4,00,000	By Work certified	12,50,000
" Material issued from stores	50,000	" Work uncertified	2,50,000
" Wages paid 1,50,000		" Material returned to stores	25,000
+ Outstanding 30,000	1,80,000	" Material at site	10,000
" Direct exp. 1,00,000		"Value of plant at site	1,50,000
+ Outstanding 40,000	1,40,000		
" Plant purchased	2,00,000		
" Establishment expenses	25,000		
" Notional profit c/d	6,90,000		
	<u>16,85,000</u>		<u>16,85,000</u>
To P&L a/c	3,68,000	By Notional Profit b/d	6,90,000
" Reserve a/c	3,22,000		
	<u>6,90,000</u>		<u>6,90,000</u>

Since more than half of the work relating to the contract is completed, it is reasonable to carry a profit of Rs. 3,68,000 to the P&L a/c for the year ended 31st March, 2002, which is calculated as follows :

$$\begin{aligned} & \text{Notional Profit} \times \frac{2}{3} \times \text{Cash received/Work certified} \\ = & 6,90,000 \times \frac{2}{3} \times \frac{80}{100} = \text{Rs. } 3,68,000 \end{aligned}$$

**Illustration : 6**

The following information is extracted from the books of M/s Visakha constructions Ltd., in respect of REVATHI Building Contract, for the year ended 31st March, 2002 .The contract price is Rs. 60,00,000 and the work commenced from 1st April, 2001 .

	Rs.
Material issued	..... 11,25,000
Wages paid	..... 16,50,000
Plant purchased and installed (1-10-2001)	3,00,000

General expenses	.....	60,000
Work certified	.....	30,00,000
Work done but not certified	.....	90,000
Wages outstanding (31-3-2002)	.....	60,000
Material at site (31-3-2002)	.....	60,000
Cash received during the year(75% of the value of work certified )		22,50,000
Material transferred to other contracts		60,000
Material received from other contracts		15,000

Depreciate plant at 10 percent per annum.

Prepare the Contract Account and find out how much of the profit can be transferred to the Profit and Loss account.

**SOLUTION :**

**In the Contract Ledger of M/s. Visakha Constructions Ltd.,**

Dr. Revathi Building Contract Account for the year ended 31-3-2002 Cr.

	Rs.		Rs.
To Material issued	11,25,000	By Work Certified	30,00,000
" Materials from other contracts	15,000	" Work Uncertified	90,000
" Wages paid 16,50,000		" Materials at site	60,000
+ Outstanding <u>60,000</u>	17,10,000	" Material transfered to other contracts	60,000
" Plant	3,00,000	"Plant at site	2,85,000
" General expenses	60,000		
" Notional Profit c/d	2,85,000		
	<u>34,95,000</u>		<u>34,95,000</u>
To P&L a/c	1,42,500	By Notional Profit b/d	2,85,000
" Reserve a/c	1,42,500		
	<u>2,85,000</u>		<u>2,85,000</u>

Note : Since more than half of the contract is completed, it is reasonable to carry 2/3 of the Notional Profit which cash received bears to value of work Certified, to the Profit and Loss Account. It is ascertained as follows :

$$\begin{aligned} & \text{Notional Profit} \times \frac{2}{3} \text{ Cash received/ Work certified} = \\ & = 2,85,000 \times \frac{2}{3} \frac{75}{100} = \text{Rs. } 1,42,500. \end{aligned}$$

**Illustration : 7**

(6) M/s. Anuradha Builders undertook a contract on 1st april, 2001 for Rs. 30,00,000. The following are the data collected from the books of the builders for the year ended 31st March, 2002:

	Rs.
Value of the work certified by architect	1,45,000
Cash received from the contractee	19,50,000
Materials sent to contract site	9,67,000
Wages paid	8,22,000
Plant installed at site	1,69,500
Cost of work done but not certified	51,000
Establishment charges	48,750
Direct expenditure	36,000
Outstanding wages(31-3-2002)	27,000
Material at site(31-3-2002)	21,000
Materials returned to stores	6,000
Direct expenses outstanding	3,000
Value of plant(31-3-2002)	1,23,000

Prepare the Contract Account for the year ended 31-3-2002, showing the profit to be credited to the Profit and Loss Account of that year.

**SOLUTION :**

**In the Contract Ledger of M/s .Anuradha Builders**

Dr.	Contract Account for the year ended 31-3-2002		Cr.
	Rs.		Rs.
To Materials sent to site	9,67,500	By Value of work certified	21,45,000
“ Wages paid	8,22,000	“ Work uncertified	51,000
“ Wages outstanding	27,000	“ Plant at site	1,23,000
“ Direct expenses	36,000	“ Material at site	21,000
“ Establishment charges	48,750	“ Material returned to stores	6,000
“ Plant installed	1,69,500		
“ Direct expenses accrued	3,000		
“ Notional Profit c/d	2,72,250		
	23,46,000		23,46,000
To P&L a/c	1,65,000	By Notional profit b/d	2,72,250
“ Reserve a/c	1,07,250		
	2,72,250		2,72,250

As more than 50 percent of the contract is completed ,it is reasonable to carry 2/3 of Notional Profit which cash received bears to work certified, to the Profit and Loss Account. It is ascertained as follows :

$$\text{Notional profit } \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}} =$$

$$= 2,72,250 \times \frac{2}{3} \times \frac{19,50,000}{21,45,000} = \text{Rs. } 1,65,000.$$

**Illustration : 8**

(7) The following information relates to a Contract in 2002:

	Rs.
Materials sent to site	1,70,698
Labour	1,48,750
Plant	30,000
Direct expenses	6,334
Establishment charges	8,252
Materials returned to stores	1,098
Work certified	3,90,000
Work uncertified	9,000
Materials at site (31-12-2002)	3,766
Wages accrued(31-12-2002)	4,800
Direct expenses accrued(31-12-2002)	480
Value of plant (31-12-2002)	22,000

The contract price was Rs. 5,00,000 and cash received from the contractee was 80% of the value of work certified. Prepare the contract account and the contractee account.

**Solution**

Dr.	Contract Account 2002		Cr.
	Rs.		Rs.
To Materials	1,70,698	By Materials returned	1,098
“ Labour	1,48,750	“ Materials at site(31-12-90)	3,766
“ Plant	30,000	“ Plant at site 31-12-1990	22,000
“ Direct expenses	6,334	“ Work-in Progress A/c :	
“ Establishment charges	8,252	– Certified work	3,90,000
“ Wages accrued	4,800	– Uncertified work	9,000
“ Direct expenses accrued	480		
“ Notional Profit c/d	56,550		
	4,25,864		4,25,864
To P&L A/c.		By Notional Profit b/d	56,550
56,550 X 2/3 X 80 / 100=	30,160		
“ W-I-P A/c (Reserve)	26,390		
	56,550		56,550
Dr.	Contractee's Account		Cr.
	Rs.		Rs.
To Balance c/d	3,12,000	By Bank a/c	3,12,000
	3,12,000		3,12,000

**Illustration : 9**

(8) X Ltd. undertook a contract for Rs. 1,50,000 on the 1st of January, 2002

Of the plant and materials charged to the contract, the plant which cost Rs. 1,500 and the materials which cost Rs. 1,200 were lost. On the 31st December, 2002 the plant which Rs. 1,500 was returned to the stores and materials consting Rs. 1,200 were on site. The cost of work done but not certified was Rs. 600.

Charge 10% deprection on plant. Reserve 1/3 of the profit and prepare the contract account, W.I.P a/c and the Balance Sheet as on the 31 st December, 2002 form the following Trial Balance.

	Rs.	Rs.
Share capital		36,000
Creditors		3,000
Cash received on contract (80% of work certified)		60,000
Land and Buildings	12,900	
Bank	7,500	
Charged to contract :		
Materials	27,000	
Plant	7,500	
Wages	42,000	
Expenses	2,100	
	<u>99,000</u>	<u>99,000</u>

**Solution**

Dr.	Contract Account for 2002		Cr.
	Rs.		Rs.
To Materials	27,000	By P&L a/c :	
" Wages	4,000	- Loss of plant	1,500
" Plant	7,500	- Loss Materials	<u>1,200</u>
" Expenses	2,100	" Plant returned	
		(1,500 less 10% dep.)	1,350
" Notional Profit c/d	6,300	" Materials at site	1,200
		" Plant on hand	
		(7,500-(1,500+1,500))	
		- (10% dep. on 4,500)	4,050
		" W-I-P a/c :	
		Certified work	75,000
		Uncertified work	<u>600</u>
	<u>84,900</u>		<u>75,600</u>
			<u>84,900</u>

To P&L a/c		By Notional Profit b/d	6,300
6,300 X 2/3 X 80/100 =	3,360		
“ W-I-P a/c (Reserve)	2,940		
	<u>6,300</u>		<u>6,300</u>

Dr.	Work-in-Progress Account		Cr.
	Rs.		Rs.
To contract a/c :		By Reserve	2,940
– Certified work	75,000	“ Balance c/d	72,660
– Uncertified work	600		
	<u>75,600</u>		<u>75,600</u>

**Balance Sheet as at 31st December 2002**

	Rs.		Rs.
Share Capital	36,000	Land and Buildings	12,900
Profit & Loss a/c	3,360	Plant less depreciation	
(-) Loss of Plant		On site	4,050
and Materials	<u>2,700</u>	In stores	<u>1,350</u>
Creditors	3,000	Materials at site	1,200
		Work in progress	72,660
		Cash received	<u>60,000</u>
		Bank	<u>7,500</u>
	<u>39,660</u>		<u>39,660</u>

**Illustration : 10**

(9) The following information relates to a building contract for Rs. 10,00,000 for which 80% of the certified work is being paid by the contractee :

	2000.	2001	2002
	Rs.	Rs.	Rs.
Materials issued	1,20,000	1,45,000	84,000
Direct wages	1,10,000	1,55,000	1,10,000
Direct expenses	5,000	17,000	6,000
Indirect expenses	2,000	7,600	500
Work certified (31st Dec)	2,35,000	7,50,000	10,00,000
Work done but not certified	2,800	8,000	—
Materials at site	2,000	5,000	8,000
Value of plant issued	14,000	—	—

The value of plant at the end of 2000,2001,2002 was Rs, 11,200,Rs.7000,and Rs.3000 respectively. Prepare the Contract Account for these three years taking into Account such profit as you think proper on the incomplete contract.

Solution :

Dr.	Contract Account for 2000		Cr.
	Rs.		Rs.
To Materials issued	1,20,000	By Materials on site	2,000
" Direct wages	1,10,000	" Plant at site	11,200
" Direct expenses	5,000	" Work-in-Progress a/c :	
" Indirect expenses	2,000	- Certified work	2,35,000
" Plant issued	14,000	- Uncertified work	<u>2,800</u>
	<u>2,51,000</u>		<u>2,51,000</u>

Dr.	Contract Account for 2001		Cr.
	Rs.		Rs.
To Balance b/d (Work-in -Progress)	2,37,800	By Materials at site	5,000
" Materials	2,000	" Plant	7,000
" Plant	11,200	" Work -in-Progress:	
		Certified work	7,50,000
		Uncertified work	<u>8,000</u>
To Materials issued	1,45,000		7,58,000
" Direct wages	1,55,000		
" Direct expenses	17,000		
" Indirect expenses	2,600		
To Notional Profit c/d.	<u>1,99,400</u>		
	<u>7,70,000</u>		<u>7,70,000</u>
To Profit & Loss a/c		By Notional Profit b/d	1,99,400
(1,99,400 X 2/3 X 80/100=)	1,06,347		
" W-I-P- A/c (Reserve)	93,053		
	<u>1,99,400</u>		<u>1,99,400</u>

Dr.	Contract Account for 2001		Cr.
	Rs.		Rs.
To Balance b/d	7,58,000	By Materials on site	8,000
" (-) Reserve Work-in-Progress	93,053	" Plant at site	3,000
	<u>6,64,947</u>		
		" Contractee a/c	10,00,000

" Materials	5,000	
" Plant	7,000	
To Profit	<u>3,34,053</u>	
	<u>10,11,000</u>	<u>10,11,000</u>

**Illustration : 11**

(10) M/s Swathi Constructions Ltd., undertook a contract for Rs. 90,00,000 on 1st July 2000. The following are the expenses incurred upto 31st December, 2000 :

Materials purchased Rs. 1,12,500., Materials issued from stores Rs. 7,87,500., Wages Rs. 4,50,000., Direct charges Rs. 45,000. The value of work certified was Rs. 18,00,000 of which the contractee paid three-fourth in cash to the contractor company. The summary of the transactions for the year ended 31st December, 2001 were as under:

Materials issued from stores Rs. 20,25,000 ; Wages Rs. 9,00,000; Direct charges Rs. 9,000. The cost of special plant purchased for the contract on 1-1-2001 was Rs. 18,00,000. Further work certified during the year amounted to Rs. 49,50,000 of which 75% was paid by the Contractee to the contractor company. Special plant is to be depreciated at 25% per annum on original cost. Work done but not certified as on 31-12-2001 was Rs. 3,37,500. Material at site was Rs. 2,25,000.

The contract was completed on 30th April, 2002, upto which date the following further expenses were incurred : Material purchases were Rs. 1,57,500; Materials issued from stores Rs. 9,00,000; Wages paid Rs. 3,37,500 ; Direct expenses Rs. 30,360

The general overhead is to be charged at 5 percent of material consumed and wages paid during the contract period. On 30-4-2002 the special plant was valued at Rs. 11,25,000. The material at site were Rs. 1,57,500 and material returned to stores amounted to Rs. 2,92,500.

You are required to prepare Contract Account and Contractee Account during the period, showing the results of the transactions, assuming that balance amount due from the contractee was duly received.

**SOLUTION :**

**In the Contract Ledger of M/s. Swathi Construction Ltd.,**

Dr.	Contract Account for the yearended 31-12-2000		Cr.
	Rs.		Rs.
To Materials purchased	1,12,500	By Work-in Progress:	
" Materials from stores	7,87,500	– Work certified	18,00,000
" Wages	4,50,000		
" Direct expenses	45,000		
" General Overheads			
(5% of materials and wages )	67,500		
" Work in Progress a/c	<u>3,37,500</u>		
(Reserve )	<u>18,00,000</u>		<u>18,00,000</u>

Since less than one-fourth contract has been done, no profit should be taken to P&L a/c . Hence the profit balance as shown by the contract account should be carried as a reserve .

Dr.		Contract Account for the year ended 31-12-2001		Cr.	
		Rs.		Rs.	
To Work in progress :			By Material at site	2,25,000	
(work certified -			" Plant at site	13,50,000	
Reserve )	14,62,500		" Work in Progress:		
" Plant	18,00,000		- Work certified		
" Materials	20,25,000		(Rs. 18,00,000 +		
" Wages	9,00,000		49,50,000 )	67,50,000	
" Direct charges	90,000		" Work uncertified	3,37,500	
" General overheads					
(5% of material consumed					
material consumed					
and wages paid)	1,35,000				
" Notional Profit c/d	22,50,000				
	<u>86,62,500</u>			<u>86,62,500</u>	
To P&L a/c	11,25,000		By Notional Profit b/d	22,50,000	
" Reserve ac/	11,25,000				
	<u>22,50,000</u>			<u>22,50,000</u>	

The profit taken to P&L a/c has been calculated as follows:

Notional Profit X 2/3 X 75%

Dr.		Contract Account (upto 30th April, 2002)		Cr.	
		Rs.		Rs.	
To Work-in-progress:			By Plant at site	11,25,000	
(work certified + work			" (Value given)		
uncertfd - Reserve)	59,62,500		" Materials at site	1,57,500	
" Plant at site	13,50,000		" Materials returned to stores	2,92,500	
" Materials purchased	1,57,500				
" Materials from stores	9,00,000		" Contractees a/c	90,00,000	
" Wages	3,37,500				
Ditect expenses	30,360				
" General Overheads					
(5% of materials and labour )	58,500				
" P & L A/c(profit)	15,53,640				
	<u>1,05,75,000</u>			<u>1,05,75,000</u>	

Dr.	Contractee' s Account		Cr.
2000	Rs.	2000	Rs.
To Balance c/d	13,50,000	By Bank a/c	13,50,000
	2001		2001
To Balance c/d	50,62,500	By Balance b/d	13,50,000
		" Bank a/c	37,12,500
	<u>50,62,500</u>		<u>50,62,500</u>
2002		2002	
To Contract a/c	90,00,000	Balance b/d	50,62,500
		" Bank a/c	39,37,500
	<u>90,00,000</u>		<u>90,00,000</u>

### 19.7 SUMMING UP

Contract costing is employed by the firms such as builders, civil engineering contractors, constructional and mechanical engineering firms. A separate contract account is opened and all the expenses such as materials, labour, depreciation and other expenses are debited to contract account. Any materials returned from the site, the value of work certified and the value of work yet to be certified will be taken on the credit side the contract account. Thereby the notional profit is or net profit is computed.

### 19.8 CHECK YOUR PROGRESS : MODEL ANSWERS

1.I.  $\frac{2}{3} \times \text{Notional Profit} \times \text{Cash received} / \text{Work Certified}$

Here Notional Profit = Contract certified + Contract yet to be certified - Cost of the contract to date.

$$= 4,20,000 + 23,000 - 3,83,000$$

$$= \text{Rs. } 60,000$$

Profit to be taken to Profit and Loss Account is =  $\frac{2}{3} \times 60,000 \times \frac{3,78,000}{4,20,000}$

$$= \text{Rs. } 36,000 .$$

### 19.9 MODEL EXAMINATION QUESTIONS

A. Answer the following in about 30 lines each.

1. What is contract costing? Explain the salient features.

B. Answer the following in about 15 lines each.

2. How do you treat cost of plant used for a contract ?

3. Briefly explain the methods of estimating profit on incomplete contracts.

## EXERCISES

1. From the following particulars extracted from the books of M/s. Brilliant Engineers Ltd., prepare Contract Account.

	Rs.
Contract price .....	60,00,000
Direct material .....	24,30,000
Wages .....	16,20,000
Plant .....	12,00,000
Stores issued .....	4,32,000
Loose tools .....	2,25,000
Tractor running expenses .....	50,000

The Contract was completed in 20 weeks. The plant was returned subject to depreciation at 20% on original cost. the value of Loose Tools and stores returned were Rs. 1,50,000 and Rs. 60,000 respectively, the depreciation to be charged on Tractor work out to Rs. 2,25,000 ...

(Answer : Profit on Contract: Rs. 9,88,000 )

2. XLtd. undertook the construction of a bridge for Rs. 75,00,000 subject to retention of 20% until one year after the certified completion of the contract. The following are the details as shown in its books on the 31st Dec. 2002

	Rs.
Labour on site	24,30,000
Materials direct to site	19,20,000
Materials from stores	4,97,200
Hire of plant used	72,600
Direct expenses	1,38,000
Overheads charged to contract	2,22,600
Materials on 31-12-2002)	37,800
Wages accrued (30-12-2002)	9,600
Cost of work not certified	99,000
Work certified	6,60,000
Materials lost in fire accident	10,000

Prepare the Contract Account and the Contractee's Account.

M/s . Namratha Constructions Co., was started on 1st April ,2001. During the year ended 31st March ,2002 it was engaged on only one contract ,the contract price of which was Rs. 60,00,000. The following is the Trial Balance of the Company as on 31st March ,2002 .

Dr.	Rs.	Cr.	
	Rs.		Rs.
Land and buildings	5,16,000	Share Capital	14,40,000
Bank balance	3,00,000	Creditors	1,20,000
Materials purchased	10,80,000		

Plant	3,00,000	Cash received on contract (80% of work certified)	24,00,000
Wages	16,80,000		
Expenses	84,000		
	<u>39,60,000</u>		<u>39,60,000</u>

Additional information :

- Of the plant and materials charged to contract, plant which costs Rs. 60,000 and materials which cost Rs. 48,000 were lost in an accident.
- On 31st March, 2002 plant which cost Rs. 60,000 was returned to stores ; the cost of work done but not certified was Rs. 24,000 and materials costing Rs. 48,000 were remaining at the site.
- Chargo 10% depreciation on plant.

Prepare Contract Account and the Balance Sheet from the particulars as mentioned above.

(Answer: Notional profit Rs. 2,52,000 rofit taken to P&L a/c Rs. 1,34,400; Reserve Rs. 1,17,600.  
Balance Sheet Total : Rs. 15,86,400)

HINTS :

- Value of work certified : Cash received from contractee  $\times 100/80$
- Plant at site (31-3-2002) : Plant cost - plant returned to stores - plant lost - depreciation @ 10% (Rs. 3,00,000 - 60,000 - 60,000 - 18,000)
- Profit taken to P&L a/c: Notional profit  $\times 2/3 \times 80\%$
- M/s. Srujana Constructions Co., under took a contract for Rs. 44,10,000 on 1st April, 2002. the following information is extracted from the books of the Company for the year ended 31st March, 2003 .

	Rs.
Marterials	11,28,960
Wages paid	13,22,190
Special plant	1,08,000
Direct charges paid	45,270
Establishment charges	1,01,700
Wages outstanding(31-3-2003)	12,960
Direct charges outstanding(31-3-2003)	3,780
Stock of material at site (31-3-2003)	21,600
Value of work certified on 31-3-2003	29,70,000
Cost of work done but not certified	63,000
Cash received based on work certified	25,39,350

Provide depreciation @ 25 % per annum on plant.

5. From the above particulars, prepare the Contract Account for the year showing how much profit can reasanably be transferred to Profit and Loss account relating to this contract. Also show how the relevant items relating to this contract appear in the company's Balance Sheet.

(Answers : Notional Profit Rs. 4,12,740 : Profit to be taken to Profit & Loss Account Rs. 2,35,260 : Reserve Rs. 1,77,480)

5. M/s. Shrestha Constructions Co. under took a contract for Rs. 45 lakhs, on 1st January, 2002. The following is the information relating to this contract for the year ended 31st December, 2002. :

	Rs.
Materials issued to Contract	7,65,000
Wages	12,15,000
Special plant	2,25,000
Other expenses incurred	75,000

Amount received upto 31st December, 2002 from the contractee Rs. 19,20,000, being 80% of the value of work certified. Of the plant and materials charged to the contract, plant costing Rs. 45,000 and materials costing Rs. 37,500 were lost. On 31st December 2002 plant which costs Rs. 30,000 was returned to stores. The cost of work done but not certified was Rs. 15,000 and materials costing Rs. 34,500 were at site on 31-12-2002. Charge 15% depreciation on plant.

From the above particulars prepare the Contract Account, showing how much profit can be transferred to Profit Loss account. Also show how the items of the contract appear in the Balance Sheet of the Company, as on 31-12-2002.

( Answer : Notional Profit Rs. 4,05,000 : Profit taken to P&L A/c Rs. 2,16,000; Reserve Rs. 1,89,000 )

6. M/s. Sobhitha constructions Ltd., undertook a contract for the construction of a factory building on 1st April, 2002. The contract price was Rs. 90,00,000. The following information is available for the year ended 31st March, 2003 relating to the contract :

	Rs.
Materials directly purchased	14,40,000
Materials issued from stores	1,80,000
Wages	5,40,000
Direct expenses	3,60,000
Establishment charges	90,000
Plant purchased and installed at site	7,20,000
Materials returned to stores	90,000
Materials at site(31-3-2003)	36,000
Wages outstanding(31-3-2003)	1,08,000
Direct expenses outstanding	1,44,000
Value of plant at site(31-3-2003)	5,40,000
Work done but not certified	3,81,600
Cash received (being 80% of work certified)	36,00,000

Prepare the Contract Account and also show the relevant items in the Balance Sheet as on 31-3-2003.

(Answer : Notional Profit Rs. 19,65,600 : Profit taken to P&L Account Rs. 10,48,320; Reserve Rs. 9,17,280).

7. The following particulars are extracted from the books of M/s. Sravanthi Contructions Ltd., relating to a contract for Rs, 80,00,000. The contract was undertaken on 1st April 2001 and was finished on 31st March, 2003. The information relating to the contract is furnished here under :

	2001 - 02	2002-03
	Rs,	Rs.
Materials	24,00,000	6,72,000
Wages	18,40,000	8,40,000
Direct expenses	1,76,000	80,000
Indirect expenses	48,000	11,200
Plant issued	1,12,000	16,000
Materials at site (year end)	40,000	56,000
Value of work certified	60,00,000	80,00,000
Cost of work uncertified	64,000	—
Plant at site (year end)	56,000	40,000
Cash received from Contractee	48,00,000	80,00,000

Prepare the Contract Account and the Contractee Account for the the years 2001 - 02 and 2002 -03 , showing the profit that can reasonably taken to the Profit and Loss account of each year.

(Answer : Notional Profit 2002 - 02 : Rs. 15,84,000; Profit taken taken to P& L a/c : Rs. 8,44,800 Reserve Rs. 7,39,200).

Profit of 2002 - 03 year : Rs. 10,56,000 )

(8) On 1st January 2002 'A' undertook a contract for Rs.10,00,000 . He incurred the following expenses during the year :

	Rs.
Materials issued from stores	1,00,000
Materials directly purchased	90,000
Plant installed at cost	70,000
Wages paid	2,00,000
Wages accrued 31-12-2002	80,000
Direct expenses paid	20,000
Direct expenses accrued 31-12-2002	5,000
Establishment charges	13,000

Of the plant and materials charged to the contract, plant which costs Rs.4,000 and materials costing Rs. 3,000 were lost. Some of the materials costing Rs. 4,000 were sold for Rs. 5,000. On 31-12-2002 plant costing Rs. 1,000 was returned to the store and part of the plant which cost Rs.400 was so damaged as to render itself useless.

The work certified was Rs. 4,80,000 and 80% of the same was received in cash . The cost of work done but uncertified was Rs. 2,000. Charge depreciation @ 10% p.a. on plant.

Prepare the Contract Account and show the profit that can reasonable be taken to the

Profit and Loss Account. Show also the particulars relating to the contract in the Balance Sheet of the contractor on the 31st of December, 2002 .

9. XYZ Construction Ltd. has been engaged in carrying out two contracts A and B during the year , The following particulars are obtained at the year-end(December 31) 2002.

	Contract A	Contract B
Date of Commencement	April 1	September 1
	Rs.	Rs.
Contract Price	6,00,000	5,00,000
Materials issued	1,60,000	60,000
Materials returned	4,000	2,000
Materials on site (Dec. 31)	22,000	8,000
Direct Labour	1,50,000	42,000
Direct Expenses	66,000	35,000
Establishment Expenses	25,000	7,000
Plant installed (Cost)	80,000	70,000
Value of plant (Dec.31)	65,000	64,000
Cost of work not certified	23,000	10,000
Value of certified work	4,20,000	1,35,000
Cash received from contractee	3,78,000	1,25,000
Architect's fees	2,000	1,000

During the period materials worth Rs. 9,000 have been transferred from Contract A to Contract B.

Prepare the contract account, contractee account and Balance Sheet as on the 31st of December showing the calculation of work-in-progress.

10. A Contractor secured a contract for Rs. 75,000 .He was to receive payments on account from time to time equal to 90% of the certified value of the work done.

He commenced work on January 1, 2002 and incurred the following expenditure during the year :

	Rs.
Plant and Tools	7,000
Machinery and Stores	20,000
Wages	15,000
Sunday Expenses	3,000
Establishment Charges	4,000

A part of the machinery costing Rs.2,000 was unsuited to the contract and was sold at a profit of Rs. 500. The value of plant and tools on the 31st December, 2002 was Rs. 4,000 and the value of machinery and stores on hand was Rs. 3,000.

By January 2003, he had received payments on account amounting to Rs. 4,385 being 90% of the certified value of work done upto the 31st of December.

In order to calculate the profit made on the contract upto December 31, the contractor estimated that further expenditure would be incurred for completing the contract and take to the credit of the Profit and Loss a/c that proportion of the estimated net to be realised on the contract which the certified value of work done to the contract price.

He estimated :

- (a) that the contract would be completed in another six months;
- (b) that the plant and tools would have a residual value of Rs. 1,000 upon the completion of the contract;
- (c) that the cost of machinery and stores required in addition to those in stock on December 31 would be Rs. 10,000
- (d) that further sundry expenses of Rs. 2,000 would be incurred.
- (e) that the wages on the contract for the six months period up to the 30th of June, 2003 would amount to Rs. 8,000;
- (f) that establishment charges would cost the same sum per month as in the previous year; and
- (g) that 2 1/2 % of the total of the contract(excluding this percentage ) should be provided for contingencies.

Prepare the contract account for the year ending on the 31st of December, 2002 and show the profit to be credited to the Profit and Loss account for the year.

11. Given below is a summary of entries in a contract ledger as on 31-12-2002 in respect of a Contract No.012 :

	Rs.		Rs.
Materials	36,500	Establishment charges	8,000
Wages	24,420	Plant	34,000
Direct expenses	6,710	Sale of scrap	1,820

You are required to prepare the contract account after taking into account the following information and to indicate the Profit or Loss to be taken to the Profit and Loss account for the year ending on 31-12-2002 .

- (a) Accruals as at 31-12-2002  
Wages : Rs. 800; Other expenses : Rs. 1,120
- (b) Depreciation on Plant upto 31-12-2002 was Rs.8,550 .
- (c) Included in the summary entries are: wages: Rs. 1,000., Other expenses : Rs. 1,500; Materials used : Rs. 2,080 since the certification of work.
- (d) Materials at site on 31-12-2002 : Rs. 10,000 .
- (e) Rs. 62,500 had been the total work certified upto 31-12-2002 when 3/8 th of the contract remained incomplete.
- (f) Total contract price was Rs. 1,00,000 .

(f) Total contract price was Rs. 1,00,000 .

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### 19.10 RECOMMENDED BOOKS

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S.P.Jain and K.L.Narang	-	'Cost Accounting' Kalyani Publishers, New Delhi
Charles T Horngren	-	Cost Accounting', A Managerial Emphasis, Prentice Hall of India (Pvt.) Ltd, New Delhi .
P.K. Ghosh	-	Cost Accounting' National Publishing House, New Delhi.
B.K. Bhar	-	Cost Accounting'. Methods and Problems. Academic Publishers, Kolkata.

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### 19.11 GLOSSARY

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<b>Certified Work</b>	:	That part of the work done which the contractee or his architect certified. Payment of the price will be made only after certification of the work done .
<b>Contract</b>	:	The work which contractor undertakes a specific job .
<b>Contractee</b>	:	The person for whom the contractor undertakes the work
<b>Contractor</b>	:	The person who undertakes the contract.
<b>Contract Price</b>	:	The agreed amount to be paid by the contractee to the contractor for the work done.
<b>Cost plus Contract</b>	:	Contracts in which the price is calculated by adding a specified profit to the cost of the contract .
<b>Work - in- progress</b>	:	This refers to incomplete contract and consists of work certified and uncertified.

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# UNIT - 20 : PROCESS COSTING

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## Contents

- 20.0 Aims and Objectives
- 20.1 Introduction
- 20.2 Salient Features
- 20.3 Distinction Between Process Costing and Job Costing
- 20.4 Accounting Treatment
- 20.5 Normal and Abnormal Losses and Gains
- 20.6 Accounting for Scrap ,Spoilage and Defectives
- 20.7 Inter-process Profits
- 20.8 Joint-Products, By -Products and Methods of Apportioning Joint-Costs,
- 20.9 Summing Up
- 20.10 Check Your Progress : Model Answers
- 20.11 Model Examination Questions
- 20.12 Recommended Books
- 20.13 Glossary

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## 20.0 AIMS AND OBJECTIVES

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In this unit we have introduced the meaning, importance, accounting procedure, inter-process profits and the methods of apportioning joint costs to joint products and by-products.

After studying this unit you shall be able to:

- understand the meaning of process cost.
- distinguish process and job costing
- know the accounting procedure of process costing.
- explain the accounting procedure for scrap, spoilage and defectives.
- describe the methods of apportioning joint costs to joint and by-products.

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## 20.1 INTRODUCTION

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Process costing is a method of costing used to ascertain the cost of the product at each stage of its manufacture, where processes are carried on, having one or more of the following features : a) where the products of one process becomes the raw material of another process of operation, b) where there is simultaneous production through one or more processes of different products with or without by-products, and c) where during the processes, the products or materials are not distinguishable from one another. In other words, it is a method applied to industries where the material has to pass through two or more processes for being converted into a finished product. This method is used in the manufacture of chemical products, soaps, vegetable oil, paints, varnish, refining, rubber, sugar, paper, textile spinning and weaving etc, where the production of continuous and where the production has to pass from one process to another until completion.

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## 20.2 SALIENT FEATURES

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- i) The whole production activities of a factory are divided into departments or processes, which are each limited to a certain operation,
- ii) Most of the items of cost can be identified with specific processes and for this purpose a separate account for each process or department is opened.
- iii) The cost per unit of the finished output of each process is obtained by dividing the total cost incurred during a period by the number of units produced during that period.
- iv) The cost of normal loss or spoilage in any process is included in the cost of the total units produced.
- v) As the product passes from one process to another, the accumulated cost of output of a process is transferred to that of the next process. Thus, the output of one process becomes the input of the next process.
- vi) While manufacturing a main product we may come across some by-products and also joint-products. The valuation and accounting for these constitute a special feature of process costing,
- vii) The work-in-progress at the end of the accounting period is calculated in terms of equivalent units for costing.
- viii) In certain cases, the output of a process is transferred to that of the next process not at cost but at market price in order to ascertain whether the production of a process is profitable or not. The market price contains the element of profit, So a reserve for the profit included has to be created to find out the profits correctly.

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## 20.3 DISTINCTION BETWEEN PROCESS COSTING AND JOB COSTING

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The differences between Process Costing and Job Costing are as hereunder :

- | Process Costing  | Job Costing   |
|--|---|
| 1) Process costing is used to ascertain the cost of a particular process over a period of time.  | 1) Job costing involves the accumulation of costs for each job order.     |
| 2) All units of the product which pass from one process to another are generally of uniform and homogenous nature.   | 2) Each job constitutes a separate cost unit.                             |
| 3) Costs are accumulated for each process over a period  | 3) Costs are ascertained for each job, the period being of no importance. |
| 4) When there are a number of processes the output of the earlier process becomes the input of the next process resulting in the transfer of costs from one process to the next process. | 4) The costs are generally not transferred from one job to another.       |
| 5) Owing to continuous production the work-in-progress is a regular feature.   | 5) There may or may not be any work-in-progress.                          |
| 6) Cost control is easy due to the uniformity of production.   | 6) Cost control is difficult.   |

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- 7) The process cost is ascertained at the end of the cost period for each process separately.
- 8) The amount of production is determined to a large extent by the supply and demand for the product.
- 7) The cost of job can be ascertained only on the completion of the job.
- 8) In job costing the production is based on specific order.

## 20.4 ACCOUNTING TREATMENT

The factory is divided into various processes or departments and a separate account is maintained for each process. The account is debited with the material, labour, direct and indirect costs, and is credited with the wastage of materials and the cost of the by-product, if any. The balance of the cost is the cost of the process product which is transferred to that of the next process. In some cases not all but only most of the finished units in one process are transferred to the next process, and the rest of the units are kept in stock. The cost of such stock is transferred to the 'Process Stock A/c', and the remaining units are transferred to the next process. On completion of the manufacture in the final process, the finished products are transferred to the 'Finished Goods Accounts'.

In process accounts columns are provided as needed on both sides for quantity and value.

Illustration-1 : In a factory, process Costing have been in use for a certain period. The production of a commodity was 1,000 tonnes. The product passed through three processes, viz., A, B and C, and raw materials were added in the processes. The costs were as here under:

	Process A Rs.	Process B Rs.	Process C Rs.
Materials	3,000	1,500	1,500
Labour	1,500	3,000	5,250
Manufacturing Expenses	1,500	4,500	5,250

Assume that there was no work-in-progress either at the beginning or at the end, show the Process costs for each process and the total of the finished product. In each process the production is 1,000 tonnes.

### Solution

<i>Process 'A' Account</i>					
Dr.					Cr.
Particulars	Cost per ton Rs.	Total cost Rs.	Particulars	Cost per ton Rs.	Total cost Rs.
To Materials	3.00	3,000	By Process-B Account		
„ Labour	1.50	1,500	(output transferred)	6.00	6,000
„ Manufacturing Expenses	1.50	1,500			
	<u>6.00</u>	<u>6,000</u>		<u>6.00</u>	<u>6,000</u>

**Solution**

Dr.		Process 'B' Account			Cr.	
Particulars	Cost per ton Rs.	Total cost Rs.	Particulars	Cost per ton Rs.	Total cost Rs.	
To Process A A/c Transfer	6.00	3,000	By Process-C Account			
" Materials	1.50	1,500	(output transferred)	15.00	15,000	
" Labour	3.00	3,000				
" Manufacturing Expenses	4.50	4,500				
	<u>15.00</u>	<u>15,000</u>		<u>15.00</u>	<u>15,000</u>	

Dr.		Process 'C' Account			Cr.	
Particulars	Cost per ton Rs.	Total cost Rs.	Particulars	Cost per ton Rs.	Total cost Rs.	
To Process B A/c transfer	15.00	15,000	By Process-C Account			
" Material	1.50	1,500	(output transferred)	27.00	27,000	
" Labour	5.25	5,250				
" Manufacturing Expenses	5.25	5,250				
	<u>27.00</u>	<u>27,000</u>		<u>27.00</u>	<u>27,000</u>	

**Illustration - 2 :**

The finished product of M/s. Aditya Co., Ltd., passes through three distinct processes to its completion. The three processes are 'Arpita', 'Alekhya' and 'Adarsha'. With the following information extracted from the books of the company, prepare the three processes accounts :

	Arpita Rs.	Alekhya Rs.	Adarsha Rs.
Direct Materials	1,08,000	18,000	6,000
Direct wages	6,000	12,000	6,000
Direct expenses	18,000	-	12,000

Production overheads were recovered at 200 percent on direct wages. Production during the period was 400 units of finished product. There was no opening or closing stocks or work-in-progress.

**Solution :**

Dr.		M/s. Aditya company Ltd., Arpita Process A/c		Cr.	
	Rs.		Rs.		Rs.
To Direct Material	1,08,000	By Alekhya Process a/c			
" Direct Wages	6,000	(@ Rs.360 per unit)		1,44,000	
" Direct Expenses	18,000				

" Production Overheads	12,000	
(@ 200%on Wages)	<u>1,44,000</u>	<u>1,44,000</u>

Dr.	Alekhya Process A/c		Cr.
	Rs.		Rs.
To Arpita Process a/c	1,44,000	By Adarsha Process a/c	
" Direct Material	18,000	(@ Rs.495 per unit)	1,98,000
" Direct Wages	12,000		
" Production Overheads	24,000		
(@200%on Wages)	<u>1,98,000</u>		<u>1,98,000</u>

Dr.	AdarshaProcess A/c		Cr.
	Rs.		Rs.
To alekhya Process a/c	1,98,000	By Finshed Stock a/c	2,34,000
„ Direct Material	6,000	(@Rs.585 perunit)	
„ Direct Wages	6,000		
„ Direct Expenses	12,000		
„ Production Over heads	12,000		
„ (@ 200%on Wages)	<u>2,34,000</u>		<u>2,34,000</u>

**Illustration - 3 :** The finished product of M/s. Uttam Co. , passes through three distinct processes : 'Uddipa, ' Urmila' , and 'Ujwala' . During the year ended 31st March ,2002, 10,000 units of finished product were produced. The costing records of the company provides the following information:

	UDDIPA	URMILA	UJWALA
	Rs.	Rs.	Rs.
Direct Materials	1,20,000	60,000	40,000
Direct Wages	1,00,000	80,000	1,00,000
Direct Expenses	20,000	86,400	36,200

The indirect expenses for the year were Rs. 56,000. The scrap in each process has realised Rs. 6,000, Rs.8,000 and Rs. 10,000 respectively. Prepare the process accounts of the three processes, showing the cost of each process and the cost of production of the finished product, per unit. Indirect expenses are to be distributed on the basis of wages among the three processes.

**Solution :**

**In the books of M/s. Uttam Company Ltd.**

Dr.	UDDIPA PROCESS ACCOUNT		Cr.
	Rs.		Rs.
To Direct material	1,20,000	By Sale of scrap	6,000
" Direct wages	1,00,000	" Urmila Process a/c	2,54,000
" Direct expenses	20,000	(@Rs. 25.40 p.u)	
" Indirect expenses (5/14 of the total)	20,000		
	2,60,000		2,60,000

Dr.	URMILA PROCESS ACCOUNT		Cr.
	Rs.		Rs.
To Uddipa Process a/c	2,54,000	By Sale of scrap	8,000
" Direct material	60,000	" Ujjwala Process a/c	
" Direct wages	80,000	(@ Rs.48.84 p.u.)	
" Direct expenses	86,400		4,88,400
" Indirect expenses (4/14 of the total)	16,000		
	4,96,400		4,96,400

Dr.	UJWALA PROCESS ACCOUNT		Cr.
	Rs.		Rs.
To Urmila Process a/c	4,88,400	By sale of scrap	10,000
" Direct material	40,000	" Finished stock a/c	
" Direct wages	1,00,000	@ Rs.67.46.P.u.	6,74,600
" Direct expenses	36,200		
" Indirect expenses (5/14 of the total)	20,000		
	6,84,600		6,84,600

**Illustration - 4 :** The finished product of M/s. Swara Raga Sudha Company passes through three distinct processes : Ragam, Tanam and Pallavi. The output of each process shall be the input for the next process and the output of the Pallavi process shall pass on to the finished stock. From the following particulars extracted from the books of the company, prepare the three processes accounts showing the cost per unit and total cost of each process and that of the finished stock. In each process the production is 1,000 units.

	Ragam Process Rs.	Tanam Process Rs.	Pallavi Process Rs.
Materials	36,000	18,000	18,000
Wages	18,000	36,000	63,000
Manufacturing expenses	18,000	54,000	63,000

Assume that there was no work-in-progress either at the beginning or at the end.

**SOLUTION :**

**In the Books of M/s. SWARA RAGA SUDHA Co.**

Dr. **RAGAM PROCESS ACCOUNT** (Output : 1000 units) Cr.

Particulars	Cost per Unit Rs.	Total Cost Rs.	Particulars	Cost per Unit Rs.	Total Cost Rs.
To Materials	36	36,000	By transfer to	72	72,000
" Wages	18	18,000	Tanam Process a/c		
" Manufacturing expenses	18	18,000			
	<u>72</u>	<u>72,000</u>		<u>72</u>	<u>72,000</u>

Dr. **TANAM PROCESS ACCOUNT** Cr.

Particulars	Cost per Unit Rs.	Total Cost Rs.	Particulars	Cost per Unit Rs.	Total Cost Rs.
To Transfer from			By Transferto	180	1,80,000
Ragam Process a/c	72	72,000	Pallavi Process a/c		
" Materials	18	18,000	"		
" Wages	36	36,000			
" Manufacturing expenses	54	54,000			
	<u>180</u>	<u>1,80,000</u>		<u>180</u>	<u>1,80,000</u>

Dr. **PALLAVI PROCESS ACCOUNT** Cr.

Particulars	Cost per Unit Rs.	Total Cost Rs.	Particulars	Cost per Unit Rs.	Total Cost Rs.
To Transfer from			By Transfer to	324	3,24,000
Tanam Process a/c	180	1,80,000	Finished Stock		
" Materials	18	18,000			
" Wages	63	63,000			
" Manufacturing expenses	63	63,000			
	<u>324</u>	<u>3,24,000</u>		<u>324</u>	<u>3,24,000</u>

## 20.5 NORMAL AND ABNORMAL LOSSES AND GAINS

In the illustration given above it was assumed that there was no loss, scrap or wastage in the whole process: In other words, the units of input of material come out of the final process without suffering any quantitative loss. But in manufacturing industries there is bound to be some loss, scrap and wastage in the course of production. If the loss is unavoidable because of the nature of the material of process, then it is normal process loss. Where the loss has been caused by unexpected or abnormal conditions like careless handling, bad plant design or operation, substandard material and accidents, it is called abnormal process loss. If the processing has been carried out efficiently, such a loss would not have occurred. It is the result of in-efficient operating conditions, and hence contrrollable.

**Accounting Treatment :** The accounting treatment differs in respect of Normal and Abnormal Losses/Wastages in process accounts. The cost of normal loss/ wastage is regarded as a part of the cost of production process in which it occurs and hence absorbed into the production cost of good products. It becomes an additional charge to usable units produced, whereas a separate account is opened for abnormal losses /wastages. The abnormal losses/wastage is transferred from the process account to the Abnormal Loss Account. The Abnormal Loss Account is closed by writing it off to the Costing Profit & Loss' Account.

- a) Where the normal loss includes scrap which has some reasonable value, this amount should be credited to the process concerned.
- b) If the scrap has a relatively small value, it would be reasonable to credit each process with the realisable value of the scrap. Scrap accumulated over a period of the time may be sold and the proceeds thus realised should be credited to " Works Overhead Expenses"

The abnormal loss/wastage may also have some scrap. The realisable value of such scrap will be credited to abnormal loss account and the balance in the abnormal loss account should be transferred to Costing Profit and Loss Account.

**Abnormal Gain/ Abnormal Effectives :** The normal loss/wastage is an estimate only. However, it may sometime happen that the actual loss/wastage in a process may be more or less than the estimated normal loss. If the actual loss is more than the estimated normal, it is known as 'Abnormal Loss/Wastage, but if the actual loss/wastage is less than the estimated normal loss, it is known as 'Abnormal Gain or Abnormal Effectives.'

The abnormal gain is also calculated in the same way as the abnormal loss/wastage is done. The value of abnormal gain will be debited to the process concerned and credited to the 'Abnormal Gain Account'. The balance of abnormal gain account should be transferred to the credit of Profit and Loss Account.

**Illustratin - 5 :** The finished product " Swathi" of M/s. Mrugasira Co. Ltd. passes through two distinct processes : Hastha' and 'Chitha' From the following information extracted from the books of the Company, you are required to prepare the two Processes Accounts of Hastha and Chitha

	Hastha Process	Chitha Process
	Rs.	Rs.
Sundry materials	1,20,000	60,000
Direct labour	1,90,000	1,00,000
Manufacturing expenses	65,400	47,740
Direct materials ( in units)	1,00,000	.....
Direct materials (in value)	1,00,000	

Output (in units)	94,000	83,000
Normal Wastage (in %)	5	10
Normal Wastage realises per 1000 Units (in value)	80	100

The output of Process Hastha becomes the raw-material to Process Chitha .

**SOLUTION:**

**M/s. Marugasira Company Ltd.,**

Dr.		HASTHA PROCESS ACCOUNT		Cr.	
	Units	Rs.		Units	Rs
To Direct Material	1,00,000	1,00,000	By Normal Wastage	5,000	400
" Sundry materials		1,20,000	(5% on D.Mat.)		
" Direct Labour		1,90,000	By.Ab. Wastage	1,000	5,000
" Mfg.expenses		65,400	" Chitha Process a/c		
			(@ Rs. 5 p.u.)	94,000	4,70,000
	<u>1,00,000</u>	<u>4,75,400</u>		<u>1,00,000</u>	<u>4,75,400</u>

Abnormal Wastage in units :  $95,000 - 94,000 = 1,000$  units

Calculation of abnormal wastage in terms of value =  $4,75,000 / 95,000 = \text{Rs. } 5 \text{ p.u.}$   
 $1,000 \text{ units} \times \text{Rs. } 5 = \text{Rs. } 5,000.$

Dr.		CHITHA PROCESS ACCOUNT		Cr.	
	Units	Rs.		Units	Rs
To Hastha Process a/c	94,000	4,70,000	By Normal Wastage	9,400	940
To Suntry materials		60,000	(10% of input)		
" Direct Labour		1,00,000	By Ab.Wastage	1,600	12,800
" Mfg. Expenses		47,740	" Finished stock	83,000	6,64,000
			(@ Rs. 8p.u.)		
	<u>94,000</u>	<u>6,77,740</u>		<u>94,000</u>	<u>6,77,740</u>

Abnormal Wastage in units =  $84,600 - 83,000 = 1,600$  Units

Value of Abnormal Wastage :  $6,76,800 / 84,600 = \text{Rs. } 8$  per units  
 $= 1,600 \text{ units} \times 8 = \text{Rs. } 12,800$

**Illustration - 6 :** The product of a company passes through three distinct process for completion, namely. A,B, and C. From the past experience it is ascerained that wastage is incurred in each process as here under :

Process A: 2% ; Process B : 5% Process C: 10% .

In each case the percentage of wastage is computed on the basis of units introduced.

The wastage in each process possesses scrap value. The wastage of process A and B is sold at Rs.5 per 100 units and that of process @ Rs. 20 per 100 units.

The output of each process passes immediately to the next process and the finished units are passed from process C stock for sale.

The following information is obtained :

	Process A	Process B	Process C
	Rs.	Rs.	Rs.
Materials Consumed	6,000	4,000	3,000
Direct Labour	8,000	6,000	2,000
Manufacturing Expenses	1,000	1,000	1,500

20,000 units have been issued to Process A at a cost Rs. 10,000 . The output of each process is as under :

Process A -	19,500 units
Process B -	18,800 units
Process C -	16,000 units

There is no work-in-progress in any process prepare. Process Accounts (the calculation should be made to the nearest rupee :

**Solution :**

Process 'A' Account					
Dr.					Cr.
Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Units introduced	20,000	10,000	By Normal Wastage	400	20
" Materials		6,000	By Abnormal Wastage	100	127
" Direct Labour		8,000	By Process B A/c	19,500	24,853
" Manufacturing Expenses		1,000	(output transferred)		
	<u>20,000</u>	<u>25,000</u>		<u>20,000</u>	<u>25,000</u>

Process 'B' Account					
Dr.					Cr.
Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process A a/c	19,500	24,853	By Normal Wastage	975	49
" Materials		4,000	" Process C A/c	18,800	36,336
" Labour		6,000	(output transferred)		
" Manufacturing Expenses		1,000			
" Abnormal Effective	275	532			
	<u>19,775</u>	<u>36,385</u>		<u>19,775</u>	<u>36,385</u>

Dr.		Process 'C' Account				Cr.	
Particulars	Units	Amount	Particulars	Units	Amount		
		Rs.			Rs.		
To Process A	18,800	39,336	By Normal Wastage	1,880	376		
" Materials		2,000	" Abnormal Wastage	920	2,309		
" Direct Labour		3,000	" Finished Stock	16,000	40,151		
" Manufacturing Expenses		1,500					
		<u>18,800</u>		<u>18,800</u>	<u>42,836</u>		
		42,836					

### Check your progress - I

The following data pertains to a Chemical Company.

Items	Total	Process I	Process II	Process III
	Rs.	Rs.	Rs.	Rs.
Direct Material	7,542	2,600	1,980	2,962
Direct Wages	9,000	2,000	3,000	4,000
Production Overheads	9,000	2,000	3,000	4,000

1,000 units were introduced to Process I at the rate of Rs. 3 each. There was no opening and closing stock.

The following is the additional information.

Process	Output during the week	Per centage of normal loss to input	Value of Scrap Rs.
Process I	950	5%	2
Process II	840	10%	4
Process III	750	15%	5

Prepare the process accounts and normal loss, abnormal loss or abnormal gain accounts.

## 20.6 ACCOUNTING FOR SCRAP, SPOILAGE AND DEFECTIVES

**Scrap :** T. Lang defines scrap as "the incidental residue from certain types of manufacture, usually of small amount and low value, recoverable without further processing". It is the usable part of the materials, which has a saleable value. It may arise in the form of trimmings, borings, turnings, shavings of metals, etc. The saw dust and trimmings from timber head end and bottom ends in foundries, cuttings and pieces of leather, etc., are examples of scrap.

**Accounting treatment :** i) Scrap resulting in one process which is to be utilised in another process should be credited to the first Process Account at its market value and debited to Stores Account.

ii) Scrap which cannot be utilised for subsequent production should be credited to Process Account at a value less than market price and debited to Stores Account.

iii) Scrap which is of small value may be sold periodically and the amount so realised should be credited to Works Overhead Account.

**Spoilage:** " It represents that portion of raw materials which has been spoiled in manufacture but which can be used again in manufacture as raw materials sold as seconds "

The distinction between the scrap and spoilage is that while scrap arises almost certainly in the course of processing of materials the spoilage arises only on occasions due to some defect in operations or the materials.

**Accounting Treatment :** If the spoilage is total i.e., all the units manufactured are spoiled, the cost of spoilage is the total cost of the material, labour and overheads incurred thereon. If the spoilage is partial then the cost is prorated between good and spoiled units.

**Defectives :** They are that portion of production which can be rectified and turned out as good units by the application of additional material or labour. This is the production which does not conform to the standard specification or quality, but which can be retrieved by bringing it upto the standard by incurring some more expenditure, termed 'salvage costs' or rework costs' or 'rectification costs' .

**Accounting Treatment :** The problem of the accounting of defective work is the problem of the accounting of the costs of rectification or re-work. All the costs of rectification are debited to the "Rectification Work Order". Where the defectives be identified with the specific jobs or production orders, the cost of rectification is charged to these jobs as the cost of manufacturing good units of products. Where the defectives are such that they cannot be identified with the jobs, the normal cost is charged as the cost of manufacturing overheads, and the abnormal cost of rectification is charged to the Costing Profit and Loss account.

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## 20.7 INTER - PROCESS PROFITS

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Ordinarily the output of one process is transferred to that of the next process at cost only, but sometimes, it is transferred at a price in excess of cost, which may include an element of profit, for the following purposes: (i) comparison of the cost of process with the market price to judge whether the working of the process is profitable or not, (ii) ascertainment of the efficiency of the process in terms of profits.

There are four methods of transfer of this type, namely : 1) At the actual cost method, 2) At standard rates specially set for each process, 3) At the market price, and 4) At cost plus a certain percentage of profits.

However the inclusion of inter-process profit involves unnecessary complication in the accounts as the stocks on hand at the end of the period contain elements of unrealised profit. To avoid such complications, it is advisable not to maintain accounts as per this system, but to keep a record separately, and make cost analysis to serve the purpose.

It is desired to include the inter-process profit in the accounts, suitable adjustments is required to be made by creating a reserve for the amounts of profit included in the closing stock in each process and the Finished Stock.

In order to explain the principles involved in working out a reserve on the unrealised profits, the following illustration is given :

**Illustration - 7 :** M/s Vijaya Company 's final product passes through two distinct processes : Jaya and Ajaya. The following information is extracted from the books of the Company relating to the two processes:

	Jaya Process Rs.	Ajeya Process Rs.
Materials consumed	1,20,000	
Wages	1,00,000	1,20,000
Overheads	60,000	80,000

The output of Jaya process is transferred to Ajeya process and the output of Ajeya process to finished stock at a profit of 20 per cent on transfer price. The sale of finished stock received from the Ajeya process is sold for Rs. 7,50,000. There is no any opening or closing stock. Prepare the two process accounts and find out the total profit made by the company .

**SOLUTION :**

M/s . Vijaya Company			
Jaya Process Account		Ajeya Process Account	
Dr.	Rs.	Cr.	Rs.
To Materials	1,20,000	By Process Ajeya a/c	3,50,000
" Wages	1,00,000	(at aprofit of 20%	
" Overheads	60,000	on transfer price)	
" Profit(@ 20%			
on transfer price)	<u>70,000</u>		
	<u>3,50,000</u>		<u>3,50,000</u>
Ajeya Process Account		Finished Stock A/c	
Dr.	Rs.	Cr.	Rs.
To Transfer from	Rs.	By Finished stock	Rs.
Jaya process	3,50,000	(at a profit of	6,87,500
" Wages	1,30,000	20 % on transfer	
" Overheads	80,000	price)	
" Profit(at 20%	1,37,500		
on transfer price)	<u>6,87,500</u>		<u>6,87,500</u>
	<u>6,87,500</u>		<u>6,87,500</u>
Finished Stock A/c		P&L A/c	
Dr.	Rs.	Cr.	Rs.
" Transfer from	Rs.	By Sales	Rs.
Ajaya Process	6,87,500		7,50,000
" P& L A/c	<u>62,500</u>		
	<u>7,50,000</u>		<u>7,50,000</u>

Dr.	Profit & Loss Account		Cr.
	Rs.		RS.
To Total profit	2,70,000	By Jaya Process a/c	70,000
		By Ajeya Process A/c	1,37,500
		By Finished Stock A/c	62,500
	<u>2,70,000</u>		<u>2,70,000</u>

**Illustration : 8**

A product passes through two process for completion , namely A and B. The output of each process is transferred to that the next process at a price which yields a profit of 20% on the transfer price. The output of process 'B' is charged to the Finished Stock in a similar manner.

There was no work -in -progress in any process at the end of the period and the following was the information available on that date.

	ProcessA Rs.	ProcessB Rs.
Materials consumed	8,000	10,000
Direct wages	6,000	4,000
Closing stock	6,000	8,000

In each process, the stocks were valued at prime cost. There were no stocks on hand at the beginning and the question of overhead was ignored. Of the goods passed into the Finished Stock, goods worth Rs. 6,000 were in stock at the end of the period and the balance was sold for Rs. 24,000 .Prepare the account for each process and also the amount of reserve that is to be created towards the unsold stock or enrealised profits.

**Solution**

Dr.	Process 'A' Account		Cr.
	Rs.		Rs.
To Materials	8,000	By Closing Stock	6,000
" Wages	6,000	" Process 'B' Account transferred	10,000
" Profit(25% on cost or 20% on transferprice )	2,000		
	<u>16,000</u>		<u>16,000</u>

Dr.	Process 'B' Account		Cr.
	Rs.		Rs.
To Transfer from process 'A'	10,000	By Closing Stock	8,000
" Materials	10,000	" Finished Stock (output transferred)	20,000
" Wages	4,000		
" Profit 25% on cost	4,000		
	<u>28,000</u>		<u>28,000</u>

Dr.	Finished Stock Account		Cr.
	Rs.		Rs.
To Transfer from process 'B'	20,000	By Sale	24,000
"Profit"	10,000	" Stock	6,000
	<u>30,000</u>		<u>30,000</u>

The accounts given show that according to books the following profits have been made during the year.

Process-A	Rs. 2,000
Process-B	Rs. 4,000
Finished Stock	Rs. 10,000
Total	Rs. 16,000

Note : 1) It may be noted that part of this profit is contained in the unsold stock of finished products and of the individual process;

2) So in order to ascertain the unrealised profit of the year a reserve has to be created in respect of the unrealised profit i.e., the profit included in the stock values.

This reserve is calculated as follows :

**Process A :** Only the finished stock transferred to process B was charged at a price in excess of cost, but not the stock on hand. So it contains no profit

**Process B :** a) The stock of this process, though valued at prime cost, consists partly of the product received from Process A and partly of materials and labour expended upon such products of 'B'

b) The prime cost of Rs. 24,000 in process-B is made up as here under :

	Rs.
Products received from process - A	10,000
Materials and wages in process- B	14,000

( in the ratio of 10 : 14)

24,000

c) Therefore, 10/24 of the stock of Rs. 8,000 is represented by the product of process-A .

d) The output of process -'A' has been charged to that of process- B at 20% on the transfer price and so 20% of 10/30 of Rs. 10,000 = Rs. 666 represent the unrealised profits and must be reserved Rs. 666-00.

**Finished stock:**

a) The stock worth Rs. 6,000 is composed partly of the product of Process-B and partly of Process-A

b) The transfer to Finished Stock from Process B was done at a profit of 25% on cost for 20% on transfer price.

c) Hence the profit included in the above mentioned stock is  $20/100 \times 6,000 = \text{Rs. } 1,200$  .

This unrealised profit will be provided for.

- d) the prime cost of this stock in Process-B was, therefore Rs. 4,800 (6,000-1,200).
- e) Out of this 10/24 represents the product of Process-A, i.e.,  $5/12 \times 4,800 = \text{Rs. } 2,000$ .
- f) But Process-A has charged its output to Process -B at a profit of 20% on the transfer price and therefore ,20% Rs. 2,000 = Rs. 400 represents the unrealised profit and must be reserved for.
- g) The total unrealised profit included in the stock of finished products is, therefore ,Rs. 1,600 ,as shown here under :

Profit added by process A Rs.	400
Prfoit added by process BRs.	1,200
	Rs. 1,600
* Total reserve to be created	Rs. 2,266

1. Hence the actual realised profit which can be credited to the Profit and Loss Account for the year is :

Profit shown by the accounts	16,000
Less: Reserve for unrealised Profit (as above)	2,266
	13,734

2. The process stocks (in process A and B) and the stocks of finished products will appear in the Balance Sheet at the end of the year at cost as hereunder :

	RS.
Process A	6,000
Process B (Rs.8,000 - Rs. 666)	7,334
Finished stock (Rs. 6,000-Rs. 1,600)	4,400
	17,734

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## 20,8 JOINT-PRODUCTS,BY-PRODUCTS AND METHODS OF APPORTIONING JOINT- COSTS

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In the process of producing the main product in the multiproduct industries, frequently materials or products of lesser value, "by-products". will emerge. On the other hand ,products produced concurrently and simultaneously in a common process or operation or a series of common processes having the same intrinsic value, however different they may be called Joint products. For example, in the Refinery industry where crude oil is processed, the Main Product is Refined oil and the by-products are sulphur, chemical fertilisers, etc. In the fractional distillation of coal, products like a) coke, ,b) gas,c) Amonia, etc., are obtained which are called Joint-products.

### Methods of Apportioning Joint-costs:

The main problem in the case of joint product costing is the apportionment of joint costs incurred upto the point of split -off or point of separation.

The following are the important methods of apportioning the joint-costs of production to joint-products :

1. Physical Unit Method
2. Market Price Method
3. Survey Method
4. Reverse Cost Method, etc.,

### 20.9 SUMMING- UP

Process costing refers to costing of one or more processes involved while converting a raw materials into a finished goods. In this unit we tried to explain the salient features of process costing and the accounting procedure of process costing.

### 20.10 CHECK YOUR PROGRESS : MODEL ANSWERS

Process I account			Week end Output - 950 Units		
Dr	Units	Amount	Particulars	Units	Cr
Particulars		Rs			Rs.
To Units introduced	1,000	3,000	By Normal	50	100
"Direct material		2,600	By Process	950	9,500
			IIA/c (Transfer)		
"Direct wages		2,000			
"Production overhead		2,000			
	1,000	9600		1,000	9,600

Process 'II' Account			Week end Out put - 840 Units		
Dr	Units	Amount	Particulars	Units	Dr.
Particulars		Rs.			Rs.
To Process I transfer	950	9,500	By Normal loss	95	380
"Direct material		19,80	" Abnormal loss	15	300
"Direc wages		3000	" Process-III A/c	840	16,800
"Production overhead		3000	( Transfer)		
	950	17,480		950	17,480

Dr.		Process III Account		Cr	
Particulars	Units	Amount Rs	Particulars	Units	Amount RS
To Process II transfer		16,800	By Normal loss	126	630
"Direct material		2,962	"Finished stockA/c 750		28,500
"Direct wages		4,000	(Transfer)		
"Product overhead		4,000			
'Abnormal gain	36	1,368			
	<u>876</u>	<u>29,130</u>		<u>876</u>	<u>29,130</u>

**Calculation of cost per unit :**

**Process -I**

- a) Normal Production = 1000 - 5% of 1000  
 = 950 units; Actual 950  
 No loss no gain
- b) Normal Cost = Cost-incurred - Amount of scrap value  
 = 9,600 - 100  
 = Rs 9,500
- Cost per unit =  $9500 / 950 = \text{Rs}10$

**Process - II**

- a) Normal Production = 950 - 10% of 950  
 = 950 - 95  
 = 855 units actual 840  
 The difference of 15 units is abnormal loss  
 but charged as if it is a finished product.)
- b) Normal cost = 17,480 - 380  
 = Rs. 17,100
- Cost per unit =  $17,100 / 855 = \text{Rs. } 20$

**Process -III**

- a) Normal Production = 840 - 15% of 840  
 = 840 - 126  
 = 714 Units Actual 750  
 (The difference of 36 units treated  
 as abnormal gain and valued at  
 the rate of finished product.)
- b) Normal Cost = 27,762 - 630  
 = Rs. 27,132
- Cost per unit =  $27,132 / 714 = \text{Rs. } 38$

## 20.11 MODEL EXAMINATION QUESTIONS

### A. Answer the following in about 30 lines each .

1. Define process costing. Discuss the salient features of process costing.
2. Define By-products and Joint-products with suitable illustrations. Explain the various bases for apportioning the Joint Costs to By-products and Joint products.

### B. Answer the following in about 15 lines each.

3. What are normal and abnormal process losses? How are they treated in Cost Accounts?
4. What is meant by inter-process profits? How they are treated in costing?

### EXERCISES

(1) The product of company passes through three distinct processes for completion. These processes are Known as A,B and C. From the past experience it is ascertained that wastage is incurred in cash process as under :

Process A	10%
Process B	5%
Process C	10%

In each Prouss the percentage of wastage is computed on the number of units entering the process concerned. The wastage of process 'A' is sold at Rs. 15 per unit and process 'B' at 25 unit and that of process 'C' at Rs. 30 per unit.

The output of each process passes immediately to that of the next process and the finished units processed from process 'C' into stock .The following information is obtained :

	Process A	Process B	Process C
	Rs.	Rs.	Rs.
Materials consumed	10,000	15,100	17,310
Direct labour	15,000	20,000	25,000
Manufacturing expenses	10,000	11,130	12,500

1000 units have been issued to process A at cost of Rs.25 per unit. The output of each process has been as under :

Process A - 920 ; Process B- 870 and Process C - 800 units. There was no stock or work - in- progress in any process. Show Process Accounts, Abnormal Loss Account and Abnormal Gain Account.

(2) Kakatiya Limited produces a patent material used in building in the manufacture of which three process are involved. The material is produced in three consecutive grades, namely, soft medium and hard. Figures relating to production for the first six months of 2003 are as follows

	ProcessA	ProcessB	Process C
Raw material used (tons)	1,000	-	-
Cost per ton (Rs.)	200	-	-
Manufacturing wages (Rs.)	72,5000	40,800	10,710
and expenses			
Weight lost	5%	10%	20%
92 Scrap (sold at Rs. 50 per ton)	50tons	30tons	51tons

Two thirds of Process - A and one half of Process - B are passed to the next process and the balances are sent to the warehouse for sale.

You are required to prepare an account for each process showing the cost per ton of each process .

(3) The finished product of M/s Geethanjali Co. Ltd., passes through two distinct process : Geetham and Gauthami and then to finished stock. Experience reveals that in each process normally 5 percent of the total weight is lost and 10 percent turns scrap, which from process Geetham and Gauthami fetch Rs. 100 and Rs. 200 per unit respectively. The following is the information extracted from the books of the company relating to the two processes :

	Geetham Process	Gauthami Process
Materials(in units )	8,000	560
Material cost per unit (Rs.)	150	250
Direct wages (in Rs.)	2,24,000	80,000
Manufacturing expenses(Rs.)	80,000	49,360
Out put in units	6,400	6,000

Prepare process accounts showing total cost and cost per unit of each process. There was no stock or work-in-progress either at the beiging or at the end.

(Answers : Geetham : Abnormal Loss 400 units @ Rs. 220 per unit; output 6,400 units @ 220 rupees perunit .

Gauthami : Abnormal gain 84 units @ Rs. 260 per unit ; out put 6000 units @ Rs. 260 per unit )

(4) The final product of M/s. Ushodaya Co. Ltd., passes through three distinct process : ARUNA, SANDHYA AND NISI. The normal wastage of each process is as follows: Aruna 3% ; Sandhya 5% and Nisi 8% . Such wastage Aruna fetches Rs. 1 per unit that of Sandhya Rs. 2 per unit and that of Nisi @ Rs. 3 per unit. 40,000 units were introduced to Aruna process @ Rs. 2 per unit. the other expenses of the processesgiven here under :

	Rs.	Rs.	Rs.
Other materials	8,000	12,000	4,000
Wages	40,000	64,000	52,000
Other expenses	31,600	12,270	17,528
Actual output (in units)	38,800	36,400	33,500

There are no opening or closing stocks. Prepare Process Accounts .

(Answer : Aruna : Abnormal Wastage 800 units, Rs. 3,200 ;

Out put 38,800 units @ Rs. 4 per unit.

Sandhya : Abnormal Wastage 460 units Rs. 2,990

Output 36,400 units @ Rs. 6.50 per unit

Nisi : Abnormal Gain : 12 units Rs. 108 ;

Out put 33,500 units Rs. 9 per unit)

(5) The final product of M/s. Iswarya Co., passes through two distinct processes: Ihika and Auchitya, The following information extracted from the books of the Company relates to the two processes :

	Ihika Process Rs.	Auchitya Process Rs.
Materials	80,000	—
Wages	80,000	1,12,000
Overheads	32,000	80,000

The output of Ihika process is transferred to Auchitya process at a price calculated to give a profit of 20 percent on the transfer price and the output of Auchitya process is charged to finished stock at a price of 25 percent on the transfer price. The sale of finished stock received from Auchitya process is sold for Rs. 80,00,00. There is no opening or closing stocks. You are required to prepare the two process accounts and find the total profit made by the company.

(Answer : Ihika : Profit Rs. 48,000 ; Auchitya Rs. 1,44,000 . Profit made by the company on the sale of finished stock Rs. 2,24,000 . Total profit made by the Company: Rs. 4,16,000 )

(6) The final product "APEKSHA" of M/s Aparajitha Co. Ltd., passes through two distinct processes "APOORVA " and "APAROOPA " . It is known from past experience that 5% of the units entering the APOORVA process and 10% of the units entering APAROOPA process would go waste. Such waste in Aporva fetches rs. 10 per unit and that in Aparooopa fetches rs. 20 perunit. the following are the other particulats extracted from the books of the company :

	APOORVA Process Rs.	APAROOPA Process Rs.
Sundry materials	24,000	12,000
Wages	28,000	16,000
Manufacturing expenses	8,050	8,190

10 ,000 units were introduced into Aporva Process at a cost of Rs. 20,000. The output was : Aporva Process 9,400 units and Aparooopa Process 8,400 units .

Prepare the Process Accounts .

(7) A product passes through two distinct processess A and B, and then to finished stock.

The normal wastage of each process is as follows ;

Process A - 3% of the units entering the process.

Process B - 5% of the units entering the process.

Wastage of Process-A was sold at 50 paise per unit and that of process -B at Re. 1 per unit, 10,000. unit were issued to process-A at a cost of Rs. 2.00 per unit.

The other expenses were as here under :

	ProcessA Rs.	ProcessB Rs.
Sundry materials	2,000	3,000
Wages	10,000	16,000
Manufacturing expenses	2,100	2,375

The actual output were :

Process-A	9,500 units
Process-B	9,100 units

Prepare Process Accounts assuming that there is no opening or closing stocks.

## 20.12 RECOMMENDED BOOKS

S.P.Jain and K.L. Narang	- Cost Accounting' Kalyani Publishers, New Delhi.
P.K. Ghosh	- Cost Accounting' National Publishing House, New Delhi.
B.K. Bhar	- Cost Accounting., 'Methods and Problems Academic, Publishers, Kolkata.

## 20.13 GLOSSARY

<b>Abnormal Gain</b>	:	Abnormal gain is a process gain and is the result of the actual loss being less than the estimated loss.
<b>Abnormal Loss</b>	:	Abnormal loss is a loss caused by unexpected or unanticipated conditions or on account of inefficient operating conditions.
<b>By-Products</b>	:	Any product of saleable or usable value incidently produced in addition to the Main Product
<b>Joint Products</b>	:	Joint products are those produced concurrently and simultaneously in a common processes having the same intrinsic value, however different they might be.
<b>Normal Loss</b>	:	It is an unavoidable loss because of the nature of the material or process used.
<b>Process Costing</b>	:	It is a method of costing used to ascertain the cost of the product at each stage of manufacture.
<b>Scrap</b>	:	It is the incidental residue from certain types of manufacture, usually of small amount and low value, recoverable without further processing.
<b>Spoilage</b>	:	It is that portion of raw materials which has been spoiled in manufacture , but which can be used again in manufacture as raw material or sold as seconds.

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# UNIT - 21 : OPERATING COSTING

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## Contents :

- 21.0 Aims and Objectives
- 21.1 Introduction
- 21.2 Operating Costing Units
- 21.3 Classification of Expenses
- 21.4 Characteristics of Undertakings where Operating Costing used
- 21.5 Transport Costing
- 21.6 Illustrations
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- 21.8 Check Your Progress: Model Answers
- 21.9 Model Examination Questions
- 21.10 Recommended Books
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## 21.0 AIMS AND OBJECTIVES

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In this unit we have presented operating costing, classification of expenses, characteristics of undertakings where operating costing used and calculation of operating costing.

By the end of this unit, you will be able :

- Understand the meaning of operating costing
- Explain the classification of Expenses
- List out the characteristics of concerns where operating costing used
- Calculate operating costing of transport service organisation.

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## 20.1 INTRODUCTION

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Operating Costing is a method to ascertain and control the costs of the undertakings which do not produce products but render service. The concerns which follow this method are for example.

Transport Service	:	Motor, Railways, Shipping, Air etc.,
Public utility services	:	Gas, Electricity, Hospitals, Theaters, Universities, Colleges water supply undertaking or Corporations etc., catering Establishments, Hotels, Hostels, Canteen, Cafeteria etc.,

The Operating Cost Method is similar to the Unit Cost Method or the output cost method. The cost per unit of the service rendered is required to be ascertained by preparing cost sheet.

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## 21.2 OPERATING COSTING UNITS

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The selection of a units of service in the case of operating costing is a difficult task. It depends upon the nature of business, The unit of cost may be (a) Simple, or (b) Composite

**Simple Cost Unit :** In this case the unit of cost is per bed in the case of a hospital, per student in the case of school, and per mile or per tonne or per passenger in the case of a transport company etc.,

**Composite Cost Unit :** In this case more than one units are combined together. the following are some of the examples of composite cost unit:

Name of the Service Undertaking	Cost Unit
a) Transport	- per Passenger - K.Ms - per Tonne - K,Ms
b) Hospitals	- per Patient - Bed - per Patient- Day or - per Patient Week
c) Electricity supply	- per KWH (Kilow watt-hours)
d) Canteen	- per Meal - Persons
e) Cinema	- per Man - Show
d) Hotels	- per Room- Day; per Person per Day
f) Hostels	- per Room - Day; per Person per Day
g) Gas works	- 1000 Cubic Feet
h) Steam production	- 1000 lb raised.

### Check Your Progress - I

What is Operating Costing ?

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## 21.3 CLASSIFICATION OF EXPENSES

Costs are classified into the following three heads :

- Stading of Fixed charges :** These charges are incurred whether service is provided or not, Example in case of Transport Vehicle, which runs or not, salary of operating manager and supervisors, insurance, vehicle tax, licence fees, garage rent etc.,
- Maintenance costs or semi-variable expenses.** These expenses are to some extent constant and to some extent variable e.g. Tyre and tube repairs and painting etc.,
- Operating expenses and running costs or variable costs :** These charges vary more or less in direct proportion to service rendered. In transport includes expenses like petrol, oil, grease, depreciation.

The classification of Larioustdtems of costs into the above three groups should not be attempted as a matter of rule. It depends basically on the circumstances of each case.

## 21.4 CHARACTERISTICS OF UNDERTAKINGS WHERE OPERATING COSTING USED

Industries or undertakings where operating costing is used have the following characteristics

- (a) A high proportion of costs of service undertakings are fixed in nature e.g., cost of running by quantity of goods. Similarly, establishment costs of hotel are not effected by the fluctuation in the number borders.
- (b) The distinction between fixed costs and variable costs is of special significance in the case of operating costing because economic scale of operation have a considerable effect on the cost of service per unit.
- (c) Service industries provide regularly a uniform service to the consumers. These industries accumulate expenses for a period and relate it to the services rendered during that period. In some specific cases operating cost may be treated as job cost Example calculating the cost of a trip, where the bus is chartered out for a specific trip.

## 21.5 TRANSPORT COSTING

**Cost Unit:** In transport costing the cost unit is generally passenger-km or tonne-km. The total cost of operating each vehicle is found out then is applied to the particular cost unit. Thus the cost of carrying a load of one tonne or a passenger for a K.M. is ascertained.

**Calculation of Unit Cost:** Thus the calculation of passenger-KM or tonne-K.M. both passengers or weight carried and distance travelled are taken into account. This is calculated as follows. No. of vehicles x capacity x distance travelled x days x passenger/weight actually carried.

By preparing Cost Sheet, Total expenditure is found and cost per unit is calculated.

### Proforma of Operating Cost Sheet

Particulars	Total Cost. Rs.	Cost per Unit Rs.
a) <b>Fixed expenses:</b> Garage Rent, Insurance, Motor Vehicle Tax, General Supervision., Salary, Interest on Capital		
b) <b>Semi-variable or maintenance expenses</b> Tyres & tubes, Repairs Paintings, etc.		
c) <b>Variable expenses or operating expenses:</b> Fuel, Engine Oil : Lubricating & Grease Wages Deprection		
d) Total (A+B+C)		
e) Per Ton - K.M. Cost		

## 21.6 ILLUSTRATIONS

Following examples will explain the above calculation.

- (1) A transport undertaking has 4 buses running between two places 30 K.Ms apart. These vehicles make 4 round trips daily, the carrying capacity 48 passengers and 75% of this capacity is actually used. The vehicles are working on an average of 25 days a month.

Passenger : K.Ms =

**Solution:**

$$\begin{aligned} & \text{No. of buses} \times \text{distance} \times \text{trips} \times 2 \times \text{capacity} \times \text{days} \times \text{passengers actually carried,} \\ & = 4 \times 30 \times 4 \times 2 \times 48 \times 25 \times 75 / 100 = 8,81,600 \text{ P.K.Ms.} \end{aligned}$$

- (2) A Truck costs Rs. 2,37,600 and its life estimated for five years, Scrap value after 5 years is estimated at Rs. 17,600. Standing charges per annum are estimated as under :

Licence	Rs. 9,000
Insurance	Rs. 12,000
Administrative expenses	Rs. 21,000
The Driver and Attendent salary	Rs. 3300 /- per month

Fuel costs Rs. 25.60 per litre. The estimated consumption of fuel is 16 K.Ms per litre. Estimated annual Kilometre running is 30,000. The cost of lubricant is Rs. 3,000 per annum Cost of Tyres is Rs. 6400/- and expected K.Ms are 16,000. Repairs over the life of the vehicle are estimated Rs. 30,000.

Solution:

### Operating Cost Sheet

Particulars	Amount per K.M.
<b>A. Standing charges :</b>	
Insurance	(Rs. 9000/30,000) 0.30
Licence	(Rs. 12000/30,000) 0.40
Administrative expenses	(Rs. 21,000/30,000) 0.70
Drivers & Attendent salaries	$\frac{3300 \times 12}{30,000}$ 1.32
Fixed cost per KM	<u>2.72</u>
<b>B. Running Charges :</b>	
Depreciation	$\frac{2,37,600 \times 17,600}{5 \times 30,000}$ 1.47
Tyres	$\frac{25.60}{16}$ 0.40
Fuel	$\frac{3,000}{30,000}$ 1.60

Lubricants	<u>6400</u> 16000	0.10
Repairs	<u>30,000</u> 5 x 30,000	0.20
Running cost per Unit		<u>3.77</u>
(A+B) Total cost per K,M, or say Rs. 6,50		<u>6.49</u>

(3) A Transport undertaking is running 4 buses between two cities 50 K,Ms apart. Seating capacity of each bus is 50 passengers. The following particulars were obtained from their books :

	Rs.
Wages of drivers ,conductors and cleaners	24,000
salaries of Office & Supervisory Staff	10,000
Diesel Oil and Other Oil	40,000
Repairs & Maintenance	8,000
Taxation, Insurance	16,000
Depreciation	26,000
Interest & Other charges	<u>20,000</u>
Total	<u>1,44,000</u>

Annual passengers carried were 75% of the seating capacity. All the four buses run on all days of the month .Find out the cost per passenger K.M.

**Solution:** Calculation of Passenger K.M :

No. of buses	= 4
Capacity	= 50 passengers
Distance of round trip	= 50 x 2 = 100 K,M.s
Days	= 30

Passengers actually carried - 75 %

Passenger K.M. = No of Buses x Capacity x Distance of round trip x Days .

Passenger K.M. Carried :

$$4 \times 50 \times 100 \times 30 \times 75/100 = 4,50,000$$

#### OPERATING COST STATEMENT FOR THE MONTH

Particulars	Amount
<b>A. Standing Charges :</b>	Rs.
Wages of Drives, Conductors & Cleaners	24,000
Salaries of Office & Supervision of staff	10,000
Taxation, Insurance	16,000
Interest & Other charges	20,000

**B. Running Charges :**

Diesel and other Oil	40,000
Repairs & Maintenance	8,000
Depreciation	26,000
<b>A + B i.e., Total Cost</b>	<b><u>1,44,000</u></b>

$$\text{Cost per passenger K.M.} = \frac{1,44,000}{4,50,000} = \text{Rs. } 0.32$$

**(4) (Power House Costing)**

From the following data pertaining to the year 2002 - 03, prepare a cost sheet showing the cost of electricity generated per unit of K.W.H by Karnataka Thermal Power Station.

Total Units Generated	20,00,000 KWH
Operating Labour	Rs: 2,00,000
Repairs and Maintenance	Rs: 2,00,000
Lubricants, Spares and Stores	RS: 1,60,000
Plant Supervision	Rs: 1,20,000
Administrative Overheads	Rs: 80,000

Coal consumed per K W H for the year

is 2.5 Kg @ Rs., 08 per Kg

Depreciation @ 5% on Capital Cost of Rs. 8,00,000

**Solution :**

Karnataka Power Thermal Station for the  
Year 2002 - 03 Power House Cost Sheet  
Electricity generated 20,00,000 K W H

Items	Rs.	Cost per K.W.H Rs.
<b>(A) Fixed Costs :</b>		
Depreciation @ 5% on Rs. 8,00,000	40,000	
Plant Supervision	1,20,000	
Administrative Overheads	80,000	
Total fixed costs for the year	<u>2,40,000</u>	<u>0.12</u>
<b>(B) Variable Costs :</b>		
Coal 2.5 KG. x Rs. 0.08	4,00,000	0.20
Operating Labour	2,00,000	0.10
Repairs and Maintenance	2,00,000	0.10
Lubricants, Spares and Stores	1,60,000	0.08
	<u>9,60,000</u>	<u>0.48</u>

- Rs.
- (C) Total Cost (A+B) Rs. 12,00,000      0.60
- (d) Cost per KWH of electricity generated : 0.60
- (5) M/s. Abhinandana Road Transport Company keeps a fleet of lorries. The company provides the following information, relating to the month of April, 2003 :

Distance run during the month	40,000 K.M.	Rs.
Salaries to drivers and cleaners, etc	.....	8,000
Diesel, Oil, etc	.....	10,000
Original cost of lorries	.....	4,80,000
Repairs	.....	24,000
Garriage rent	.....	4,000
Licence and insurance	.....	24,000

Depreciation is to be allowed at 25 percent per annum on original cost of lorries. Prepare a statement of operating cost for the month of April, 2003 showing the cost per running Km.

**SOLUTION**

**M/S. Abinandana Road Transport Company.**

**Operating Cost Statement for the month of April, 2003**

I. Fixed Charges :	Rs.	Rs.
Garrage rent	4,000	
Licence and insurance, etc.,	24,000	
Salaties to drivers, cleaners	8,000	
(4,80,000 X 25/ 100 X 1/12)	10,000	46,000
<b>II Variable costs :</b>		
Diesel, oil, etc.,	10,000	
Repairs	24,000	34,000
Total Operating cost per month	80,000	
Distance run duting the month :	40,000 K,m,	
Cost per running Km. = $\frac{80,000}{40,000}$	=Rs. 2	

- (6) M/s. Ahlada Transport Company runs six buses between two cities which are 250 Km. apart from each other. The seating capacity of each bus is 40 passengers and on an average 80 percent of its seating capacity is used by the passengers. Each bus made one round trip per day. The following is the information extracted from the books of the company for the month of April, 2003 :

	Rs.
Salaries of drivers, conductors and cleaners	28,400
Office staff salaries	11,500
Diesel oil and other oils	51,600
Interest and other charges	15,000

Insurance and taxes	12,000
Repairs and maintenance	6,000
Depreciation	19,500

Prepare operating cost statement and ascertain cost per passenger Km.

**SOLUTION:**

**M/s. AHLADA TRANSPORT COMPANY**

**Operating cost Statement (April, 2003)**

I.	Fixed /Standing charges :	Rs.	Rs.
	Salaries of drivers, conductors & cleaners	28,400	
	Office staff salaries	11,500	
	Insurance and taxes	12,000	
	Interest and other charges	15,000	
		<u>        </u>	66,900
II.	Variable Running charges :		
	Diesel and other oils	51,600	
	Repairs and maintenance	6,000	
	Depreciation	19,500	
		<u>        </u>	77,100
	Total Expenditure		<u>1,44,000</u>

Calculation of total passenger Km. :

$$6 \times 40 \times 80\% \times 30 \times 250 \times 2 = 28,80,000$$

Total passenger Km in the month of April, 2002 = 28,80,000

$$\text{Cost per passenger Km} = \frac{1,44,000}{28,80,000} = 5 \text{ Paise .}$$

(7) M/s. Quick and Safe Transport company supplies the following information. The company has a fleet of 5 buses running between two cities of 200 Km. from each other . The seating capacity of each bus is 50 passengers.

	Rs.
Wages of drivers, conductors and cleaners	1,20,000
Diesel and other oils and lubricants	2,00,000
Office salaries and expenses	50,000
Interest and other charges	1,00,000
Depreciation	1,30,000
Taxation and insurance	80,000
Repairs and maintenance	40,000

On an average each bus carried passengers 80 percent of the seating capacity during the month. All the 5 buses ran on all the 30 days in April, 2003. Find out the cost per passenger Km.

**SOLUTION :**

**M/s. Quick and Safe Transport Company**

**Calculation of Total Passenger Km.**

Number of buses : 5 ; capacity of each bus : 50 passengers, distance of one round trip :  
200 X 2 = 400 Km.

Passengers actually carried by each bus during the month : 80 percent of the seating capacity =  
50 X 80 % = 40

Passenger Km. = 5 X 50 X 400 X 80 % = 24,00,000 P.Km.

**Operating Cost Statement**

	Rs.
<b>I. Standing charges:</b>	
Wages of drivers, conductors & cleaners	1,20,000
Office salaries and expenses	50,000
Taxation and insurance	80,000
Interest and other charges	<u>1,00,000</u>
	<u>3,50,000</u>
<b>II. Running Charges :</b>	
Diesel & other oils & lubricants	2,00,000
Repairs and maintenance	40,000
Depreciation	<u>1,30,000</u>
	<u>3,70,000</u>
<b>Total I and II :</b>	<u><u>7,20,000</u></u>

Cost per Passenger Km.  $\frac{7,20,000}{24,00,000} = 30$  paise.

**(8) (Power House Costing)**

From the following data pertaining to the year 2002-03 prepare a cost sheet showing the cost of electricity generated pwe unit of K.W.H .by Karnataka Thermal Power Station.

Total Units generated 20,00,000 KWH

Operating Labour	Rs: 2,00,000
Repairs and Maintenance	Rs: 2,00,000
Lubricants, Spares and Stores	Rs: 1,60,000
Plant Supervision	Rs: 1,20,000
Administrative Overheads	Rs: 80,000

Coal consumed per KWH for the year is 2.5 Kg @ Rs.. 08 per Kg

Depreciation @ 5% on Capital Cost of Rs. 8,00,000

**SOLUTION :**

**Karnataka Power Thermal Station**  
**Power House Cost Sheet Year 2002-03**

Electricity generated 20,00,000 KWH

Items	Rs.	Cost per K.W.H
(A) Fixed costs :		Rs.
Depreciation @ 5% on Rs .8,00,000	40,000	
Plant supervision	1,20,000	
Administrative Overheads	80,000	
Total fixed costs for the year	Rs. 2,40,000	0.12
(B) Variable Costs:		
Coal 2.5 Kg. x Rs.0.08	4,00,000	0.20
Operating Labour	2,00,000	0.10
Repairs and Maintenance	2,00,000	0.10
Lubricants, Spares and Stores	1,60,000	0.08
	Rs. 9,60,000	0.48
(C) Total Cost (A+B)	Rs. 12,00,000	0.60
(D) Cost per K W H of electricity generated :	0.60	

## 21.7 SUMMING UP

Operating Costing method is used to ascertain the cost of service in service undertakings. For examples Transport undertaking, Electricity generating Units, Canteens etc.,

Selection of unit of service is important which depend on nature of business. Normally unit of service is composite Cost- per passenger - K.M. Costs are classified as standing, semivariable and operating expenses. Eg :

In service undertakings, a high proportion of costs are fixed. The distinction between fixed costs and variable costs is of special significance. Service industries provide regular and uniform service to customers .

In transport costing. cost unit, is passenger-KM or tonne-Km. The total operating cost of each vehicle is found, and computation is done to know cost per unit.

In transport undertakings, while calculating passenger - Km or tonne-Km., both passengers or weight carried and distance travelled are taken into account. This is calculated as follows,

No. of vehicles x capacity x distance travelled x passenger/ weight actually carried,

## 21.8 CHECK YOUR PROGRESS : MODEL ANSWERS

1.1. Operating costing is method followed by undertakings which produce service but not products ,

## 21.9 MODEL EXAMINATION QUESTIONS

### II. Answer the following in about 15 lines :

1. Define operating costing. Mention the industries where it is to be applied.
2. Explain what do you understand by "Composite Unit"/ Give examples.
3. State the characteristics of undertakings where operating costing is used.
4. Write about classification of expenses in operating costing.

### EXERCISES

5. From the following information calculate total K.Ms and total passenger K.Ms

No. of Buses ;	:	5
Days operated in the month	:	25
Trips made by each bus	:	4
Distance of route (one side)	:	20 K.Ms long
Capacity of Bus	:	50 passengers
Normal passengers travelling	:	90% of capacity

(Answer : Total K.M.20,000

: Total passengers K.M. = 9,00,000)

- (6) A transport service company is running 8 buses between two towns which are 50 K.Ms apart. Seating capacity of each bus is 40 passengers. The following particulars are obtained from their books.

	Rs.
Wages of drivers, conductors & cleaners	4,800
Salaries of office & supervisors staff	2,000
Diesel Oil & Other Oil	8,000
Repairs and maintenance	1,600
Taxation & insurance etc.,	3,200
Depreciation	3,200
Interest and other charges	4,000
	<u>26,800</u>

Actual passengers travelled were 90% of the seating capacity. All the four run on all days of the month. Each bus made one round trip per day. Find out the per passenger K.M.

Ans : 4 paise; Passenger K.M.3,60,000

- (3) The Rayalseema Transport Company is running 3 buses between two places 30 K,Ms apart. The seating capacity of each bus is 40 pasengers. Their books give the following particulars.

	Rs.
Wages of Drivers	1,600
Wages of Conductors & Cleaners	1,000
Salary of Supervisors	1,200
Cost of Fuel	5,000
Repairs	1,000
Garage Rent	600
Taxation & Insurance	2,000
Depreciation	2,400
Other Overhead expenses	1,200
	<u>16,000</u>

Actual passengers carried were 80% of the seating capacity. All the three buses run on all days of the month. Each bus made two round trips per day. Find out the cost per passenger K.M.

(Ans. : Cost per passenger KM Rs. 0.046)

- 4) The Bharat Road Transport Company which keep a fleet of lorries shows the following information.

Kilometres run for April, 2003	30,000
Wages of April	8,000
Petrol Oil etc., for April	16,000
Original Cost of vehicles	4,00,000
Depreciation to be allowed @ 25% per annum on original cost .	

	Rs.
Repairs for the month of April	24,000
Garrage Rent for April	4,000
Licence, Insurance etc., for the year	24,000

Prepare a statement for April, 2003 showing the fixed and variable cost per running K.M,

(Ans : Total cost per K.M. = 2.04)

- (5) 9. From the following data calculate the cost per K.M. of acehicle.

Value of vehicle	3,00,000
Road licence fee per year	10,000
Insurance charge per year	2,000
Garrage Rent per year	12,000

Driver Wages per month	4,000
Cost of petrol per litre	16,000
Kilometres per litre	8
Proportionate charges for tyres & maintenance per K.M.	4.00
Estimated life	1,50,000 K.Ms
Estimated annual kilometers	6,000

(6) Mr. Swaroop owns a fleet of taxis and the following information is available from the records maintained by him.

Number of Taxis	10
Cost of each Taxi	59,600
Salary of Manager	Rs. 700 per month
Salary of Accountant	Rs. 500 "
Salary of Cleaner	Rs. 200 "
Salary of Mechanic	Rs. 400 "
Garrage Rent	Rs. 600 "
Insurance Premium	Rs. 5% p.a.
Annual Tax	Rs. 900 per taxi
Driver Salary	Rs. 350 per month
Annual Repairs	Rs. 1000 per taxi

Total life of a taxi is about 2,00,000 K.Ms. A taxi runs, in all, 3,000 K.Ms in a month and 30 % of a this distance has to be run without any passenger.

Petrol consumption is one litre for every 10 K.Ms @ Rs. 4.41 per litre Oil and other sundries are Rs. 10.50 per 100 K.Ms.

Calculate the cost of running taxi per K.M.

(Ans : Total Cost per K,M, per taxi : 1.635)

(7) From the following information of a Transport Company, prepare operating Cost sheet showing the cost per passenger- Km.

The company owns and runs FIVE buses the cost of each one is as follows : Rs. 4,00,000; Rs. 9,60,000 ; Rs. 3,60,000; Rs. 4,40,000; and Rs. 6,40,000 respectively. Depreciation is to be charged at 20 percent on the value of the buses. Annual repairs and maintenance expenses amount to 80 percent of the depreciation of the buses. There are 10 drivers and 20 cleaners. While drivers salary is Rs. 800 per driver per month, that of the cleaners is Rs. 400 per cleaner per month There are six garages and garage rent is at Rs. 400 per month per each garage. The Director' s fee is Rs. 3,200 per month. Office expenses are at Rs. 8,000 per month. Licence and Taxes amount to Rs. 8,000 for every six months. the old tyres are sold once in every six months, each time fetching Rs. 25,600. Altogether 900 passengrs were carried over 1,600 K,M. during the year . Diesel expenses Rs. 80,000 .

(Answer : Total cost : Rs. 14,40,000 . Total passenger Km: 14,40,000.

Cost per Passenger Km. : Re.1)

( Note: The sale proceeds of the Old Types are to be shown as a deduction from the item " Repairs and Maintenance expenses)

- (8) The following information is extracted from the books of M/s. PQR Power Company. Prepare Operating Cost Sheet of the Company, showing the cost of one Unit (KWH) of electricity generated. Total Units produced : 15,00,000 Units .

	Rs.
Wages of the workers .....	66,500
Plant supervision .....	25,250
Lubricants and other supplies .....	10,500
Repairs and maintenance expenses .....	22,000
Administrative expenses .....	19,750
Capital Value .....	1,50,000

For every unit of electricity generated 2 kg. of coal is consumed @ Rs. 0.70 per Kg. Charge 4 percent of depreciation on the value of capital.

( Answer : Total Cost : Rs. 22,50,000

Cost per Unit of Electricity Generated Rs. 1.50)

- (9) From the following information, calculate (a) the total running Km. and (b) the total passenger Kms for the month of December, 2002 :

Number of buses	5
Number of days of operation in the month	25
Round Trips made by each bus	4
Distance of route (one side)	50 Km. long.
Capacity of each bus	40 Passengers
Normal passengers travelling	80% capacity

(Answer : (a) Total Running Kms. : 50,000 Kms .

(b) Total Passenger Kms. : 16,00,000 passenger Kms.)

- (10) From the following information extracted from the books of M/s, Pushpak Transport Company. compute cost per passenger Km. :

The company has 5 passenger buses costing Rs. 3,50,000 Rs. 7,50,000, Rs.3,00,000, Rs. 2,00,000 and Rs. 4,00,000 respectively. Annual depreciation of buses 20 percent of cost ... Annual repairs and maintenance 60 percent of depreciation.

Salaries of 10 drivers at Rs. 750 each per month. Wages of 10 cleaners at Rs. 500 per month.

Interest at 5 percent on cost of buses purchased. Rent of 6 garages at Rs. 250 each per month.

Directors fees and establishment expenses at Rs. 4,000 and rs. 3,000 respectively.

License and taxes at Rs. 7,500 per every six months. Amount realised by the sale of old tyres and tubes at Rs. 3,500 once in every six months.

1,000 passengers were carried over 10,000 Km. during the year.

( Answer : Total Passenger Kms. 1,00,00,000 during the year

Total operating cost of 5 buses during the year : Rs.10,00,000

Cost per passenger Km. = 10 paise

Note : Sale proceeds of old Tyres and Tubes are to be shown as a deduction from the item of expenditure Repairs and Maintenance expenses .

(11) M/s. Amarendra Transport Service Company is running Four buses between two towns, which are 100 Km. apart from each other . The seating capacity of each bus is 50 passengers. The following are the particulars extracted from the books of the Company for the month of April, 2003 :

	Rs.
Wages of drivers , conductors and cleaners	4,800
Diesel oil and other oils	8,000
Depreciation	13,200
Repairs and maintenance	1,600
Interest and other charges	5,000
Salaries of office and supervisory staff	12,000
Taxes and insurance	3,000

Actual passengers carried were 80 percent of the seating capacity. All the four buses ran on all the days of the month. Each bus made one round trip per day. Find out the cost per passenger Km.

(Answer : Total Passenger Km. 9, 60,000.

Total operating expenditure of 4 buses in the month = Rs. 48,000 .

Cost per Passenger Km. = 5 paise. )

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## 21.10 RECOMMENDED BOOKS

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1. Jain S.P. & Naran of K.L.	-	Cost Accounting"Kalyani Publishers, New Delhi.
2. Shukha & Grewal	.	"Cost Accounts" S. Chand & Company, New Delhi.
3. Nigam R.S., Natang S.P. & Sehgal B.G.	-	Advand Cost Accounting" AManagerial Approach" Sultan Chand & Company , New Delhi.
4. Agarwal M.L.	-	Theory & Practies of Cost Accounting, Sahitya Bhavan ,Agra.

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## 21.11 GLOSSARY

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Operating Cost	:	Cost of providing services
Simple Cost Unit	:	Unit of costs is one e.g. per be in the Hospital.
Composite Cost Unit	:	More than one Cost unit eg- passenger K.m.

**BLOCK - V :**  
**RECONCILIATION OF ACCOUNTS AND**  
**COST CONTROL TECHNIQUES**

- Unit - 22 : Reconciliation of Cost and financial Accounts
- Unit - 23 : Marginal Costing
- Unit - 24 : Budgetary Control
- Unit - 25 : Standard Costing

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# UNIT - 22 : RECONCILIATION OF COST AND FINANCIAL ACCOUNTS

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## Contents

- 22.0 Aims and Objectives
- 22.1 Introduction
- 22.2 Need for Reconciliation
- 22.3 Reasons for Disagreement
- 22.4 Procedure for Reconciliation
- 22.5 Summing Up
- 22.6 Check Your Progress : Model Answers
- 22.7 Model Examination Questions
- 22.8 Recommended Books
- 22.9 Glossary

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## 22.0 Aims and Objectives

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This unit aims at explaining the need for reconciliation of cost and financial accounts, reasons for the difference between cost and financial account and the preparation of reconciliation statements.

After studying this unit, you will be able to :

- explain the need for reconciliation
- identify the reasons for disagreement
- prepare the reconciliation statement

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## 22.1 INTRODUCTION

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Where cost and financial accounts are maintained in a concern both the accounting systems would disclose some final result of profit or loss which should be the same for both. This is so because both the cost and financial accounting systems derive information and data from the same sources (i.e. invoices, purchase bills, etc., for materials, pay-rolls for wages and salaries, and bills and vouchers for other expenses). But when independent sets of accounts are maintained, though interlocked through the control accounts, the final result (profit/loss) disclosed by one set of books may not agree with the profit or loss shown by the other set. There are many reasons for this disagreement. For the reasons which cause the difference between the respective financial results and also for proving the correctness of the figures in the two sets of accounts, it is necessary to reconcile the profit shown in the cost accounts with that shown in financial accounts.

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## 22.2 NEED FOR RECONCILIATION

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The reconciliation of Cost and Financial Accounts becomes necessary because of the following reasons :

- i) to ensure arithmetical accuracy of both the sets of accounts;
- ii) to enable the management to know the reasons for the difference in profit (or loss) as shown by both the sets of accounts; and
- iii) to make cost data more reliable.

### Check your progress - 1

- I. Why do you need to reconcile Cost and Financial Accounts ?

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## 22.3 REASONS FOR DISAGREEMENT

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The disagreement between the cost and financial results is caused by the following reasons;

**i) Items shown in financial accounts but not in cost accounts**

There are a number of items which are shown only in the financial accounts. Expenses included in financial accounts will have reduced the financial profit while items of revenue included in financial accounts will have increased the profit. As such, the financial profit is bound to differ from the costing profit. The items may be classified as under :

- a) *Pure financial charges* : Loss on sale or exchange of fixed assets; Loss on investments; Discount on debentures; Interest on bank loans, mortgages and debentures; Expenses like stamp duty, discount, etc., in connection with the raising and transfer of capital (issue and transfer of shares, debentures, etc.)
- b) *Pure financial incomes* : Profit on sale of fixed assets; Rent receivable; Dividend received; Fees received on issue and transfer of shares; Interest received on bank deposits and loans.
- c) *Applications of profits* : Income-tax; Dividends paid; Transfers to reserves; Donations and charities; Written off amounts of goodwill, preliminary expenses, etc.

**ii) Items shown only in Cost Accounts**

There are certain items which are shown only in cost accounts but not in financial accounts. These items usually are notional charges like rent on buildings owned, interest on owned capital, etc.

**iii) Differing treatment of Items**

Some items are treated differently in financial and cost accounts.

For example,

- (a) **Inventory Valuation** : The basis adopted for valuation of materials, work-in-progress and finished goods may not be the same in the two sets of accounts which may cause

disagreement in profits shown. In financial accounts the valuation of stock is usually on the basis of market value of cost, whichever is lower. In cost accounts, on the other hand, the stock is valued according to the method of accounting in use (e.g., FIFO LIFO, Average Price, etc.)

(b) **Overheads** : In the financial accounts, the overheads incurred are only taken into account, whereas in cost accounts overheads are recovered at pre-determined rates. If the under or over absorbed overhead amount is finally transferred to Costing Profit and Loss Account, there will be no difference between cost and financial profit figures. If, however, the amount is carried over to the next accounting year, the profit figures differ.

(c) **Depreciation** : If the method of depreciation followed in one set of accounts is different from that followed in the other, then also the profit figures disagree.

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## 22.4 PROCEDURE FOR RECONCILIATION

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The reconciliation of cost and financial profits is done by preparing a Reconciliation Statement or a Memorandum Reconciliation Account. This reconciliation is done at regular intervals. The figure of profit as per cost accounts or financial account is taken as the starting point for the reconciliation. The various reasons for the disagreement are ascertained. The effect of each reason on the profit of the accounts not taken as the starting point is assessed. If the effect of the items is to increase the profit of the latter the amount of the item is added to the profit taken as the starting point. If the effect of the item is to reduce the profit then such amount should be deducted. In this way, if every item is analysed and the amount added or subtracted, as the case may be, the ultimate figure would be the profit or loss as per the accounts not taken as the starting point.

For example, if the profit as per, financial accounts or the loss as per cost account is taken as the starting point, then the following items have to be added and subtracted; to ascertain the profit as per cost accounts or loss as per financial accounts.

### Items to be added :

- i) items of income included in Cost Accounts but not in Financial Accounts.
- ii) items of expense included in Financial Accounts but not in Cost Accounts.
- iii) under absorption of overheads in Cost Accounts.
- iv) excess value of closing stocks of inventory in Cost Accounts.
- v) under valued opening stocks of inventory in Cost Accounts etc.,

which would inflate the profit in Cost Accounts.

### Item to be deducted :

- i) items of income included in Financial Accounts but not in Cost Accounts.
- ii) items of expenses included in Cost Accounts but not in Financial Accounts.
- iii) over absorption of overheads in Cost Accounts.
- iv) excess value of opening stocks of inventor in Cost Accounts.
- v) under value of closing stocks in inventory in Cost Accounts etc.,

which reduce the profit in Cost Account.

Note : The above procedure is reversed, if the profit as per cost accounts or loss as per financial accounts is taken as the starting point.

The Reconciliation can also be done by preparing a Memorandum Reconciliation Account, the specimen of which is given below :

Memorandum Reconciliation Account		Cr.
Dr.		
To Financial expenses :	Rs.	By Profit as per Cost Accounts
Bank interest		By Financial incomes :
Discount		Profit on sale of assets
Fines		Dividends received
Penalties		Interest received
Under-writing commission		Rent received
Donations		
Written off amount of Goodwill and Preliminary expenses		" <u>Items charged in Cost Accounts</u>
" Under absorption of overheads		" Interest on Capital
" Under valuation of opening stock in Cost Accounts		" Over absorption of overheads
" over valuation of closing stock in Cost Accounts		" Over valuation of opening stock in Cost Accounts
" Profit as per Financial Accounts.		" Under valuation of closing stock in Cost Accounts

#### Illustration - 1

In a firm, the work overhead is absorbed @ 60% of direct wages and administration expenses @ 20% of the works cost. The total expenditure is as follows :

	Rs.
Direct Materials Cost	2,00,000
Direct Wages	1,50,000
Works Expenses	98,000
Administration expenses	85,000
	5,33,000

10% of the output is in stock and sales amounted to Rs. 5,10,000  
Prepare a Cost Sheet and a reconciliation statement.

#### Solution

Cost Books		
Cost Sheet		Rs.
Direct Material Cost		2,00,000
Direct Wages		1,50,000
	Prime Cost	3,50,000
Works Overhead, 60% of direct wages		90,000
	Works Cost :	4,40,000
Administration Expenses, 20% of works cost		88,000

	Cost of Production	5,28,000
Less Closing stock of finished goods (10% of output)		<u>52,800</u>
	Cost of goods sold	4,75,200
	Sales	<u>5,10,000</u>
	Net Profit	<u>34,800</u>

### Financial Books

Dr.	<i>Profit and Loss Account for the year ended.....</i>		Cr.
	Rs.		Rs.
To Material Cost	2,00,000	By Sales	5,10,000
" Direct Wages	1,50,000	" Closing Stock	53,300
" Works Expenses	98,000		
" Admn. Expenses	85,000		
" Net Profit	30,300		
	<u>5,63,300</u>		<u>5,63,300</u>

### Reconciliation Statement

	Rs.
Profit as per Financial Books	30,300
Add under absorption of works expenses	8,000
	<u>38,300</u>
Less over absorption of administration expenses	3,000
	<u>35,300</u>
Less under valuation of stock in Cost Books	500
Profit as per cost books	<u>34,800</u>

### Illustration - 2

Find out the Profit as per Cost Accounts and Financial Accounts from the following information and reconcile the results :

	Product X	Product Y
No. of units produced and sold	600	400
Total direct material cost (Rs.)	3,600	2,800
Total direct wages (Rs.)	3,000	2,400
Selling price per unit (Rs.)	25	30

The works on cost is charged at 80% of direct wages and the office on cost at 25% of works cost. The actual works expenses amounted to Rs. 4,500 and the office expenses to Rs. 3,900. There was no opening or closing stock.

**Solution :**

*Statement of Cost (Cost Books)*

	Product X Rs.	Product Y Rs.	Total Rs.
Direct Material Cost	3,600	2,800	6,400
Direct Wages	3,000	2,400	5,400
Prime Cost	6,600	5,200	11,800
Works on Cost, (80% of wages)	2,400	1,920	4,320
Work Cost	9,000	7,120	6,120
Office on Cost, (25% of works cost)	2,250	1,780	4,030
Cost of Production	11,250	8,900	20,150
Net Profit	3,750	3,100	6,850
Sales	15,000	12,000	27,000

**Financial Books**

Dr.		<i>Profit and Loss Account for the year ended.....</i>		Cr.
To Direct Materials :	Rs.	B Sales :		Rs.
X     3,600		X   15,000		
Y     2,800	6,400	Y   12,000		27,000
" Direct Wages :				
X     3,000				
Y     2,400	5,400			
" Works Expenses	4,500			
" Office Expenses	3,900			
" Net Profit	6,800			
	<u>27,000</u>			<u>27,000</u>

*Reconciliation Statement*

	Rs.
Profit as per Cost Books	6,850
Add Over-recovery of office expenses	130
	<u>6,980</u>
Less Under recovery of works expenses	180
Profit as per Financial Books	<u>6,800</u>
Works expenses	
Office expenses	4,030
Cost book	4,320
(2,400 + 1,920)	(2,250 + 1,780)
Financial Books	4,500
Difference	<u>180</u>

### Illustration - 3

The following is summary of the Trading, Profit and Loss Account of X Ltd., for the year ending on December 31, 2002 :

Dr.	Rs.	Cr.	Rs.
To Materials Consumed	27,40,000	By Sales (1,20,000 units)	60,00,000
" Wages	15,10,000	" Finished Stock (4,000 units)	1,60,000
" Factory over heads	8,30,000	" Work-in-Progress	1,20,000
" Administration Expenses	3,82,400	" Dividends Received	18,000
" Selling & Distribution Expenses	4,50,000		
" Preliminary Expenses (written off)	40,000		
" Goodwill (written off)	20,000		
" Net Profit	3,25,600		
	<u>62,98,000</u>		<u>62,98,000</u>

The company manufactures a standard unit.

In the Cost Accounts

- i) Factor expenses have been allocated to the production at 20% on prime cost;
- ii) Administration expenses have been allocated at Rs. 3 per unit on units produced;
- iii) Selling and Distribution expenses have been allocated at Rs. 4 per unit on units sold.

Prepare a Statement of Cost and Profit and reconcile the profit disclosed with that shown in the Financial Accounts.

### Solution

#### Statement of Cost

Materials Consumed		Rs.
Wages	5,52,000	27,40,000
	1,24,000	15,10,000
	Prime Cost	42,50,000
Factory Expenses, (20% on Prime Cost)		8,50,000
		51,00,000
(-) Closing Works-in-progress		1,20,000
	Factory cost	49,80,000
Administration Expenses (1,20,000 + 4,000) x Rs. 3		3,72,000
	Cost of Production	<u>53,52,000</u>

(-) Cost of Closing Finished Stock	$\frac{5,52,000}{1,24,000} \times 4,000$	1,72,656
	Cost of Goods sold	51,79,355
Selling and Distribution expenses (1,20,000 x Rs. 4)		4,80,000
	Cost of Sales	56,59,355
	Net Profit	3,40,655
	Sales	60,00,000

**Reconciliation Statement**

		Rs.
Profit as per Financial Accounts		3,25,600
(Add) Under-absorption of administration expenses		
(Rs. 3,82,400 - 3,72,000)	10,400	
Preliminary expenses	40,000	
Goodwill	20,000	
Difference in value of closing stock	<u>12,645</u>	83,045
		4,08,645
(Less) : Over-recovery of selling expenses		
(Rs. 4,80,000 - 4,50,000)	30,000	
Over-recovery of factory expenses		
(Rs. 8,50,000 - 8,30,000)	20,000	
Dividend received	<u>18,000</u>	68,000
		<u>3,40,645</u>
Profit as per Cost Books		<u>3,40,645</u>

**Illustration - 4**

From the following particulars, prepare a Reconciliation Statement :

	Rs.
Net Profit as per financial books	63,780
Net Profit as per cost books	66,760
Factory on cost under-recovered in cost books	5,700
Administration expenses recovered in excess	4,250
Depreciation charged in financial books	3,660
Depreciation recovered in cost books	3,950
Interest received but not included in costs	450
Income-tax provided in financial books	600
Bank interest credited in financial books	230
Stores adjustment (credit in financial books)	420
Depreciation of stock charged in financial accounts	860
Dividends appropriated in financial accounts	1,200
Losses provided for only in financial books	260

**Solution**

*Reconciliation Statement*

	Rs.	Rs.
Profit as per Financial Accounts		63,780
Add : Factory expenses under-recovered	5,700	
Income tax provided in financial books	600	
Depreciation of stock charged in financial books	860	
Dividend appropriated in financial books	1,200	
Losses provided for only in Fin. books	260	
		<u>8,620</u>
		72,400
Less : Administration expenses over-recovered	4,250	
Depreciation over-recovered in cost-books	290	
Interest received but not included in costs	450	
Banks interest credited in Fin. books	230	
Stores adjustment credited in financial books	420	
		<u>5,640</u>
Profit as per cost books		<u>66,760</u>

**Illustration - 5**

A Company's profit according to the costing system was Rs. 46,126 whereas the financial accounts showed a profit of Rs. 33,248. From the following additional information you are required to prepare a reconciliation statement showing the reasons for the difference between the two figures :

<i>Profit and Loss a/c for the year ending on the 30th of June, 1990</i>			
Dr.	Rs.	Cr.	
To Opening Stock	4,94,358	By Sale	6,93,000
" Purchases	1,64,308	" Closing Stock	1,50,242
" Direct Wages	46,266		
" Factory Overheads	41,652		
" Gross Profit c/d	96,658		
	<u>8,43,242</u>		<u>8,43,242</u>
To Administration expenses	19,690	By Gross Profit b/d	96,658
" Selling expenses	44,352	" Sundry income	632
" Net Profit	33,248		
	<u>97,290</u>		<u>97,290</u>

The costing records show :

- i) Stock balance of Rs. 1,56,394
- ii) Direct wages absorbed during the year : Rs. 49,737
- iii) Factory overhead absorbed : Rs. 39,428
- iv) Administration expenses charged @ 3% of selling price
- v) Selling expenses charged @ 5% of value of sales
- vi) No mention of sundry income

**Solution***Reconciliation Statement*

	Rs.	Rs.
Profit as per Financial Accounts		33,248
Add : Difference in value of closing stock	6,152	
Under absorbed factory overhead	2,224	
Under absorbed selling expenses	<u>9,702</u>	<u>18,078</u>
		51,326
Less : Excess direct wages absorbed in cost accounts	3,468	
Administration overhead over-recovered	1,100	
Sundry income not shown in cost accounts	<u>632</u>	<u>5,200</u>
		<u>46,126</u>
Profit as per Cost Books		

**Illustration - 6**

From the following particulars prepare (1) a statement of cost (2) Profit and Loss Account (as per financial books), and (3) Reconciliation Statement of Cost and Financial accounts.

	Rs.
Stock of materials at the beginning	30,000
Stock of finished goods at the beginning	60,000
Purchase of raw materials	1,80,000
Wages	75,000
Sale of finished goods	5,20,000
Stock of materials at the end	45,000
Stock of finished goods at the end	15,000

Calculate the factory on-cost @ 25% on Prime Cost and office on-cost @ 75% on factory on-cost. Actual works expenses amounted to Rs. 58,150 and office expenses to Rs. 45,750

**Solution***Statement of Cost (Cost Books)*

	Rs.	Rs.
Opening stock of raw materials	30,000	
(+) Purchase of raw materials	<u>1,80,000</u>	
	2,10,000	
(-) Closing stock of raw materials	<u>45,000</u>	
Raw materials consumed		1,65,000
Wages		<u>75,000</u>
		2,40,000
Prime Cost		<u>60,000</u>
Factory on-cost at 25% on prime cost		

	Factory Cost	3,00,000
Office on-cos at 75% on factory on-cost		<u>45,000</u>
	Cost of production	3,45,000
(+) Opening stock of finished goods		<u>60,000</u>
		4,05,000
(-) Closing stock of finished goods		<u>15,000</u>
	Cost of good sold	3,90,000
	Profit	<u>1,30,000</u>
	Sale of finished goods	<u>5,20,000</u>

### Financial Books

Dr.	<i>Profit and Loss Account for the year ended.....</i>		Cr.
	Rs.		Rs.
To Opening Stock :		By Sales	5,20,000
Raw materials	30,000	" Closing Stock :	
Finished goods	60,000	Raw Materials	45,000
" Purchases	1,80,000	Finished goods	15,000
" Wages	75,000		
" Factory expenses	58,150		
" Office expenses	45,750		
" Net Profit	1,31,100		
	<u>5,80,000</u>		<u>5,80,000</u>

### Reconciliation Statement

Profit as per Cost Accounts	Rs.
	1,30,000
Add : Over-absorbed factory expenses (60,000 - 58,150)	<u>1,850</u>
	1,31,850
Less : Under-absorbed office expenses (45,750 - 45,000)	<u>750</u>
Profit as per Financial Accounts	<u>1,31,100</u>

## 22.5 SUMMING UP

Reconciliation of cost and financial accounts should be done at regular intervals in order to check the arithmetical accuracy of both sets of accounts as well as to explain the difference in profits. Difference in profit or loss between cost and financial accounts will arise on account of the following reasons

- i) Items shown in financial accounts but not in cost accounts.
- ii) Items shown only in cost accounts.
- iii) Differing treatment of accounts.

For preparing reconciliation statement of cost and financial accounts, we have to apply the same principles of bank reconciliation statement. In order to reconcile the profits, one may start from profit figures as per cost accounts and vice versa. All additions or deductions from profit concerned should be clearly stated with brief explanations wherever possible.

## 22.6 CHECK YOUR PROGRESS : MODEL ANSWERS

- I. I. The following are the reasons for preparation of cost and financial accounts.
- To check arithmetical accuracy.
  - To explain the differences in profits.
  - To make cost data more reliable.

## 22.7 MODEL EXAMINATION QUESTIONS

**A. Answer the following in about 30 lines each.**

- Mention the reasons for disagreement between the profit figures of Cost Accounts and Financial Accounts.

**B. Answer the following in about 15 lines each.**

- Briefly explain the reasons for reconciliation of Cost and Financial accounts.
- Briefly explain the procedure for reconciliation.
- What is 'Memorandum Reconciliation Account' ?

### EXERCISES

- The following particulars are taken from the books of a company.

	Rs.
Opening stock of materials	2,50,000
Closing stock of materials	2,00,000
Purchase of materials	8,50,000
Wages	3,70,000
Opening stock of finished goods	1,80,000
Closing stock of finished goods	76,500
Sales of finished goods	21,50,000

Calculate the factory overhead at 20% on prime cost and office overhead at 80% of factory on-cost. Actual works expenses are Rs. 2,80,000 and actual office expenses are Rs. 1,80,000.

Prepare (i) a Statement of Cost as per Cost Accounts, (ii) Profit or Loss Account as per Financial Books, and (iii) Reconciliation Statement reconciling the profit figures of Cost and Financial books.

- The net profit shown by financial account of a Company amounted to Rs. 37,100 whereas the profits disclosed by the Company's Cost accounts for the period amounted to Rs. 57,320. On the scrutiny of both the sets of accounts the following differences were noticed :

	Rs.
i) Directors' fees not charged in cost accounts	1,300
ii) A provision for bad and doubtful debts	1,140
iii) Bank interest	60
iv) Income tax	16,600
v) Overheads recovered in cost accounts was while actual overhead expenses were	17,000 16,640

- vi) Work was started during the year on a new factory and expenditure of Rs. 32,000 was incurred. Depreciation at 5% was provided in financial accounts.

Prepare a Reconciliation Statement.

3. From the information given below, prepare (a) a statement showing costing profit or loss, and (b) another statement reconciling the costing profits with those shown by financial books

Dr.		Trading and Profit and Loss Account for the year		Cr.
	Rs.			Rs.
To Material	1,00,000	By Sales (1,00,000 Units)		2,00,000
" Direct Wages	50,000			
" Factory Expenses	30,000			
" Office Expenses	9,000			
" Selling Expenses	6,000			
" Net Profit	5,000			
	<u>2,00,000</u>			<u>2,00,000</u>

The normal output of the factory is 1,50,000 units. Factory expenses of fixed nature are Rs. 18,000. Office expenses are constant to the extent of Rs. 3,000 and the balance varies with sales.

[Ans : Costing Profit Rs. 20,000]

4. The profit as per cost accounts is rs. 1,50,000. The following details are ascertained on comparison of cost and financial accounts :

	Cost Accounts	Financial Accounts
	Rs.	Rs.
a) Opening Stock :		
Materials	10,000	15,000
Finished goods	18,000	16,000
b) Closing Stock :		
Materials	12,000	13,000
Finished goods	20,000	17,000
c) Interest charged but not paid Rs. 10,000		
d) Dividends received from UTI Rs. 1,000.		
e) Indirect expenses charged to financial accounts. Rs. 80,000 but rs. 75,000 recovered in cost accounts.		

Find out the profit as per financial accounts by preparing a Reconciliation Statements

[Ans : Rs. 1,31,000]

5. Prepare cost sheet and profit and loss account from the following information and reconcile with the help of Memorandum Account :

	Rs.
Materials	20,000
Wages	18,000
Works overheads	15,000
Office overheads	16,000

Selling overheads 4,000

Sales 1,00,000

In cost records, works overhead charges are recovered at 100% on direct wages and office overhead charges are recovered at 25% on works cost. Selling expenses are charged at 10% on sales.

In financial accounts, debenture interest paid Rs. 5,000 and preliminary expenses written off Rs. 3,000

[Ans : Costing Profit : Rs. 20,000; Financial Profit Rs. 19,000]

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## 22.8 RECOMMENDED BOOKS

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1. Jain S.P. & Naran of K.L. : 'Cost Accounting'  
Kalyani Publishers, New Delhi.
2. Shukla & Grewal : 'Cost Accounts'  
S. Chand & Company, New Delhi.
3. Nigam R.S., Narang S.P. & Sehgal B.G : 'Advanced Cost Accounting, "A Managerial Approach" S. Chand & Company,  
New Delhi.
4. Agarwal M.L. : 'Theory & Practice of Cost Accounting,  
Sahitya Bhavan, Agra.
5. PT Pattan Sheety & DR. Palekar : 'Cost Accounting'  
A Basic Approach, S.Chand & Co.,  
New Delhi.
6. D.K. Mittal & LUV Mittal : 'Cost Accounting'  
Galgotia Publishing Company,  
New Delhi 2001.

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## 22.9 GLOSSARY

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- Integral Accounting System** : A system of recording financial and costing transactions in one-self contained ledger called the integrated ledger.
- Non-integral Accounting System** : A system of accounting where financial and cost accounts are maintained independently of each other and separately.
- Cost Ledger** : The principal ledger of the cost department. It contains all impersonal accounts.
- Cost Control Accounts** : The accounts maintained to interlock cost and financial accounts which are maintained independently of each other. They make the cost ledger self-balancing.
- Memorandum Reconciliation Account** : The reconciliation of costing and financial profits may also be presented in the form of an account known as memorandum reconciliation account.

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## UNIT - 23: MARGINAL COSTING

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### Contents

- 23.0 Aims and Objectives
- 23.1 Introduction
- 23.2 Distinction Between Total Cost and Marginal Cost
- 23.3 Marginal Cost Equation
- 23.4 Application of Marginal Costing
- 23.5 Advantages and Disadvantages of Marginal Costing
- 23.6 Break-Even Analysis
- 23.7 Preparation of Break Even Charts
- 23.8 Managerial uses of Break-Even analysis
- 23.9 Limitations of Break-Even Analysis
- 23.10 Summing Up
- 23.11 Check Your Progress : Model Answers
- 23.12 Model Examination Questions
- 23.13 Recommended Books
- 23.14 Glossary

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### 23.0 AIMS AND OBJECTIVES

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In this unit we introduce you the marginal costing and its characteristics, advantages, disadvantages calculation of break-even analysis, its managerial uses and limitations.

After studying this unit, you will be able to :

- distinguish between total cost and marginal cost.
- form the marginal cost equation
- list out the advantages and disadvantages of marginal cost.
- define the term break-even
- calculate the break-even point
- understand the managerial uses of break-even analysis, and
- explain the limitations of break-even analysis

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### 23.1 INTRODUCTION

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Marginal Costing is not a system of cost ascertainment as job costing or process costing is. It is a special technique to present the management with information helpful to the study of the effects of changes in volume of output on profit. This technique is known as Marginal Costing. Fixed costs do not change with the changes in the output. As such, these costs are also known as Period Costs. But variable expenses increase or decrease in proportion to increase or decrease in the volume of output. So they do not affect the cost of production per unit when production changes.

Marginal costing is primarily concerned with the determination of product cost which consists of the total costs less the fixed costs. Thus marginal cost is the same as the variable cost. It excludes fixed expenses entirely from the cost of production giving rise to the same cost per unit as various levels of output. Under this technique fixed expenses are not allocated to cost units but are charged against 'fund' arises out of excess of selling price over total variable cost.

The ICMA London defines the term marginal cost as "The amount at an given volume of output by which aggregate costs are changed if the volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit". This definition shows that with the increase in one unit of output the total cost is increased and that this increase in the total cost when an additional unit is produced is known as marginal cost. For example, a company produces 100 fans per annum, the total fixed cost is Rs. 1,000 per annum and the variable cost per unit is Rs. 30, then the total cost is

	=	Rs. 3,000
Variable (Marginal cost) cost (100 x 30)	=	1,000
Fixed cost	=	<u>4,000</u>

If output is increased by one fan, the cost will appear as follows :

Variable cost (101 x 30)	Rs. 3,030
Fixed Cost	Rs. 1,000
	<u>4,030</u>

Marginal cost per unit is, therefore, Rs. 30. Variable cost or marginal cost is also called 'direct cost, 'activity cost' or volume cost'.

The ICMA London defined Marginal Costing as "The ascertainment of marginal cost and of effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs". In marginal costing, costs are separated into fixed and variable components. Only variable costs are included in the cost of production. And fixed costs are charged against 'fund' which arises out of excess of selling price over total variable cost. It is also known as 'variable costing', 'differential costing' or 'incremental costing'.

Very often marginal costing and direct costing are treated as being one and the same. But the ICMA London has made a distinction between these two terms by defining direct costing as "the practice of charging all direct costs to operations, processes or products, leaving all indirect costs to be written-off against the profit in which they arise."

### Characteristics of Marginal Costing

1. All elements of costs are classified into fixed and variable components, including even semi-variable costs.
2. Only the marginal costs are treated as the cost of the unit.
3. The value of stocks of finished goods and work-in-progress also comprises only marginal costs.
4. Fixed costs are charged to the 'fund' which arises out of excess of selling price over total variable costs. As such, these costs find to place in the cost of production.
5. Prices are based on marginal cost plus 'contribution'. 'Contribution' is the excess of selling price over marginal cost of sales.
6. The relative profitability of products or departments is determined after a study of the contributions made available by each product or department.

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## 23.2 DISTINCTION BETWEEN TOTAL COST AND MARGINAL COST

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Total costing, which is also known as Absorption Costing, is distinct from Marginal Costing in respect of the following aspects :

1. Absorption costing is a total cost technique. It is practice of charging all costs, both variable and fixed, to operations, processes or products. In contrast only variable costs are charged to products, processes or operations in Marginal costing. Fixed cost, as mentioned above, is treated as a period cost and included in the unit cost.
2. The excess of selling price over total cost is known as 'profit in total costing' whereas the excess of selling price over total variable cost is known as 'contribution in Marginal Costing'.
3. The profit does not bear a direct relationship to sales in total costing. But under marginal costing, contribution bears a direct relationship to sales.
4. In total costing, the stock of finished goods and work-in-progress is valued at total cost which includes both variable and fixed costs. The stock of finished goods is valued at variable cost only in marginal costing. This results in a higher valuation of stock in absorption costing than in marginal costing.
5. In absorption costing arbitrary apportionment of fixed costs quite often results in under and overabsorption of costs. Marginal costing excludes fixed costs. As such, the question of arbitrary apportionment of fixed costs does not arise.
6. Absorption costing which results in different costs per unit at different levels of output will not guide the managerial decision. But marginal costing is a useful technique which helps the management in making cost comparisons and in solving many managerial problems.

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## 23.3 MARGINAL COST EQUATION

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'Contribution is the difference between the sales and the marginal cost or variable cost and it contributes towards fixed expenses and profit. So the contribution first goes to meet fixed expenses and then to earn profit. If contribution is equal to fixed costs, there is no profit or loss. This sales point or volume of production at which total fixed costs, there is no profit or loss. This sales point or volume of production at which total fixed costs are equal to contribution is known as the break-even point or no profit or no loss point'.

The contribution can be expressed as :

Contribution (C) = Selling price (S.P.) – Marginal (Variable) Cost (V)

or Contribution = Fixed expenses (F) + Profit.

For the sake of convenience, the elements of costs can be shown in the form of an equation which is known as the 'Marginal Cost Equation' and is as follows.

$S - V = F \pm P/L$  where 'S' stands for sales, V for variable costs,

$\pm$  P for Profit and L for Loss

In order to earn profit, contribution must be more than the fixed expenses and to avoid loss, it must be equal to fixed expenses.

The marginal cost equation mentioned above is very helpful in finding out any of the four factors, S, V, F or P, if any of these three is known. This can be further explained with the help of the illustration given below :

### Illustration - 1

Determine the amount of fixed expenses from the following information :

	Rs.
Sales	1,20,000
Direct Materials	40,000
Direct Labour	25,000
Variable Overheads	10,000
Profit	25,000

### Solution

Marginal Cost Equation is :

$$S - V = F + P$$

$$S \text{ or Sales} = \text{Rs. } 1,20,000$$

$$V \text{ or Variable Costs} = \text{Rs. } 40,000 + 25,000 + 10,000 = \text{Rs. } 75,000$$

$$P \text{ or Profit} = \text{Rs. } 25,000$$

Applying the figures in the equation, we get

$$\text{Rs. } 1,20,000 - 75,000 = F + \text{Rs. } 25,000$$

$$F = 20,000$$

$$\text{Fixed expenses} = \text{Rs. } 20,000$$

### Illustration - 2

From the following information, find out the amount of variable cost :

Sales	Rs. 3,00,000
Fixed expenses	Rs. 50,000
Profit	Rs. 62,500

### Solution

Marginal Cost Equation is :

$$S - V = F + P$$

$$\text{or } S - F - P = V$$

$$\text{or } V = S - F - P$$

$$\text{Variable Cost (V)} = 3,00,000 - 50,000 - 62,500$$

$$V = 3,00,000 - 1,12,500$$

$$V = \text{Rs. } 1,87,500$$

### Illustration - 3

From the following particulars, find out the profit :

	Rs.
Marginal Cost	6,00,000
Fixed expenses	2,00,000
Sales	10,00,000

**Solution :**

Marginal cost equation is :

$$S - V = F + P$$

$$\text{Or } P = S - V - F$$

$$P = 10,00,000 - 6,00,000 - 2,00,000$$

$$P = 10,00,000 - 8,00,000$$

$$P = \text{Rs. } 2,00,000$$

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## 23.4 APPLICATION OF MARGINAL COSTING

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The most useful contribution of marginal costing is its being helpful to the management in making policy decisions. The total costing leads to different costs per unit at different levels of output. It makes comparison and control of cost difficult. It does not take into consideration the additional cost involved. As such it is not very helpful in taking managerial decisions such as the selection of a suitable product mix, the decision to buy or make a product or component, and the minimum price to be fixed during the depression.

Marginal costing technique is used by the management for solving business problems. Marginal costing takes into consideration the additional cost involved by distinguished the variable from the fixed costs. It helps the management in making several decisions such as decisions concerning the price at which a product should be sold and use of surplus capacity. It is also helpful in exercising cost control because separate records are maintained for fixed and variable expenses. The following are some of the managerial problems which are simplified by the use of marginal costing.

1. Fixation of selling price
2. Make or buy decisions
3. Effect of change in sales price
4. Maintaining a desired level of profits
5. Selection of a suitable product mix
6. Alternative methods of production.

### 1) Fixation of Selling Price

The information provided by the marginal costing helps in pricing the products. It helps the management in fixing the prices in different circumstances or contexts. The management while fixing prices has to keep in view the expected level of profits. In normal times the price fixed must cover all costs to make profits. But in certain circumstances, products may have to be priced below the total cost and it should be equal to the marginal cost. during Depression, the production must be continued when the selling, price is equal to marginal cost because fixed

expenses have to be borne, even though the production is discontinued. In this connection, marginal costing provides information regarding the rate of contribution at various levels of prices and capacity so as to enable the management to know the limits of prices within which it can operate.

## 2) Make or Buy Decisions

This decision has to be taken when the product that is being manufactured has a component that can either be made within the factory or purchased from an outside firm. By making component parts, a concern can make use of its idle capacity. In arriving at such a decision, the price asked by the outside suppliers must be compared with the marginal cost of producing the components. If the marginal cost is lower than the price demanded by the outside sellers, the component parts should be manufactured by utilising the idle capacity; otherwise, it should be decided to purchase them from outside suppliers.

It also helps in making the selection of a product when there are scarce or limited resources. The limited resources are known as key factors or limiting factors, and such factors should be utilised in cases, where contribution per unit of limited resource is the maximum.

## 3) Effect of Change in Sales Price

Management has to cut the price of products from time to time on account of competition, expansion, government regulations, etc. So, it is necessary to know the effect changes in prices of the products. A cut in the selling price results in a reduction in the contribution.

## 4) Maintaining a desired level of output

The management may be interested in maintaining a desired level of profits. The volume of sales needed to have a desired level of profits can be ascertained with the help of the marginal costing technique. To maintain the current level of profits, the number of units to be sold, if the selling price is proposed to be reduced can be ascertained. It can be illustrated as follows:

### Illustration - 4

You are given the following data for a factory for the year 2001 which ended :

Output : 20,000 units

Fixed expenses : Rs. 1,00,000

Variable expenses per unit : Rs. 10

Selling price per unit : Rs. 20

How many units must be produced and sold if the selling price is reduced by 10% in order to give the same profit?

### Solution

Contribution = Selling price (S.P.) - Variable Cost (V.C.)

= 20 - 10 - Rs. 10 per unit

Present profit = Total contribution - Fixed expenses

= 20,000 x 10 - 1,00,000 - 1,00,000

Selling price with 10% reduction =  $\frac{20 - 10}{100} \times 20 = \text{Rs. } 18$

Contribution - Rs.18 - Rs. 10 - Rs. 8

Desired sales =  $\frac{\text{F.C.} + \text{Profit}}{\text{Contribution per unit}}$

$\frac{1,00,000 + 1,00,000}{8} = 25,000 \text{ units.}$

### 5) Selection of a Suitable Product Mix

When a factory manufactures more than one product, the management faces the problem of finding the product mix that would yield the highest profits. The mix which yields the maximum contribution would be the best product mix. The production of such a product mix has to be maintained and increased. Marginal costing helps the management in taking a decision to continue, increase, reduce or suspend the production of a unit or to change the product mix.

### 6) Alternative Methods of Production

If the management has to choose from among alternative methods of manufacturing a product, the changes in the marginal contribution under each of the proposed methods has to be worked out. It is necessary to compare the alternative methods of production. i.e., machine work and hand work. The method which gives the greatest contribution can then be adopted.

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## 23.5 ADVANTAGES AND DISADVANTAGES OF MARGINAL COSTING

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Marginal costing has the following advantages:

1. Marginal costing is better suited to the needs of the management. The knowledge of cost behaviour under various operating conditions is essential to the management. Marginal costing differentiates between fixed costs and variable costs, and the cost data required for decision making and profit planning are readily available from costing records.
2. Marginal costing is simple to operate because it avoids the complications of apportionment of fixed costs.
3. Fixed costs are excluded altogether from the cost of production. As a result, there is no complication of over and under-absorption of overheads.
4. Fixed costs are incurred on a time basis and are not independent of the volume of production. To avoid misleading cost statements, marginal costing takes only the marginal cost.
5. If a number of products are manufactured, marginal costing facilitates the study of relative profitability of different products.
6. Under marginal costing, no fictitious profits can arise, as stocks are valued at marginal costs.
7. Marginal costing is a helpful for to budgeting and standard costing.

Marginal costing suffers from the following limitations :

1. It is difficult to classify all expenses as fixed or variable. But marginal costing assumes that all expenses can be classified into fixed and variable expenses. There may be semi-variable expenses like depreciation, bonus, etc. It is very difficult to categories semi-variable expenses correctly as fixed expenses or variable expenses.
2. The time factor is not given due attention because marginal costs exclude fixed expenses which are concerned with time. For suitable comparison fixed expenses also must be considered.
3. Marginal costing ignores the fact that fixed costs are also controllable.
4. The technique of marginal costing is difficult to apply in industries such as ship-building or contracts where the value of work-in-progress is high in relation to turnover.

5. In the long run the selling price cannot be fixed without taking fixed overheads into account.
6. It does not provide any standard for the valuation of performance. A system of budgetary control and standard costing gives more effective control than marginal costing.
7. The Balance Sheet will not provide a true and fair view because work-in-progress and finished stocks will be shown at the marginal cost. As such, in the case of fire accidents the complete loss cannot be recovered from the insurance company.

## 23.6 BREAK-EVEN ANALYSIS

The basic objective of any business enterprise is to earn profit. Profit depends on many factors. The most important factors which influence the profit of a business concern are the selling price of the product its cost of production and the volume of sales. These three factors are inter-dependent; The selling price depends to some extent on the cost of production and the sales volume depends upon the volume of production which in turn influences the cost of production.

Cost is the resultant of a number of factors such as

- i) Volume of production
- ii) Product mix
- iii) Internal efficiency in production
- iv) Change in the method of production
- v) Size of order
- vi) Lots or batches of products
- vii) Size of plant, etc.

Of all these factors, volume is the largest single factor, which influences cost. In other words, there is a close relationship between the cost, volume and profit of an enterprise. The cost-volume-profit relationship is technically known as 'Break Even Analysis'.

Break even analysis helps in formulating price policies as it presents a detailed analysis of different price structures and their influence on costs and profits.

Break even analysis refers to the study of revenue and cost of a business firm in relation to its volume of sales. It is also known as cost-volume-profit analysis because it shows the affect of changes in the level of production on cost and profit. Before we discuss the break even analysis in detail let us consider the declination of 'Break Even Point'. The Break Even Point may be defined as 'that level of sales at which total revenues are equal to total costs and the net income is zero'. This is also known as no profit - no loss point. In other words, the break even point is the sales volume at which there is neither profit nor loss, cost being equal to revenue. The main objective of Break Even Analysis is not simply to find out the break even point, but to know the relationships of cost, price and volume within a company's practical range of operations. It should also identify the amount of overhead costs which are to be charged or product cost at various levels of operation.

### Objectives of Break Even Analysis

Break Even Analysis is highly useful for profit planning, cost control and for 'the making of different business decisions. The following are the main objectives of break even analysis :

1. Knowledge of the relationship between profit, and costs on one hand and of the volume on the other go a long way in forecasting the profit accurately.

2. Break even analysis is helpful in preparing a flexible budget which indicates costs at various levels of activity.
3. Break even analysis is of immense use in performance evaluation for the purpose of control. For reviewing profits earned and costs incurred, the effect of changes in volume on costs are required to be evaluated.
4. Break even analysis assists in formulating price policies by protecting the influence of different price structures on costs and profits.
5. Break even analysis furnishes the amount of overhead costs which could be charged to product costs at various levels of operation.

### Assumptions

The break even analysis is based on the following assumptions :

1. All costs can be separated into perfectly variable or absolutely fixed over the entire range of volume of production.
2. Fixed costs remain constant regardless of the changes in the level of production.
3. Variable costs fluctuate in the same proportion as the volume of output changes.
4. Selling price remains constant and, therefore, the revenue varies with the physical volume of production.
5. The volume of sales and the volume of production are equal. As such, there will not be any opening or closing stocks.
6. Production policies and operating efficiency remain constant and the productivity per worker remains unchanged.
7. There is only one product or in the case of multi-product firms, the product mix is stable.

### Calculation of Break- Even Point

As explained earlier, the break-even point is that level of sales at which total revenues are equal to total costs. This is the minimum level of production where total costs are recovered. At this point, contribution could be equal to fixed costs and beyond this volume of operations profit begins. The break-even-point is determined in terms of both physical units and sales value in rupees.

#### i) Break-even point in terms of physical units

This method is applicable to and convenient for single product firms. The break-even volume is the number of units of a product which must be sold to earn adequate revenue to cover the total costs, i.e., fixed and variable costs.

The selling price of a unit covers not only its variable costs but also 'leaves a margin (i.e., contribution) to cover fixed costs. The break-even point is reached when a sufficient number of units are sold to cover total costs so that the total contribution margin of the units sold is equal to the fixed costs. The formula for calculation of break even point is as follows :

#### Illustration - 5

Sales = Rs. 1,00,000

Variable cost per unit Rs. 5;

Selling price per unit Rs. 10;

Fixed cost Rs. 50,000. Calculate B.E.P.

**Solution :**

$$\text{BEP} = \frac{\text{Fixed Costs}}{\text{Contribution Margin per Unit}}$$

$$= \frac{50,000}{10 - 5} = \frac{50,000}{5} = 10,000 \text{ units.}$$

This means that the firm makes neither profit nor loss at a sales volume of 10,000 units,

**ii) Break even point in terms of Sales Value**

In the case of multi-product firms, it is not possible to measure the break even point in terms of any common unit of product. It is convenient to determine their break even point in terms of total rupee sales. Even in the case of these firms, the break even point is the point where contribution margin (i.e., Sales value - Variable costs) would be equal to the total fixed costs. The contribution margin is expressed as a ratio sales. For example, if the sales amount to Rs. 10,000 and variable cost of these sales Rs. 5000, then the contribution ratio is (10,000 - 5,000) / 10,000 i.e., 0.5

The formula to find out Break even point is =  $\frac{\text{Fixed cost}}{\text{Contribution Ratio}}$   
or  
P/V Ratio

**Illustration - 6**

Calculate Break-even point from the information given below :

Sales	.....	Rs. 15,000
Variable costs	.....	Rs. 9,000
Fixed Costs	.....	Rs. 4,000

**Solution**

P / V Ratio is ..... Rs. =  $\frac{15,000 - 9,000}{15,000}$

$$= \frac{6,000}{15,000} = 0.4$$

$$\text{B.E.P.} = \frac{\text{Fixed Costs}}{\text{P/V Ratio}}$$

$$= \frac{4,000}{0.4} = \text{Rs. } 10,000$$

It is evident from the following that at sales value Rs. 10,000 (i.e., B.E.P) there is no profit or no loss.

Sales Value	.....	Rs. 10,000
Variable costs (0.6 x 10,000)	6,000	
Fixed costs	.....	4,000
Net Profit		NIL

### Illustration - 7

A firm has monthly fixed cost commitment of Rs. 2,00,000. It is producing only one product which sells at a price of Rs. 80 per unit. Variable cost per unit is Rs. 60. Calculate monthly BEP and annual BEP.

#### Solution

$$\text{Monthly BEP in units} = \frac{\text{Monthly FC}}{S - V} = \frac{2,00,000}{80 - 60} = 10,000 \text{ units.}$$

$$\text{Annual BEP in Units} = \frac{\text{Annual FC}}{S - V} = \frac{2,00,000 \times 12}{80 - 60} = 1,20,000 \text{ units.}$$

### Illustration-8

The profit -volume ratio of ABC Ltd. is 50% and the margin of safety is 40%- You are required to calculate the net profit if sales volume is Rs. 1,00,000

#### Solution:

$$\text{Margin of Safety} : 1,00,000 \times 40\% = \text{Rs. } 40,000$$

$$\text{Margin of Safety} = \frac{\text{Net Profit}}{\text{P/v Ratio}}$$

$$40,000 = \frac{\text{Net Profit}}{50\%}$$

$$50\% \text{ of } 40,000 = \text{Net Profit.}$$

$$20,000 = \text{Net Profit}$$

$$\text{Net Profit at the sales volume of Rs. } 1,00,000 \text{ is Rs. } 20,000$$

### Illustration - 9

A company earned a profit of Rs. 30,000 during the year 2001-2002. If the marginal cost and selling price of a product are Rs. 8 and Rs. 10 per unit respectively, find out the amount of margin of safety.

#### Solution :

$$\text{Contribution} = \text{S.P} - \text{V.C}$$

$$= 10 - 8 = \text{Rs. } 2$$

$$\text{P/V Ratio} : \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{2}{10} \times 100 = 20\%$$

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

$$= \frac{30,000}{20\%} = \text{Rs } 1,50,000$$

### Illustration - 10

The following information is extracted from the books of MPR Ltd.

Year	Sales Rs.	Cost Rs.
2000	2,00,000	1,40,000
2001	2,40,000	1,60,000

Calculate B.E.P.

**Solution :**

Year	Sales Rs.	Profit (Sales - Cost) Rs.
2000	2,00,000	60,000
2001	2,40,000	80,000
Change :	40,000	20,000

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100 \\ &= \frac{20,000}{40,000} \times 100 = 50\% \end{aligned}$$

Fixed Cost = Contribution - Profit

$$\text{For 2000} = (50\% \text{ of } 2,00,000) - 60,000$$

$$= 1,00,000 - 60,000 = \text{Rs. } 40,000$$

$$\text{For 2001} = (50\% \text{ of } 2,40,000) - 80,000$$

$$= 1,20,000 - 80,000 = \text{Rs. } 40,000$$

### Check Your Progress - 1

A company producing a single article sells it at Rs. 10/- each the variable cost of production is Rs.6/- each and fixed cost is Rs.400/- per annum.

From the above data calculate

- P/V Ratio
- Break-even Sales
- Sales to earn a profit of Rs. 500/
- Profit at sales Rs. 3000/
- New Break-even sales if the sales price is reduced by 10%

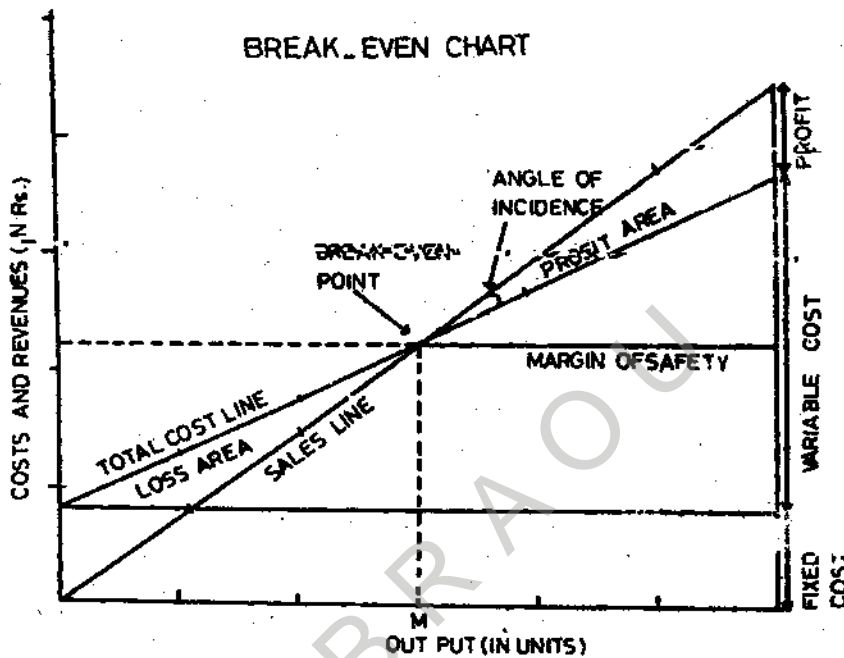
## 23.7 PREPARATION OF BREAK EVEN CHARTS

A break-even chart is a graphical representation of break-even analysis. It shows the interrelationship between profit, volume and cost. It also shows the break even point and depicts the estimated profit or loss at varying levels of output.

The important methods of preparing break-even charts are given below:

## First method

The volume or level of production is shown on the 'X' axis and costs and sales revenue are shown on 'Y' axis. The fixed costs are represented by a straight line parallel to the horizontal axis (i.e. OX). The variable costs are then plotted over and above the fixed costs. The resultant line is the total costs line, a combination of both variable and fixed costs. Sales or revenue line starts from the base and goes upward, thereby showing the increasing revenue. The point of intersection of the total costs line and the sales line is the break even point, because the total cost at this level of production is exactly equal to the total sales revenue. This would mean that if production is less than this point (i.e., OM) the firm will incur loss; if the production is more than this point, the firm will make profit. In the chart the loss area is shown below the break even point and the profit area above the break-even point.

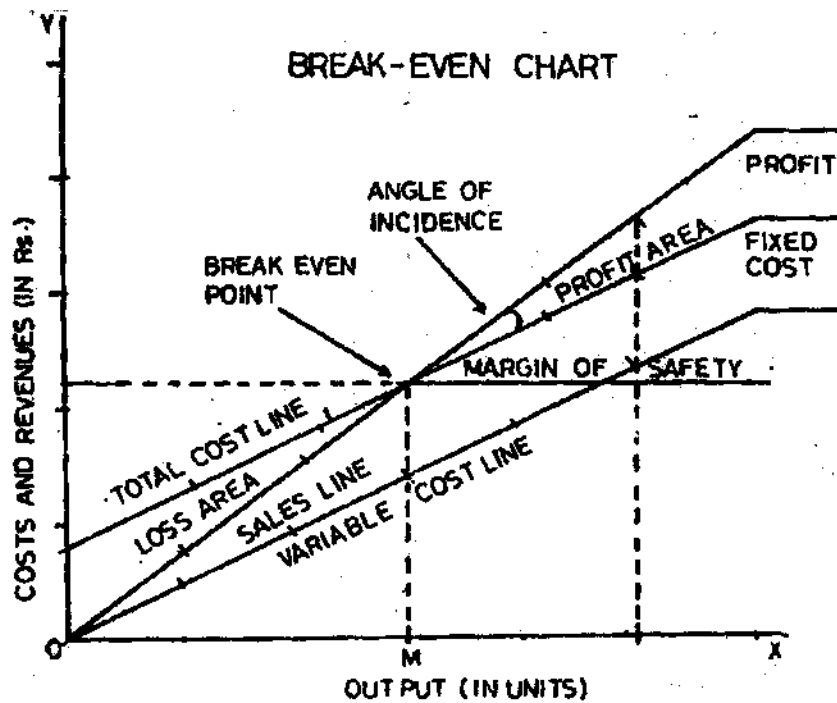


The angle of incidence shown in the chart indicates the rate at which profits are being made. A large angle of incidence is an indication that profits are made at a high rate. On the other hand, a small angle indicates a low rate of profit and suggests that variable costs form a great part of the cost of production.

The margin of safety refers to the excess of actual sales over break even sales. A large angle of incidence with a high margin of safety indicates the most favourable position for a business firm.

## Second Method

A variation, of the first method is that fixed costs are shown above the variable costs. This may be seen from the following figure



The total costs line, is drawn over the variable costs line representing the total cost at various levels of output. This method has the advantage of indicating the recovery of fixed costs at various levels of production before profits are realised. As a result, contribution at various levels of production can easily be found out from the chart. This assessment is helpful to the management in decision making.

### 23-8 MANAGERIAL USES OF BREAK-EVEN ANALYSIS

The break-even analysis is useful because it gives the management a microscopic picture of the profit structure of the business enterprise. The break-even analysis not only brings out the areas of strengths and weaknesses in the firm but also helps in detecting certain leverages which can be utilised to enhance its profitability. We all know that modern business is characterised by ever changing conditions and the management can know the profit vulnerability of a business enterprise owing to some changes in business conditions through break-even analysis.. Indeed, the break-even analysis is helpful in many ways :

1. The break-even chart helps the management to know at a glance the profits generated at various levels of sales.
2. Break even analysis enables the management to determine the volume of sales necessary to achieve a target profit.
3. The management can make the adjustment in respect of the sales volume needed to achieve a given amount of profit in the context of changing prices.
4. The break even analysis is helpful in knowing the various implications of the expanding of production capacity or the installation of additional equipment.
5. The break even chart shows how profit changes at different price levels under assumed conditions of demand and costs.
6. The break even analysis helps the management in deciding whether to go in for making certain components which are part of their finished products or to purchase them from outside suppliers.

7. Break even analysis helps the management in taking a decision with regard to the dropping of a product or adding a new product to the existing production line. The management would be able to know, through break-even analysis, the consequence of such decisions on revenue and costs.
8. Further, break-even analysis helps the management in choosing appropriate promotion-mix. We know that sellers use several methods of modes promotion, viz., personal selling, advertising etc. However, the promotion of various modes in promotion-mix varies from seller to seller. Break even analysis helps the management to take appropriate decisions by showing how the additional promotional expenditure would influence the break-even point.
9. Break-even analysis can also be used to compare different ways of doing jobs. For example, simple machines, though slow, are economical for production in small quantities. But when bigger quantities are to be produced, costlier machines are to be employed. The break-even analysis enables the management to choose the best method of doing jobs at different levels of output.

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### 23.9 LIMITATIONS OF BREAK EVEN ANALYSIS

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Though break-even analysis helps the management in many ways, it suffers from certain limitations.

These limitations are inherent in the assumptions underlying the break even analysis. Therefore, before coming to any hasty conclusion, the validity of the break even analysis should be considered in the light of its limitations such as the following :

1. The break-even analysis is based on the assumption that all costs :can be separated into fixed and variable. But in practice, it may not be possible to divide costs into fixed and variable ones. In most of the cases, the costs do not remain either totally constant or totally variable in relation to the volume of production.
2. It assumes that fixed costs are fixed for ever. But in the long-run, when the size of the business changes, the fixed costs are bound to change.
3. It assumes that variable costs are directly proportional to the output. But the variable costs may not have any proportional relationship to the output.
4. It assumes that the selling price remains unchanged. But the selling price may have to be changed from time to time according to the market conditions.
5. The assumption that only one product is produced or that the existing product-mix remains unchanged is unrealistic.
6. The assumption that there is synchronisation between production and sales does not hold good in practice.
7. Lastly, it does not take into account the capital invested, and, therefore, it cannot present a complete picture of profit planning.

#### Check your progress - 2

1. What is Break-Even Chart ?

.....

.....

.....

## 23.10 SUMMING UP

Marginal cost is "the amount at any given volume -of out put by which aggregate-costs are changed if the volume of output is increased or decreased by one unit". Marginal Costing is "the ascertainment, by differentiating, between fixed and variable costs, of marginal costs, and of the effect on profit of changes in volume and type of output. Thus under marginal costing the costs are classified as fixed and variable, and only variable costs are charged to products, while fixed Costs are charged to profit and loss account.

Marginal costing helps in 1) fixation of Selling Price ii) make or buy decisions iii) effect of change in sales price iv) Maintaining a desired level of profits v) selection of suitable product mix vi) alternative methods of production.

Break even analysis, refers to a situation where the firm neither earns profit nor loss, the revenue will be equivalent to total cost.

Assumptions :

- i) Selling price remains constant
- ii) All costs are separated into fixed and variable.
- iii) Total fixed cost is constant at all levels of output.
- iv) Production and sales are equal.
- v) Production policies and operating, efficiency remain constant.

Managerial uses of break-even analysis.

- i) Helps to know the profits generated at various levels of sales.
- ii) Helps in determining the sales level to earn the desired profit.
- iii) Helps to adjust in respect of sales volume needed to achieve a given amount of profit in the context of changing prices.
- iv) Helps to know the implication of production expansion.
- v) Helps the management whether to make or buy.
- vi) Helps the management whether to continue or dropping a product.
- vii) Whether to continue from losses or to shut-down the factory.
- viii) Helps in choosing appropriate product-mix.

Break-even analysis suffers with many limitations.

## 23.11 CHECK YOUR PROGRESS : MODEL ANSWERS

$$\begin{aligned} 1. \quad \text{Contribution} &= \text{Sales Price} - \text{Variable Cost} \\ &= \text{Rs. } 10 - 6 \\ &= \text{Rs. } 4 \\ \text{i) Profit volume ratio} &= \frac{\text{Contribution}}{\text{Sales}} = \frac{4}{10} \\ \text{P.V Ratio} &= 40\% \text{ or } .4 \end{aligned}$$

ii) Sales at B.E.P.

$$\begin{aligned}\text{B.E.P. Sales} &= \frac{\text{Fixed cost}}{\text{P/V Ratio}} \\ &= \frac{400}{4} = 400 \times \frac{10}{4} \\ &= \frac{4}{10} \\ &= \text{Rs. 1,000 (100 units)}\end{aligned}$$

iii) Sales at Profit of Rs. 500

$$\begin{aligned}\text{Sales} &= \frac{\text{Contribution}}{\text{P/V Ratio}} \\ \text{Contribution} &= \text{Fixed Cost} + \text{Profit} \\ \text{Sales} &= \frac{400 + 500}{40\% \text{ or } 4} \\ &= \text{Rs. 2250 (225 units)}\end{aligned}$$

iv) Profit at sales Rs. 3,000

$$\begin{aligned}\text{Sales} &= \frac{\text{Contribution}}{\text{P/V Ratio}} \\ 3000 &= \frac{\text{Contribution}}{4} \\ 3000 \times .4 &= \text{Contribution} \\ 1200 &= \text{Fix} + \text{Profit} \\ 1200 &= 400 + \text{Profit} \\ 1200 - 400 &= \text{P} \\ 800 &= \text{P}\end{aligned}$$

v) New B.E.P. if sales reduced by 10%

$$\begin{aligned}\text{P/V Ratio} &= \frac{9 - 6}{9} \\ &= \frac{1}{3}\end{aligned}$$

$$\begin{aligned}\text{B.E.P. Sales} &= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \\ &= \frac{400}{1/3} \\ &= 400 \times 3/1 \\ &= \text{Rs. 1,200}\end{aligned}$$

2.1 A Break-Even Chart is simply a graphical representation of break-even analysis. The cost-volume-profit relationship can be expressed with the help of this chart. This chart depicts fixed costs, variable cost, total cost, break-even point, profit or loss, margin of safety and the angle of incidence.

## 23.12 MODEL EXAMINATION QUESTIONS

**A. Answer the following in about 30 lines each.**

1. The technique of marginal costing can be a valuable aid to management. Discuss.
2. What are the advantages and dis-advantages of Marginal Costing?
3. What is Break-Even Analysis? What are its-managerial uses?

**B. Answer the following in about 15 lines each.**

4. 'What are the characteristics of marginal costing?
5. Define 'marginal cost' and 'marginal costing'. How are variable costs and fixed costs treated in marginal costing?
6. 'Marginal costs are primarily used in guiding decisions yet to be made' Explain the statement.
7. Differentiate between marginal costing and absorption costing.
8. What is a break-even chart? How do you prepare it?
9. What are the assumptions of break-even analysis?
10. What are the limitations of break-even analysis?

### EXERCISES

1. Determine the amount of fixed expenses from the following particulars :

	Rs.
Sales	4,80,000
Direct material	1,60,000
Direct labour	1,00,000
Variable overheads	40,000
Profit	1,00,000

2. From the following particulars find out the amount of profit :

	Rs.
Sales	1,20,000
Direct material	40,000
Direct labour	25,000
Variable overheads	10,000
Fixed expenses	20,000

3. From the following calculate P/V Ratio and break-even point :

	Rs. .
Sales	2,50,000
Fixed expenses	50,000
Profit	75,000

4. Calculate break-even point in terms of physical units from the following :

Fixed Costs	=	Rs. 80,000
Variable Cost	=	Rs. 4 per unit
Selling Price	=	Rs. 20 per unit.

5. At existing sale of Rs. 50,00,000 the producer is earning a profit of Rs. 10,00,000. P/V Ratio 40%. Find out BEP, selling price, variable cost and fixed cost if the present sale is 10,000 units.

[Ans : Rs. 25,00,000; Rs. 500; Rs. 300 per unit ; Rs. 10,00,000]

6. The P/V Ratio of ABC Ltd is 25% and the margin of safety is 20% work out the net profit and the break even point at the sales volume of Rs. 50,000.

[ Ans : Rs. 2,500; Rs. 40,000]

7. The following results of a company for the last two years are as follows

Period (Year)	Sales Rs.	Profit Rs.
I	2,00,000	20,000
II	3,00,000	40,000

What would be the profit when sales are Rs. 1,80,000 ? What sales will yield a profit of Rs. 50,000 ?

[ Ans : Profit Rs. 16,000; Sale Rs. 3,50,000]

8. Sales of a product amount to 200 units per month at Rs. 10 per unit. Fixed overhead is Rs. 400 per month and variable costs Rs. 6 per unit. There is a proposal to reduce price by 10%. Calculate present and future P/V Ratios and find out how many units must be sold to maintain total profit ?

[ Ans : P/V Ratio : Present 2/5; New 1/3; 2,400 units]

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### 23.13 RECOMMENDED BOOKS

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1. Jain S.P. & Narang of K.L. : "Cost Accounting"  
Kalyani Publiishers, New Delhi.
2. Shukla & Grewal : "Cost Accounts"  
S. Chand & Company, New Delhi.
3. Nigam R.S., Narang S.P. & Sehgal B.G. : 'Advanced Cost Accounting  
"A Managerial approach"  
S. Chand & Company, New Delhi.
4. Agarwal M.L. : Theory & Practice of Cost Accounting,  
Sahitya Bhavan, Agra.
5. S.P. Iyengar : 'Cost Accounting'  
Sultan Chand & Sons, New Delhi.

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### 23.14 GLOSSARY

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- Break even analysis** : The study of revenue and cost of a firm in relation to its volume of sales. It is also known as cost volume profit analysis.
- Break even chart** : Graphical representation of break even analysis.
- Break even point** : The level of sales at which total revenues are equal to total costs and the net income is zero. It is also know as 'no profit-no-loss point.'
- Key factor** : A factor which exercises significant influence on a budget and acts as a constrain in achieving higher level of performance.
- Margin of safety** : Excess of actual sales over break even sales.
- Marginal cost** : 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.
- Marginal costing** : Ascertainment of marginal cost and its effect on profit by differentiating between fixed costs and variable costs.
- Profit volume (P/V) Ratio** : The ratio contribution to sales
- Contribution** : Contribution is the difference between Sales and Variable Cost.

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## **UNIT - 24 : BUDGETARY CONTROL**

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### **Contents**

- 24.0 Aims and Objectives
- 24.1 Introduction
- 24.2 Budget, Budgeting and Budgetary Control
- 24.3 Objects of Budgetary Control
- 24.4 Steps in Budgeting
- 24.5 Essentials of Budgetary Control
- 24.6 Organisation for Budgetary Control
- 24.7 Types of Budgets
- 24.8 Advantages and Limitations of Budgetary Control
- 24.9 Summing Up
- 24.10 Check Your Progress : Model Answers
- 24.11 Model Examination Questions
- 24.12 Recommended Books
- 24.13 Glossary

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### **24.0 AIMS AND OBJECTIVES**

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This unit aims at explaining the concepts of budget, budgeting and budgetary control, essentials and objects of budgetary control, steps in budgeting, organisation for budgetary control and types of budgets. The advantages and limitations of budgetary control are also explained.

Once you go through the unit, you will be able to :

- understand the meaning of Budget, Budgeting and Budgetary Control..
- explain the objects of Budgetary Control.
- identify the steps in Budgeting
- recognise the essentials of Budgetary Control.
- describe the types of Budgets.

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### **24.1 INTRODUCTION**

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In any formal programme of profit planning and control business enterprises, budgeting comes to the forefront. In fact, it forms the heart of planning function. Managers use long-range and short-range budgets to anticipate and evaluate performance. Budgets constitute the principal instruments for projecting future costs and revenues and the foundation of firm's financial control

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### **24.2 BUDGET, BUDGETING AND BUDGETARY CONTROL**

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The budget is a blue print of the projected plan of action expressed in quantitative terms and for a specified period of time. It may be defined as a "financial and/or quantitative statement

prepared prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective (ICWA) England).

Budgeting refers to formation of plans for future activities which lay down carefully constructed objectives and programmes of activity and provide yardsticks by which deviation from planned achievements can be measured. Budgetary Control refers to the principles, procedures and practices of achieving the given objectives through budgets. It consists of establishment of budgets relating of the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure the objective of that policy or to provide a firm basis for its revision.

In the words of Rowland and William, the difference between budget, budgeting and budgetary control is, "budgets are the individual objectives of a department etc., whereas budgeting may be said to be the act of building the budgets. Budgetary control denotes all this and in addition, includes the science of planning the budgets themselves and utilisation of such budgets as an overall management tool for business planning and control. Thus budget is the financial plan and budgetary control results from the administration of the financial plan.

### Check your progress - 1

#### 1. Define Budget

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.....  
.....

#### 2. What is Budgeting .

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

#### 3. Explain Budgetary Control ?

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## 24.3 OBJECTIVES OF BUDGETARY CONTROL

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The budget serves four important purposes, (i) It analyses and synthesises the plans and performance of individual departments of an undertaking. It lays down target of performance for each department. (ii) It gives the individual departments a basis to work on a target to work and to fulfil; a method how to achieve it; a knowledge of how its own function is helping the function of the other departments and finally, how the efforts of the different departments are furthering the common aim of the company. The budget renders invaluable service in the vital coordination function of the management. (iii) The budget enables the different management levels to understand one another and assess how the work of each unit is proceeding according to management plans and policies. It is an ideal means of communication. (iv) Lastly, the budget is a means of control of cost and performances. Since the targets are set in the budget, in full

view of existing operating conditions and pre-determined norms, comparison of actual performance with budgets is a measure of efficiency, performance and cost.

The budget is thus, a medium of planning, co-ordination, communication and control.

#### **i) As a means of Planning**

The budget is a plan of action. To construct a budget, the factors and forces which affect the budgeted activity should be investigated and tabulated. This process itself requires detailed planning of the resources and methods towards achieving the company's objective. It affords the basic foundation in which successful planning can grow.

#### **ii) As a means of Co-ordination**

No company can act in isolation, less so, in a planned economy. It enables adjustment and co-ordination between internal and external circumstance to ensure functioning of the individual company with utmost facility and harmony with external forces. The budget co-ordinates the policies of a company with its plan of action and actual performance. It is a means of co-ordination between the different executive levels.

#### **iii) As a means of Communication**

The budget is a means of communication between lower and the shop floor management and higher echelons of management for changes in policies and plans and actual performance and implementation of plans and targets. Without this two-way communication, no harmony is possible and bottlenecks, confusion and disarray are bound to crup up impeding production and progress.

#### **iv) As a means of Control**

The control function of the budget is perhaps the most important. No control of performance or cost is possible without pre-determined targets or standards. The budget sets down the 'norms' of performance and expenses against forces and operating conditions realistically assessed, watches and measures the actual performance with the budget or norm, and brings out shortfalls and weaknesses for remedial action.

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## **24.4 STEPS IN BUDGETING**

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Budgeting, to be effective, requires the following steps.

- i) Forecasting sales indicating what quantity and quality of goods should be made.
- ii) Determining management policy with regard to range of products, stocks levels, channels of distribution, investments etc.
- iii) Preparing a production budget in accordance with forecast and policies, planning the needs for materials, labour, production and service facilities along with the costs involved.
- iv) Preparing the financial estimates as regards cash requirements for planned operations and investments.
- v) Preparing a 'master budget' combining and co-ordinating the individual budgets.
- vi) Preparing statements and reports, evaluating current position and performance against the budgets.

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## **24.5 ESSENTIALS OF BUDGETARY CONTROL**

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Budgeting is of great use and can be an efficient method of planning and control provided it fulfils the following conditions.

The Budget Controller is assisted by the Budget Committee. The Budget Committee will include General Manager, Sales Manager, Works Manager, Accountant or Budget Controller, Purchase Officer, Personnel Manager and Departmental Managers. The General Manager generally acts as a Chairman of the Committee. The functional managers will prepare the budgets and submit them to the Committee for approval. It is the duty of the Budget Committee to make necessary adjustments in the budgets, co-ordinate all the budgets and finally approve the budgets.

### **g) Budget Manual**

The Institute of Cost and Management Accountants, England, defines a budget manual as "a document which sets out, inter alia, the representatives of the persons engaged in the routine of and the forms and records required for budgetary control." Thus, it is a written document which guides the executives in preparing various budgets. Budgets are to be drawn keeping in view the objectives of the organisation given in the budget manual.

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## **24.7 TYPES OF BUDGETS**

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Different types of budgets have been developed keeping in view the different purposes they serve. Broadly budgets can be divided into the following categories.

- A) Functional Budgets
- B) Accountability Budgets
- C) Operating or Performance Budgets
- D) Fixed Budgets
- E) Flexible Budgets

### **A) Functional Budgets**

The important budgets under this category are :

- a) Sales Budget
- b) Selling and Distribution Cost Budget
- c) Production Budget
- d) Production Cost Budget
- e) Materials Budget
- f) Purchase Budget
- g) Labour Budget
- h) Production Overhead Budget
- i) Other Functional Budgets : ●
  - i) Plant Utilisation Budget
  - ii) Capital Expenditure Budget
  - iii) Maintenance Cost Budget
  - iv) Administration Cost Budget
  - v) Research & Development Budget
  - vi) Expansion and Modernisation Budget
  - vii) Profit Budget
  - viii) Cash Budget

month end and discussed with the Budget Committee. Long-term budgets should be supplemented by short-term budgets to make the budgetary control successful.

### c) Key Factor Analysis

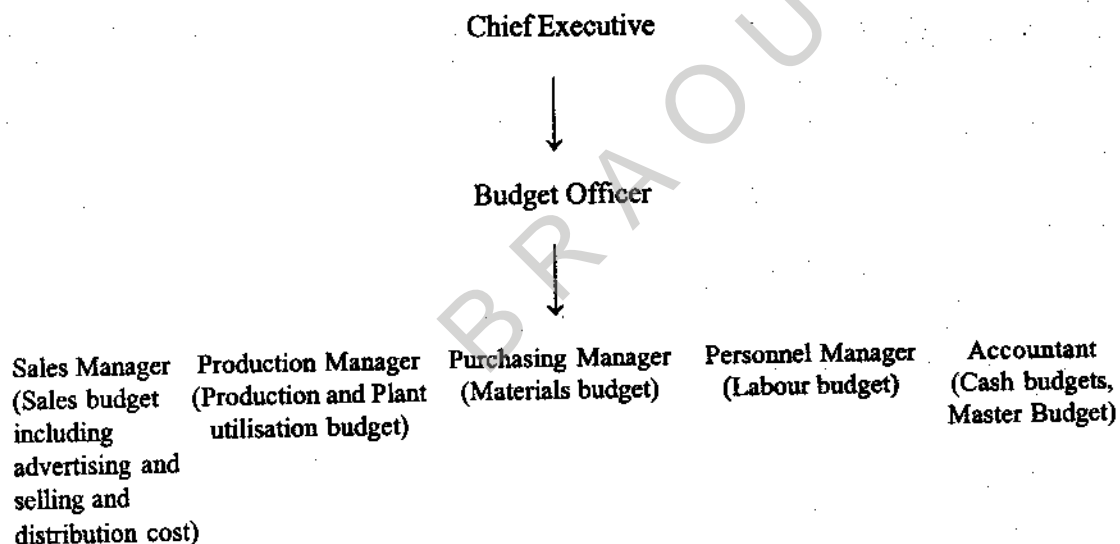
Key factor has been defined as the factor the extent of whose influence must first be assessed in order to ensure that functional budgets (e.g., sales budget, production budget, labour budget, etc.) are reasonably capable of fulfillment. Key factor is also known as 'Principal budget or limiting or 'governing' factor. It is essential to locate the key factor before the preparation of budgets because it influences all other budgets. All budgets should be co-ordinated keeping in view the principal budget factor if the budgetary control is to achieve the desired results. The key factor will differ from concern to concern and might be sales, plant capacity, shortage of raw materials or labour or capital etc.,

### d) Level of Activity Analysis

The level of activity is important in planning production. This will be decided by the management after taking into consideration the prospects of improving the net profitability of a product.

### e) Organisational Chart

Before successful installation of a budgetary control, it is necessary that a concern should have a definite plan of organisation. Authority and responsibility of each executive should be clearly defined. An organisation chart for budgetary control is given below :



The above organisation chart shows that Chief Executive is the head of budgetary control system. He delegates his authority to the Budget Officer who sees that all budgets are co-ordinated and drawn in time. The other managers will prepare the budget shown against them in the chart.

### f) Budget Officer and Budget Committee

The Chief Executive should appoint some person known as Budget Controller or Budget Officer who should be given the specific duty of administering the budget. His rank should be equal to other functional managers. As his work will deal with the preparation and co-ordination of budgets involving figures, he will usually be a person with accountancy knowledge. He should also have a technical knowledge of the business. He should see that the functional managers draw the budgets in time. He should also to chase the budgets, see that the actual performance is going in line with performance differs substantially. He should help in revising the budgets if there are fundamental changes in the circumstances after the budgets have been prepared.

#### iv) Periodic Control Statements

For implementing the system of budgetary control, it is again necessary that control statements are submitted periodically. The budget reports are generally prepared in the form of Departmental Operating Statements, a proforma of which is given below,

A departmental-operating statement is a statement showing the performance (in percentage terms) of a departmental manager during a specific period. This is an important statement, listing comprehensively all the relevant data relating to the operations of the department, and it lies very much at the heart of control accounting. These reports serve as feedback reports on whose basis further planning could be improved. Results will be rendered as necessary e.g., daily, weekly and monthly. Generally the daily reports are meant for the lower levels of management and they will be followed by summaries at longer intervals e.g., weekly or monthly, for higher ranks of management.

#### v) Interlocking of Budgets

Various budgets are inter-locked and integrated so that they reflect the operating plans for the specified future period. A budget control system to be successful, must develop this attribute.

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### 24.6 ORGANISATION FOR BUDGETARY CONTROL

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There should be an efficient organisation if budgetary control has to be operated effectively. In organising a system of budgetary control, it is essential to obtain full cooperation of each member of the management team. Budgeting is a coordinated effort where the knowledge, skill and experience of all functionaries are combined in the preparation of plans. Every functionary in an organisation is expected to make his own forecasts for the forthcoming period and state what he can achieve, if given proper facilities. The forecasts of various functionaries are prepared normally in terms of physical quantities which then can be consolidated by the 'Budget Officer' or 'Budget Controller' to prepare the 'Master Budget'. Through a process of discussions and adjustments, the targets drawn up in quantitative terms become the specific targets, to which line executives themselves stand committed. Therefore, there would be a sense of responsibility amongst the executives to achieve the target, because it is of their own liking. It is through co-ordinated planning that management serves optimum combination of the factors of production for achieving maximum efficiency.

While installing the budgetary system in an organisation the following preliminary steps should be taken.

#### a) Budget Centres

A budget centre is a section of the organisation or an undertaking defined for the purpose of budgetary control. Budget centres should be established for cost control and all budgets should be related to cost centres. Budget centres will disclose the section of the organisation where planned performance is not achieved.

This may be defined as the period for which a budget is prepared and employed. The budget period will depend upon the type of business, the length of the manufacturing cycle, the ease or difficulty in forecasting future market conditions and other factors including the control aspect. The usual budget period is the normal financial year, but it is not necessary to maintain this period. In the case of seasonal industries, the budget period should be a short one and should cover one season. But in case of industries with heavy capital expenditure such as heavy engineering works, the budget period should be long enough to meet the requirements of the business. From control point of view, the budget period should be a short one viz., monthly, quarterly, etc., so that the actual results may be compared with the budget each week end or

### i) Flexibility

The budgetary device to be effective must be a control which would allow of variations always occurring during a normal trading year. The modern concept of budgetary control is that such control shall be flexible and this is obtained by what is known as "the operation of the variable". If conditions change much from those prevailing at the time of making the budget, inflexibility will be suicidal and it must be recast. The budget is neither wishful thinking nor a straight jacket activity. The Institute of Cost and Management Accountants, U.K., defines it as "a budget, which by recognising the difference between fixed, semi-fixed and variable costs, is designed to change in relation to the level of activity attained"

### ii) Team Work

The fundamental requirement of a system of budgetary control is the co-operation of all levels of members of the company. From such co-operation particularly pleasant working relations arise. If the budgets are prepared from the bottom up, they will in general, work as they were intended to work. It is not possible to install a budget system without a review of the organisation in general coupled with the closed relationship of one department with another.

### iii) Identical Classification Codes and Headings

For budgeting, accounting and costing to be meaningful, it is important that an identical scheme of classifying codes and headings is adopted. Code numbers or symbols avoid the problem of long and cumbersome account titles. Of late, the introduction of punched sorting cards and machine bookkeeping, have necessitated the use of codes.

Departmental Operating Statement X Co.'Ltd.							
Department :			Date and Month of Issue :				
Budget Centre :			Performance :				
Elements of Cost		Expenses		Variance	Analysis of Variances		Remarks
Code	Description	Budget	Actual		Controllable	Un-controllable	
Total :							

Note : For better control, cumulative figures of budgeted and actual expenses may be shown and variances analysed accordingly.

### a) Sales Budget

A sales budget is the most important and forms the basis on which all the other budgets are built up. This budget is a forecast of the quantities and values of sales to be achieved in a budget period. Every effort should be made to ensure that its figures are as accurate as possible because this is usually the starting budget (sales being the limiting factor) on which all other budgets are built up. The Sales Manager should be made directly responsible for the preparation and execution of this budget. In the preparation of this budget the Sales Manager has to consider such important factors as past sales figures and trends, salesmen's estimates, plant capacity, availability of raw-materials and other supplies, general trade prospects, orders on hand, seasonal fluctuations, financial capacity of the concern, adequate return on capital employed and competition.

#### Sales Budget

(By Product)

Year :

Month	Product 1		Product 2		Product 3		Total Sales amount
	Quantity	Value Rs.	Quantity	Value Rs.	Quantity	Value Rs.	Rs.
Jan.							
Feb.							
Mar.							
Apr.							
May							
June							
July							
Aug.							
Sep.							
Oct.							
Nov.							
Dec.							
Total :							

#### Illustration - 1

X Co. Ltd., manufactures two products A and B and sells them through two divisions - North and South. For the purpose of submission of sales budget to the budget committee, the following information has been made available.

Product	Budget Sales		Actual Sales	
	North	South	North	South
A	4,000 at Rs. 9	6,000 at Rs. 9	5,000 at Rs. 9	7,000 at Rs. 9
B	3,000 at Rs. 21	5,000 at Rs. 21	2,000 at Rs. 21	4,000 at Rs. 21

Adequate market studies reveal that product A is popular but underpriced. It is observed that if the price of A is increased by Re. 1, it will find a ready market. On the other hand, B is

over priced to customers and the market could absorb more if sales price of B be reduced by Re. 1. The management has agreed to give effect to the above price changes.

From the available information based on these price changes and reports from salesmen, the following estimates have been prepared by divisional manager.

Product	0% increase in sales over current budget		Possible Additional sales above the estimates through intensive advertisement	
	North	South	North	South
			Units	Units
A	+10%	+ 5%	600	700
B	+20%	+10%	400	500

You are required to prepare a budget for sales incorporating the above estimates and also show the budgeted and actual sales of current year.

Solution

arise

### Sales Budget

For the year :

Prepared by

Checked by

Submitted on

Division	Product	Budget for Future Period			Budget for Current Period			Actual Sales for Current Period		
		Qty. Units	Price Rs.	Vale Rs.	Qty. Units	Price Rs.	Value Rs.	Qty. Units	Price Rs.	Value Rs.
North	A	5000	10	50000	4000	9	36000	5000	9	45000
	B	4000	20	80000	3000	21	63000	2000	21	42000
	Total :	9,000	--	130000	7000	--	99000	7000	--	87000
South	A	7000	10	70000	6000	9	54000	7000	9	63000
	B	6000	20	120000	5000	21	105000	4000	21	84000
	Total :	13000	--	190000	11000	--	159000	11000	21	147000
Grand Total (Summary)										
	A	12000	10	120000	10000	9	90000	12000	9	108000
	B	10000	20	200000	8000	21	168000	6000	21	126000
	Total :	22000	--	320000	18000	--	258000	18000	--	2340000

This budget may be modified according to salesman or period such as month, quarter, etc.

b) **Selling and Distribution Cost Budget** : This budget shows the cost of selling and distribution for the quantities shown in the sales budget. The Sales Manager, Distribution Manager, Advertising Manager and the Accountant will cooperate with the Budget Officer in compiling

this budget and give their views regarding the expected change due to change in volume of sales as per sales budget.

c) **Production Budget** : Production budget is a forecast of the total output of the entire organisation, broken down into estimates of output of each type of product with a scheduling of operations (by weeks and months) to be performed and a forecast of the closing finished stock. This budget may be expressed in quantitative (weight, units etc.,) or financial (rupees) units or both. This budget is prepared after taking into consideration the estimated opening stock and sales and the desired closing stock of each product. The Works Manager is responsible for the total production budget and the departmental managers are responsible for the departmental production budget.

### Production Budget

Year :

Product :

Department :

Month	Units required for sales	Add: Closing stock of finished goods	Total required	Less Opening stock of finished	Production units to be completed	Add: Equivalent units in closing w-in-p.	Less: Equivalent units in opening w-in-p.	Total Equivalent units to be completed
Jan.								
Feb.								
Mar.								
Apr.								
May								
June								
July								
Aug.								
Sep.								
Oct.								
Nov.								
Dec.								
Total :								

#### Illustration - 2

A company manufactures two products A and B. The sales manager forecasts the sales in units as follows :

Product	Jan.	Feb.	March	April	May	June	July
A	28	28	24	20	16	16	18
B	10	12	16	20	24	24	20

It is assumed that there will be no work-in-progress at the end of any month and finished units equal to half the sales for the following month will be kept in stock. Prepare a production budget for each month.

**Solution**

Closing stock of finished goods is equal to half of sales for the next month, so opening stock is half of the budgeted sale for the same month.

**Production Budget (in no. of units)**

Month	Sales	Product A			Sales	Product B		Production
		+ Closing stock	- Opening stock	Production		+ Closing stock	- Opening stock	
Jan.	28	14	14	28	10	6	5	11
Feb.	28	12	14	26	12	8	6	14
March	24	10	12	22	16	10	8	18
April	20	8	10	18	20	12	10	22
May	16	8	8	16	24	12	12	24
June	16	9	8	17	24	10	12	22
July	18	9	9	18	20	10	10	20
Aug.	18	9	9	18	20	10	10	20
Sept.	18	9	9	18	20	10	10	20
Oct.	18	9	9	18	20	10	10	20
Nov.	18	9	9	18	20	10	10	20
Dec.	18	9	9	18	20	10	10	20

**d) Production Cost Budget :** This budget summarises the materials budget, labour budget and factory overhead budget and may be expressed and analysed by departments and/or production. A production cost budget shows the estimated cost of carrying out the production plans and programmes set out in the production budget. It shows the following :

- i) Material cost from materials budget
- ii) Labour cost from labour budget
- iii) Factory overhead - subdivided into fixed, variable and semi-variable costs from factory overhead budget.

These costs are analysed by departments and/or products according to convenience.

**Production Cost Budget of X Co. Ltd.**

	For the year :		Total
	A	B	
Units to be produced			
Material cost			
Labour cost			
Factory overhead			
Total :			

e) **Materials Budget** : This budget shows the estimated quantities as well as costs of raw material. and components required for producing goods as per production budget. At the first stage of preparation of material budget, only quantities are incorporated. Afterwards the price from purchases budget is used to obtain the cost of each material consumed.

**Illustration - 3**

Prepare a material budget of X Co. Ltd., based on production budget. The production orders of the products show the following consumption.

Consumption for a batch of 1000 units :

Materials (Code)	Product A	Product B
	Kg.	Kg.
11	50	80
13	10	5
16	—	30
17	6	4
18	4	4
<b>Total:</b>	<u>70</u>	<u>129</u>

Solution

X Co. Ltd.,  
**Materials Budget**

For the year :

Product	Quantity to be produced (units)	Materials (Code)				
		11	13	16	17	18
		Kg	Kg	Kg	Kg	Kg
A	12,000	600	120	—	72	48
B	11,000	880	55	330	110	44
<b>Total Quantity</b>		<u>1480</u>	<u>175</u>	<u>330</u>	<u>182</u>	<u>92</u>
<b>Rate per Kg. (from purchase budget)</b>		Rs. 60	Rs. 60	Rs. 10	Rs. 50	Rs. 25
<b>Cost of Materials</b>		Rs. 88,800	Rs. 10,500	Rs. 3,300	Rs. 9,100	Rs. 2,300

Note : For obtaining the total material cost of each product, consumption figures of each product must be multiplied by the purchase price.

**f) Purchase Budget :** This budget gives details of the purchases which must be made to meet the needs of the business. It includes all items of purchase, such as, raw materials, indirect materials and other equipments. However, the purchase budget for raw materials is the most important and the following factors are required to be considered in preparing this budget.

- i) opening and closing stocks
- ii) unfulfilled orders at the beginning of the budget period
- iii) storage space, economic, buying quantity and financial resources.
- iv) Prices to be paid.

**Illustration - 4**

Prepare a purchase budget of X Co. Ltd. for material based on the materials budget (see illustration in materials budgets) and the estimated opening and closing stocks of material :

**Estimated stocks of Materials for Budget Period**

Stock	Materials				
	11	13	16	17	18
	Kg	Kg	Kg	Kg	Kg
On 1st January	180	25	90	22	12
On 31st December	200	50	60	40	20

**Solution**

**X Co. Ltd.,  
Purchase Budget**

For the year :

Items	Materials				
	11	13	16	17	18
	Kg	Kg	Kg	Kg	Kg
Consumption during the period (as per material budget)	1480	175	330	182	92
Add : Stock on 31st Dec.	200	50	60	40	20
Total :	1680	225	390	222	112
Less : Opening Stock	180	25	90	22	12
Quantity to be purchased	1500	20	300	200	100
	Rs.	Rs.	Rs.	Rs.	Rs.
Price per Kg (as per material budget)	60	60	10	50	25
	Rs.	Rs.	Rs.	Rs.	Rs.
Purchase budget	90,000	12,000	3,000	10,000	2,500

**g) Labour Budget :** The purpose of labour budget is to assist in the provision of the correct number and types of employees for the project output. Once the preliminary classification of labour into its principal grades has been carried out, the labour requirements for each product can be estimated. The standard time for each product are then set with the help of time and motion studies. From the total man hours required for production, labour requirements are determined and from the estimated rate per hour, labour cost per unit is determined.

**h) Production Overhead Budget :** The budget indicates all fixed, variable and semi-variable items of production overhead to be incurred during the budget period. One budget for each budget centre may be drawn up for control purposes and finally all overheads of service departments must be transferred to production departments. Finally, the total overheads of production departments must relate to production:

**i) Other Functional Budgets :** There may be various other functional budgets to suit to the particular needs. Some of them are mentioned below in brief.

**i) Plant Utilisation Budget :** This budget indicates the plant and machinery requirements -to meet the budgeted production during the period. Such a budget will detail the machine load in every department and indicates the extent of under or over-loading. Thus, management may get useful information regarding the effective utilisation of plant and machinery in an organisation.

**ii) Capital Expenditure Budget . :** This budget shows the estimated expenditure on fixed assets during the budget period. As the amount involved in capital expenditure is sometimes high, this requires careful attention of the top management. This budget is based on the requisitions for capital expenditure from various departments and after considering their profitability, capital expenditure is sanctioned and incorporated in the budget

**iii) Maintenance Cost Budget :** Where maintenance work is heavy and costly, a maintenance cost budget helps to minimise the lost time. Maintenance are of two types- (a) preventive maintenance or regular maintenance with the object of preventing breakdown and run the machines smoothly, and (b) breakdown maintenance requiring emergent repair work in case of breakdown. Both types of maintenance should prevail and a compromise must be made between them so as to minimise the cost. Co-operation between maintenance engineer and the budget officer is an essential part of preparing and operating a maintenance budget. In a maintenance budget, the cost of preventive maintenance; emergency repairs and other common cost should be shown separately.

**iv) Administration Cost Budget :** All administration cost relating to each budget centre should be shown separately and then incorporated in the administration cost budget. A very important aspect of predetermining administration costs is to make sure that all the administrative functions are carried out as efficiently as possible.

**v) Research & Development Budget :** This budget discusses the estimated expenditure for research and development during the budget period. The budget is drawn up in two parts- (i) fixed or constant expenses necessary to maintain research and development work at the irreducible level; and (ii) costs to be incurred on completing projects in hand and/or those to be taken up.

**vi) Capital Expansion and Modernisation Budget :** -The Capital Expansion Budget is planned on a long-term basis. Say, two to five years. This budget contains estimated expenses of the project and the expected date of its completion. Each project is divided into phases, each phase consisting of specific items of facets of work.

**vii) Profit Budget :** A profit budget is an annual budget which indicates the planned profit which management desires to attain. This is prepared with the help of budgeted costs and budgeted revenues i.e., deducting the former from the latter. It also takes into consideration the budgeted investment and the budgeted rate of return. The annual budget is often broken down into half yearly or quarterly budgets. The difference between the actual profit and budgeted 159

into half yearly or quarterly budgets. The difference between the actual profit and budgeted profit is known as the profit variance.

viii) **Cash Budget** : This budget gives an estimate of the anticipated receipts and payments of cash during the budget period. The budget is prepared in two parts, one showing the estimated cash receipts on account of cash sales, credit collections' and miscellaneous receipts and the other showing the estimated disbursement on account of cash purchases, amount payable to creditors, wages payable to workers, indirect expenses payable, income tax payable etc. The cash budget provides information regarding estimated cash requirements which helps in the negotiation of a bank loan or overdraft so that potential financial strains and crises are avoided.

**Specimen of Cash Budget**  
for the year ending \_\_\_\_\_

	Total	First quarter	Second quarter	Third quarter	Fourth quarter
Cash balance, (beginning)	xxx	xx	xx	xx	xx
Budgeted receipts	xxx	xx	xx	xx	xx
Budgeted disbursements	xxx	xx	xx	xx	xx
Excess of receipts				xx	xx
Excess of disbursements	xxx	xx	xx	xx	xx
Bank Loans	xxx	xx	xx	xx	xx
Repayments of loans	xxx	xx	xx	xx	xx
Interest on loans	xxx	xx	xx	xx	xx
Cash balance, (ending)	xxx	xx	xx	xx	xx

**Illustration - 5**

X Co., wishes to arrange overdraft facilities with its bankers during the period from April to June 2002 when it will be manufacturing mostly for stock. Prepare a cash Budget for the above period from the following data, indicating the extent of the bank facilities the company will require at the end of each month.

(a)	Sales Rs.	Purchases Rs.	Wages Rs.
February 1990	1,80,000	1,24,800	12,000
March 1990	1,92,000	1,44,000	14,000
April 1990	1,08,000	2,43,000	11,000
May 1990	1,74,000	2,46,000	10,000
June 1990	1,26,000	2,68,000	15,000

- (b) 50 per cent of credit sales are realised in the month following the sales and the remaining 50 per cent in the second month following. Creditors are paid in the month following the month of purchase.
- (c) Cash at bank on 1-4-2002 estimated is Rs. 25,000.

## Solution

### Cash Budget (April - June)

Particulars	April 2002 Rs.	May 2002 Rs.	June 2002 Rs.
Receipts :			
Sales realisation	90,000	96,000	54,000
	96,000	54,000	87,000
	1,86,000	1,50,000	1,41,000
Payments :			
Wages	14,000	11,000	10,000
Purchases	1,44,000	2,43,000	2,46,000
	1,58,000	2,54,000	2,56,000
Excess of receipts over payments	28,000	---	---
Excess of payments over receipts	---	1,04,000	1,15,000
Balance b/f	25,000	53,000	51,000
Balance c/f	53,000	(-) 51,000	(-) 1,66,000

The company requires bank overdraft in May and June to the extent of Rs. 51,000 and Rs. 1,66,000 respectively.

With the help of all the functional budgets, referred to above, a summary budget is prepared. A 'summary budget' is a budget which is prepared from and summaries of all the functional budgets. The end products of the summary budget are -

- The Budgeted Profit and Loss Account* : Summarising the budgeted income from the sales budget and the budgeted costs from other functional budgets, a budgeted profit and loss account is built up.
- The Budgeted Balance Sheet* : This is built up by (i) taking the budgeted values of all assets and liabilities at the end of the budget period, considering the movement of funds for purchase and sale of assets; (ii) taking the final cash balance from cash budget; and (iii) adding the budgeted profit retained in the opening net worth.

#### A) Master Budget

The summary budgets thus prepared are reviewed, re-adjusted and re-budgeted in order to get the maximum benefit from budgetary control. This process of reviewing and reconsideration continues until an overall satisfactory budget is drafted. The budget is then accepted by the top management and upon such acceptance, the budget is termed as 'Master Budget'. The Institute of Cost and Management Accountants, England, defined the master budget as "the summary budget incorporating its component functional budgets and which is finally approved, adopted and employed". Master budget is prepared by the Budget Committee on the basis of coordinated functional budgets and becomes the target for the company during the budget period when it is finally approved by the Committee.

#### B) Accountability Budgets

These may be departmental budgets or cost centre budgets or budgets by Departmental Head or Executive.

A departmental budget or cost centre budget of load and performance is framed for each department or cost centre of the concern. The budget is framed after taking into account

the overall planned and budgeted activities for the month. Each item of expenses for the department or cost centre is then assessed and the actual is compared with the budget. This enables location of responsibility for excess over the budget by each department or cost centre, for each expense, for unit of activity as well as, for shortfall in actual performance from the budget. Similarly, the budgets can also be framed for different departmental heads or executives who will be made responsible for deviations after comparing actual with budgeted performance.

### C) Operating or Performance Budget

An operating budget sets down norms of performance for each operation, production centre or department. The actual performance is compared with the budgeted performance. This shows the degree of operating efficiency or operating level achieved by each department and the causes of any shortfall or variance:

### D) Fixed Budgets

A fixed budget can be defined as a budget prepared for a given level of activity. It does not provide for any changes in expenditure arising out of changes in the anticipated conditions and when the actual level of activity differs from the budgeted level of activity. These budgets will prove useful only when the actual level of activity corresponds to the budgeted level of activity.

### E) Flexible Budgets

The Institute of Cost and Management Accountants, England, defines flexible budget as "a budget designed to change in accordance with the level of activity actually attained". Thus, a flexible budget gives different budgeted costs for different levels of activity. A flexible budget is prepared after making an intelligent classification of all expenses between fixed, semi-variable and variable because the usefulness of such a budget depends upon the accuracy with which the expenses can be classified. These budgets are useful in seasonal nature of industry where level of activity varies from period to period, in a new business where it is difficult to foresee the demand and in an undertaking which is suffering from shortage of a factor of production such as materials, labour, plant capacity etc., where the level of activity depends upon the-availability of such a factor of production.

### Check Your Progress - 3

1. What is Master Budget ?

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### Illustration - 6

The following data are available in respect of a manufacturing company for a yearly period.

	Rs. in lakhs
<b>Fixed Expenses :</b>	
Wages and Salaries	9.5
Rent, rates and taxes	6.6
Depreciation	7.4
Sundry administrative expenses	6.5
Semi-variable expenses (at 50% capacity)	3.5
Maintenance and repairs	7.9

Sales department salaries etc.	3.8
Sundry administrative expenses	2.8
<b>Variable expenses (at 50% capacity) :</b>	
Materials	21.7
Labour	20.4
Other expenses	7.9
	Rs. 98.0

Assume that fixed expenses remain constant for all levels of production. Semi-variable expenses remain constant between 45 per cent and 65 per cent of capacity, increasing by 10 per cent between 65 per cent and 80 per cent capacity and by 20 per cent between 80 per cent and 100 per cent capacity.

Sales at various levels are :	Rs.in lakhs
50% capacity	100
60% capacity	120
75% capacity	150
90% capacity	180
100% capacity	200

Prepare a flexible budget for the year and forecast the profits at 50 per cent, 75 per cent, 90 per cent and 100 per cent capacity.

Solution

### Flexible Budget

(Rupees in lakhs)

Capacity	50%	60%	75%	90%	100%
Sales	100	120	150	180	200
Wages and Salaries	9.5	9.5	9.5	9.5	9.5
Rent, rates and taxes	6.6	6.6	6.6	6.6	6.6
Depreciation	7.4	7.4	7.4	7.4	7.4
Administration expenses	6.5	6.5	6.5	6.5	6.5
<b>Total fixed costs</b>	<b>30.0</b>	<b>30.0</b>	<b>30.0</b>	<b>30.0</b>	<b>30.0</b>
Maintenance repair	3.5	3.5	3.8	4.2	4.2
Indirect labour	7.9	7.9	8.7	9.5	9.5
Selling Expenses	3.8	3.8	4.2	4.6	4.6
Administration expenses	2.8	2.8	3.1	3.3	3.3
<b>Total Semi-variable costs</b>	<b>18.0</b>	<b>18.0</b>	<b>19.8</b>	<b>21.6</b>	<b>21.6</b>
Materials	21.7	26.0	32.5	39.0	43.4
Labour	20.4	24.5	30.6	36.7	40.8
Other expenses	7.9	9.5	11.9	14.3	15.8
<b>Total variable costs</b>	<b>50.0</b>	<b>60.0</b>	<b>75.0</b>	<b>90.0</b>	<b>100.0</b>
<b>Total cost</b>	<b>98.0</b>	<b>108.0</b>	<b>124.8</b>	<b>141.6</b>	<b>151.6</b>
<b>Profit</b>	<b>2.0</b>	<b>12.0</b>	<b>25.2</b>	<b>38.4</b>	<b>48.4</b>

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## 24.8 ADVANTAGES AND LIMITATIONS OF BUDGETARY CONTROL

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The important advantages of budgetary control are as follows :

- 1) It enables the management to conduct business in the most efficient manner.
- 2) It lays down an objective for the business as a whole. The budget is an impersonal policeman that maintains ordered effort and brings about efficiency in result.
- 3) It lays emphasis on the staff organisation. It ensures that individual responsibilities are clearly defined and that the requisite authority commensurate with responsibility, is delegated so that buck passing may be prevented when the budgeted results are not achieved.
- 4) It takes the help of different levels of management in the preparation of the budget and thus represents the judgement of the entire organisation.
- 5) Management by exception is possible because the comparison of actual and budgeted results point out weak spots so that remedial action is taken against weak spots which are not in conformity with the budgeted performance.
- 6) It ensures effective utilisation of men, materials, machines and money, because production is planned according to the availability of these items.
- 7) It is helpful in reviewing current trends in the business and in determining future policy of the business because current and future trends are studied in the preparation of the budget.
- 8) It acts as a measure of efficiency of departments and persons working in the organisation.
- 9) Budgetary control creates conditions for setting up a system of standard costing.
- 10) It helps in promoting a feeling of cost consciousness and in restricting expenditure to the minimum.
- 11) Functions of planning communication, co-ordination and control can be better performed with the budgetary control.

The budgetary control as a management device suffers from the following limitations :

- 1) It may be impossible to achieve the budgeted targets, as estimates and forecasts relating to future made in the budget can never be perfectly accurate for the simple reason that future is unpredictable.
- 2) In rapidly changing conditions it may not be possible to achieve budgeted targets. Budgets may have to be revised frequently which may prove to be a costly affair.
- 3) Budgets may serve as constraints on managerial initiative because every executive tries to achieve the budgeted targets. It tends to bring about rigidity in control.
- 4) Co-ordination of various budgets is expensive. As such, small organisations cannot afford to employ the budgetary control technique.
- 5) Budgetary control may lead to conflicts among functional executives because every executive may try to get a larger share of budgetary allocation, lesser responsibility and blame others for pitfalls.

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## 24.9 SUMMING UP

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Budget is a financial/or quantitative statement prepared and approved prior to a definite period of time.

Budgeting is the formulation of plans for future activity which lay down carefully constructed objectives and programmes of activity and provide yardsticks to measure and find out deviation.

Budgetary control is the establishment of budgets relating to the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results to provide a basis for its revision. The budget is a medium of planning, co-ordination, communication and control.

### Steps in Budgeting :

- i) Forecasting the sales
- ii) Managerial arrangement with regard to investment, range of products, stock, levels and distribution channels etc.,
- iii) Preparation of production budget.
- iv) Preparation of financial estimates.
- v) Preparation of master budget.
- vi) Preparation of statements and reports, evaluating current position and performance against the budget.

### Essentials of Budgetary Control.

- i) Flexibility
- ii) Team Work
- iii) Identical Classification Codes and Headings.
- iv) Periodic Control Statements
- v) Interlocking of Budgets.

While installing a budgetary system in an organisation the following steps should be taken.

- a) Budget Centres
- b) Budget Period
- c) Key Factor
- d) Level of Activity Analysis

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## 24.10 CHECK YOUR PROGRESS : MODEL ANSWERS

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- I. I. Budget is a financial and / or quantitative statement prepared prior to a definite period of time.
- II. Budgeting is the formation of plans for future activity which lay down carefully constructed objectives and programmes of activity and provide yardsticks by which deviation from planned achievements can be measured.
- III. Budgetary control is the establishment of budgets relating to the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results to provide basis for its revision.

2. I. The objectives of budgetary control are as follows :
  - (a) It serves as a means of planning.
  - (b) It enables coordination between internal and external circumstances.
  - (c) It is a means of communication.
  - (d) It serves as a means of control.
3. I Master Budget is the end product of the entire budget making process. It is consolidated summary of various functional budgets. It gives budgeted profit and loss account for the budget period and budgeted balance sheet at the end of the period.

## 24.11 MODEL EXAMINATION QUESTIONS

### A. Answer the following in about 30 lines each.

1. Define a cash budget and state its significance. Explain the process of its preparation.
2. What is a master budget? Explain its significance in a big business concern.
3. What are the advantages and limitations of budgetary control?
4. A budget is a medium of planning, coordination, communication and control? Elucidate the statement.

### B. Answer the following in about 15 lines each.

5. Define a budgeted profit and loss account and a budgeted balance sheet and state their usefulness.
6. What are the principal steps in budgeting?
7. What are the objectives of budgetary control?
8. What are the essentials of a budgetary control system?

### EXERCISES

1. The expenses budgeted, for production of 10,000 units, in a factory are given below :

	Per Unit
	Rs.
Materials	70
Labour	25
Variable Overheads	20
Fixed Overheads (Rs. 1,00,000)	10
Variable expenses (direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administrative expenses (Rs. 50,000)	5
	155
Total cost of sale per unit (to make and sell)	155

Prepare a budget for production of (a) 6000 units and (b) 8000 units. Assume that administrative expenses are rigid for all levels of production.

2. XYZ Co. Ltd., manufactures two products, X and Y, operate three sales divisions for selling them in the market. From the following information, prepare a sales budget for the months ended 30-6-1990 to be presented to the budget committee. Budgeted sales for the 6 months ended 31-12-1989 were as follows :

Product	Division - I	Division - II	Division - III
X	1600 at Rs. 10	2400 at Rs. 10	2400 at Rs. 10
Y	800 at Rs. 9	4800 at Rs. 9	2000 at Rs. 9

Actual rates for the same period were as follows :

Product	Division - I	Division - II	Division - III
X	2000 at Rs. 10	3200 at Rs. 10	2800 at Rs. 10
Y	400 at Rs. 9	4000 at Rs. 9	1600 at Rs. 9

At a meeting of the Divisional Sales Managers, the following decisions have been taken.

- 1) The price of the product X should be increased by Re. 1. The sales manager contends that there is high potential demand for product X and that product X has been under priced.
- 2) Product Y is not selling at the expected rate (This is due to the fact that the product has been over priced). However, if the selling price is reduced by Rs. 1/- it is expected that the market would absorb more.

On the basis of these price changes and reports from salesmen, the Divisional Sales Managers have made the following estimates.

% increase over previous budget

Product	Division - I	Division - II	Division - II
X	20	30	10
Y	5	10	8

3. A limited company is to be incorporated to takeover a running business. It is proposed to raise Rs. 50 lakhs, by issuing equity shares and balance of capital required in first 6 months, is to be financed by a financial institution. The latter is to be given 8% debentures to the nearest Rs. 1 lakh above the amount required secured on fixed assets.

Initial investment consists of:	Rs.
Freehold premises	20 lakhs
Plant	8 lakhs
Stock	5 lakhs
Motor van and other items	6 lakhs

Payment on account of the above items are to be made in the month of incorporation.

Estimates of transacting for the first 6 months commencing from July are given below.

Sales :	July	12	Rs. 12.5 lakhs
	August	12	Rs. 15.0 lakhs
	September	12	Rs. 18.0 lakhs
	October	12	Rs. 22.0 lakhs
	November	12	Rs. 23.0 lakhs

and for each of the next three months Rs. 24.00 lakhs.

Gross profit on sales to be at the rate of 20%.

Creditors to be paid at the end of the month following the month of purchase.

Expenses :

a) Preliminary expenses to be paid in August	Rs. 50,000
b) General expenses per month payable at the end of each month	Rs. 40,000
c) Wages and salaries payable on the first day of next month for each of the first three months; and Rs. 85,000 per month thereafter.	Rs. 70,000

Assume that shares and debentures are issued on 1st July. Draw up a cash budget and budgeted final accounts upto 31st December and Balance Sheet on that date.

4. With the following data for a 60% activity, prepare a budget for production at 80% and 100% capacity.

Production at 60% activity	600 units
Materials	Rs. 100 per unit
Labour	Rs. 40 per unit
Expenses	Rs. 10 per unit
Factory overheads (40% fixed)	Rs. 40,000
Administrative overheads (60% fixed)	Rs. 30,000

5. The Sales Director of a manufacturing company reports that next year, he expects to sell 50,000 units of a certain product. The Production Manager consults the Store-Keeper and submits his figures as follows:

Two kinds of raw-materials A and B are required for manufacturing the product. Each unit of product requires 2 units of A and 3 units of B. The estimated business at the commencement of the next year are : finished product 10,000 units; A 12,000 units; B 15,000 units. The desirable closing balance at the end of the next year are : finished product 14,000 units, A 13,000 and B 16,000 units.

Draw up a purchases budget for the next year.

6. For a production of 10,000 articles, the following are budgeted expenses per unit.

	Rs.
Direct Materials	60
Direct Labour	30
Variable Overheads	20
Fixed Overheads	16
Variable Expenses (direct)	5
Selling Expenses (20% fixed)	15
Administrative Expense (Rs. 50,000 fixed for all levels)	5
Distribution Expenses (20% fixed)	5

Prepare flexible budget for production of 8,000 and 12,000 units of articles

[Ans : Variable Rs. 10,48,000 and Rs. 15,72,000; Fixed Rs. 2,50,000]

7. The cost of an article at a capacity level of 5,000 units is given below. Find out the cost of the product under each individual expenses at production levels of 4,000 units and 6,000 units.

	Rs.
Materials	25,000 (100% Varing)
Labour	15,000 (100% Varing)
Power	1,250 (80% Varing)
Repairs	2,000 (75% Varing)
Stores	1,000 (100% Varing)
Inspection	500 (20% Varing)
Depreciation	10,000 (100% Varing)
Admn. Overheads	5,000 (25% Varing)
Selling Overheads	3,000 (50% Varing)

The individual expenses vary for a variation of 25% in capacity above or below the level of 5,000 units are given above in the brackets.

[Ans. Rs. 12 : 88; Rs. 12 : 33]

8. From the following particulars, prepare production budget of XYZ corporation for the year ended 30th June 2002 :

Product	Sales (units) (As per Sales Budget)	Estimated Stock (Units)	
		1st July '01	30th June '02
A	1,50,000	14,000	15,000
B	1,00,000	5,000	45,000
C	70,000	8,000	8,000

[Ans : Units to be produced : A : 1,51,000 units; B-99,500 Units; C-70,000 units]

## 24.12 RECOMMENDED BOOKS

- |   |   |   |
|---|---|---|
| 1. Jain S.P. & Narang K.L                   | - | "Cost Accounting"<br>Kalyani Publishers, New Delhi.                                   |
| 2. Shukla & Grewal                          | - | "Cost Accounts"<br>S, Chand & Company, New Delhi.                                     |
| 3. Nigam R.S.,<br>Narang S.P. & Sehgal B.G. | - | Advanced Cost Accounting<br>"A managerial approach"<br>S. Chand & Company, New Delhi. |
| 4. Agarwal M.L.                             | - | Theory & Practice of Cost Accounting,<br>Sahitya Bhavan, Agra.                        |
| 5. DK. Mittal & LUV Mittal                  | - | Cost Accounting,<br>Galgotia Publishing Company, New Delhi.                           |

## 24.13 GLOSSARY

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<b>Budget</b>	:	A projected plan of action for a specified period, expressed in quantitative terms.
<b>Budget Centre</b>	:	A section of the organisation clearly identified for the purpose of budgetary control.
<b>Budgetary Control</b>	:	The principles, procedures and practices of achieving the given objectives through budgets.
<b>Budget Manual</b>	:	A guide to the executives, which sets out the procedure of preparing budgets, the forms and records etc. required in that regard.
<b>Key Factor</b>	:	It is the factor which influences the sales or production during a period. It is also known as 'limiting factor' or 'governing factors'.
<b>Master Budget</b>	:	It is consolidated summary of various functional budgets.
<b>Flexible Budget</b>	:	It is a budget designed to change in accordance with the level of activity actually attained.
<b>Fixed Budget</b>	:	It is a budget prepared for a given level of activity. It does not provide any changes in expenditure arising out of changes in the anticipated conditions and when the actual level of activity differs from the budget level of activity.

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## **UNIT - 25 : STANDARD COSTING**

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### Contents

- 25.0 Aims and Objectives
- 25.1 Introduction
- 25.2 Standard, Standard Cost and Standard Costing
- 25.3 Distinction between Standard Costing and Budgetary Control
- 25.4 Steps in Establishing Standards
- 25.5 Types of Standards
- 25.6 Variance Analysis and its Importance
- 25.7 Disposal of Variances
- 25.8 Advantages and Limitations
- 25.9 Summing Up
- 25.10 Check Your Progress : Model Answers
- 25.11 Model Examination Questions
- 25.12 Recommended Books
- 25.13 Glossary

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### **25.0 AIMS AND OBJECTIVES**

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This unit discusses the meaning of standard cost, distinction between standard cost and budgetary control, steps in establishing standards, types of standards, importance of variance analysis, advantages and limitations of standard costing.

By the end of this unit, you will be able to;

- understand the meaning of standard, standard cost and standard costing.
- distinguish between standard costing and budgetary control.
- list out the steps in establishing standards.
- explain the types of standards.
- narrate the advantages and limitations of standard costing.

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### **25.1 INTRODUCTION**

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For the purposes of cost control, it is essential to pre-determine costs or establish planned costs indicating what the management desires to achieve. Standard costing is a method of planning and pre-determining the costs. The importance of standard costing emanates from the limitations of historical costing.

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### **25.2 STANDARD, STANDARD COST AND STANDARD COSTING**

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The term "standard" means a bench-mark or yard-stick. It may be used to refer to the predetermined rate of to any pre-determined amount against which the performance is judged. Hence, a standard cost is an estimated cost and suggests what the cost should be under given

conditions. A standard cost may be defined as a pre-determined cost which is calculated from management's standard of efficient operations and the relevant necessary expenditure. This cost is used as a basis for price fixation and cost control through variance analysis.

Standard costing refers to the principles and procedures which involve the use of pre-determined standard costs relating to each element of cost. Standard costing may be defined as preparation and use of standard costs, their comparison with actual costs and analysis of variance to find their causes and points of incidence. Thus, the technique of cost control adopted in standard costing comprises the following.

- (a) Pre-determination of technical details such as materials and labour operations required, quantum of inevitable losses, expected efficiencies etc.
- (b) Pre-determination of standard labour costs, standard material costs and standard overheads.
- (c) The pre-determined standard costs and actual costs are compared and the variances, i.e., differences, are worked out.
- (d) Variances are analysed in order to determine the reasons therefor.
- (e) The results of the analysis are presented to management to enable them to take suitable remedial measures.

Standard costing is not a system of accounting. It is only a technique which can be applied in any type of costing, such as job costing, process costing etc. Standard costing is more suitable to firms engaged in the manufacture of standardised products such as automobiles and air craft, brewery, chemicals, dye, hosiery, paper, rubber, foundries, spinning, weaving etc. .

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### **25.3 DISTINCTION BETWEEN STANDARD COSTING AND BUDGETARY CONTROL**

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Both standard costing and budgetary control have a common objective of establishing and improving the managerial control over costs. In both-cases, actual performances are compared with pre-determined targets. In many respects, both the devices are inter-related but they are not interdependent. A system of budgetary control in conjunction with standard costing would be more effective in controlling costs than when both of them are separately used.

The main points of distinction between budgetary control and standard costing are as follows:

- (a) Budgetary control can be operated even in the absence of standard costing system. But standard costing cannot be operated without budgetary control.
- (b) Budgets and standards have different purposes. Budgets are the anticipated or expected costs meant to be used, in a given period, while standard costs are the assumed or planned costs to be incurred in specified conditions.
- (c) Budgetary control is effected by instituting budgets in terms of money and / or quantities, while under standard costing such costs are related to the budgeted quantities or of production to obtain standard cost per unit.
- (d) Budgets are the ceilings and lay emphasis on the costs not exceeding budgets, while standard costing lays emphasis on the costs approaching the standard.
- (e) Budgets are set for all activities of industries, firms, governments in respect of incomes and expenses, receipt and payments etc. But standards are set particularly for manufacturing costs.

- (f) If an expenditure is within the budget ceiling, it will be deemed to be an efficient achievement. Contrarily, if the expenditure exceeds the budgetary ceiling, a mere explanation is offered to the management. But in the case of a variance in standards, a further probe and detailed analysis is undertaken.
- (g) Adherence to budgets keeps the business out of difficulties. Standards are pointers for the improvement of the firm.

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## 25.4. STEPS IN ESTABLISHING STANDARDS

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Setting of standard costs for each element of total cost, i.e., direct material, direct labour and overhead, is the first step in the operation of the standard costing system. However, the following preliminaries are to be considered before setting standards.

- i) Study of technical and operational aspect of the concern.
- ii) Establishment of cost centres.
- iii) Determining the type of standards to be used in view of the effective results and control to be achieved.
- iv) Review and classification of existing financial and cost accounting systems so as to facilitate the study of variances.
- v) Fixation of responsibility for variances on the individuals and departments.

### Check your progress - I

I. List out the steps in establishing standards.

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## 25.5 TYPES OF STANDARDS

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Standards may be basically of three types viz., (i) Current standards (ii) Basic standards and (iii) Normal standards.

These standards may be applied depending upon the period of use, level of output, standards to be attained etc.

**i) Current Standards**

These are standards set to suit the current conditions, i.e., the conditions during the period of use. However, these standards need to be revised periodically, in order to keep pace with changes in price level.

**ii) Basic Standards**

These standards are fixed for an indefinite period and hence also known as static or fixed standards. Such standards are useful for undertakings with small range of products and long production runs: These standards help in estimating the variances between basic and current costs.

**iii) Normal Standards**

These are average standards to be attained over a period of time in future, usually the period of a trade cycle. The favourable and unfavourable conditions that may occur, the

degree of internal efficiency. But under normal conditions, these standards can't be attained.

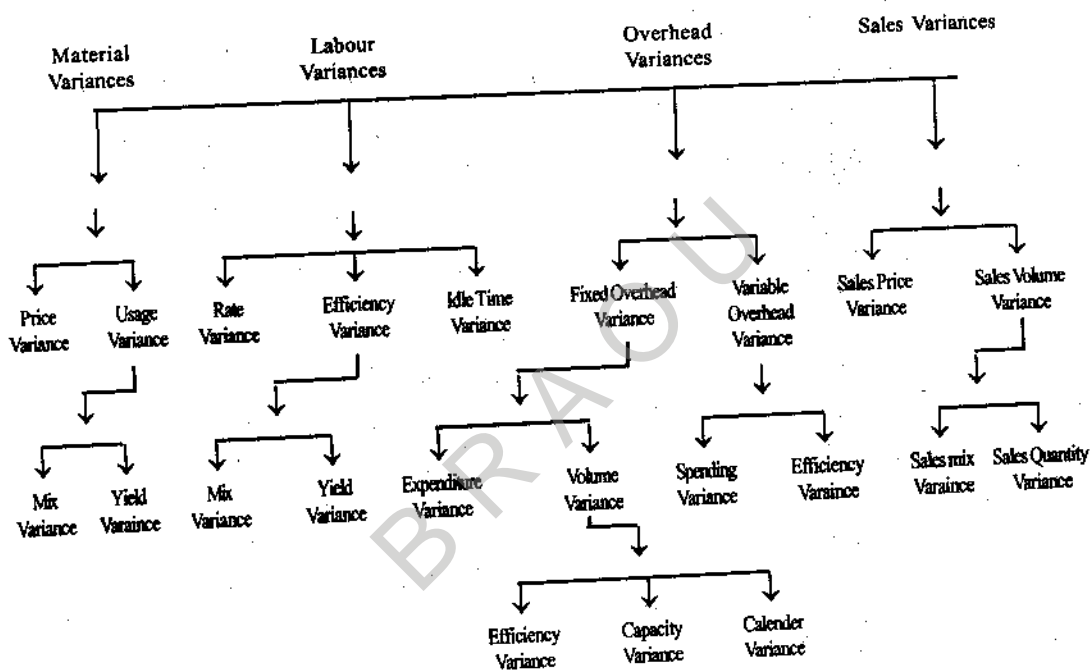
**ii) Expected Standard**

Expected standards are set for a specified and short period. While setting these standards, estimated and prevailing conditions for the period are taken into account. These standards are more realistic than ideal standards.

## 25.6 VARIANCE ANALYSIS AND ITS IMPORTANCE

The pre-set standard costs provide any meaning and utility only when they are compared with actual costs incurred. The difference between actual cost and standard cost of an element is known as "variance". If the standard cost is higher than the actual cost the difference is known as a 'favourable' variance. On the other hand, if the actual cost is higher than the standard cost, the difference is known as unfavourable or adverse variance.

### TYPES OF VARIANCES



Analysis of these variances provides the management with a clear idea regarding the steps to be taken to exercise effective control and to reduce the adverse variance. These variances may be controllable or uncontrollable. The time taken, materials consumed etc. are controllable and responsibility for such variances can be fixed on the executives concerned. Variances due to labour disputes, devaluation of currency, fluctuations in demand etc., are uncontrollable variances.

**Check your Progress**

1. What are the various types of variances ?

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## 25.7 DISPOSAL OF VARIANCES

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There are two ways of disposing the variances i.e. to charge them to costing 'profit and loss account' or to cost of sales and inventories. The first method is preferable because adverse variances indicate inefficiency and as such it is appropriate to charge them to profit and loss account which reveals the overall efficiency of the undertaking. However, if favourable variances in respect of stores and wages are credited to 'profit and loss account' the profit figure would be unrealistic. Yet, it is being considered as the correct accounting procedure.

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## 25.8 ADVANTAGES AND LIMITATIONS OF STANDARD COSTING

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### Advantages of Standard Costing

Standard costing is complementary to the costing system based on actual costs. Therefore, in view of the superiority of standard costing over historical costing, the advantages of the former can be outlined as follows :

- i) Standard costs are established on the basis of ideal conditions on past experience. Thus, standard costing is superior to historical costing.
- ii) Standard costing is more useful to management functions as it provides necessary information of production and pricing policies.
- iii) Under standard costing, actual costs are compared with pre-set standards and variances there upon are analysed. This analysis provides an insight into the deficiencies of management and helps in detecting the exact causes for variances.
- iv) Since pre-determined standard costs act as yardsticks for measuring the efficiency of actual performance, cost control function is simplified.
- v) Standard costing helps the management in focussing its attention only on variances but not on the routine and planned programmes, thus achieving the principle of management by exception.
- vi) Standard costing makes the executives responsible for variances and thus simulates cost consciousness among them.
- vii) Standard costing provides complete integration of cost and financial accounts and thus avoids the need for reconciling them.
- viii) Standard costing segregates the effect on cost of temporary rise or fall in the volume of output and sales.

### Limitations of Standard Costing

The following are some of the important limitations of standard costing :

- i) Small organisations cannot afford to establish standard costing as it involves a high degree of technical skill which would be very costly. However, once the system is established, the benefits on it would exceed the initial costs.
- ii) In order to make the executive responsible for variances, controllable and non-controllable variance need to be segregated. But this is practically very difficult.
- iii) Standards once set cannot be revised frequently according to changes in manufacturing and economic conditions, as it involves additional cost and certain difficulties.
- iv) Standard costing may be unsuitable in such industries where servicing and repairing jobs and non-standardised products are dealt within accordance with customer specifications.

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## 25.9 SUMMING UP

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'Standard means a bench-mark or yard-stick'. Standard Cost is a pre-determined cost which is calculated from managements standards of efficient operation and the relevant expenditure.

Standard costing is the preparation and use of standard costs, their comparison with actual costs and the analysis of variance to their causes and points of incidence.

The budgets are estimated costs, whereas standard costs are specifications of what a cost ought to be when it is incurred. Budgets are the ceilings and lay emphasis-on the costs not to exceed budget. While standard costing lays emphasis on costs approaching the standard. Standards are particularly to manufacturing firms, but budgets are applicable to all activities of firms, industries and Governments.

Steps in establishing standards.

- 1) Study of technical and operational aspects.
- 2) Establish cost centres.
- 3) Determine the type of standards to be used.
- 4) Design finance and cost accounting system to facilitate to measure the variance.
- 5) Fix the responsibility on the departments and individuals.

Types of standards :

- i) Current Standards
- ii) Basic Standards
- iii) Normal Standards
- iv) Ideal Standard
- v) Expected Standard.

Standard costing plays a vital role in all the manufacturing firms

- i) Measure the actuals
- ii) Compare the actuals with the standards
- iii) Find out the variance, if any
- iv) Take corrective action.

As we have discussed in the unit, standard costing has many advantages and at the same time it suffers from some limitations.

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### 25:10 CHECK YOUR PROGRESS : MODEL ANSWERS

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1. 1 The following are the steps in establishing standard costing.
  - 1) Careful study of technical and operational aspects of the firm.
  - 2) Establish cost centres.
  - 3) Determine the type of standard to be used in view of effective control.

- 4) Design a suitable financial and cost accounting system so as to facilitate the study of variance.
  - 5) Fixing responsibility on individuals and departments.
2. I The various types of variances are given below :
- (i) Price Variance
  - (ii) Usage variance
    - a) Mix Variance
    - b) Yield Variance
  - (ii) Variable Overhead
    - a) Spending Variance
    - b) Efficiency Variance
- (B) Labour Variances
- (i) Rate Variance
  - (ii) Efficiency Variance
    - a) Mix Variance
    - b) Yield Variance
  - (iii) Idle-time variance
- (C) Overhead Variance
- (i) Fixed Overhead Variance
    - a) Expenditure Variance
    - b) Volume Variance
      - Efficiency Variance
      - Capacity Variance
      - Calendar Variance
- (D) Sales Variances
- (i) Sales Price Variance
  - (ii) Sales Volume Variance
    - a) Sales Mix Variance
    - b) Sales Quantity Variance

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## 25.11 MODEL EXAMINATION QUESTIONS

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**A. Answer the following in about 30 lines each.**

1. Discuss the importance of standard costing as a tool for cost control. In what type of industries standard costing can be introduced?
2. Explain the various types of standards which are generally in use in manufacturing concerns.
3. Make a critical appraisal of the role of variance analysis in standard cost control system.

4. It is stated that variance analysis effectiveness is a function to follow up by management. What steps would you suggest for improving the effectiveness of standard cost control?
5. Explain the important material variances and state the causes for such variances.

**B. Answer the following in about 15 lines each.**

6. Define 'standard', standard cost and standard costing.
7. Explain the steps involved in standard costing.
8. Explain the important labour variances and discuss the reasons for such variances.
9. Explain the important overhead variances with suitable examples.
10. What is the procedure for the disposal of variances?
11. Discuss the advantages and limitations of standard costing.

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### 25.12 RECOMMENDED BOOKS

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- |   |   |  |
|---|---|--|
| 1. Jain S.P. & Naran of K.L.                | - | "Cost Accounting"<br>Kalyani Publishers, New Delhi.                                    |
| 2. Shukla & Grewal                          | - | "Cost Accounts"<br>S. Chand & Company, New Delhi.                                      |
| 3. Nigam R.S.,<br>Narang S.P. & Sehgal B.G. | - | Advanced Cost Accounting,<br>"A Managerial Approach"<br>S. Chand & Company, New Delhi. |
| 4. Agarwal M.L.                             | - | Theory & Practice of Cost Accounting,<br>Sahitya Bhavan, Agra.                         |
| 5. D.K. Mittal & Luv Mittal                 | - | Cost Accounting, Galgotia<br>Publishing Company, New Delhi.                            |

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### 25.13 GLOSSARY

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<b>Basic Standard</b>	:	A standard fixed for an indefinite period
<b>Calendar Variance</b>	:	Variance in cost arising due to difference in number of working days.
<b>Current Standard</b>	:	A standard set to suit the conditions during the period of use
<b>Ideal Standard</b>	:	A standard attainable under high degree of favourable internal and external conditions.
<b>Predetermined Cost</b>	:	A cost determined before it is incurred, to be of guidance at the time when it is incurred.
<b>Standard</b>	:	A yard-stick to measure
<b>Variance Analysis</b>	:	An analysis of variances of the actual costs from standard costs' for exercising effective cost control.
<b>Yield Variance</b>	:	Difference between the actual and standard output per unit of input.

**BLOCK - VI :**  
**REVISIONARY PROBLEMS**

**Unit - 26 : Problems with Solution on Materials, Labour and Overheads**

**Unit - 27 : Problems with Solution on Methods of Costing**

**Unit - 28 : Problems with Solution on Reconciliation and Marginal Costing**

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## UNIT - 26 : PROBLEMS WITH SOLUTIONS ON MATERIALS, LABOUR AND OVERHEADS

### 1) MATERIALS

#### Problem No. 1

M/s. Bombay Ball Bearing Company quotes for a particular size of Ball Bearing as follows. 200 units @ Rs. 10/- each; 1000 units @ Rs. 9/- 2000 units @ Rs. 7/- each; trade discount @ 20%; cash discount @ 5% if payment is made within a week; containers @ Rs. 12/- each; credit on return @ Rs. 10/- each. One container is required for every 200 units. The Buying Officer decides to buy 1,200 units. Transport charges amounting Rs. 36/- would be charged by supplier.

You are required to calculate the cost of purchase in total and per unit

#### Solution

#### Computation of purchase price :

Material :	Ball Bearings	Unit Purchased 1200	
		Total cost	Per unit
		Rs.	Rs.
	Purchase cost (1200 x 9)	10,800	9.00
	Less : Trade discount @ 20%	2,160	1.80
	Net purchase cost	8,640	7.20
Add :	Returnable containers		
	6 containers @ Rs. 12/-      72-00		
	Less credit on return of		
	6 containers @ Rs. 10/-      60-00	12	0.01
		8,652	7.21
	Add Transport charges identifiable	36	0.03
	Total	Rs. 8,688	7.24

Note Cash discount has not been taken into account as it is an item of financial nature.

#### Problem No. 2

The rate of annual consumption of a material item is 675 units. The interest and cost of storing a material item costing 10% of Rs. 30/- and the cost of placing an order is Rs. 18/- Calculate the EOQ from the above particulars

#### Solution

$$E.O.Q = \text{Economic Order Quantity} = \sqrt{\frac{2.A.S}{I}}$$

A = Annual usage in units is 675

S = Cost of placing an order Rs. 18

I = Inventory carrying cost (including interest)

per unit per annum 10 percent of Rs. 30/- i.e.. Rs. 3

$$E.O.Q. = \sqrt{\frac{2 \times 675 \times 18}{3}}$$

E.O.Q = 90 units

### Problem No. 3

From the following particulars calculate the maximum stock level, minimum stock level, reordering level and average stock level.

- a. Normal consumption = 300 units per day
- b. Maximum consumption = 420 units per day
- c. Minimum consumption = 240 units per day
- d. Re-order quantity = 3600 units
- e. Re-order period = 10 to 15 days
- f. Normal reorder period = 12 days

#### Solution

Re-order level :

$$\begin{aligned} &= \text{Maximum consumption} \times \text{Maximum re-order period} \\ &= 420 \times 15 = 6,300 \text{ units.} \end{aligned}$$

Minimum stock level :

$$\begin{aligned} &= \text{Re-ordering level} - (\text{Normal consumption} \times \text{Normal reorder period}) \\ &= 6,300 - (300 \times 12) = 2,700 \text{ units} \end{aligned}$$

Maximum stock level :

$$\begin{aligned} &= \text{Reordering} + \text{Reorder quantity} - (\text{Minimum consumption} \times \text{Minimum re-order period}) \\ &= 6300 + 3600 - (240 \times 10) = 9900 - 2400 \\ &= 7500 \text{ units} \end{aligned}$$

Average stock level :

$$\begin{aligned} &= \frac{1}{2} (\text{Minimum stock level} + \text{Maximum stock level}) \\ &= \frac{1}{2} (2700 + 7500) = 5100 \text{ units.} \end{aligned}$$

### Problem No. 4

Calculate inventory turnover from the following

Maximum stock : 7,000 units

Minimum stock : 3,000 units

Issues during the year = 1,50,000 units

#### Solution

$$\text{Inventory Turnover} = \frac{\text{Materials Consumed}}{\frac{1}{2} (\text{Maximum Stock} + \text{Minimum Stock})}$$

$$= \frac{1,50,000}{\frac{1}{2} (7,000 + 3,000)} = \frac{1,50,000}{5,000} = 30$$

or

$$\frac{365}{30} = 12.17 \text{ days consumption is the average stock}$$

### Problem No. 5

Calculate the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum = 10,000 kgs.

Order placing cost per order = Rs. 50

Cost per Kg. of raw materials = Rs. 2

Storage costs = 8% on average inventory

#### Solution

$$EOQ = \sqrt{\frac{2.A.S.}{I}}$$

Where, A = Annual Consumption = 10,000 Kgs

S = Cost of placing on order = Rs. 50

I = Inventory Carrying cost per unit per annum 8% of Rs. 2

$$\sqrt{\frac{2 \times 10,000 \times 50}{0.16}} = 2,500 \text{Kgs}$$

Number of orders to be placed in a year :

$$\frac{\text{Total Quantity Required per year}}{\text{Economic Order Quantity}} = \frac{10,000 \text{ Kgs}}{2,500 \text{ Kgs}} = 4 \text{ orders}$$

### Problem No. 6

A company uses three raw materials A, B and C for a particular product of which the following data apply :

Raw Material	Usage Per unit of Product (Kg)	Reorder Quantity (kg)	Price Per Kg.	Lead Time			Reorder Level (Kg)	Minimum Level Kg
				Min	Ave	Max		
A	10	10,000	0.10	1	2	3	8,000	
B	4	5,000	0.30	3	4	5	4,750	
C	6	10,000	0.15	2	3	4		2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities ?

(i) Minimum Stock of A

(ii) Maximum Stock of B

(iii) Reorder level of C

(iv) Average Stock of A

#### Solution :

(i) Minimum Stock of A : Reorder Level - (Average usage x Average lead time)

$$= 8,000 - (2000 \times 2) = 4,000 \text{ Kgs.}$$

(ii) Maximum Stock of B : Reorder level + Reorder Quantity – (Minimum Usage x Minimum lead time)

$$= 4,750 + 5,000 - (4 \times 175 \times 3) = 9,750 - 2,100 = 7,650 \text{ Kgs.}$$

(iii) Reorder level of C = Maximum Usage x Maximum lead time

$$= 4 \times 1,350 = 5,400 \text{ Kgs.}$$

(iv) Average Stock of A = Minimum Stock level + 1/2 of Reorder Quantity

$$= 4,000 + 1/2 (10,000) = 9,000 \text{ Kgs}$$

### Problem No. 7

The following information relating to consumption of 3" nut bolts in Bharat Engineering Ltd., are gathered from the Stock Register :

Normal Consumption : 72 Pcs. per week

Maximum Consumption = 100 Pcs. per week

Minimum Consumption = 50 pcs. per week

Ordering Quantity = 250 pcs.

Delivery time to get fresh supply : Normal : 2 Weeks

Emergency : 3 days

Determine different stock levels for 3" nut bolts, assuming the factory work 6 days a week.

### Solution :

(a) Reorder Level = Maximum Consumption x Maximum delivery period.

$$\text{Maximum} = 100 \times 2 = 200 \text{ Pcs.}$$

(b) Maximum Stock Level = Reorder Level + Reorder Quantity - (Minimum Consumption x Minimum Delivery Period)

$$= 200 + 250 - (50 \times 2) = 350 \text{ Pcs.}$$

(c) Minimum Stock Level = Reorder level – (Normal Consumption x Normal delivery period)

$$= 200 - (72 \times 2) = 56 \text{ Pcs.}$$

(d) Danger Stock Level : Average Consumption x Emergency delivery period

$$= 72 \times 3/6 = 36 \text{ Pcs.}$$

### Problem No. 8

Calculate the material turnover ratio for the year 1999 from the following information and determine which of the two materials is fast moving.

	Material X Rs.	Material Y Rs.
Material in Hand on 01-01-1999	25,000	87,500
Material in Hand on 31-12-1999	15,000	62,500
Material purchased during the year	1,90,000	1,25,000

**Solution :**

	Material X Rs.	Material Y Rs.
Cost of material consumed :		
Opening Stock	25,000	87,500
Add : purchases	1,90,000	1,25,000
	<hr/>	<hr/>
	2,15,000	2,12,500
Less : closing stock	15,000	62,500
	<hr/>	<hr/>
	2,00,000	1,50,000
Average stocks :		
Opening stock	25,000	87,500
Closing stock	15,000	62,500
	<hr/>	<hr/>
	40,000	1,50,000
Average	40,000	1,50,000
	<hr/>	<hr/>
	2	2
	<hr/>	<hr/>
	= 20,000	= 75,000

$$\text{Material Turnover Ratio} = \frac{\text{Cost of material consumed}}{\text{Cost of average stock}}$$

$$\text{Material Turnover Ratio of X} = \frac{2,00,000}{20,000} = 10$$

$$\text{Material Turnover Ratio of Y} = \frac{1,50,000}{75,000} = 2$$

$$\text{Material Turnover in Days} = \frac{\text{Days during the year}}{\text{Material Turnover Ratio}}$$

$$\text{Material Turnover in Days X} = \frac{365}{10} = 36.5 \text{ days}$$

$$\text{Material Turnover in Days : Y} = \frac{365}{2} = 182.5 \text{ days}$$

A turnover ratio of 36.5 days in the case of X and 182.5 days in the case of Y, shows that on an average stock is being held for 36.5 and 182.5 days respectively. Therefore, Material Y is slow moving and Material X is fast moving.

### Problem No. 9

The following information is available on the purchase and issue of a material during the month of August, 2000.

Purchases	Issues
August, 2 : 200 units @ Rs. 2-00 per unit	August 15 : 250 units
August, 10 : 300 units @ Rs. 2-40 per unit	August, 20 : 200 units
August, 18 : 250 units @ Rs. 2-60 per unit	

Prepare a Stores Ledger Account posting the issues under FIFO and LIFO methods.

**Solution**

**FIFO METHOD**

*Stores Ledger Account*

Date	Receipts			Issues			Balance		
	Units	Rate Rs.	Amount Rs.	Unit	Rate Rs.	Amount Rs.	Units	Rate Rs.	Amount Rs.
2000									
August, 2	200	2-00	400-00	---	---	---	200	2-00	400-00
August, 10	300	2-40	720-00	---	---	---	200 300	2-00 2-40	1,120-00
August, 15	--	--	--	200 50	2-00 2-40	520-00	250	2-40	600-00
August, 18	250	2-60	650-00	---	---	---	250 250	2-40 2-60	1,250-00
August, 20	--	--	--	200	2-40	480-00	50 250	2-40 2-60	770-00

**LIFO METHOD**

*Stores Ledger Account*

Date	Receipts			Issues			Balance		
	Units	Rate Rs.	Amount Rs.	Unit	Rate Rs.	Amount Rs.	Units	Rate Rs.	Amount Rs.
2000									
August, 2	200	2-00	400-00	---	---	---	200	2-00	400-00
August, 10	300	2-40	720-00	---	---	---	200 300	2-00 2-40	1,120-00
August, 15	--	--	--	250 50	2-40 2-40	600	200 50	2-00 2-40	520-00
August, 18	250	2-60	650-00	---	---	---	200 50 250	2-00 2-40 2-60	1170-00
August, 20	--	--	--	200	2-40	520-00	200 50 50	2-00 2-40 2-60	650-00

**Problem No. 10**

Set-up a "Stores Ledger" form and enter the following transactions adapting the weighted average method of pricing out issues. At the end of each month in 2002 all materials are valued at the cost of last delivery.

June 1 : Opening balance - 50 units @ Rs. 3 per unit

June 5 : Issued out to production : 2 units

June 7 : Purchased 48 units @ Rs. 4 per unit

June 9 : Issued out 20 units to production

June 19 : Purchased 76 units @ Rs. 3 per unit

June 24 : Received back into stores 19 units out of 20 units issued on 9th

June 27 : Issued to production 10 units

**Solution :**

**STORES LEDGER**  
(Weighted Average Method)

Date	Receipts			Issues			Balance	
	Qty	Rate Rs.	Amount Rs.	Qty	Rate Rs.	Amount Rs.	Qty	Amount Rs.
2000								
June, 1	--	--	--	--	--	--	50	150
							@ Rs. 3	
June 5	--	--	--	2	3	6	48	144
June 7	48	4	192	--	--	--	96	336
June 9	--	--	--	20	3-50	70	76	266
June 19	76	3	228	--	--	--	152	494
June 24	19	3-50	66-50	--	--	--	171	560-50
	(Returns)							
June 27	--	--	--	10	3-27	32-78	161	527-72
June 30	Stores adjustment	-	35-78	--	--	--	161	563-50*

\* Since closing stock is to be valued at the cost of last delivery, the value comes to Rs. 563=50 (i.e. 161 x 3 : 50). The difference of Rs. 35 : 78 (i.e. Rs. 563.50 - Rs. 527.72) has been transferred to stores adjustment account.

**Problem No. 11**

The following transactions took place in respect of material A :

Date	Receipts		Issues
	Rate Rs.	Units	Units
01-03-2001	1-00	400	---
10-03-2001	1-20	600	---
16-03-2001	---	---	500
19-03-2001	1-30	500	---
25-03-2001	---	---	400

Prepare a Stores Ledger Account under simple average rate method.

**Solution**

*Stores Ledger Account*

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amount Rs.	Unit	Rate Rs.	Amount Rs.	Units	Amount Rs.
01-03-2001	400	1-00	400-00	---	---	---	400	400-00
10-03-2001	600	1-20	720-00	---	---	---	1000	1,120-00
16-03-2001	---	---	---	500	1-10	550-00	500	570-00
19-03-2001	500	1-30	650-00	---	---	---	1000	1,220-00
25-03-2001	---	---	---	400	1-25	500-00	600	720-00

Note Calculation of issue price :

$$\text{On 16-03-2001} = \frac{1.00 + 1.20}{2} = \text{Rs. 1.10}$$

$$\text{On 25-03-2001} = \frac{1.20 + 1.30}{2} = \text{Rs. 1.25}$$

**Problem No. 12**

From the particulars given in problem 11 prepare a Stores Ledger Account under weighted average rate method.

**Solution**

*Stores Ledger Account*

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amount Rs.	Units	Rate Rs.	Amount Rs.	Units	Amount Rs.
01-03-2001	400	1-00	400-00	---	---	---	400	400-00
10-03-2001	600	1-20	720-00	---	---	---	1000	1,120-00
16-03-2001	---	---	---	500	1-12	560-00	500	560-00
19-03-2001	500	1-30	650-00	---	---	---	1000	1,210-00
25-03-2001	---	---	---	400	1-21	484-00	600	726-00

Note Calculation of issue price :

$$\text{on 16-03-2001} = \frac{400 \times 1.00 + 600 \times 1.20}{400 + 600} = \frac{400 + 720}{1000}$$

$$= \frac{1120}{1000} = \text{Rs. 1.12}$$

$$\text{on 25-03-2001} = \frac{560 + 500 \times 1.20}{500 + 500} = \frac{560 + 600}{1000}$$

$$= \frac{1160}{1000} = \text{Rs. 1.16}$$

**Problem No. 13**

400 lbs of wool costing Rs. 72,000 was issued for the manufacture of 38" size pullover. On the completion of manufacture of pullovers, the following information is furnished.

- a) 1,600 good pullovers of 38" size of 2' lb each were manufactured.
- b) 100' lbs of wool is scrapped and realises Rs. 700.
- c) 200' lbs of off cuts were used for the manufacture of another variety of hoisery. The market value of this is Rs. 1,800.
- d) 200 pullovers were found defective and were rectified at an additional material cost of Rs. 500/-

You are required to find out the cost of material of one pullover.

**Solution**

	Quantity lbs.	Amount Rs.
Material issued	4,000	72,000
Less : sale of scrap	100	700
Less : Off cuts used for the manufacture of another variety (spoilage)	<u>3900</u> 200	<u>71,300</u> 1,800
Add : Cost of rectification of 200 defective pullovers	3,700 -	69,500 500
Less : Wastage in process Cost of 1800 (good 1600 + 200 defectives)	3700 100 <u>3,600</u>	70,000 <u>70,000</u>

$$\text{Cost of Material per pullover} = \frac{70\,000}{1,800} = \text{Rs. } 38.89$$

## 2. LABOUR

- 1) From the following particulars, prepare a statement showing the cost per day of 8 hours of engaging a particular type of labour :
- Monthly salary (Basic plus DA) : Rs. 1,600
  - Leave salary payable to workmen : 5% of salary
  - Employer's contribution to provident fund at 5% of salary (a + b)
  - Employer's contribution to the State Insurance at 5% of salary (a + b)
  - Expenditure on amenities to labour : Rs. 52 per head per month
  - Number of working hours in a month : 200 hours.

### Solution :

Working hours in a day	:	8 hours	
Working hours in a month	:	200 hours	
Working days in a month	:	= 25 days	
			Rs.
Monthly Salary (basic plus DA)			1,600
Leave Salary payable @ 5% of salary : 1600 x 5%			80
Employer's contribution to provident fund :		$\frac{200}{8}$	
5 % of (a + b) = 1680 x 5% =			84
Employer's contribution to State Insurance :			
5% of (a + b) = 1680 x 5%			84
Expenditure on amenities to labour @ Rs. 52 per head			<u>52</u>
		Total labour cost per month	<u>1,900</u>
Cost per day of 8 hours : 1,900 x $\frac{8}{200}$		= Rs. 76	
Cost per hour : $\frac{1,900}{200}$		= Rs. 9.50	

- 2) The personal department of a Company has supplied the following information relating to its work force during the month June, 2002.

Number of workers on 1st June 1,900

Number of workers on 31st June 2,100

During the month, 60 persons were discharged and 20 left the Company. During the month 200 workers were engaged, out of which only 40 workers were appointed against the vacancy caused by the number of workers separated and the remaining on account of an expansion scheme of the Company.

Calculate labour turnover rate and equivalent annual rate, under different methods.

### Solution

- Average number of workers =  $\frac{(1900 + 2100)}{2} = 2000$
1. Separation method
- Labour Turnover rate =  $\frac{80 \times 100}{2000} = 4\%$
- Equivalent Annual Turnover =  $\frac{4 \times 365}{30} = 48.67\%$

2. Flux Method :

$$\text{Labour Turnover} = \frac{80 + 40}{2000} \times 100 = 6\%$$

$$\text{Equivalent Annual Turnover} = \frac{6 \times 365}{30} = 73\%$$

3. Replacement Method :

$$\text{Labour Turnover} = \frac{40 \times 100}{2000} = 2\%$$

$$\text{Equivalent Annual Turnover} = \frac{2 \times 365}{30} = 24.33\%$$

3) From the following particulars, find out the net wages cheque in a factory for a particular month :

	Rs.
i) Wages for normal hours worked	41,000
ii) Wages for overtime	4,400
iii) Leave wages	5,400
iv) Deduction of workers contribution to E.S.I.	1,000
v) Workers contribution to Provident Fund	3,200
vi) House Rent is to be recovered from 30 workers @ Rs. 20/- per month.	

**Solution**

*Statement of Wage payment*

	Rs.	Rs.
Wages for normal		41,000
Wages for over time		4,400
Leave Wages		5,400
		<u>50,800</u>
Less Deductions :		
Workers contribution to E.S.I.	1,000	
Workers contribution to P.F.	3,200	
House Rent (30 x 20)	<u>600</u>	
		4,800
		<u>46,000</u>
		Net wages (cheque required) :

4) Calculate labour cost per man-day of 8 hours from the following particulars :

- |  |   |
|--|---|
| i) Basic salary                        | Rs. 4/- per day   |
| ii) Dearness allowance                 | 25 paise per every point over 100 cost of living index for working class. |
|  | Current cost of living index 500 points                                   |
| iii) Leave salary                      | 10 per cent of i) and ii)   |
| iv) Employees' contribution to P.F.    | 8 per cent of i), ii) and iii)  |
| v) Employer's contribution to E.S.I    | 2.5 per cent of i), ii) and iii)  |
| vi) Expenditure on amenities to labour | Rs. 20 per head per month   |
| vii) Number of working days in a month | 25 days of 8 hours each.  |

**Solution**

**Statement of Labour Cost (Per man-day of 8 hours)**

	Rs.
i) Basic Salary	4=00
ii) D.A. @ 25 paise per point of 100 cost of living index for a month of 25 days.	
$= \frac{400 \times 25}{100} \times \frac{1}{24}$	4=00
iii) Leave Salary : 10% of i) and ii)	
$= \frac{8 \times 10}{100}$	0 = 80
iv) Employer's contribution to P.F. 8% of i), ii) and iii)	
$= \frac{8.80 \times 8}{100}$	0 = 70
v) Employer's contribution to E.S.I. 2.5% of i), ii) and iii)	
$= \frac{8.80 \times 2.5}{100}$	0 = 22
vi) Amenties to laboru @ Rs. 20 per head per month of 25 working days	0 = 80
	<b>Rs. 10 = 52</b>

- 5) The following is the output of workers A, B and C in a particular 40 hour week.  
 A : 64 units, B : 74 units, C : 84 units  
 Guaranteed Time Rate Rs. 5 per hour  
 Low piece rate Rs. 2 per unit  
 High piece rate Rs. 3 per unit  
 High task : 80 units per week

Show the earnings and labour cost per unit under Taylor, Merrick and Gantt Task differential piece rate systems.

**Solution**

*Statement of Earnings and Labour Cost per Unit*

Worker	Output Per week	Percentage of Task (80 units)	Taylor's System		Merrick System		Gantt Task System	
			Earnings	Labour cost per Unit	Earnings	Labour cost per Unit	Earnings	Labour cost per Unit
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
A	64	80.0	128-00	2-00	128-00	2-00	200-00	3.125
B	74	92.5	148-00	2-00	162-80	2-20	200-00	2.707
C	84	252.0	252-00	3-00	201-60	2-40	252-00	3.000

6) From the following particulars, calculate the total earnings of the workers and his effective rate of earnings under Halsey (50 - 50) premium plan.

Rate per hour Rs. 1.50

Time allowed for the job 16 hours

Time taken 12 hours

**Solution**

Standard Time, S	=	16 hours
Time Taken or T	=	12 hours
Rate or R	=	1.50 per hour
Total Earnings	=	$T \times R + 50\% (S - T) \times R$
	=	$12 \times 1.50 + (16 - 12) \times 1.50$
	=	$18 + 3.00 = \text{Rs. } 21 = 00$
Total wages for 12 hours	=	$\text{Rs. } 21 = 00$

Effective rate of earnings per hour :

$$\frac{\text{Total wages}}{\text{Time Taken}} = \frac{\text{Rs. } 21 = 00}{12} = \text{Rs. } 1.75$$

7) From the details given below, calculate the bonus, total earnings and rate of earnings per hour using Rowan System.

Time allowed	....	6 hours
Hourly rate	....	Rs. 1.50 $\frac{50}{100}$
Time taken	....	4 hours $\frac{100}{100}$

**Solution**

Bonus earned =  $\frac{S - T}{S} \times T \times R$       Where

T = Time taken

S = Standard time or time allowed

R = Rate per hour

$$= \frac{6 - 4}{6} \times 4 \times 1.50$$

= Rs. 2.00

Total earnings =  $T \times R + \frac{S - T}{S} \times T \times R$

$$= 4 \times 1.50 + \frac{6 - 4}{6} \times 1.50$$

$$= 6.00 + 2 = 00$$

$$= \text{Rs. } 8 = 00$$

Rate of earnings per hour =  $\frac{8}{4} = \text{Rs. } 2 = 00$

8) Calculate the earnings of a worker under : (i) Halsey premium Plan and (ii) Rowan's Premium Plan from the following particulars :

Hourly rate of wages guaranteed : Rs. 5

Standard item for producing one dozen articles : 3 hours

Actual time taken by the worker to produce 20 dozens of articles : 48 hours

**Solution :**

Calculation of earnings of a worker under Halsey and Rowan's Premium Plus :

Standard item : S : 60 hours ; Time taken to do the work : T : 48 hrs.

Time saved (S-T) = (60 - 48) = 12 hours : Wage Rate : Rs. 5.

**As per Halsey Premium Plan :**

$$\text{Formula : } T \times R + \frac{S - T}{S} \times R$$

$$T \times R = 48 \times 5 = \text{Rs. 240}$$

$$\text{Bonus} = \frac{1}{2} \times 12 \times 5 = \text{Rs. 30}$$

$$\text{Total Wage : Halsey Plan} = \underline{\text{Rs. 270}}$$

**As per Rowan's Premium Plan :**

$$T \times R + \frac{S - T}{S} \times T \times R$$

$$T \times R = 48 \times 5 = \text{Rs. 240}$$

$$\text{Bonus} = \frac{12}{48} \times 48 \times 5 = \text{Rs. 60}$$

$$\text{Total Wage : Rowan's Plan} = \underline{\text{Rs. 300}}$$

9) Calculate wages payable to the two workers Akhil and Achal under the Taylor's differential Piece Rate System from the following information.

Standard work : 20 units per hour

Normal Wage rate : Rs. 10 per hour

Differential rates to be applied :

75 percent of piece rate when below standard, and

125 percent of piece rate when at or above standard

The workers Akhil and Achal have produced in a day of 8 hours, as follows :

Akhil : 120 units and

Achal : 180 units

**Solution :**

Calculation of wages due to Akhil and Achal according to Taylor's Differential Piece Rate System.

Standard production in 8 hours = 8 x 20 = 160 units

Normal wage rate per unit at Rs. 10 per hour =  $\frac{10}{20} = 50$  paise.

Worker Akhil produced 120 units, which is below standard

$$\text{His wages would be : } 120 \times 0.50 \times \frac{75}{100} = \text{Rs. 45}$$

Worker Achal produced 180 units, which is above standard

$$\text{His wages would be : } 180 \times 0.50 \times \frac{125}{100} = \text{Rs. 112.50}$$

10) From the following information, calculate the bonus and earnings under Emerson's Efficiency Bonus System

Standard output in 10 hrs	120 units
Actual output in 10 hrs	132 units
Time Rate	Rs. 1/- per hour

**Solution**

$$\text{Earnings} = \text{HW} \times \text{RH} + \frac{\text{EBP}}{100} \times \text{HW} \times \text{RH}$$

Where

HW = Hours worked

RH = Rate per hour

EBP = Efficiency Bonus Percentage

Efficiency Calculation :

a) Under Standard Hour Method.

$$\text{Efficiency Percentage} = \frac{\text{Actual production in terms of standard hour}}{\text{Actual hours worked}} \times 100$$

Therefore, actual

$$\text{production in standard hours} = 132 \times \frac{10}{120} = 11 \text{ hrs.}$$

$$\text{So, efficiency percentage} = \frac{11}{10} \times 100 = 110\%$$

b) Under Output Method.

$$\begin{aligned} \text{Efficiency Percentage} &= \frac{\text{Actual output for a period}}{\text{Standard output for the period}} \times 100 \\ &= \frac{132}{120} \times 100 = 110\% \end{aligned}$$

$$\text{Now, Bonus percentage} = 20 + (110 - 100) \times 1 = 30\%$$

$$\text{Bonus} = \frac{30}{100} \times 10 \times \text{Rs. 1} = \text{Rs. 3} = 00$$

$$\text{Earnings} = 10 \times 1 + \frac{30}{100} \times 10 \times 1 = 10 + 3 = \text{Rs. 13} = 00$$

11) Twenty-five men work in a group. If the weekly production of the group exceeds 200 pieces per hour (which is the standard), each man gets a bonus in addition to his time wages.

Bonus regulation - 'Each man's share should be one-half of the percentage in excess of the standard production. Each man is paid this percentage of a wage rate of Rs. 1.20 per hour. There is no relationship between the individual workman's hourly rate and the bonus rate.

The following is one week's record

	Hours worked	Production (Units)
Monday	190	44,200
Tuesday	210	47,300
Wednesday	195	45,200
Thursday	215	47,600
Friday	200	46,900
Saturday	190	44,800
	<u>1,200</u>	<u>2,76,000</u>

Compute -

- The rate and amount of bonus for the week
- Total earning of X, who worked 45 hours during the week and was paid Re 1/- per hour basic, and that of Y, who worked 48 hours, was paid Rs. 1.10 per hour basic.

**Solution**

- Bonus :
 

Actual production for the week	2,76,000
Standard production, 200 pieces per hour	<u>2,40,000</u>
Production in excess of standard	36,000

$$\text{Excess production percentage} = \frac{36,000}{2,40,000} \times 100 = 15\%$$

So, each man's share =  $\frac{1}{2}$  of 15% = 7.5%

Bonus rate = 7.5% of Rs. 1.20 = Re. 0.09 per hour

Amount of bonus = 1,200 hours at RE. 0.09 per hour  
= Rs. 108=00

- Wages Computation :

- Wages Computation :

	Rs.
X : 45 hours @ Re. 1=00 per hour	45 = 00
Bonus - 45 hours @ Re. 0.09 per hour	4 = 05
<b>Total earnings</b>	<u>Rs. 49 = 05</u>

Y : 48 hours @ Re. 1.10 per hour	52 = 80
Bonus - 48 hours @ Re. 0.09 per hour	4 = 32
<b>Total earnings</b>	<u>Rs. 57 = 12</u>

### 3. OVERHEADS

- 1) A Company has five departments of which three - P1, P2 and P3 are production departments and Two S1 and S2 - departments. The following are the actual costs for a specified period :

	Rs.
Repairs	2,000
Rent	2,500
Depreciation	1,200
Supervision	4,000
Insurance	1,500
Employer's liability of employees' insurance	700
Lighting	1,800

The following data are available in respect of the five departments.

	P1	P2	P3	S1	S2
Area (Sq. ft.)	280	240	220	180	80
No. of workers	50	40	20	20	10
Total wages (Rs.)	10,000	8,000	5,000	5,000	2,000
Value of plant (Rs.)	40,000	36,000	32,000	20,000	12,000
Value of stock (Rs.)	30,000	20,000	10,000	4,000	

Apportion the costs to the various departments on a suitable basis.

#### Solution

#### *Overhead Distribution Summary*

Expense item	Basis of apportionment	Total amount Rs.	Production Departments			Service Departments	
			P1 Rs.	P2 Rs.	P3 Rs.	S1 Rs.	S2 Rs.
Repairs	Value of plant	2,000	572	415	457	286	171
Rent	Area	2,500	700	600	550	450	200
Depreciation	Value of plant	1,200	343	308	274	172	103
Supervision	No. of workers	4,000	1,429	1,143	571	571	286
Insurance	Value of stock	1,500	703	469	234	94	-
Employee's Insurance	No. of workers	700	250	200	100	100	50
Lighting	Area	1,800	504	432	396	324	144
		13,700	4,501	3,666	2,582	1,997	954

- 2) X Ltd. has two production departments, A and B and one service department, C. The following figures were extracted from the records of the company.

Rent and Rates : Rs. 10,000      General Lighting : Rs. 1,200

Indirect wages : Rs. 3,000      Power : Rs. 3,000

Depreciation of machinery : Rs. 20,000

The following are further details which are available :

	A	B	C
Floor space (sq. ft.)	10,000	10,000	12,000
Light points (Number)	20	15	10
Direct wages (Rs.)	6,000	4,000	6,000
H.P. of machines	40	30	30
Value of machinery	90,000	90,000	20,000
Working hours	10,000	8,000	---

The Service department expenses are to be allocated to the Production departments equally.

Calculate the percentage of overheads in relation to direct wages for departments A and B, and

The overhead cost per hour for each of the departments.

### Solution

#### Overhead Distribution Summary

Expenses item	Basis of apportionment	Total Amount Rs. Rs.	Production Departments		Service Depts.	
			A Rs.	B	B Rs.	C Rs.
Rent & Rates	Floor space	10,000	3,126	3,126	3,748	
General Lighting	Light points	1,200	534	400	266	
Indirect wages	Direct wages	3,000	1,125	750	1,125	
Power	H.P. of Machines	3,000	1,200	900	900	
Depreciation	Value of Machinery	20,000	9,000	9,000	2,000	
		37,200	14,985	14,176	8,039	
			4,020	4,019	-8,039	
			19,005	18,195		
					454.88	
	% of overheads to Direct Wages		316.75			
	Overhead cost per hour		Rs. 1.900		Rs. 2.27	

- 3) A factory has three Production departments X, Y and Z, and two Service Departments, A and B. The overhead distribution for September 2002 is as follows :

Production Departments	Rs.	Service Departments	Rs.
X	50,000	A	5,000
Y	20,000	B	8,000
Z	25,000		

The expenses of the Service Departments are charged on a percentage basis as hereunder:

	X	Y	Z	A	B
A	30%	30%	20%	---	20%
B	50%	20%	20%	10%	---

Using the Repeated Distribution Method, apportion the expenses of Service Departments to Production Departments.

### Solution

#### Overhead Distribution Summary (Sundry Distribution)

	X Rs.	Y Rs.	Z Rs.	A Rs.	B Rs.
As per distribution summary	50,000	20,000	25,000	5,000	8,000
A	1,500	1,500	1,000	-5,000	1,000
B	4,500	1,800	1,800	900	-9,000
A	270	270	180	-900	180
B	90	36	36	18	-180
A	5.4	5.4	3.6	-18	3.6
B	1.8	0.9	0.9	--	-3.6
	<u>56,367.2</u>	<u>23,612.3</u>	<u>28,020.5</u>		

- 4) The following information is extracted from the books of M/s Swathi Engineering Co. for the quarter year ended 31st March, 2003. You are required to prepare Production Overheads Distribution Summary showing clearly the basis of apportionment where necessary :

Particulars of expenses	Production Departments			Service Depts.	
	X	Y	Z	A	B
Direct wages (Rs.)	16,000	24,000	32,000	8,000	16,000
Direct Materials (Rs.)	8,000	16,000	16,000	12,000	12,000
Employees (Nos.)	800	1,200	1,200	400	400
Power (Kwh)	32,000	24,000	16,000	8,000	8,000
Light points (Nos.)	80	128	32	48	32
Assets value (Rs.)	4,80,000	3,20,000	2,40,000	80,000	80,000
Are occupied Sq.m.	1,200	2,000	400	400	400

The expenses incurred for the period were as follows :

Motive Power rs. 4,400; Lighting Rs. 800; Stores overheads Rs. 3,200, Amenities to employees Rs. 12,000, Depreciation Rs. 1,20,000, Repairs and maintenance Rs. 24,000, General overheads Rs. 48,000, Rent and Taxes Rs. 2,200.

Apportion the expenses of Service department A in the ratio of 3:1:1 and these of Service Dept., B in 3:3:4, to the Production Departments X, Y, and Z respectively.

Solution :

*Production Overheads Distribution Summary  
for the quarter ended 31st March 2003*

Expense item	Total amount	Production Departments			Service Departments	
		X Rs.	Y Rs.	Z Rs.	A Rs.	B Rs. Rs.
Direct Material	24,000				12,000	12,000
Direct Wages	24,000				8,000	16,000
Motive Power on the basis of KWH)	4,400	1,600	1,200	800	400	400
Lighting (on the basis of light points)	800	200	320	80	120	80
Stores overheads (D. Mat. Ratio)	3,200	400	800	800	600	600
Amenities to Employees (on the basis of Employee)	12,000	2,400	3,600	3,600	1,200	1,200
Depreciation (on Asset Value)	1,20,000	48,000	32,000	24,000	8,000	8,000
Repairs & Maintenance (on Asset Value)	34,000	9,600	6,400	4,800	1,600	1,600
General overheads (on D. Wages)	48,000	8,000	12,000	16,000	4,000	8,000
Rent & Taxes (on Area basis)	2,200	600	1,000	200	200	200
<b>Total :</b>	<b>2,62,600</b>	<b>70,800</b>	<b>57,320</b>	<b>50,280</b>	<b>36,120</b>	<b>48,080</b>
Dept. A (3:1:1)		21,672	7,224	7,224	-36,120	-
Dept. B (3:3:4)		14,424	14,424	19,232	-	-48,080
<b>Total</b>	<b>2,62,600</b>	<b>1,06,896</b>	<b>78,968</b>	<b>76,736</b>	<b>-</b>	<b>-</b>

5) M/s. Uttam Company Ltd., is having in all four departments, of which the three A, B and C are production departments and the one D is a Service Department. The actual costs incurred for the year ended 31st March, 2002 are as follows :

	Rs.		Rs.
Rent	40,000	Supervision	60,000
Reparis	24,000	Insurance	20,000
Depreciation	18,000	ESI - Employers' Liability	6,000
Lighting	4,000	Power	36,000

The following information is also available in respect of the Four departments :

	Dept. A	Dept. B	Dept. C	Dept. D
Area (in Sq. Ft.)	3,000	2,200	1,800	1,000
200 No. of workers	480	320	240	160

Plant Value (in Rs.)	4,80,000	3,60,000	2,40,000	1,20,000
Total Wages (in Rs.)	1,60,000	1,20,000	80,000	40,000
Value of stock (in Rs.)	3,00,000	1,80,000	1,20,000	--

Appropriate the costs to the various departments on the most equitable method.

**Solution**

*M/s. Uttam Company Limited.*  
*Appropriation of costs between the Four Departments*

Particulars of costs	Basis of apportionment	Dept. A amount	Dept. B	Dept. C	Dept. D
Rent	Area	15,000	11,000	9,000	5,000
Reparis	Plant value	9,600	7,200	4,800	2,400
Depreciation	Plant value	7,200	5,400	3,600	1,800
Supervision	No. of workers	24,000	16,000	12,000	8,000
Insurance	Value of stocks	10,000	6,000	4,000	—
ESI Emprls Liab.	Wages	2,400	1,800	1,200	600
Lighting	Area	1,500	1,100	900	500
Power	Plant value	14,400	10,800	7,200	3,600
		84,100	59,300	42,700	21,900

Note : It has been assumed that insurance is only with regard to stock

In the absence of any information, power expenses have been appropriated on the basis of value of plant.

6) A manufacturing Company has three Production Departments : X, Y, and Z and one Service Department : A. The following data is available for one month of 25 working days of 8 hours each. All these departments work for all the days and with full attendance.

Particulars of exp.	Total Rs.	A Rs.	X Rs.	Y Rs.	Z Rs.
Power & Lighting	13,200	2,880	2,400	3,600	4,320
Supervisor's Salary	24,000	-	-	-	-
Rent	6,000	-	-	-	-
Welfare	7,200	-	-	-	-
Others	14,400	2,400	2,400	4,800	4,800
	<u>64,800</u>				
Supervisors Salary		20%	30%	30%	20%
Number of workers		120	360	480	240
Floor area in Sq. Ft.		6,000	7,200	9,600	7,200
Services rendered by the service Dept.			50%	30%	20%

Appropriate the expenses to the various departments on the basis of equitable method. Also calculate Labour-hour rate for each of the Departments : X, Y, and Z.

## Solution

Statement showing the apportionment of expenses between Production Depts.

Particulars of Exp.	Basis of Apportionment	Total Rs.	A Rs.	X Rs.	Y Rs.	Z Rs.
Power & Lighting	Given	13,200	2,880	2,400	3,600	4,320
Supervisors salary	Given %	24,000	4,800	7,200	7,200	4,800
Rent	Aloor Area	6,000	1,200	1,440	1,920	1,440
Welfare	No. of Workers	7,200	720	2,160	2,880	1,440
Others	Given	14,400	12,000	15,600	20,400	16,800

Allocation of Service Dept. Exp.

to Production Departments	--	--	6,000	3,600	2,400
Total Overheads :		--	21,600	24,000	19,200

Had the Supervisors Salary apportionment is not given in the problem, it would have been allocated on the basis of the number of workers.

Number of hours in a month :  $25 \times 8 = 200$  hours

Total Labour Hours in each Production Department :

X :  $200 \times 360 = 72,000$  hours ; Y :  $200 \times 480 = 96,000$  hours;

Z :  $200 \times 240 = 48,000$

Labour Hour rate : X Dept;  $21,600 / 72,000 = 30$  Paise

Y Dept :  $24,000 / 96,000 = 25$  Paise

Z Dept :  $19,200 / 48,000 = 40$  Paise

7) M/s. Kashyap Manufacturing Company has three production Departments A, B, C; and Two Service Departments D and E. For the month of January, 2003 the departmental distribution of expenses has the following totals :

Production Departments :

A Rs. 16,000; B Rs. 14,000 ; and C Rs. 10,000

Total : 40,000

Service Departments :

D Rs. 4,680 ; E Rs. 6,000

Total 10,680

50,680

The expenses of the service departmentns are charged out on a percentage basis as follows :

	A	B	C	D	E
Service Department D :	20%	40%	30%	--	10%
Service Department E :	40%	20%	20%	20%	--

Prepare a statement showing the apportionment of two Service Departments' expenses to Production Departments by Simultaneous Equation Method.

**Solution :**

Let  $x$  = total overheads of department D

$y$  = total overheads of department E

Then

$$x = 4,680 + .2y$$

$$y = 6,000 + .1x$$

Re-arranging and multiplying to eliminate decimals :

$$10x - 2y = 46,800 \quad \dots (1)$$

$$-x + 10y = 60,000 \quad \dots (2)$$

Multiplying equation (1) by 5, we get :

$$50x - 10y = 2,34,000$$

$$-x + 10y = 60,000$$

$$\hline 49x = 2,94,000$$

$$\therefore x = 6,000$$

Substituting this value in equation (1), we get :  $y = 6,600$

All that now remains to be done is to take these values  $x = 6,000$  and  $y = 6,600$  and to apportion them on the basis of the agreed percentage to the three production departments :  
Thus:

Particulars	Total	A	B	C
	Rs.	Rs.	Rs.	Rs.
As per distribution summary	40,000	16,000	14,000	10,000
Service Dept. D (90% of Rs. 6000)	5,400	1,200	2,400	1,800
Service Dept. E (80% of Rs. 6,600)	5,280	2,640	1,320	1,320
<b>Total :</b>	<b>50,680</b>	<b>19,840</b>	<b>17,720</b>	<b>13,120</b>

8) M/s. Gautham Manufacturing Company has three production departments P1, P2 and P3; and two Service departments S1 and S2. The two service departments are interdependent on each other. The expenses incurred by the Production departments are : P1 Rs. 16,00,000 P2 Rs. 14,00,000 ; and P3 Rs. 10,00,000

The expenses of S1 dept. are Rs. 4,68,000; S2 Rs. 6,00,000 The expenses of S1 and S2 departments are to be apportioned to the production departments on the following basis :

Particulars	P1	P2	P3	S1	S2
Expenses of S1 :	20%	40%	30%	--	10%
Expenses of S2 :	40%	20%	20%	20%	--

Show clearly as to how the expenses of the Service Department S1 and S2 would be apportioned to the production departments P1, P2 and P3. according to repeated Distribution Method.

**Solution**

*M/s. Gautham Manufacturing Co.  
Statement showing Apportionment of Overheads (Repeated Distribution Method)*

Particulars	Production Departments			Service Depts.	
	P1 Rs.	P2 Rs.	P3 Rs.	S1 Rs.	S2 Rs.
As per the distribution summary	16,00,000	14,00,000	10,00,000	4,68,000	6,00,000
S1 expenses	93,600	1,87,200	1,40,400	-4,68,000	46,800
S2 expenses	2,58,720	1,29,360	1,29,360	1,29,360	-6,46,800
S1 expenses	25,872	51,744	38,808	-1,29,360	12,936
S2 expenses	5,172	2,588	2,588	2,588	-12,936
S1 expenses	516	1,040	776	-2,588	256
S2 expenses	120	68	68	-	-256
	19,84,000	17,72,000	13,12,000	-	-

This problem can also be solved by the Simultaneous Equation method.

9) A factory has two Service Departments, S1 and S2 and three Production departments, P1, P2 and P3. The overhead distribution summary for October, 2002 is as follows :

Production Departments	Service Departments	
	Rs.	Rs.
P1	4,000	S1 1,170
P2	3,500	S2 1,500
P3	2,500	S2 1,500

The expenses of service departments are charged on a percentage basis as follows :

	P1	P2	P3	S1	S2
S1	20%	40%	30%	--	10%
S2	40%	20%	20%	20%	--

Apportion the Service department's expenses under

- (a) Simultaneous Equations Method
- (b) Repeated Distribution Method, and
- (c) Trial and Error Method.

**Solution**

- (1) Simultaneous equation method :

Let the total overhead of S1 be X and S2 be Y

Then  $X = \text{Rs. } 1,170 + 20\% \text{ of } Y$

$Y = \text{Rs. } 1,500 + 10\% \text{ of } X$

$$\text{i.e., } X = \text{Rs. } 1,170 + \frac{Y}{5}$$

$$Y = \text{Rs. } 1,500 + \frac{X}{10}$$

$$5x - y = 5,850$$

$$-x + 10y = 15,000$$

$$5x - y = 5,850$$

$$-5x + 50y = 75,000$$

Combining the equations we get

$$49y = 80,850$$

$$y = \text{Rs. } 1,650$$

$$x = \text{Rs. } 1,170 + \frac{Y}{5}$$

$$= \text{Rs. } 1,170 + \frac{1650}{5} = \text{Rs. } 1,500$$

The ascertained value of x and y have to be distributed among the three production departments on the basis of the agreed percentages :

		P1	P2	P3
As per distribution summary		4,000	3,500	2,500
S1	20% of 1500	300	40% of 1500 600	30% of 1500 450
S2	40% of 1650	660	20% of 1650 330	20% of 1650 330
		<u>4,960</u>	<u>4,430</u>	<u>3,280</u>

(2) Repeated Distribution Method :

*Overhead Distribution Summary*

	Production Departments			Service Departments	
	P1 Rs.	P2 Rs.	P3 Rs.	S1 Rs.	S2 Rs.
As per primary distribution	4,000	3,500	2,500	1,170	1,500
S1	234	468	352	-170	117
S2	647	323	323	324	1,617
S1	65	130	97	-324	32
S2	13	6	7	6	32
S1	1	3	2	-6	---
	<u>4,960</u>	<u>4,430</u>	<u>3,280</u>		

(3) Trial and Error Method :

	S1	S2	
	1,170	1,150	
		117	(10% of 1,170)
20% of 1,617	324.40	32.34	(10% of 323.4)
20% of 32.34	6.47	00.65	(10% of 6.47)
	<u>1499.87</u>	<u>1,299.99</u>	
Rounded off to	<u>1,500.00</u>	<u>1,300.00</u>	

		P1		P2		P3
As per distribution summary		4,000		3,500		2,500
S1	20% of 1500	300	40% of 1500	600	30% of 1500	450
S2	40% of 1650	<u>660</u>	20% of 1650	<u>330</u>	20% of 1650	<u>330</u>
		<u>4,960</u>		<u>4,430</u>		<u>3,280</u>

10) The following figures have been extracted from the books of the Hyderabad Industrial Works. All jobs pass through two departments, viz., processing and finishing.

	Processing Dept. Rs.	Finishing Dept. Rs.
Material used	24,000	2,000
Director labour	12,000	6,000
Factory overhead	7,200	4,800
Direct Labour Hours	24,000	10,000
Machine Hours	20,000	4,000
The following information relates to job No. 0123 :		
Material and	240	20
Direct Labour	130	50
Direct Labour Hours	<u>500</u>	<u>150</u>
Machine hours	500	50

Calculate normal overhead rates using

- Direct Labour Hour Method
- Direct Labour Cost Method, and
- Machine Hour Rate Method.

Prepare a statement showing the different cost results for Job. No. 0123 under each of the three methods.

**Solution**

	Processing Dept. :	Finishing Dept.
Direct Labour Hour Rate		
$\frac{\text{Factory overhead}}{\text{Labour Hours}}$	$\frac{7200}{2400} = \text{Re. } 0.30$	$\frac{4800}{10000} = \text{Re. } 0.48$
Direct Labour Cost Method		
$\frac{\text{Factory Overhead}}{\text{Direct Labour Cost}}$	$\frac{7200}{12000} \times 100 = 60\%$	$\frac{4800}{6000} \times 100 = 80\%$
Machine Hour Rate		
$\frac{\text{Factory overhead}}{\text{Machine Hours}}$	$\frac{7200}{20000} = \text{Rs. } 0.36$	$\frac{4800}{6000} = \text{Rs. } 1.20$

*Statement of Cost of Job. No. 0123*

	Labour Hour Rate		Labour Cost Rate		Machine Hour rate	
	Processing	Finishing	Processing	Finishing	Processing	Finishing
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Materials	240	20	240	20	240	20
Direct labour	130	50	130	50	130	50
Prime Cost	<u>370</u>	<u>70</u>	<u>370</u>	<u>70</u>	<u>370</u>	<u>70</u>
Factory overhead						
500 x .30	150					
150 x 0.48		72				
130 x $\frac{60}{1000}$			78			
50 x $\frac{80}{100}$				40		
500 x 0.36					180	
50 x 1.20						60
	<u>520</u>	<u>142</u>	<u>448</u>	<u>110</u>	<u>550</u>	<u>130</u>

11) From the data given below calculate the machine hour rate :

Rent of the department	Rs. p.a.
(space occupied by the machine 1/5th of the department)	
Lighting (no. of men in the department :	
12 and two men are engaged on this machine)	576
Insurance for the machine	72
Cotton waste, oil etc. for the machine	120
Salary of foreman	

(1/4th of the foreman's time is occupied by this machine)	12,000
Cost of the machine	18,400
Estimated scrap value	400

It is assumed from past experience :

- that the machine will work for 1800 hours per annum;
- that it will incur an expenditure of Rs. 2,250 in respect of repairs during the working life of the machine;
- that it consume 5 units of power @ 12 paise per unit, and
- that the working life of the machine will be 18,000 hours

### Solution

Computation of Machine Hour Rate :

	Rs.	Rs. per hour
Standing charges :		
Rent Rs. 1560 + 5	312	
Lighting $576 \times \frac{2}{12}$	96	
Insurance	72	
Cotton waster, oil etc.	120	
Salary for foreman $12000 \times \frac{1}{4}$	<u>3,000</u>	
	<u>3,600</u>	
Standing charges per hour :		2.00
Machine expenses :		
Depreciation $\frac{18400 - 400}{18000}$		1.00
Repairs $2250 + 18000$		0.125
Power 5 units @ 12 p.		<u>0.60</u>
		<u>3.725</u>

- 12) Calculate the machine hour rate from the following particulars :

Cost of the machine	Rs. 20,000
Estimated scrap value	15000 hours
Estimated scrap value	Rs. 500
Estimated working hours per annum	2000
Amount taken as a loan at 10% to purchase the machine (the rest is provided by the firm itself)	Rs. 14,000
Power 20 units @ 7 paise per unit	
Repairs and maintenance per annum	Rs. 1,500
No. of operators (looking after three other machines also)	2
Wages per operator	Rs. 150/- p.m.
Overheads chargeable to the machine	Rs. 200/- p.m.
Insurance premium per annum	0.7 of the cost of the machine

### Solution

#### Computation of Machine Hour Rate

	Rs.	Rs.
Standing charges :		
Wages of operators $\frac{150 \times 2 \times 12}{4} =$	900	
Overheads	2,400	
Insurance premium	140	
Interest on capital borrowed	1,400	
	<u>4,840</u>	
Standing charged per hour $4840 \div 2000$		2.42
Machine expenses :		
Depreciation $\frac{20000 - 500}{15000} =$		1.30
Repairs $\frac{1500}{2000}$		0.75
Power 20 units @ 7 paise		1.40
		<u>5.87</u>
	<b>Machine Hour Rate</b>	<b>5.87</b>

Note : Sometimes the interest of borrowings is not included as a standing charge in which case the machine hour will be Rs. 5.17.

- 13) The following annual charges are incurred in respect of a machine shop where manual labour is almost nil and where work is done by means of five machines of exactly similar type and specification.

	Rs.
Rent and Rate (proportion to the floor space)	4,500
Depreciation on machine	500
Repairs for five machines	1,500
Cost of power consumed @ 6 1/4 paise per unit for the shop	3,750
General lighting charges for the shop	550
Attendants - there are two attendants for the five machines and they are each paid Rs. 60 p.m.	
There is one supervisor for the five machines and he is paid Rs. 250 p.m.	
Cotton waste, lubricants, etc., for the shop	500
Hire Purchase instalment on the machine (including Rs. 300 as interest)	1,500

The machine uses 10 units of power per hour.

Calculate the machine Hour Rate for the year.

### Solution

In this problem the number of hours the machine works per year is not given. But it can be calculated with the help of the cost of power.

Cost of power for the shop Rs. 3,750

Rate per unit : 6 1/4 p.

No. of units  $\frac{3750 \times 100 \times 4}{25} = 60,000$  units.

No. of units per machine :  $60,000 \div 5 = 12,000$

Machine uses 10 units per hour.

No. of machine hours :  $\frac{12000}{10} = 1200$

Calculation of Machine Hour Rate

	Rs.	Rs.
Standing charges :		
Rent $4500 \div 5 =$	900	
General lighting $550 \div 5$	110	
Attendants wages $\frac{2 \times 60 \times 12}{5}$	288	
Supervisor's Salary : $\frac{250 \times 12}{5}$	600	
Cotton waste, lubricators etc $\frac{500}{5}$	100	
Interest on Hire purchase	300	
	<u>2,298</u>	

Standing charges per hour :  $\frac{2298}{1200}$  1.915

Machine expenses :

Depreciation $\frac{500}{1200}$	0.417
Repairs $(1500 + 5) \div 1200$	0.250
Power 10 units @ 6 1/4 p.	<u>0.625</u>
Machine Hour Rate	<u>3.207</u>

# UNIT - 27 : PROBLEMS WITH SOLUTIONS ON METHODS OF COSTING

## 1. UNIT COSTING

### Problem No. 1

M/s. Bhagyanagar Industries Ltd., manufactures a standard product. The following is the data relating to the product for the month of April, 2002:

Raw materials consumed : Rs. 60,000; Direct wages : Rs. 36,000; Machine hours worked: Rs. 3,000; Machine hour rate : Rs. 4; Office on cost : 10% of works cost; Selling on cost : Rs. 2.50 per unit; units produced : 10,000; Units sold : 9,200 @ Rs. 40/- each unit. You are required to prepare a Cost Sheet in respect of what is given above showing (i) cost per unit and (ii) profit for the month.

### Solution

M/s. Bhagyanagar Industries Ltd.  
Cost sheet for the month of April, 2002

	per unit	Total
	Rs.	Rs.
		Output : 10,000
Raw material consumed (Direct Material)	6.00	60,000
Direct wages	3.60	36,000
Direct expenses	--	---
<b>PRIME COST</b>	9.60	96,000
Factory Overheads (3,000 hours @ Rs. 4 per unit)	1.20	12,000
<b>WORKS COST</b>	10.80	1,08,000
Office Overheads (10% of works cost)	1.08	10,800
<b>COST OF PRODUCTION (10,000 units)</b>	11.88	1,18,800
Less stock of finished goods (800 units @ Rs. 11.88 per unit)		9,504
<b>COST OF GOODS SOLD (9,200 units)</b>		1,09,296
Add selling overheads : Rs. 2.50 per unit on 9,200 units		23,000
<b>TOTAL COST (9,200 units)</b>		1,32,296
<b>PROFIT (on sale of 9,200 units)</b>		2,35,704
<b>SALES : 9,200 units @ Rs. 40 each</b>		3,68,000

(i) Cost per unit Rs. 11.88 (ii) Profit for the month of August : Rs. 2,35,704

## Problem No. 2

The following details have been obtained from the cost records of M/s. Ever Glittering Paints Ltd., for the month of September, 2001

	Rs.
Stock of raw materials (on the 1st September 2001)	75,000
Work in progress (on the 1st of September, 2001)	28,000
Stock of finalised goods (on the 1st of September, 2001)	54,000
Stock of raw materials (on 30-9-2001)	91,500
Work in progress (on 30-9-2001)	35,000
Stock of finished goods (on 30-9-2001)	31,000
Wages (Direct labour)	52,500
Sales	2,11,000
Purchase of raw materials	66,000
Factory rent and rates	15,000
Depreciation on Plant and Machinery	3,500
Expenses on purchases	1,500
Carriage outwards	2,500
Advertising	3,500
Office rent and taxes	2,500
Travelling sales men's salaries & commission	14,500

### Solution

M/s. Ever Glittering Paints Ltd.

Statement showing the value of materials consumed, total cost of production,  
the cost of goods sold and profit on the goods sold

Period : Month of September, 2001	Rs.	Output : Rs.
Opening stock of raw materials (1-9-2001)	75,000	
Add: purchases during the month	66,000	
Add: expenses on purchases	1,500	
	<u>1,42,500</u>	
Less: closing stock of raw materials (30-9-2001)	<u>91,500</u>	51,000
(a) The value of materials consumed :		52,500
Direct wages		<u>1,03,500</u>
Prime Cost		
Add: Factory Overheads :	15,000	
Factory rent and rates	<u>3,500</u>	18,500
Add: Work in Progress (1-9-2001)		<u>28,000</u>

Less : Work in Progress (30-9-2001)		1,50,000	
		35,000	
		<u>1,15,000</u>	
Add : Office and administrative on cost :			
Office rent and taxes		2,500	
		<u>1,17,500</u>	
Add : Opening stock of finished goods (1-9-2001)		54,000	
		<u>1,71,000</u>	
Less : Closing stock of finished goods (30-9-2001)		31,000	
Cost of goods sold :		<u>1,40,500</u>	
Add : Selling and distribution on cost			
Carriage outwards	2,500		
Advertising	3,500		
Travelling salesmen's salaries, etc.	14,500	20,500	
Total cost (cost of goods sold)		<u>1,61,000</u>	
Profits on goods sold		50,000	
		<u>2,11,000</u>	

### Problem No. 3

The following particulars relate to a commodity produced by M/s. Prosperous Co., for the half year ending on the of 30th June, 2002

	Rs.
Stock of raw materials 1-1-2002	22,000
Work in Progress 1-1-2002	5,280
Stock of finished goods 1-1-2002 (1600 tonnes)	17,600
Stock of raw materials (30-6-2002)	24,464
Work in Progress (30-6-2002)	17,600
Stock of finished goods (30-6-2002) (3,200 tonnes)	35,200
Purchase of raw materials	1,32,000
Direct wages	1,10,000
Rent, rates and insurance & other works expenses	44,000
Carriage inwards	1,584
Sales of finished goods	3,30,000
Cost of factory supervision	8,800

Advertisement and other selling expenses amounted to 75 paise per tonne sold. 25,600 tonnes of the commodity were produced during the period.

You are required to calculate (a) the cost of raw materials; consumed; (b) the cost of output for the period; (c) the cost of sales and (d) total profit and profit per tonne sold.

**Solution****The Prosperous Co.**

Statement showing cost and profit for the half year ending on the 30th of June, 2002

Output : 25,600 times

	Rs.	Rs.
Opening stock of raw materials	22,000	
Add : Purchase of raw materials	1,32,000	
Add : Carriage inwards	1,584	
	<u>1,55,584</u>	
Less : Closing stock of raw materials	24,464	1,31,120
(a) Cost of raw materials consumed :		1,10,000
Direct wages	....	<u>2,41,120</u>
Prime Cost		
Add : Works expenses :		
Rent, rates insurance and other works expenses	44,000	
Cost of factory supervision	8,800	
	<u>52,800</u>	
		2,93,920
Add : Work in progress (opening)		5,280
		<u>2,99,200</u>
Less : Work in progress at the end		17,600
(b) Works Cost (as there are no office expenses this itself represents Cost of Production of 25,600 tonnes of goods produced)		<u>2,81,600</u>
Add : Opening stock of finished goods (1600 tonnes)		17,600
		<u>2,99,200</u>
Less closing stock of finished goods (3,200 tonnes)		35,200
		<u>2,64,000</u>
Cost of production of goods sold (24,000) tonnes		
Add : Advertisement and other selling expenses @ 75 paise per tonne sold : 24,000 x 75 paise		18,000
		<u>2,82,000</u>
(c) Cost of sales (24,000 tonnes)		48,000
Profit (on sale of 24,000 tonnes)		<u>3,30,000</u>
(d) Sales (24,000 tonnes)		
Profit per tonne = Rs. 48,000 divided by 24,000 = Rs. 2		

**Problem No. 4**

The following figures relate to the pens manufactured by M/s. Parker and Sheifer Co., Ltd. for the period of six months ending on the 30th of June 2002 :

	Rs.		Rs.
Stock of materials (1-1-2002)	96,000	Depreciation of plant	13,000
Stock of materials (30-6-2002)	1,25,600	Depreciation (office furniture)	600
Materials purchased	3,70,000	Directors' fees	12,000
Travelling expenses	4,200	Gas & water (factory)	2,400
Travelling salesmen's salaries	15,400	Gas & water (office)	800
Productive wages	2,52,000	General expenses	6,800
Manager's salary		Carriage inwards	14,300
(3/4th to factory & 1/4th to office)	20,000	Bad debts	13,000
Carriage & cartage outwards	8,600	Repairs of plant	8,900
Rent, rates & insurance (factory)	17,000	Sales	9,22,200
Rent, rates & insurance (office)	4,000	Drawing office salaries	13,000
Cash discount allowed	5,800		
Counting house salaries	25,200		

Prepare a statement showing (a) The cost of materials consumed, (b) Prime Cost, (c) Factory Cost, (d) Percentage of Factory Overheads on Productive Wages, (e) Percentage of General overheads on Factory cost, (f) Total Cost, and (g) Profit.

**Solution**

**M/s. Parker and Shiefer co., Ltd.**

Statement showing total cost and the profit made during the six months ending on the 30th of June 2002

	Rs.	Rs.
Opening stock of raw materials	96,000	
Add: Purchases of raw materials	3,70,000	
Add: Carriage inwards	14,300	
	<u>4,80,300</u>	
Less: Closing stock of raw materials	1,25,600	
	<u>3,54,700</u>	
(a) Cost of material consumed :		
Add: Productive wages	2,52,000	
	<u>6,06,700</u>	
(b) Prime Cost		
Add: Factory on cost :		
Depreciation on Plant	13,000	
Gas and water	2,400	
Manager's salaries (3/4 of 20,000)	15,000	
Repairs to plant	8,900	
Rent, rates and insurance	17,000	
Drawing Office salaries	13,000	
	<u>69,300</u>	
Factory Cost		<u>6,76,000</u>

Add: Office and administration on cost:-			
Depreciation (office furniture)		600	
Directors' fees		12,000	
Gas and water		800	
Manager's salary (1/4 of 20,000)		5,000	
General expenses		6,800	
Rent, rates and insurance		4,000	
Counting house salaries		25,200	54,400
	Cost of Production :		<u>7,30,400</u>
Add: Selling and distribution on cost :			
Travelling expenses		4,200	
Travelling sales men salaries		15,400	
Carriage & cartage outwards		8,600	
Bad debts		13,000	
Cash discount		5,800	
			<u>47,000</u>
(f) Total Cost			<u>7,77,400</u>
(g) Profit			<u>1,44,800</u>
Sales			<u>9,22,200</u>

General overheads = Office overheads + Selling overheads  
= 54,000 + 47,000 = 1,01,400

Percentage of General Overheads on Factory Cost =  $\frac{1,01,400}{6,76,000} \times 100 = 15\%$

Percentage of Factory Overheads on Wages =  $\frac{69,300}{2,52,000} \times 100 = 27.5\%$

### Problem No. 5

Pavan and Anil are partners engaged in the manufacture of two kinds of mantles, 'Vayu' and 'Maruti'. The following particulars relate to these mantles for the year 2001 :

	Vayu	Maruti
Number of mantles manufactured	25,000	12,000
	Rs.	Rs.
Direct costs :		
Materials	3,140	2,650
Wages	9,400	5,700
Power, etc	2,100	1,410
	<u>14,640</u>	<u>9,760</u>
Other costs :	Rs.	
Factory supervision	3,600	
Packing wages and expenses	400	
Managing and selling exp.	4,440	

You are required to prepared a statement showing the cost of each kind of mantle when ready for despatch, taking the following into account :

- Factory supervision to be charged in proportion to the direct costs.
- Packing expenses to be apportioned in the ratio that direct costs plus factory supervision costs of 'Vayu' bear to similar costs of 'Maruti'.
- Management and selling expenses to be charged in proportion to the mantles manufactured.

### Solution

Statements showing the cost of Mantles

Particulars	Vayu	Maruti
	(25,000) Rs.	(12,000) Rs.
<b>Direct costs :</b>		
Materials	3,140	2,650
Wages	9,400	5,700
Power, etc	2,100	1,410
	14,640	9,760
<b>Add: Other Overhead Cost :</b>		
Factory supervision in the ratio of (3 : 2)	2,160	1,440
Packing wages and expenses (3 : 2)	240	160
Management and selling expenses (25 : 12)	3,000	1,440
	6,400	3,040
<b>Total Cost ;</b>	20,040	12,800

Note :

- The proportion of direct costs is  $14,640 : 9,760 = 3 : 2$
- The proportion of direct costs plus packing wages and expenses of Vayu and Maruti is also  $3 : 2$  ( $16,800 : 11,200$ )
- The proportion of mantles manufactured is  $25 : 12$  ( $25000 : 12000$ )

### Problem No. 6

The accounts of M/s. Brilliant Products, Ltd., show the following information during the year ending on the 30th June, 2002

Materials used : Rs. 3,00,000; Productive wages : 2,50,000; Factory and General expenses : Rs. 50,000; Administrative and other expenses : Rs. 30,000.

The factory and general expenses relate to the factory only. You are required to prepare the following statements :

- Factory cost of production statement.
- Percentage of factory and general expenses to productive wages,
- Percentage of administrative and other expenses to factory cost,
- The price the Company should quote, on the basis of the information given above, for the production of a machine requiring materials valued at Rs. 1,000 and wages at Rs. 500, so that the price may yield a profit of 25% on the selling price.

**Solution**

**M/s. Brilliant Products Ltd.**

Period : Year ending on the 30th of June, 2002

Output : \_\_\_\_\_

	Rs.
Cost of Material consumed	3,00,000
Productive wages	2,50,000
<b>PRIME COST</b>	<u>5,50,000</u>
Add Factory and general expenses	50,000
<b>(a) FACTORY COST</b>	<u>6,00,000</u>
Add Administrative and other expenses	30,000
<b>COST OF PRODUCTION</b>	<u>6,30,000</u>

(b) Percentage of Factory and general expenses to Productive wages  
 $= 50000/2,50,00 \times 100 = 20\%$

(c) Percentage of Administrative and other expenses to Factory cost =  
 $30,000/6,00,000 \times 100 = 5\%$

*Statement showing the estimated cost of production  
of the proposed machine*

	Rs.
Materials	1,000
Wages	500
	<u>1,500</u>
	Prime Cost
Add Factory and general expenses at 20% on wages	100
	<u>1,600</u>
	Factory Cost
Add Administrative and other expenses at 5% on Factory cost	80
	<u>1,680</u>
	Cost of Production
Profit at 25% on Selling price or 33.3% on Cost of production	560
	<u>2,240</u>
	Selling Price :

**Problem No. 7**

The following is the summarised expenditure incurred in connection with the manufacture of a commodity by M/s. Fitwell Co., Ltd.

	Three months ending on	
	31-3-2002	30-6-2002
Raw materials consumed	72,000	98,000
Productive wages	1,44,000	1,96,000
Unproductive wages	60,000	82,000
Direct expenses	18,000	25,000
Taxes and insurance (works)	1,500	1,500
Light and water	2,000	2,000

Factory rent	3,000	3,000
Depreciation	4,000	4,000
Factory repairs	6,000	9,000
Administration expenses	24,000	24,000
	<u>3,34,500</u>	<u>4,44,500</u>

Output (in tonnes) 12,000 16,000

Prepare a Cost Sheet showing the comparative cost of each item per tonne for each of the above mentioned periods.

Solutions

M/s. FIT WELL CO., LTD.

Cost Sheet

Three month ending on 31-3-2002		Particulars	Three months ending on 30-6-2002	
Total Amount Rs.	Cost per tonne Rs.		Total Amount Rs.	Cost per tonne Rs.
Output : 12000 tonnes			Output : 16000 tonnes	
72,000	6.00	Cost raw materials	98,000	6.13
1,44,000	12.00	Productive wages	1,96,000	12.25
18,000	1.50	Direct expenses	25,000	1.56
<u>2,34,000</u>	<u>19.50</u>	<b>PRIME COST</b>	<u>3,19,000</u>	<u>19.94</u>
		Works expenses :		
60,000	5.00	Unproductive wages	82,000	5.12
1,500	0.13	Taxes and Insurance	1,500	0.09
2,000	0.17	Light and water	2,000	0.13
3,000	0.25	Factory rent	3,000	0.19
4,000	0.33	Depreciation	4,000	0.25
6,000	0.50	Factory repairs	9,000	0.56
<u>3,10,500</u>	<u>25.88</u>	<b>FACTORY COST</b>	<u>4,20,500</u>	<u>26.28</u>
24,000	2.00	Administration expenses	24,000	1.50
<u>3,34,500</u>	<u>27.88</u>	<b>COST OF PRODUCTION</b>	<u>4,44,500</u>	<u>27.78</u>

Problem No. 8

In respect of M/s. All Efficient Co., run by Mr. Sincere and Mr. Hardwork, the following figures have been obtained for the year 2001.

	Rs.		Rs.
Cost of materials	6,00,000	Selling charges	2,24,000
Wages and labour	5,00,000	Distribution exp.	1,40,000
Factory overheads	3,00,000	Profit	5,25,000
Administrative exp.	3,36,000		

Assuming that in 2002 : 1) the rate of Factory Overheads will go up by 20%. 2) distribution expenses will come down by 10% and 3) selling and administration expenses will go up by 12 1/2% at what price is the product to be sold so as to earn the same rate of profit on the selling price as in 2001 if the cost of materials and labour of this product were to be Rs. 8,000 and Rs. 5000 respectively ? Factory overheads are to be based on direct labour and other charges on Factory cost.

**Solution**

M/s. All Efficient Co., Ltd.

*Statement showing the Total cost and Profit.*

	Rs.
Cost of materials	6,00,000
Wages	<u>5,00,000</u>
	11,00,000
Prime Cost	
Add Factory overheads	<u>3,00,000</u>
	14,00,000
Works Cost	
Add Administration overheads	<u>3,36,000</u>
	17,36,000
Cost of Production	
Add Selling expenses	2,24,000
Add Distribution expenses	1,40,000
	<u>21,00,000</u>
Total Cost	
Profit	5,25,000
Selling Price	<u>26,25,000</u>

Percentage of Factory Overheads to wages = Rs. 3,00,000

divided by 5,00,000 x 100 = 60%

Percentage of Administration Overheads of Factory Cost = Rs. 3,36,000

divided by 14,00,000 x 100 = 24%

Percentage of Selling expenses to Factory Cost = Rs. 2,24,000

divided by 14,00,000 x 100 = 10%

Percentage of Distribution expenses to Factory Cost = Rs. 1,40,000

divided by 14,00,000 x 100 = 16%

Percentage of Profit to Total Cost = Rs. 5,25,000

divided by 21,00,000 x 100 = 25%

*Statement showing the estimated Selling Price of the product in 2002  
basing on the above mentioned factors :*

	Rs.
Cost of Material	8,000
Cost of Labour	<u>5,000</u>
	13,000
PRIME COST	
Add Factory expenses 60% on wages	3,000
Plus 20% increase over Rs. 3,000	<u>600</u>
	<u>3600</u>

WORKS COST		16,600
Add	Administration expenses at 24% on Works cost	3,984
	Plus 12 1/2% increase on Rs. 3,984	498
		14,482
		21,082
COST OF PRODUCTION		
Add	Selling expenses at 16% on Works Cost	2,656
	Plus 12 1/2% increase on Rs. 2,656	332
		2,988
Add	Distribution expenses at 10% on Works Cost	1,660
	Minus 10% decrease on Rs. 1,660	166
		1,494
TOTAL COST		25,564
Add	Profit 25% on Total Cost or 20% on S.P.	6,391
	SELLING PRICE :	31,955

### Problem No. 9

The following are the balances of the impersonal ledger of M/s. Black Diamond Colliery Co., for the year ending on the 31st of December, 2001.

	Rs.		Rs.
Wages for coal product	5,80,000	Coal sold	
Coal for colliery consumption	45,000	(including colliery 11200 tons)	8,84,000
Timber used in coal production	64,000	Wages for coke making	50,000
Ropes used in coal production	12,000	Stores used for coke making	37,000
Stores used in coal production	76,000	Salaries used coke making	8,000
Royalties paid	42,000	Coke sold 43,500 tons	5,40,000
General charges	70,000		
Salaries	36,000		

The stock of the coal at the beginning of the year amounting to 7000 tons was valued at Rs. 5 per ton and at the end of the year 15000 tons were valued at a similar rate. The stock of coke at the beginning of the year amounted to 2000 tons at Rs. 10 per ton and at the close of the year 500 tons values at the identical rate. The total production of colliery was 1,85,000 tons of coal and 42,000 tons of coke; and 65,000 tons of coal was used for coke making.

Prepare separately the production Account for coal and coke respectively, showing the cost of each item of expenses per ton of coal and coke respectively, taking coal used for coke making at cost price.

**Solution**

*Coke Production Account  
for the year ending on the 31st of December, 2001*

Dr.	Rs.	Cr.	Rs.
To Opening stock 7000 tons @ Rs. 5	35,000	By Sales including colliery consumption	8,84,000
To Raw material (coal @ 24 Ps. per ton)	45,000	By Coke production 65000 tons @ Rs. 5	3,25,000
To Timber @ 35 Ps. per ton	64,000	By Stock of coal 15000 tons @ Rs. 5	75,000
To Ropes @ 6 Ps. per ton	12,000		
To Wages @ Rs. 41 Ps. per ton	5,80,000		
To Royalties paid @ 23 Ps. per ton	42,000		
To General charges @ 38 Ps. per ton	70,000		
To Salaries @ 19 Ps. per ton	36,000		
To Stores used @ 4 Ps. per ton	76,000		
To Production cost of 18500 @ Rs. 5.19	9,60,000		
To Profit c/d	3,24,000		
	12,84,000		12,84,000

Dr.	Rs.	Cr.	Rs.
To Stock 2000 tons @ Rs. 10 per ton	20,000	By Sales of 43,500 tons	5,40,000
To Coal Production A/c.	3,25,000	Closing stock of 500 tons @ Rs. 10/-	5,000
To Wages @ 1.19 per ton	50,000		
To Stores (88 paise)	37,000		
To Salaries @ 19 paise per ton	8,000		
Production of 44,000 tons @ Rs. 10/-	4,40,000		
Profit (Approx.)	1,05,000		
	5,45,000		5,45,000

Note : Cost of each item per ton is calculated taking into account the output of coal to be 1,85,000 tons and that of coke 43,500 tons.

**Problem No. 10**

The summarised Trading and Profit and Loss Account of M/s. SWIFT CYCLES LTD., for the year ending on the 30th of September, 2001 as under :

Coke Production Account		Cr.	
Dr.	Rs.	Rs.	
To Cost of materials	1,00,000	By Sales	5,80,000
To Direct wages	1,50,000		
To Manufacturing cost	80,000		
To Gross profit c/d	2,50,000		
	5,80,000		5,80,000
To Staff salaries	60,000	By Gross profit b/d	2,50,000
To Rent and rates	10,000		
To Selling expenses	50,000		
To General expenses	40,000		
To Net Profit c/d	90,000		
	2,50,000		2,50,000

During the year the company manufactured 2000 cycles, for the year ending 30th September, 2002 it is estimated that :

- a) Output and sales will be 2,100 cycles.
- b) Prices of materials will rise by 30% on the previous year's level.
- c) Wages rates will rise by 33.3%
- d) Manufacturing cost will rise by 25%
- e) A bonus of one-sixth salary is expected to be paid to office staff.
- f) Selling costs and other expenses will rise in proportion to cost of materials.

You are required to submit a statement to the directors showing the price at which cycles should be marked so as to show a profit of 10% on the selling price.

**Solution**

M/s Swift Cycles Limited  
COST SHEET

Period : The year ending on 30-9-2001

		Cost Per unit	Output : 2000 cycles Total Cost (Output : 2000)
		Rs.	Rs.
	Cost of Materials	50-00	1,00,000
	Cost of productive labour	75-00	1,50,000
	Prime Cost	125-00	2,50,000
Add	Manufacturing expenses	40-00	80,000
	Factory Cost	165-00	3,30,000
Add	Office and administration expenses		
	Office salaries	60,000	
	Rent & Rates	10,000	
	General Expenses	40,000	
		55-00	1,10,000
	Cost of Production	220-00	4,40,000
Add	Selling expenses	25-00	50,000
	Total Cost	245-00	4,90,000

*Statement showing the estimated selling price per cycle during the year ending on the 30th of September, 2002*

		Cost per Cycle
		Rs. Ps.
Cost of material (Rs. 50 + 30% increase)		65-00
Cost of Labour (Rs. 75+33.3% increase)		100-00
	Prime Cost	<u>165-00</u>
Add Manufacturing expenses (Rs. 40 + 25% increase)		50-00
	Factory Cost	<u>215-00</u>
Add Office on cost :		
Salaries (Rs. 30 + 1/6 of salaries as Bonus)		35-00
Rent & Rates (Rs. 5 + 30% increase)		6-50
General expenses (Rs. 20 + 30%)		26-00
	Cost of Production	<u>282-50</u>
Add Selling expenses (Rs. 25 + 30% increase)		32-50
	Total Cost ;	315-00
Add Profit (10% on selling price or 1/9 of cost)		35-00
	Selling Price	<u>350-00</u>

**Problem No. 11**

Miss Minerva, the Managing Director of M/s. Marvel Manufacturing Co., consults you as to the minimum price at which she can sell the output of one of the departments of the company which is intended to produce goods on a mass scale in future. The company's records show the following particulars for the department for the past year.

Production and sales	100 Units	Rs.	Rs.
Materials		6,500	
Direct Labour		3,500	Office overhead 1,400
Direct charges		500	Selling overhead 1,600
Works overhead		3,500	Profit 2,500

You ascertain that 40% of the works overhead fluctuates directly with production and that 70% of the selling overhead fluctuates with sales. It is anticipated that the department will produce 500 units per annum and that direct labour charges per unit be reduced by 20% while fixed works overhead charges will increase by Rs. 1,500. Office overhead and fixed selling overhead charges are expected to show an increase of 25%, and no increase in other charges is anticipated.

Prepare a statement for submission to Miss Minerva.

**Solution***Statement showing Total cost and cost per unit*

Particulars	Total cost	Cost per
	100 units	Unit
	Rs.	Rs.
Materials	6,500	65-00
Labour	3,500	35-00
Direct charges	500	5-00
	<u>Prime Cost</u>	<u>105-00</u>
Add Works overheads	3,500	35-00
	<u>Works Cost</u>	<u>140-00</u>
Add Office overheads	1,400	14-00
	<u>Cost of Production</u>	<u>154-00</u>
Add Selling overheads	1,600	16-00
	<u>Total Cost</u>	<u>170-00</u>

*Statement showing the estimated cost of 500 units*

Particulars	Rs.
Materials (Rs. 65 x 500)	32,500
Labour (Rs. 35 - 20% decrease = 28 x 500)	14,000
Direct charges (Rs. 5 x 500)	<u>2,500</u>
	<u>Prime Cost</u>
	49,000
Add Works overheads :	
40% Variable (40% of 35 = Rs. 14 x 500)	7,000
60% fixed (60% of 3500 = 2100 + 1500)	<u>3,600</u>
	<u>10,600</u>
	<u>Work Cost</u>
	59,600
Add Office overheads (Rs. 1,400 x 25% )	<u>1,750</u>
	<u>Cost of production</u>
	61,350
Add Selling overheads :	
70% Variable (70% of Rs. 16 = 11.20 x 500)	5,600
30% Fixed (30% of 1,600 = 480 + 25%)	<u>600</u>
	<u>6,200</u>
	<u>Total Cost</u>
	67,550

## 2. JOB AND BATCH COSTING

### Problem No. 1

The following information is extracted from the cost records of an engineering works in respect of Job No. 505.

Materials Rs. 8,020; Wages : Department X 60 hours @ Rs. 6 P.H., Department Y 40 hours @ Rs. 4 P.H.; Department Z 20 hours @ rs. 10 P.H.

Overhead expenses for these three departments were estimate as follows : (a) Fixed overheads at Rs. 40,000 for 10,000 normal working hours (b) Variable overheads : Department X Rs. 10,000 for 5,000 working hours; Department Y Rs. 6,000 for 1,500 working hours; Department Z Rs. 4,000 for 500 working hours.

You are required to calculate the cost Job No. 505 and calculate the price to give a profit of 25% on selling price.

### Solution

Calculation of overheads recovery rate :

Fixed overheads :      Estimated fixed cost Rs. 40,000  
    Estimated direct working hours : 10,000  
    Hourly rate =  $40,000 \div 10,000 = \text{Rs. } 4/- \text{ P.H.}$

Variable overheads : Amount of overheads + No. of working hours

Department X =  $10,000 \div 5,000 = \text{Rs. } 2/- \text{ P.H.}$

Department Y =  $6,000 \div 1,500 = \text{Rs. } 4/- \text{ P.H.}$

Department Z =  $4,000 \div 500 = \text{Rs. } 8/- \text{ P.H.}$

### COST SHEET FOR JOB NO. 505

		Rs.
Materials		8,020
Wages :		
Department X @ Rs. 6 P.H. for 60 hours	360	
Department Y @ Rs. 4 P.H. for 40 hours	160	
Department Z @ Rs. 10 P.H. for 20 hours	200	
		720
Prime Cost :		8,740
Add Overhads :		
Fixed overheads : 120 hours x Rs. 4 = 480		
Variable overheads :		
Department X @ Rs. 2 P.H. for 60 Hrs. 120		
Department Y @ Rs. 4 P.H. for 40 Hrs. 160		
Department Z @ Rs. 8 P.H. for 20 Hrs. 160		
	440	920
Total Cost :		9,660
Add Profit at 25% on selling price or one-third of Cost		3,220
Selling Price :		12,880

## Problem No. 2

A work order for 500 units of a commodity has to pass through four different machines of which the machine hour rates are as follows :

Machine A Rs. 2-5; Machine B Rs. 6-00; Machine C Rs. 8-00; Machine D Rs. 5-00.

The following expenses have been incurred on the work order : Materials Rs. 40,000; Wages Rs. 3,000; Number of hours worked: Machine A 400 hours; Machine B 600 hours; Machine C 480 hours and Machine D 200 hours.

### Solution

*Statement showing Cost and Selling Price of a work order for 500 units*

	Rs.	Rs.
Material used	40,000	
Less material returned	<u>2,000</u>	
		38,000.00
Wages		<u>3,000.00</u>
	Prime Cost ;	41,000.00
Add Works overhads :		
Machine A 400 hours x Rs. 2-50	1,000	
Machine B 600 hours x Rs. 6-00	3,600	
Machine C 480 hours x Rs. 8-00	3,840	
Machine D 200 hours x Rs. 5-00	<u>1,000</u>	
		<u>9,440.00</u>
	Works Cost :	50,440.00
Add Office overhead :		
60% of Works cost		<u>30,264.00</u>
		80,704.00
Less Sales of discarded units :		
10% of production discarded	8,070.40	
Half to be realised	<u>4,035.20</u>	
	Loss :	4,035.20
	Total Cost :	<u>76,668.80</u>
Add Profit 20% on Selling Price or 25% on Cost		<u>19,167.20</u>
	Selling Price of 500 units :	<u>95,836.00</u>
	Selling price per unit = Rs. 95,836 ÷ 500 = Rs. 191.67	

Note : It is presumed that the net output of the work order is 500 units, after the discarded units have been adjusted for.

### Problem No. 3

From the following data extracted from a paper Mill, find out in the suitable Cost Sheet form (a) Prime Cost (b) Works Cost (c) Total Cost (d) Selling Price and (e) Selling price per tonne of paper.

Direct Material : Paper pulp 1,000 tonnes @ Rs. 100 per tonne, other Miscellaneous materials 200 tonnes at Rs.60 per tonne.

Direct Labour : 100 skilled men @ Rs. 10 per day for 20 days and 50 unskilled workmen @ Rs. 6 per day for 20 days.

Direct expenses : Special equipment Rs. 10,000 and special dies Rs. 4,000

Works overhead : Variable 100% on direct wages. Fixed 60% on direct wages.

Administrative overhead at 10% of works cost and selling and distributive overhead at 15% of works cost. Profit 10% on total cost. Finished paper manufactured 1,000 tonnes. Sale of waste paper Rs. 2,000.

There was work-in-progress neither at the beginning nor at the end. The scrap value of special equipment is nil after use. Work was done only for 20 days in the month.

#### Statement showing the Selling Price of Paper

Period :	Output : 1,000 tonnes	
	Rs.	Rs.
Direct Material :		
Paper pulp 1,000 tonnes @ Rs. 100 per tonne	1,00,000	
Other materials 200 tonnes @ Rs. 60 per tonne	<u>12,000</u>	1,12,000
Direct Labour :		
100 skilled men @ Rs. 10 per day for 20 days	20,000	
50 unskilled men @ Rs. 6 per day for 20 days	<u>6,000</u>	26,000
Direct Expenses :		
Special Equipment	10,000	
Special dies	<u>4,000</u>	14,000
		<u>1,52,000</u>
	(a) Prime-Cost :	
Works overhead :		
Variable 100% on direct labour	26,000	
Fixed 60% on direct labour	<u>15,600</u>	41,600
		<u>1,93,600</u>
Less sale of waste paper		<u>2,000</u>
	(b) Works Cost	1,91,600
Office overhead 10% of works cost ;		<u>19,160</u>
Cost of Production :		2,10,760
Selling and Distributive overheads 15% on Works Cost :		<u>28,740</u>
	(c) Total Cost	2,39,500
Profit at 10% on total Cost :		<u>23,950</u>
	(d) Selling Price :	<u>2,63,450</u>

The output is 1,000 tonnes and the total selling price Rs. 2,63,450.

(e) The selling Price per tonne =  $2,63,450 \div 1,000$  Rs. 263.45.

**Problem No. 4**

During August, 2001 a Company was engaged on three jobs, all of which were started on 1st August. The following details relating to the jobs are available :

	Job No. 333 Rs.	Job No. 334 Rs.	Job No. 335 Rs.
Purchase of materials	4,000	4,200	2,800
Stores issued	480	—	1,400
Direct wages	1,800	1,400	1,200
Direct expenses	—	200	—
Materials returned to stores	—	—	80

Materials valued at Rs. 160 were transferred from Job No. 333 to Job No. 335. Overheads for the month amounted to Rs. 5,600 and overheads are absorbed at 120% of direct wages. Job No. 334 was completed during the month and invoiced to the customer at Rs. 8,400.

Prepare (a) Job cost account (b) Work-in-progress control A/c (c) overheads control account and (d) Costing profit and Loss Account for August, 2001

Dr.	Job No. 333 Account		Cr.
	Rs.		Rs.
To Materials	4,000	By Transfer of materials to	
To Stores	480	Job NO. 335	160
To Direct wages	1,800	By Balance c/d	8,280
To Overheads	2,160		
	<u>8,440</u>		<u>8,440</u>

Dr.	Job No. 334 Account		Cr.
	Rs.		Rs.
To Materials	4,200	By Cost of Sales	7,480
To Direct wages	1,400		
To Direct expenses	200		
To Overheads	<u>1,680</u>		
	<u>7,480</u>		<u>7,480</u>

Dr.	Job No. 335 Account		Cr.
	Rs.		Rs.
To Materials	2,800	By Materials returned to stores	80
To Transfer of materials from Job No. 333	160	By Balance c/d	6,920
To Stores	1,400		

To Direct wages	1,200	
To Overheads	1,400	
	<u>7,000</u>	<u>7,000</u>
To Balance b/d	6,920	

Dr.	<i>Work-in-Progress Control Account</i>		Cr.
	Rs.		Rs.
To Purchases	11,000	By Returns to stores	80
To Stores	1,880	By Cost of Sales	7,480
To Direct Wages	4,400	By Balance c/d	15,200
To Direct Expenses	200		
To Overheads	5,280		
	<u>22,760</u>		<u>22,760</u>

Dr.	<i>Overheads Control Account</i>		Cr.
	Rs.		Rs.
To Overheads incurred	5,600	By Overheads absorbed	5,280
		By Balance c/d (under-absorption)	320
	<u>5,600</u>		<u>5,600</u>
By Balance b/d	320		

Dr.	<i>Costing Profit and Loss Account</i>		Cr.
	Rs.		Rs.
To Cost of sales	7,480	By Sales	8,400
To Profit	920		
	<u>8,400</u>		<u>8,400</u>

### Problem No. 5

The following information is obtained from the books of a business concern for the year ended 31st December, 2001 :

	Completed Jobs	Work-in-progress
	Rs.	Rs.
Raw materials supplied from stores	45,000	15,000
Wages	50,000	20,000
Chargeable expenses	5,000	2,000
Materials transferred to work-in-progress	1,000	1,000
Materials returned to Stores	500	

Factory overhead is 80% of wages and Office overhead 25% of Factory cost. The value of the executed contracts during 1990 was Rs. 2,05,000.

Prepare (a) Consolidated Completed Jobs Account showing the profit made or loss incurred on the contracts and also (b) Consolidated work-in-progress Account.

**Solution**

Dr.	<i>Consolidated Completed Jobs A/c</i>		Cr.
	Rs.		Rs.
To Raw Materials consumed :		By Contractee's Account	
supplies from stores	45,000	(the amount of contracts	
Less transferred to W.I.P.	<u>1,000</u>	completed)	2,05,000
	44,000		
Less returned to stores	500		
	<u>43,500</u>		
To Wages	50,000		
To Chargeable expenses	5,000		
To Factory overheads			
(80% of wages)	40,000		
	<u>1,38,500</u>		
To Office overheads 25% of			
Rs. 1,38,500	34,625		
To Net Profit transferred to			
P & L A/c.	31,875		
	<u>2,05,000</u>		<u>2,05,000</u>

Dr.	<i>Consolidated Work-in-progress A/c</i>		Cr.
	Rs.		Rs.
To Raw Materials consumed :		By Balance c/d	
supplied from stores	15,000		67,500
Add Transferred from			
completed jobs	<u>1,000</u>		
	16,000		
To Wages	20,000		
To Chargeable expenses	2,000		
To Factory overheads			
(80% of wages)	16,000		
	<u>54,000</u>		
To Office overheads			
(25% of 54,000)	13,500		
	<u>67,500</u>		<u>67,500</u>

### Problem No. 6

The following cost data are extracted from the books of a manufacturing concern for the year ending on the 31st December, 2001 :

Direct material	1,20,000	Administration overheads	56,000
Direct wages	1,00,000	Selling & Distribution overheads	70,000
Factory overheads	60,000	Profit	1,01,500

In 2002 the manufacturing concern receives an order for a number of jobs. It is estimated that materials required will be Rs. 1,60,000 and wages amounting to Rs. 1,00,000 will be spent on the jobs. What should be the price for these jobs if the factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads has gone up by 10%? The factory recovers factory overheads as a percentage of direct wages and administration and selling and distribution as a percentage of works cost.

### Solution

For quoting the selling price for the jobs to be undertaken, it is necessary to ascertain first the relation between different elements of cost incurred in 2001.

*Statement showing the total cost and the selling price of jobs undertaken in 2001*

	Rs.
Direct materials	1,20,000
Direct wages	1,00,000
Prime Cost :	2,20,000
Factory overheads (60% of direct wages)	60,000
Works Cost :	2,80,000
Administration overheads (20% of Works Cost)	56,000
Cost of Production :	3,36,000
Selling & distribution overheads (25% of Works cost)	70,000
Cost of sales or Total Cost :	4,06,000
Profit (25% on Total Cost or 20% on sales)	1,01,500
Sales :	5,07,500

*Statement showing the estimated cost of the Jobs to be undertaken in the year 2002*

	Rs.
Direct Materials	1,60,000
Direct wages	1,00,000
Prime Cost :	2,60,000
Factory overheads (60% of direct wages)	60,000
Works Cost :	3,20,000
Administration overheads (20% of work cost)	64,000
* Cost of Production	3,84,000
Selling and Distribution overheads : (25%+10% of 25%) of Works Cost	88,000

Cost of Sales or Total Cost :	4,72,000
Add : Profit (20% on Sales or 25% on total cost)	1,18,000 *
Selling Price	5,90,000

### Problem No. 7

ABC company produces goods against orders. Its manufacturing section consists of three departments, X, Y and Z. It is practice of the company to prepare quarterly budgets for the purposes of control and the absorption of overheads. The following information is extracted from the first quarter budget of the company.

	Departments			
	Total Rs.	X Rs.	Y Rs.	Z Rs.
Materials	60,000	10,000	20,000	30,000
Labour	23,500	7,500	8,000	8,500
Variable Factory overhead	15,000	5,000	4,000	6,000
Fixed factory overhead	15,000	—	—	—
Administrative overhead	10,000	—	—	—
Machine hours	20,000	6,000	4,000	10,000

The factory overheads are absorbed on the basis of machine hours and the administration overheads is absorbed as a per centage of factory Cost.

The company has received an order from its regular customer for the supply of a specific variety of products that pass through two departments only, i.e., X and Y. In respect of the order, the following particulars are available :

	X	Y
Material Cost (Rs.)	1,500	2,500
Labour Cost (Rs.)	700	800
Machine hours	600	400

Prepare a job order cost sheet and ascertain the price of the order if the margin of 20% on sales is added to the total cost of production.

**Solution :**

#### Job Order Cost Sheet

Particulars	Amount (Rs.)
Material Cost : Dept. X : Rs. 1,500 + Dept. Y : Rs. 2,500	4,000-00
Labour Cost : Dept. X : Rs. 700 + Dept. Y : Rs. 800	1,500-00
Prime Cost	5,500-00

Factory Overhead (On the basis of machine hours)

Variable : Dept X :  $\frac{5,000}{6,000} \times 600$  Rs. 500

	Dept Y : $\frac{4,000}{4,000} \times 400 \text{ Rs. } 400$	900-00
Fixed :	$\frac{15,000}{20,000} \times 1,000$	750-00
	Factory Cost	<u>7,150-00</u>
	Administrative Overhead : 8.81% of factory cost	<u>629-91</u>
	Cost of Production	7,779-91
Profit : 20% of sales :	$7779 - 91 \times \frac{20}{80} = 1,944-98$	1,944-98
	Selling Price of the order	<u>9,724-89</u>

### Problem No. 8 :

M/s ABC Ltd is committed to supply 24,000 bearings per annum on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set up cost per batch of bearing manufacturing is Rs. 324

- (i) What should be the optimum run size of bearing manufacture ?
- (ii) What should be the interval between two consecutive optimum runs ?
- (iii) Find out the minimum inventory holding cost.

Solution

$$(i) \text{ EBQ} = \sqrt{\frac{2AS}{C}}$$

Where; A = Annual demand : 24,000 bearings

S = Set-up Cost Rs. 324

C = Carrying Cost : 10 paise x 12

$$= \sqrt{\frac{2 \times 24,000 \times 324}{0.10 \times 12}} = 3,600 \text{ units}$$

$$(ii) \text{ Interval between two consecutive optimum runs } \frac{3,600}{24,000} \times 365 \text{ days} = 55 \text{ days.}$$

(iii) Minimum inventory cost per annum

$$= \left[ \left( \frac{\text{Annual Production}}{\text{EBQ}} \right) \times \text{Setting-up cost} \right] + \left[ \text{Average Inventory per annum} \times \text{Holding Cost per unit} \right]$$

$$= \left[ \left( \frac{24,000}{3,600} \right) \times 324 \right] + \left[ \left( \frac{3,600}{2} \right) \times (0.10 \times 12) \right]$$

$$= \text{Rs. } 4,320$$

**Problem No. 9**

Component SW is made entirely in the machine shop number ASW-II. Material cost is Rs. 20 per component. Each component takes 6 minutes to produce and the machine operator is paid Rs. 15 per hour. Machine hour rate is Rs. 72 per hour.

The setting-up of the machine to produce the component takes 3 hours for the operator.

You are required to prepare cost sheets showing the setting-up costs and the production costs, both in total (i.e. for the batch) and per component, assuming the batch size of (a) 100 components; (b) 150 components, and (c) 200 components.

**Solution****Statement of Batch Cost**

Particulars	Total Batch Cost (Rs.)	Cost per Component (Rs.)
<b>(a) Batch size of 100 components :</b>		
Setting-up costs :		
– Wages (3 hours @ Rs. 15 per hour)	45	
– Machine expenses (3 hours @ Rs. 72 per hour)	216	
<b>Total setting-up costs :</b>	<u>261</u>	2-61
Material cost (100 units @ Rs. 20 per unit)	2,000	
Wages (10 hours @ Rs. 15 per hour)	150	
Machine expenses (10 hours @ Rs. 72 per hour)	720	
<b>Production Cost</b>	<u>2,870</u>	28-70
<b>Total Setting-up + Production Costs</b>	<u>3,131</u>	<u>31-31</u>
<b>(b) Batch size of 150 components :</b>		
Setting-up costs (same as above)	261	1-74
Production costs (150 x 28-70 per component as above)	<u>4,305</u>	28-70
<b>Total Setting-up + Production Costs</b>	<u>4,566</u>	<u>30-44</u>
<b>(c) Batch size of 200 components :</b>		
Setting-up costs (same as above)	261	1-31
Production costs (200 x 28-70 per component as above)	<u>5,740</u>	28-70
<b>Total setting-up + Production Costs</b>	<u>6,001</u>	<u>30-01</u>

**Problem No. 10**

Batch No. X-786 incurrant the following costs :

Department A : 420 labour horus @ Rs. 3-50

Department B : 686 labour hours @ Rs. 3-00

Direct materials = Rs. 3,280

Factory overheads are absorbed on labour and the rates Rs. 8 per hour for Department 'A' and Rs. 5 per hour for department 'B'.

The firm uses a cost plus system for determining selling prices and expects a 25% gross profit (sales value minus factory cost)

Administrative overheads are absorbed at 10% of selling price.

Assuming that 1,000 units were produced in Batch NO. X-786, Calculate :

- The selling price per unit;
- The total amount of administrative overheads recovered by Batch NO. X-786 ; and
- The notional net profit per unit.

**Solution :**

*Cost Sheet of Batch No. X-786*

Particulars	Amount Rs.	Amount Rs.
Materials		3,280
Labour :		
Dept A : 420 Labour hours @ Rs. 3-50	1,470	
Dept B : 686 labour hours @ Rs. 3-00	2,058	3,528
Prime Cost		6,808
Factory Overheads :		
Dept A : 420 labour hours @ Rs. 8	3,360	
Dept B : 686 labour hours @ Rs. 5	3,430	6,790
Factory Cost		13,598
Administrative Overheads (10% of Rs. 18,131)		1,813
Total Cost		15,411
Profit		2,720
Selling Price :		18,131

(a) The selling price per unit :  $\text{Rs. } 18,131 \div 1,000 = \text{Rs. } 18.13$

(b) Administrative overheads recovered = Rs. 1,813

(c) Notional net profit per unit  $\text{Rs. } 2,720 \div 1,000 = \text{Rs. } 2.72$

**Working Notes :**

$$\text{Sales value} = \frac{10 \times 13,598}{75} = \text{Rs. } 18,131$$

Sales Value Rs. 18,131 – Factory Cost Rs. 13,598 = Rs. 4,533 (equal to 25% of sales value)

### 3. CONTRACT COSTING

#### Problem No. 1

From the following particulars extracted from the books of a contractor, prepare Contract Account and the Contractee's Account Value of Contract Rs. 4,00,000. The contract work commenced on 1st July, and was complete on the 31st December 2002.

Direct materials	1,50,000	Loose Tools	6,000.
Wages	1,25,000	Cost of Tractor :	
Special Plant	30,000	Running materials	4,000
Stores issued	14,000	Wages of drivers, etc.	7,000
Other direct expenses	6,000		

On 31st December the Plant was returned subjects to a depreciation of 15% on the original cost. The values of Loose tools and Stores returned were Rs. 4,000 and Rs. 2,000 respectively. The value of the Tractor was Rs. 50,000 and depreciation was to be charged at this contract at the rate, of 20% per annum. The amount of administrative expenses to be charged to the contract is calculated at the rate of 10% on the works cost :

Dr.	<i>Contract Account</i>		Cr.
	Rs.		Rs.
To Direct Materials	1,50,000	By Plant returned	
To Wages	1,25,000	(cost less Depreciation)	25,500
To Special Plant	30,000	By Loose Tools	4,000
To Stores issued	14,000	To Stores returned	2,000
To Loose Tools	6,000	By Contractees a/c	4,00,000
To Cost of Tractor :			
Running materials	4,000		
Wages of drivers	7,000		
	11,000		
To Other direct expenses	6,000		
To Depreciation of Tractor	5,000		
To Administrative expenses	31,550		
To P & L a/c (Profit)	52,950		
	4,31,500		4,31,500
	4,31,500		4,31,500
Dr.	<i>Contract Account</i>		Cr.
	Rs.		Rs.
To Contract a/c	4,00,000	By Bank a/c	4,00,000
	4,00,000		4,00,000
	4,00,000		4,00,000

- Note: 1. Depreciation of the Special Plant has been calculated at 15% on the original cost of the plant.
2. Depreciation of Tractor has been calculated at 20% for half year.
3. Administrative expenses have been calculated at 10% on the Works cost which means total amount of expenses incurred minus total value of items returned  
i.e., 10% of Rs. 3,47,000 - Rs. 31,500 = 10% of Rs. 3,15,000 = Rs. 31,550.

2) From the cost data given below relating to a contractor, prepare Contract Account :

Material - Rs. 1,60,000; Wages - Rs. 1,40,000 Direct Charges - Rs. 1,00,000

The contract price is Rs. 8,00,000. Cash received from the contractee is Rs. 4,00,000 being 80% of Work certified. Cost of work uncertified is Rs. 20,000.

Solution

Dr.	Contract Account		Cr.
	Rs.		Rs.
To Materials	1,60,000	By Work-in-progress :	
To Wages	1,40,000	Work certified $4,00,000 \times \frac{100}{80}$	5,00,000
To Direct charges	1,00,000	work uncertified	20,000
To Balance c/d	1,20,000		
	<u>5,20,000</u>		<u>5,20,000</u>
To P & L a/c	64,000	By Balance b/d	1,20,000
To Reserve c/d	56,000		
	<u>1,20,000</u>		<u>1,20,000</u>
To work-in-progress b/d (Work certified + Work uncertified)	5,20,000	By Reserve b/d	56,000

3) The following particulars extracted from the records of a contractor relate to two contract - X and Y. You are required to prepare contract accounts for both the contracts and state what amount of Profit to Loss should be taken to Profit and Loss Account for the year 2002.

	Contract X	Contract Y
	Rs.	Rs.
Total expenditure upto the 31st of December, 2001	3,60,000	2,70,000
Wages (2002)	42,000	8,600
Materials and haulage hire (2002)	63,000	3,000
Indirect expenses (2002)	2,100	240

Plants which were originally charged at cost were valued on 30th November, 2002 at Rs. 10,000 and Rs. 1,50,000 respectively for contracts X and Y. The contract price for X was Rs. 4,80,000 and for Y Rs. 1,20,000. The work in each case was finished on 30th November, 2002, but the contracts could not be considered as completed until the maintenance period of six months as stipulated in the agreement had expired on 31st May, 2003. The cost of maintenance is estimated at Rs. 2,000 for Contract X and Rs. 1,400 for Contract Y.

Dr.		Contract X Account for the year ended 2002		Cr.	
	Rs.			Rs.	
To Work-in-progress (expense incurred upto 31-12-2001)	3,60,000	By Plant (Closing balance)		1,00,000	
To Wages	42,000	By Contractee A/c (contract price)		4,80,000	
To Materials & Hire	63,000				
To Indirect expenses	2,100				
To Cost of maintenance	2,000				
To Profit transferred to P & L a/c.	1,10,900				
	<u>5,80,000</u>			<u>5,80,000</u>	

Dr.		Contract Y Account for the year ended 2002		Cr.	
	Rs.			Rs.	
To Work-in-Progress (expenses incurred upto 31-12-2001)	1,70,000	By Contractee a/c (contract price)		1,20,000	
To Wages	8,600	By Plant (Closing balance)		1,50,000	
To Materials & hire	3,000	By Loss transferred to P & L a/c		13,240	
To Indirect expenses	240				
To Cost of maintenance	1,400				
	<u>2,83,240</u>			<u>2,83,240</u>	

4) Mr. Nary Contract undertook several large contracts and his ledger thus contained a separate account for each contract. On 31st December, 2002 the account of Contract No. 101 showed the following amount spent thereon :

	Rs.
Materials directly purchased	1,80,000
Materials issued from stores	50,000
Plant purchased	1,60,000
Wages	2,44,000
Direct expenses	24,000
Portion of establishment charges	54,000
	<u>7,12,000</u>

The contract was for Rs. 15,00,000 and upto 31st December 2002 Rs. 5,80,000 had been received in cash which represented the full amount certified less 20% retention money. The materials on site unconsumed were valued at Rs. 15,000. The contracting plant was to be depreciated by Rs. 16,000.

Prepare the contract showing what profit thereon has been earned upto date. Also, state what among would in your opinion, be taken to the profit and loss account of the period.

**Solution**

Dr.	Contract No. 101 Account		Cr.
	Rs.		Rs.
To Materials directly Purchased	1,80,000	By Work certified	7,25,000
To Materials from stores	50,000	By Materials at site	15,000
To Plant purchased	1,60,000	To Plant at site	
To Wages	2,44,000	(Rs. 1,60,000 – 16,000)	1,44,000
To Direct expenses	24,000		
To Establishment charges	54,000		
To Balance being profit cd	1,72,000		
	<u>8,84,000</u>		<u>8,84,000</u>
To P & L a/c	91,734	By Balance b/d	1,72,000
To Balance c/d	80,266		
	<u>1,72,000</u>		<u>1,72,000</u>

Note : Work certified = Rs. 5,80,000 x  $\frac{100}{80}$  = Rs. 7,25,000

Profit transferred to P & L account :

$$\text{Rs. } 1,72,000 \times \frac{2}{3} \times \frac{80}{100} = \text{Rs. } 91,734$$

5) The following particulars are extracted from the books of a firm of Engineers relating to a contract for the year 2002

	R s .
Materials sent to site	1,70,698
Labour engaged at site	1,48,750
Plant installed at site	30,000
Direct expenses	6,334
Establishment charges	8,252
Materials returned to stores	1,098
Work certified by architects	3,90,000
Cost of work uncertified	9,000
Materials on hand (31-12-2002)	3,766
Wages accrued due (31-12-2002)	4,800
Direct expenses accrued (31-12-2002)	22,000
Value of Plant as on (31-12-2002)	22,000

The contract price has been agreed at Rs. 5,00,000. Cash received from the contractee on account was Rs. 3,60,000.

You are required to prepare (a) Contract Account (b) Contractee's Account and the items that appear in the Balance sheet of the Contractors

**Solution**

Dr.		<i>Contract Account for the year ending on 31-12-2002</i>		Cr.	
	Rs.		Rs.		Rs.
To Materials sent to site	1,70,698	By Materials returned to stores	1,098		
To Labour	1,48,750	By Work certified	3,90,000		
To Plant installed at site	30,000	By Work uncertified	9,000		
To Direct expenses	6334	By Materials on hand	3,776		
Add accrued	480	To Value of plant (31st Dec. 1990)	22,000		
To Establishment	8252				
To Wages accrued	4,800				
To Notional Profit c/d	56,550				
	<u>4,25,864</u>				<u>4,25,864</u>
To P & L a/c	34,800	By Notional Profit b/d	56,550		
To Reserve	21,750				
	<u>56,550</u>				<u>56,550</u>

$$\text{Profit transferred to P \& L a/c.} = 56,550 \times \frac{2}{3} \times \frac{360000}{390000} = \text{Rs. } 34,800$$

Dr.		<i>Contractee's Account</i>		Cr.	
	Rs.		Rs.		Rs.
To Balance	3,60,000	By Cash a/c.	3,60,000		

*Items that appear in the Balance Sheet as on 31-12-2002*

Liabilities		Assets	
	Rs.		Rs.
Wages outstanding	4,800	Work in progress	3,77,250
Direct expenses outstanding	240	Less cash recovered	<u>3,60,000</u>
P & L a/c. (Profit)	34,800		17,250
		Materials in stores	1,098
		Materials on hand	3,766
		Plant (after depreciation)	22,000

6) The particulars given below are extracted from the ledger of a Contractor in respect of Contract No. 777 for the year ending on the 31st of December, 2002

	Rs.		Rs.
Materials	73,000	Establishment charge	16,000
Wages	48,840	Plant	68,400
Direct expenses	13,420	Sale of scrap	3,640

You are required to prepare Contract No. 777 Account after taking into account the following information and to indicate what profit or loss should be taken to the profit and loss account for the year ending on the 31st December, 2002.

- (a) Outstanding wages Rs. 1,600; outstanding other Direct expenses Rs. 2,240.
- (b) Depreciation of Plant upto 31st December 2002 was Rs. 17,100.
- (c) Included in the summary of entries are : Wages Rs. 2,000, Other expenses and losses Rs. 3,000; Materials used Rs. 4,160, since the certification of work done.
- (d) Materials on site on the 31st December, 2002 cost Rs. 20,000.
- (e) Rs. 1,25,000 had been the total work certified upto 20th of December, 2002 when three-eighths of the contract remained incomplete.
- (f) The total contract Price was Rs. 2,00,000.

**Solution**

Dr.		Contract No. 777 Account for the year ended 31-12-2002		Cr.	
		Rs.			Rs.
To Materials		73,000	By Work certified		1,25,000
To Wages	48,840		By Work uncertified :		
Add outstanding	1,600		Wages	2,000	
	<u>50,440</u>		Other expenses	3,000	
To Direct expenses	13,420		Materials used	<u>4,160</u>	9,160
To Add outstanding	<u>2,240</u>	15,660	By Materials at site		20,000
To Establishment charges		16,000	By Plant at site (less depn.)		51,300
			(168400-17100)		
To Plant		68,400	By Sale of scrap		3,640
			By Loss Transferred to P & L a/c		14,400
		<u>2,23,500</u>			<u>2,23,500</u>

- 7) M/s. Rohini Constructions Ltd., obtained a contract for building a Factory for Rs. 50,00,000. Building construction work started on 1st April, 2001 and at the end of March, 2002 they received from the Contractee Mr. Punarvasu, a sum of Rs. 19,50,000, which works out to 75 percent of the value of work Certified. The following information is extracted from the books of the contractor :

	Rs.
Stores issued to contract	10,00,000
Stores on hand (31-03-2002)	50,000
Wages paid	9,00,000
Plant purchased for the contract (1-4-2001)	10,00,000
Direct expenses	1,25,000
Overheads allocated to this contract	60,000
Work done but not certified	60,000

Plant to be depreciated at 10 percent. You are required to prepare the Contract account showing the profit to be carried to the Profit and Loss Account for the year ended 31st March, 2002.

**Solution**

In the contract Ledger of M/s. Rohini Constructions Ltd.,

<i>Factory Building Contract Account</i>		<i>for the year ended 31-3-2002.</i>	
Dr.	Rs.	Cr.	Rs.
To stores issued	10,00,000	By stores on hand	50,000
To Wages	9,00,000	By Work Certified	26,00,000
To Plant	10,00,000	By Work uncertified	60,000
To Direct Expenses	1,25,000	By Plant less Depn.,	9,00,000
To overheads	60,000		
To Notional Profit c/d	25,000		
	36,10,000		36,10,000
To P & L A/c	2,62,500	By Notional Profit b/d	5,25,000
To Reserve c/d	2,62,500		
	5,25,000		5,25,000

Since more than 50 percent of the contract is completed, it is reasonable to carry 2/3 of Notional profit which cash received bears to work certified, to Profit and Loss Account. It is ascertained as follows :

$$\begin{aligned} \text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}} &= \\ = 5,25,000 \times \frac{2}{3} \times \frac{19,50,000}{26,00,000} &= \text{Rs. } 2,62,500 \end{aligned}$$

8. M/s. Upendra Constructions Ltd., has undertaken a contract for the Construction of a bridge for Rs. 96,00,000 and commenced the work on 1st April, 2001. The following information relating to the Contract for the year ended 31st March, 2002 is given to you :

	Rs.
Materials issued	26,88,000
Wages paid	27,20,000
Plant purchased (1-4-2001)	4,80,000
General Overheads	2,56,000
Direct expenses	64,000
Material at site on 31-3-2002	32,000
Wages outstanding (31-3-2002)	22,400
Direct expenses outstanding (31-3-2002)	9,600
Cost of work done but not certified	1,12,000
Value of work certified	60,00,000
80% of the work certified is received in cash.	

Life of the plant purchased is Five years and its scrap value at the end of the fifth year is zero.

Prepare Bridge Contract Account for the year ended 31-3-2002, showing the portion of the profit which might reasonably be taken to the Profit and Loss Account.

**Solution :**

**In the Contract Ledger of M/s. Upendra Constructions Ltd.**

Dr.	<i>Bridge Contract Account for the year ended 31-3-2002</i>		Cr.
	Rs.		Rs.
To Materials issued	26,88,000	By Materials at site	32,000
To Wages 27,20,000		By Work Certified	60,00,000
+ O/s     22,400	27,42,400	By Work uncertified	1,12,000
To Direct Exp 64,000		By Plant at site	3,84,000
+ O/s     9,600	73,600		
To General exp.	2,56,000		
To Notional Profit c/d	2,88,000		
	<u>65,28,000</u>		<u>65,28,000</u>
To P & L ac/	1,53,600	By Notional Profit b/d	2,88,000
To Reserve c/d	1,34,400		
	<u>2,88,000</u>		<u>2,88,000</u>

Since more than 50 percent of the Contract is completed, it is reasonable to carry 2/3 of the Notional Profit, which cash received bears to the value of work certified, to the P & L

Account. It is ascertained as follows :  $\text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}} = 2,88,000 \times \frac{2}{3}$

$$\times \frac{80}{100} = \text{Rs. } 1,53,600.$$

9) M/s. Bharani Constructions Co. undertook a contract for Rs. 80,00,000 on 1st January, 2002. From the following particulars extracted from the books of the Company, prepare a contract account for the year ending 31-12-2002 and show how much profit or loss can reasonably be taken to Profit and Loss Account for this period.

	Rs.
Materials issued	19,20,000
Plant purchased and installed at the site	6,40,000
Wages	24,00,000
Working expenses	96,000
Administration expenses	1,60,000
Material costing Rs. 1,60,000 sold for	1,76,000
Work certified	56,00,000
Plant at site (31-12-2002)	3,20,000
Cost of work uncertified	2,56,000

It is estimated that :

1. the contract could be completed in a further period of six months;
2. the plant's residual value after the completion of the contract would be Rs. 80,000;
3. the additional wages to complete the contract would come to Rs. 8,16,000;
4. A further sum of Rs. 64,000 is likely to be spent for working expenses ;
5. the administrative expenses would further be Rs. 80,000.
6. Rs. 10,40,000 worth of material is required for the completion of the contract.

**Solution**

In the contract Ledger of M/s. Bharani Constructions Co.

Dr.	<i>Contract Account for the year ended 31st December, 2002</i>		Cr.
	Rs.		Rs.
To Materials	19,20,000	By Sale of Material	1,76,000
To Wages	24,00,000	By Plant at site	3,20,000
To Plant	6,40,000	By Value of work Certified	56,00,000
To Working expenses	96,000	By Cost of work uncertified	2,56,000
To Admn. Expenses	1,60,000		
To P & L a/c (profit on sale of material)	16,000		
To Notional Profit c/d	11,20,000		
	63,52,000		63,52,000
To P & L a/c	7,16,800	By Notional profit b/d	11,20,000
To Reserve c/d	4,03,200		
	11,20,000		11,20,000

Calculation of Profit to be taken to P & L A/c :

	Rs.
Cost of contract upto 31-12-2002 :	
Material + Plant + Wages + Working Exp + Admn. Exp =	52,16,000
Less Material sold (cost) + Plant at site =	4,80,000
	47,36,000
Additional estimated exp. to complete the contract :	
Materials + Wages + Working exp + Admn Exp + Plant	
less residual value	22,40,000
Estimated total cost of the Contract :	69,76,000
Estimated Profit (balance figure)	10,24,000
Total Contract Price :	80,00,000

$$\text{Amount of profit to be transferred to P \& L a/c. Estimated Profit} \times \frac{\text{Worked Certified}}{\text{Contract Price}}$$

$$= \text{Rs. } 7,16,800$$

10) The following particulars are extracted from the books of M/s. Rohini Constructions Ltd., relating to a Contract for Rs. 80,00,000 :

	2000 Rs.	2001 Rs.	2002 Rs.
Material	9,00,000	14,00,000	12,00,000
Wages	8,60,000	12,00,000	10,00,000
Carriage	40,000	1,20,000	1,00,000
General expenses	40,000	1,00,000	32,000
Work Certified	18,00,000	60,00,000	80,00,000
Work uncertified (at cost)	20,000	1,00,000	

Plant costing Rs. 2,00,000 was bought in the beginning and depreciation was charged at 25 percent per annum. The Contractee has paid at 80 percent of work certified every year and settled the account in 2002. Prepare : (a) Contract Account & (b) Contractee Account for three years and show how work-in-progress will appear in the Balance sheet prepared at the end of each of the three years.

**Solution :**

**In the Contract Ledger of M/s. Rohini Constructions Ltd.,**

Dr.		Contract Account for the year ended 31-12-2002		Cr.
	Rs.			Rs.
To Materials	9,00,000	By Value of work certified		18,00,000
To Wages	8,60,000	By Cost of work done but		
To Carriage	40,000	not certified		20,000
To Gen. Exp.	40,000	By Plant at site (2,00,000-50,000)		1,50,000
To Plant	2,00,000	By P & L A/c (Loss)		70,000
	<u>20,40,000</u>			<u>20,40,000</u>

**Contract Account for the year ended 31-12-2001**

Dr.		Contract Account for the year ended 31-12-2001		Cr.
	Rs.			Rs.
To work-in-progress :		By VI. of W. Certified		60,00,000
Work Certified 18,00,000		By Cost of Work Uncertified		1,00,000
Work Uncertified <u>20,000</u>	18,20,000	By Plant at site		
To Plant at site	1,50,000	(1,50,000 - 50,000)		1,00,000
To Materials	14,00,000			
To Wages	12,00,000			
To Carriage	1,20,000			
To Expenses (General)	1,00,000			
To Notional Profit c/d	14,10,000			
	<u>62,00,000</u>			<u>62,00,000</u>

To P&L A/c	7,52,000	By Notional Profit b/d	14,10,000
To Reserve c/d	6,58,000		
	<u>14,10,000</u>		<u>14,10,000</u>

Calculation of Profit taken to P & L A/c :

Notional Profit  $\times \frac{2}{3}$  x Percentage of cash received to value of work Certified

$$= 14,10,000 \times \frac{2}{3} \times \frac{80}{100} = \text{Rs. } 7,52,000/-$$

<i>Dr.</i>		<i>Contract Account for the year ended 31st Dec., 2002</i>		<i>Cr.</i>
	Rs.			Rs.
To Work-in-progress : (W. Certified + W. Uncertified - Reserve)	54,42,000	By Contractee A/c		80,00,000
To Plant (1-1-2002)	1,00,000	By Plant at site (31-12-2002)		50,000
To Materials	12,00,000			
To Wages	10,00,000			
To Carriage	1,00,000			
To General Expenses	32,000			
To P & L A/c	1,76,000			
	<u>80,50,000</u>			<u>80,50,000</u>

<i>Dr.</i>		<i>Contractee's Account</i>		<i>Cr.</i>
	Rs.			Rs.
2000		2000		
To Balance c/d	14,40,000	By Bank a/c (80% of 18,00,000)		14,40,000
2001		2001		
To Balance c/d	48,00,000	By Balance b/d		14,40,000
		By Bank a/c (80% of 42,00,000)		33,60,000
	<u>48,00,000</u>			<u>48,00,000</u>
2002		2002		
To Contract A/c	80,00,000	By Balance b/d		48,00,000
		By Bank a/c		32,00,000
	<u>80,00,000</u>			<u>80,00,000</u>

*Balance Sheet (Assets side only) As on 31st December*

	Rs.	Rs.
<b>2000</b>		
Work-in-progress :		
Value of work certified	18,00,000	
Cost of work done but not certified	<u>20,000</u>	
	18,20,000	
– Amount received from Contractee	<u>14,40,000</u>	3,80,000
Plant at site		<u>1,50,000</u>
<b>2001</b>		
Work-in-Progress :		
Value of work certified	60,00,000	
Cost of work done but not certified	<u>1,00,000</u>	
	61,00,000	
– Reserve	<u>6,58,000</u>	
	54,42,000	
– Amount received from the contractee	<u>48,00,000</u>	6,42,000
Plant at site		<u>1,00,000</u>
<b>2002</b>		
Work-in-Progress	Nil	
Value of plant (1,00,000–50,000)		50,000

11) The following is the cost data extracted from the books of a firm of Contractors for the year ending on the 31st of December, 2002 relating to contracts 'PRIYA' and 'SUPRIYA', which were commenced on the 1st January and the 1st of July, 2002 respectively.

	PRIYA Rs.	SUPRIYA Rs.
Contract Price	6,00,000	1,00,000
Materials	1,60,000	30,000
Wages	3,20,000	34,000
Sundry Expenses	60,000	6,000
Plant installed at site commencement	20,000	12,000
Materials on hand	10,000	4,000
Outstanding expenses :		
Wages	6,200	2,100
Sundry expenses	4,000	3,400
Cash received from the contractee (being 80% of the value of work certified)	3,60,000	64,000
Cost of work done but not certified ...	50,000	10,000

Plant at site is charged out at cost and depreciation is to be taken into account at 3% per month. Draw out a statement in Columnar form to show the estimated profit or loss in respect of each contract as on the 31st of December, 2002.

### Solution

Statement showing the Estimated Profit / Loss on PRIYA and SUPRIYA Contracts for the year ending on the 31st December, 2002

	Contract PRIYA	Contract SUPRIYA
	Rs.	Rs.
Materials	1,60,000	30,000
Wages	3,20,000	34,000
Sundry Expenses	60,000	6,000
Depreciation on plant	7,200	2,160
Outstanding wages	6,200	2,100
Outstanding sundry expenses	4,000	3,400
	<u>5,57,400</u>	<u>77,600</u>
Less materials on hand	10,000	4,000
Total amount spent for the contracts..	<u>5,47,400</u>	<u>73,660</u>
Work certified	4,50,000	80,000
Work uncertified	50,000	10,000
	<u>5,00,000</u>	<u>90,000</u>
Cost of the contract work completed.	<u>5,47,400</u>	<u>73,660</u>
Profit and Loss	<u>-47,400</u>	<u>16,340</u>

$$\text{Work certified (PRIYA)} = 3,60,000 \times \frac{100}{80} = \text{Rs. } 4,50,000$$

$$\text{Work certified (SUPRIYA)} = 64,000 \times \frac{100}{80} = \text{Rs. } 80,000$$

12) A firm of Engineers undertook a contract for Rs. 8,00,000 on the 1st of January, 2001. The following expenses were incurred upto the 31st of December, 2001.

Materials issued from stores Rs. 70,000; Materials charged direct Rs. 10,000; Direct charges Rs. 4,000; Wages Rs. 40,000. The amount of Work Certified was Rs. 1,60,000 of which the firm received 75% in cash.

The transaction for the year 1986 were as follows : Materials issued from the stores Rs. 1,80,000, wages Rs. 80,000. direct charges Rs. 8,000. The cost of special plant and machinery issued on the 1st of January 2002 for the contract was Rs. 1,60,000. Further work certified during the year amounted to Rs. 4,40,000, 75% of which was received. Work done but not certified as on 31-12-2002 was valued at Rs. 30,000. Special plant is to be depreciated at 25% on the original cost. Materials on site were valued at Rs. 20,000.

The contract was completed on the 30th of April, 2003 upto which date the following further expenses were incurred; materials issued from stores Rs. 80,000; Materials charged direct Rs. 14,000; Wages Rs. 30,000; direct charges Rs. 2,700.

The general overhead each year is to be taken at 5% of the amount of materials consumed and wages paid during the year. On the 30th of April, 2003 the plant was valued at Rs. 1,00,000. The materials at site were sold for Rs. 14,000 and those returned to stores amounted to Rs. 26,000.

Prepare Contract account and Contractee's Account, indicating the results of transactions. It may be assumed that the balance due from the Contractee was duly received.

### Solution

Dr.	Contract Account		Cr.
	Rs.		Rs.
2001 To Materials from stores	70,000	By Balance c/d (work-in-progress)	1,30,000
To Materials charged directly	10,000		
To General overheads	6,000		
To Direct charges	4,000		
To Wages	40,000		
	<u>1,30,000</u>		<u>1,30,000</u>

As only a small portion of contract was completed, no profit has been taken to P&L A/c. for in 2001.

	Rs.		Rs.
2002 To Balance b/d	1,30,000	By Work certified :	
To Materials from stores	1,80,000	Rs. 1,60,000 + 4,40,000	6,00,000
To Direct charges	8,000	By Work uncertified	
To Wages	80,000	By Special plant at site	
To General overheads	12,000	Rs. 1,60,000 - 40,000	1,20,000
To Special plant	1,60,000	By Materials at site	20,000
To Balance c/d	2,00,000		
	<u>7,70,000</u>		<u>7,70,000</u>
To Profit & Loss a/c	1,00,000	By Balance b/d	2,00,000
To balance c/d	1,00,000		
	<u>2,00,000</u>		<u>2,00,000</u>
2003 To Work-in-progress	6,30,000	By Balance b/d	1,00,000
To Material at site	20,000	By Contractee's a/c (contract price)	8,00,000
To Plant at site	1,20,000	By Materials at site sold	14,000
To Materials from stores	80,000	By Materials returned	26,000
To Materials direct	14,000	By Plant at site (closing balance)	1,00,000
To Wages	30,000		
To Direct charges	2,700		

To General overheads            5,200  
 To Profit & Loss a/c            1,38,100

10,40,000

10,40,000

<i>Dr.</i>	<i>Contractee's Account</i>		<i>Cr.</i>
	Rs.		Rs.
2001 To Balance c/d	1,20,000	2001 By Cash	1,20,000
2002 To Balance c/d	4,50,000	2002 By Balance b/d	1,20,000
		By Cash	3,30,000
	<u>4,50,000</u>		<u>4,50,000</u>
2003 To Contractee's a/c	8,00,000	2003 By Balance b/d	4,50,000
		By Cash	3,50,000
	<u>8,00,000</u>		<u>8,00,000</u>

13) M/s. Efficient Engineers Co., Ltd., undertook a contract and incurred the following expenses thereon during the year ending on 31-12-2002.

	Rs.		Rs.
Stores issued	1,08,000	Loose tools	24,000
Materials purchased	52,000	Wages paid	72,000
Special plant	1,00,000	Sundry expenses	4,000

The contract agreement was signed for Rs. 4,00,000 on the 1st January, 2002 on which date the work commenced. Loose tools worth Rs. 12,000 were found unsuitable and were sold at a profit of 25%. The balance of the Loose tools was value at Rs. 9,000 and depreciation is to be calculated on plant at 7 1/2% per annum. Excess materials worth Rs. 9,000 was sold at a profit of Rs. 2,500. Work certified amounted to Rs. 3,66,000 and work completed but not certified was valued at Rs. 6,000 only.

The contractors instructed the cost accountant that the profit to be taken credit for during the year should be adjusted to the proportion, which work uncertified bears to the contract price after taking into consideration the following expected expenditure needed to complete the contract:

- i) that materials in addition to that already consumed would amount to Rs. 28,000.
- ii) Wages for completion of the contract would amount to Rs. 16,000
- iii) Running expenses including repairs to the plant would cost Rs. 3,200.
- iv) Plant at the completion of the contract shall be worth Rs. 90,000 only.

The contract is expected to be completed by the 31st of March, 2003. Prepare contract account for the year ending on 31-12-2002 and show your calculation of the amount to be credited to the profit and loss account for that year.

### Solution

Dr.	<i>Contract Account for the year ending on 31-12-2002</i>		Cr.
	Rs.		Rs.
To Stores issued	1,08,000	By Loose tools sold (cost)	12,000
To Materials purchased	52,000	By Loose tools on 31-12-2002)	9,000
To Special plant	1,00,000	By Special plant (31-12-2002)	
To Loose tools	24,000	(Rs. 1,00,000 – 7,500).	92,500
To Wages paid	72,000	By Excess materials sold (cost)	9,000
To Sundry expenses	4,000	Work certified	3,66,000
To Balance being profit c/d	1,34,500	By Work uncertified	6,000
	<u>4,94,500</u>		<u>4,94,500</u>
To P & L a/c	1,03,212	By Balance b/d	1,34,500
To Balance c/d	31,288		
	<u>1,34,500</u>		<u>1,34,500</u>

The Profit transferred to Profit and Loss account is arrived at as follows :	Rs.
Net expenditure incurred for the contract upto the 31st December, 2002	2,37,500
Add estimated expenses for the remaining part of the Contract :	
Materials	Rs. 28,000
Wages	Rs. 16,000
Running expenses	Rs. 3,200
Depreciation on Plant	Rs. 2,500
	49,700
Total estimated expenditure for Contract	2,87,200
Total contract price	4,00,000
Total estimated profit :	1,12,800

$$\text{Profit transferred to P \& L A/c} = 1,12,800 \times \frac{3,66,000}{4,00,000} = \text{Rs. } 1,03,212.$$

Note : Profit on the sale of Loose tools and Excess materials is taken to Profit and Loss Account and is not connected with the Contract Account.

#### 4. PROCESS COSTING

##### Problem No. 1

The product of M/s. Chaitanya Company Ltd., passes through three distinct process. The finished material of each process is passed on to the next process, when completed. From the following particulars, prepare process cost accounts to show the cost of each of three processes for the month of March, 2002.

	Process A	Process B	Process C
	Rs.	Rs.	Rs.
Material consumed	15,00,000	5,00,000	2,00,000
Wages	8,00,000	20,00,000	6,00,000
Direct expenses	2,60,000	7,20,000	2,50,000

The indirect expenses amounted to Rs. 6,50,000 and may be apportioned on the basis of wages to Process B and C only. No account need be taken of stocks at the commencement and at the close of the month.

##### Solution

Dr.	<i>Process A Account</i>		Cr.
	Rs.		Rs.
To Materials consumed	15,00,000	By Transfer to Process B	25,60,000
To Wages	8,00,000		
To Direct expenses	2,60,000		
	<u>25,60,000</u>		<u>25,60,000</u>
Dr.	<i>Process B Account</i>		Cr.
	Rs.		Rs.
To Transfer from Process A	25,60,000	By Transfer to Process C	62,80,000
To Materials consumed	5,00,000		
To Wages	20,00,000		
To Direct expenses	7,20,000		
To Indirect expenses	5,00,000		
	<u>62,80,000</u>		<u>62,80,000</u>
Dr.	<i>Process C Account</i>		Cr.
	Rs.		Rs.
To Transfer from process B	62,80,000	By Finished Stock account	74,80,000
To Materials consumed	2,00,000		
To Wages	6,00,000		
To Direct expenses	2,50,000		
To Indirect expenses	1,50,000		
	<u>74,80,000</u>		<u>74,80,000</u>

2) From the following figures prepare accounts to show the cost of each of the three processes of manufacture. The production of each process is passed on to the next process immediately on completion.

	Process X	Process Y	Process Z
	Rs.	Rs.	Rs.
Materials & Wages	60,800	24,000	58,500
Works overhead	11,200	10,500	12,000
Production in units	72,000	75,000	96,000
Opening stock (1-7-2002) in units	--	8,000	33,000
Closing stock (31-7-2002) in units	--	2,000	11,000
Wastage in units	--	3,000	1,000

Opening and closing stocks constitute raw materials. As such, they are to be valued at the same rate at which output from the preceding process is obtained.

**Solution**

<i>Process X Account</i>				
Dr.	Units	Amount		Cr.
		Rs.		Units
				Amount
				Rs.
To Materials & Wages	--	60,800	By Transfer to Process Y	72,000
To Work overheads	--	11,200	(@ Re. 1 pe unit)	72,000
		<u>72,000</u>		<u>72,000</u>

<i>Process Y Account</i>				
Dr.	Units	Amount		Cr.
		Rs.		Units
				Amount
				Rs.
To Transfer from process X a/c	72,000	72,000	By Closing stock	
To Opening stock	8,000	8,000	(@ Re. 1 per unit)	2,000
To Material & Wages	--	24,000	By Transfer to Process Z a/c	
To Works overheads	--	10,500	(@ 1-50 per unit)	75,000
			By Wastage	3,000
		<u>80,000</u>		<u>80,000</u>
		<u>1,14,500</u>		<u>1,14,500</u>

<i>Process Z Account</i>				
Dr.	Units	Amount		Cr.
		Rs.		Units
				Amount
				Rs.
To Transfer from from Proce Y a/c	75,000	1,12,500	By Closing stock	
To Opening stock			(@ Rs. 1-50 per uit)	11,000
(@ Rs. 1.50 per unit)	33,000	49,500	By Transfer to stock a/c	
To Materials & Wages	--	58,500	(@ Rs. 2.-25 per unit)	96,000
To Works overheads	--	12,000	By Wastage	1,000
		<u>1,08,000</u>		<u>1,08,000</u>
		<u>2,32,500</u>		<u>2,32,500</u>

3) The finished product of M/s. Sojanya Company Ltd., passes through three distinct processes : Spandana, Chandana and Vandana. During the Calendar year 2002, 3000 units of finished product were produced. The costing records of the company furnishes the following information:

	Spandana	Chandana	Vandana
	Rs.	Rs.	Rs.
Direct material	80,000	40,000	30,000
Direct wages	60,000	50,000	40,000
Direct expenses	13,000	6,400	10,000
Cost of Cans	--	30,600	--
Cost of Packing	--	--	9,000

The indirect expenses of the period were Rs. 30,000. These are to be distributed to the Processes on the basis of Wages. The scrap obtained in each process is sold for Rs. 6,000; Rs. 8,000 Rs. 10,000 respectively. Prepare the Process accounts of the three processes, showing the cost of each process and the finished product.

**Solution :**

Output : 3,000 units

*M/s. Sojanya Company Ltd.*

Dr.		Spandana Process Account		Cr.	
	Rs.			Rs.	
To Direct Material	80,000	By Sale of Scrap		6,000	
To Direct Wages	60,000	By Chandana Process a/c			
To Direct Expenses	13,000	@ Rs. 53 per unit		1,59,000	
To Indirect Expenses (@ 6/15 of total)	12,000				
	<u>1,65,000</u>			<u>1,65,000</u>	

Dr.		CHANDANA PROCESS ACCOUNT		Cr.	
	Rs.			Rs.	
To Spandana Process a/c	1,59,000	By Sale of Scrap		8,000	
To Direct Material	40,000	By Vandana Process a/c			
To Direct Expenses	50,000	@ Rs. 96 per unit		2,88,000	
To Indirect Wages (@ 5/15 of Total)	10,000				
To Cost of Cans	30,600				
	<u>2,96,000</u>			<u>2,96,000</u>	

Dr.		VANDANA PROCESS ACCOUNT		Cr.	
	Rs.			Rs.	
To Chandana Process a/c	2,88,000	By Sale of Scrap		10,000	
To Direct Material	30,000	By Finished Stock a/c		3,75,000	
To Direct Wages	40,000	@ Rs. 125 per unit			
To Direct Expenses	10,000				
To Indirect Expenses	8,000				

(@ 4/15 of total)  
 To Packing Expenses 9,000

3,85,000

3,85,000

4) The final product of M/s. Ujawala Co. Ltd., passes through three distinct process : "Utpala", Unmila and "Utteja". The output of each process is passed on as input to the next process and the output of Utteja to the Finished stock. From the following particulars, prepare the three process accounts showing the cost of each of the three processes for the month of March, 2002;

Particulars	Utpala Process Rs.	Urmila Process Rs.	Utteja Process Rs.
Material consumed	1,50,000	50,000	20,000
Wages	80,000	2,00,000	60,000
Direct expenses	26,000	72,000	25,000

The indirect expenses amounted to Rs. 85,000 and they are to be apportioned on the basis of Wages. There are no stocks either at the beginning or at the end of the month.

Dr.	Utpala Process Account		Cr.
	Rs.		Rs.
To Material consumed	1,50,000	By Transfer to Urmila	
To Wages	80,000	Process a/c	2,76,000
To Direct expenses	26,000		
To Indirect expenses	20,000		
	$(85,000 \times \frac{4}{17})$		
	<u>2,76,000</u>		<u>2,76,000</u>

Dr.	Urmila Process Account		Cr.
	Rs.		Rs.
To Transfer from Utpala / Process	2,76,000	By Transfer to Utteja	
To Material consumed	50,000	Process a/c	6,48,000
To Wages	2,00,000		
To Direct expenses	72,000		
To Indirect expenses			
	$(85,000 \times \frac{10}{17})$	50,000	
	<u>6,48,000</u>		<u>6,48,000</u>



*Chitha Process Account*

	Tonnes	Rs.		Tonnes	Rs.
To Transfer from					
Hastha Process	13,200	28,38,000	By Loss of weight	385	--
			2% of 14,250		
To Material cons.	1,050	3,15,000	By Sale of scrap		
@ Rs. 300 per ton			(1425 x 240)	1,425	3,42,000
To Direct wages		2,40,000	By Swathi Stock	12,540	31,35,000
To Manufacturing expenses		84,000	@ Rs. 250 per ton		
	<u>14,250</u>	<u>34,77,000</u>		<u>14,250</u>	<u>34,77,000</u>

6) The final product SANGAM of M/s. Triveni Co., Ltd., passes through there distinct processes namely : Ganga, Yamuna and Saraswathi of the material introduced in each process, there will be normal wastage in each process to the extent of 3% in Ganga; 5% in Yamuna; and 8% in Saraswathi process.

The wastage so obtained in each process is being sold at different rates : @ 50 paise per unit in Ganga, Re. 1 per unit in Yamuna; and Rs. 2 per unit in Saraswathi.

50,000 units of material was introduced in Ganga Process @ Rs. 2 per unit. The other expenses were as follows :

	Ganga Rs.	Yamuna Rs.	Saraswathi Rs.
Other materials	15,000	37,500	27,500
Direct Wages	26,000	42,060	35,255
Direct expenses	5,250	5,940	10,045
Actual output in each Process (in Units) :	47,500	45,500	40,500

Prepare Process accounts of Ganga, Yamuna and Saraswathi, assuming that there were no opening of closing stocks.

**Solution**

<i>In the Ledger of M/s. Triveni Co., Ltd.,</i>					
<i>Ganga Process Account</i>					
Dr.					Cr.
	Units	Amount Rs.		Units	Amount Rs.
To Materials	50,000	1,00,000	By Normal Wastage	1,500	750
To Other Material		15,000	By (3% @ 50 paise		
To Direct Wages		26,000	per unit)		
To Direct Expenses		5,250	By Ab. Wastage @	1,000	3,000
			Rs. 3 per unit		
			By Yamuna Process		
			@ Rs. 3 per unit	47,500	1,42,500
	<u>50,000</u>	<u>1,46,250</u>		<u>50,000</u>	<u>1,46,250</u>

Dr.		Yamuna Process Account		Cr.	
	Units	Amount Rs.		Units	Amount Rs.
To Ganga Process a/c	47,500	1,42,500	By Normal Wastage	2,375	2,375
To Other Material		37,500	5 % @ Re. 1 p.u.		
To Direct Wages		42,060	By Saraswathi Pro.		
To Direct Expenses		5,940	@ Rs. 5 per unit	45,500	2,27,500
To Abnormal Gain	375	1,875			
	<u>47,875</u>	<u>2,29,875</u>		<u>47,875</u>	<u>2,29,875</u>

Dr.		Saraswathi Process Account		Cr.	
	Units	Rs.		Units	Rs.
To Yamuna Process a/c	45,500	2,27,500	By Normal Wastage	3,640	7,280
@ Rs. 5 p.u.			@ Rs. 2 p.u.		
To Other Material		27,500	By Ab. Wastage		
To Direct Wages		35,255	@ Rs. 7 p.u.	1,360	9,520
To Direct Expenses		10,045	By Sangam Stock a/c		
			@ Rs. 7 p.u.	40,500	2,83,500
	<u>45,500</u>	<u>3,00,300</u>		<u>45,500</u>	<u>3,00,300</u>

Calculation of Abnormal Wastage and Abnormal Gain :

$$\text{Ganga Process : } \frac{\text{Normal Cost}}{\text{Normal output}} \times \text{Ab. Wastage units} = \frac{1,45,500}{48,500} \times 1,000 = \text{Rs. 3,000}$$

$$\text{Yamuna Process } \frac{\text{Normal Cost}}{\text{Normal output}} \times \text{Ab Gain units} = \frac{2,25,625}{45,125} \times 375 = \text{Rs. 1,875}$$

Abnormal Wastage in Saraswathi Process is calculated as it was calculated in the Ganga Process.

7) Hindupur Fertilisers Ltd. manufactures and sells fertilisers in three processes. Particulars relating to costs and production during the month of January 2002 are given below :

	Process A	Process B	Process C
Raw materials used (Tonnes)	200	71	164
Cost per tonne	Rs. 100	300	50
Direct Wages	Rs. 8,000	3,490	2,850
Overheads	Rs. 2,520	2,400	3,820
Finished Product :			
Sent to warehouse for sale	25%	50%	100%
Sent to next process	75%	50%	--
Sale of scrap per tonne	80	60	120

In each process 6% of total weight is lost and 8% is scrap. All fertilisers are sold at a profit of 25% on cost but transfers to next process are made at cost. You are required to prepare Process cost account for each process for January 2002 and determine the selling prices.

**Solution**

Dr.		<i>Process A Account</i>		Cr.	
	Units	Rs.		Units	Rs.
To Raw materials	200	20,000	By Scrap 8%		
To Direct wages	--	8,000	(@ Rs. 80 per tonne)	16	1,280
To Overheads	--	2,520	By Normal wastage 6%	12	--
			By Transfer to warehouse 25%		
			(@ Rs. 170 per tonne)	43	7,310
			By Transfer to process B		
			(@ Rs. 170 per tonne)	129	21,930
	<u>200</u>	<u>30,520</u>		<u>200</u>	<u>30,520</u>

$$\text{Cost of output sent to warehouse} = \frac{30520 - 1280}{172} \times 43 = \text{Rs. } 7,310$$

Dr.		<i>Process B Account</i>		Cr.	
	Units	Rs.		Units	Rs.
To Transfer from Process A a/c.	129	21,930	By Normal wastage 6%	12	--
To Raw materials used (@ Rs. 300 per tonne)	71	21,300	By Scrap sold 8%	16	960
To Direct wages	--	3,490	(@ Rs. 60 per unit)		
To Overheads	--	2,400	By Transfer to warehouse 50%		
			(@ Rs. 280 per tonne)	86	24,080
			By Transfer to Process C		
			(@ Rs. 280 per tonne)	86	24,080
	<u>200</u>	<u>49,120</u>		<u>200</u>	<u>49,120</u>

$$\text{Cost of output sent to warehouse for sale} = \frac{49120 - 960}{172} \times 86 = \text{Rs. } 24,080.$$

Dr.		<i>Process C Account</i>		Cr.	
	Units	Rs.		Units	Rs.
To Transfer from Process B a/c.	86	24,080	By Normal wastage 6%	15	--
To Raw materials used (@ Rs. 50 per tonne)	164	8,200	By Sale of scrap 8%	20	2,400
To Direct wages	--	2,850	(@ Rs. 120 per tonne)		
To Overheads	--	3,820	By Finished Stock a/c.		
			(@ Rs. 170 per tonne)	215	36,550
			(warehouse for sale)		
	<u>250</u>	<u>38,950</u>		<u>250</u>	<u>38,950</u>

Selling Price of 25% of output of Process A sent to warehouse for sale =

Cost + Profit at 25% on cost =  $170 + 42.50 = \text{Rs. } 212.50$  per tonne.

Selling Price of 50% of output of Process B sent to warehouse for sale =

Cost + Profit at 25% on cost =  $280 + 70 = \text{Rs. } 350$  per tonne.

Selling price of 100% of output of Process C sent to warehouse for sale =

Cost + Profit at 25% on cost =  $170 + 42.50 = \text{Rs. } 212.50$  per tonne.

8) M/s. Kalyan Oil Co. Ltd. is a manufacturing concern, the main product of which passes through three processes, viz., Crushing, Refining and Finishing. The following particulars were extracted from the books for the month ending on the 31st of March, 2003.

Kernels consumed	1000 tonnes	Rs. 4,50,000		
		Crusing Process Rs.	Refining Process Rs.	Finishing Process Rs.
Wages	.....	16,000	11,800	11,750
Power and steam	.....	2,400	2,000	3,000
Repairs and stores	.....	1,800	1,500	1,200
Sundry Work expenses	.....	400	500	700
Office and establishment charges	.....	Rs. 6,900		
Sundry materials for refining	.....	Rs. 3,800		
Barrels for storing finished oil ...	.....	Rs. 42,050		

Cake sales 400 tonnes for Rs.30,000; Crude oil obtained 550 tonnes; Sundry bags sold Rs. 1,800; Residual oil and fats sold for Rs. 1,800 (40 tonnes); Refined oil 500 tonnes; Finished oil stored in barrels 480 tonnes and 20 tonnes sundry sales realised Rs. 2,200. Establishment charges are to be apportioned in Rs. 2,600 Rs. 2,800, and Rs. 1,500 to the three processes in order. You are required to prepare the accounts of the three process viz, Crusing, Refining and Finishing for the month of March, 2003.

### Solution

Crushing Process Account					
Dr.			Cr.		
	Unit	Amount Rs.		Unit	Amount Rs.
To Kernels used	1,000	4,50,000	By Sale of cake	400	30,000
To Wages		16,000	By Normal wastage	50	--
To Power & Steam		2,400	By sale of bags	--	1,800
To Repairs and stores		1,800	By Crude oil transferred		
To Works expenses		400	to Refining Process a/c	550	4,41,400
To Office & establishment expenses		2,600	(@ Rs. 802.55 per tonne)		
	<u>1,000</u>	<u>4,73,200</u>		<u>1,000</u>	<u>4,73,200</u>

Dr.		<i>Refining Process Account</i>		Cr.	
	Units	Amount Rs.		Units	Amount Rs.
To Crude oil from crushing process	550	4,41,400	By Normal wastage	10	--
To Wages		11,800	By Sale of residual oil & fats	42	1,800
To Repairs & Stores		1,500	By Refined oil transferred to Finishing Process	500	4,62,000
To Power & Steam		2,000	@ Rs. 924 per tonne		
To Works expenses		500			
To Sundry materials		3,800			
To Office & Establishment expenses		2,800			
	<u>550</u>	<u>4,63,800</u>		<u>550</u>	<u>4,63,800</u>

Dr.		<i>Finishing Process Account</i>		Cr.	
	Units	Amount Rs.		Units	Amount Rs.
To Refined oil from Refining process	500	4,62,000	By Sale of sundries	20	2,200
To Wages		11,750	By Finished stock sent to warehouse	480	5,20,000
To Power & Steam		3,000	(@ Rs. 1,083.33 per tonne)		
To Repairs & Stores		1,200			
To Works expenses		700			
To Barrels purchased		42,050			
To Office & establishment expenses		1,500			
	<u>500</u>	<u>5,22,200</u>		<u>500</u>	<u>5,22,200</u>

9) The product of a Company passes through three distinct processes to completion. From past experience it is ascertained that wastage computed on the number of units incurred in each process is as follows :

Process A : 2%; Process B : 5%; Process C : 10%

The wastage of process A & B is sold at Rs. 10/- per 100 units and that of process C at Rs. 80 per 100 units. The following is the information regarding the production in March, 2003.

	Process A Rs.	Process B Rs.	Process C Rs.
Materials	12,000	8,000	4,000
Direct labour	16,000	12,000	6,000
Machine expenses	2,000	2,000	3,000
262 Other factory expenses	3,500	3,800	4,200

20,000 units have been issued to Process A at a cost of Rs. 2,00,000.

The output of each process has been as follows :

Process A 19,500 units; Process B 18,800 units and Process C 16,000 units. There was no stock or work-in-process in any process in the beginning and at the end of March. Prepare Process Cost Accounts.

**Solution**

Dr.		<i>Process A Account</i>		Cr.	
	Units	Amount Rs.		Units	Amount Rs.
To Raw material	20,000	20,000	By Normal wastage 2%		
To Other materials		12,000	(@ Rs. 10 per 100)	400	40
To Direct labour		16,000	By Abnormal Wastage		
To Machine expenses		2,000	(@ Rs. 2.73 per unit)	100	273
To Other factory expenses		3,500	By Transfer to Process B		
			(@ Rs. 2.73 per unit)	19,500	53,187
	<u>20,000</u>	<u>53,500</u>		<u>20,000</u>	<u>53,500</u>

Dr.		<i>Process B Account</i>		Cr.	
	Unit	Amount Rs.		Unit	Amount Rs.
To Transfer from Process A	19,500	53,187	By Normal wastage 5%	975	97.50
To Materials		8,000	(@ Rs. 10 per 100)		
To Machine expenses		2,000	By Transfer to Process C		
To Direct Labour		12,000	(@ Rs. 4.26 per unit)	18,800	80,060.50
To Other Factory exp.		3,800			
To Abnormal effectiveness	275	1,117.1			
(@ Rs. 4.26 per unit)					
	<u>19,775</u>	<u>80,158</u>		<u>19,775</u>	<u>80,158.00</u>

Dr.		<i>Process C Account</i>		Cr.	
	Units	Amount Rs.		Units	Amount Rs.
To Transfer from Process B	18,800	80,060.50	By Normal Wastage 10%	880	1,504.00
To Materials		4,000.00	(@ Rs. 80 per 100)		
To Direct labour		6,000.00	By Abnormal wastage		
To Machine expenses		3,000.00	(@ Rs. 5.66 per unit)	920	5,207.00
To Other factory expenses		4,200.00	By Finished stock a/c		
			(@ Rs. 5.66 per unit)	16,000	90,549.50
	<u>18,800</u>	<u>97,260.50</u>		<u>18,000</u>	<u>97,260.50</u>

Value of abnormal wastage = Cost of Normal output divided by quantity of Normal output multiplied by abnormal wastage (quantity).

Value of abnormal wastage in Process A =  $53,460 \div 19,600 \times 100 = 273$

Value of abnormal wastage in Process C =  $95,760.50 \div 16,920 \times 920 = \text{Rs. } 5,207$

Value of abnormal effectiveness = Cost of Normal output divided by Normal output multiplied by Quantity of abnormal effectiveness

=  $78,889.50 \div 18,525 \times 275 = \text{Rs. } 1,171$  (approx.)

10) A product passes through three distinct processes A, B and C. The normal wastage of each process is as follows :

Process A 3%; Process B 5%; Process C 8%

Wastage of Process A was sold at 25 paise per unit, that of Process B at 50 paise per unit and that of Process C at Re. 1/- per unit. 10,000 units were issued to Process A at the beginning of October, 1990 at a cost of Re. 1/- per unit. The other expenses were as follows :

	Process A	Process B	Process C
	Rs.	Rs.	Rs.
Sundry Materials	1,000	1,500	500
Labour	5,000	8,000	6,500
Direct expenses	1,050	1,188	2,009

Actual output was :

Process A 9,500 units; Process B 9,100 units and Process C 8,100 units.

Prepare the Process Accounts assuming that there were no opening or closing stocks. Also, give the abnormal wastage and abnormal effectiveness accounts.

### Solution

Dr.	Process A Account				Cr.	
	Units	Amount Rs.		Units	Amount Rs.	
To Raw material	10,000	10,000	By Normal wastage			
To Sundry materials		1,000	3% of 10,000	300	75	
To Labour		5,000	By Abnormal wastage	200	350	
To Direct expenses		1,050	By Transfer to Process B a/c (@ Rs. 1.75 per unit)	9,500	16,625	
	<u>10,000</u>	<u>17,050</u>		<u>10,000</u>	<u>17,050</u>	

Value of abnormal wastage =  $\frac{16,975}{9,700} \times 200 = \text{Rs. } 350$

Dr.	Process B Account				Cr.	
	Unit	Amount Rs.		Unit	Amount Rs.	
To Transfer from Process A	9,500	16,625	By Normal wastage			
To Sundry materials		1,500	(5% of 9,500)	475	238	

To Labour	8,000	By Transfer to Process C a/c.		
To Abnormal effectiveness 85	225	(@ Rs. 3 per unit)	9,100	27,300
	<u>9,575</u>		<u>9,575</u>	<u>27,538</u>

$$\text{Abnormal effectiveness} = \frac{27075}{9025} \times 75 = \text{Rs. } 225$$

Dr.		Process C Account		Cr.	
	Unit	Amount Rs.		Unit	Amount Rs.
To Transfer from process B	9,100	27,300	By Normal wastage		
To Sundry materials		500	8% of 9,100 units	728	728
To Labour		6,500	By Abnormal wastage	272	1,156
To Direct expenses		2,009	@ Rs. 4.25 per unit	8,100	34,425
	<u>9,100</u>	<u>36,309</u>		<u>9,100</u>	<u>36,309</u>

$$\text{Abnormal wastage} = \frac{25581}{8372} \times 272 = \text{Rs. } 1,156$$

11) The Jubilant Star Co. Ltd. is engaged in the production of a chemical X and in the process of manufacture, a by-product Y is produced, which after a separate process has a commercial value. For the month of March 2003 the following are the costing data available :

	Joint expenses Rs.	Separate expenses	
		X Rs.	Y Rs.
Materials	96,000	36,800	900
Labour	58,500	38,400	13,750
Overheads	17,250	7,500	2,450
	<u>1,71,750</u>	<u>82,700</u>	<u>17,100</u>

The output for the month of March was 142 tonnes of X and 49 tonnes of Y. The selling price of Y was Rs. 1,400 per tonne. Assuming that the profit on Y is estimated at 25% on selling price, prepare the accounts to show the cost per tonne of X and Y.

**Solution**

	Rs.	
Selling price of Y per tonne	1,400	
Less Profit included therein 15% of the selling price	350	
Total cost of Y per tonne :	<u>1,050</u>	
Total cost of 49 tonnes of Y = 1,050 x 49 =		51,450
Less value of separate expenses incurred for Y =		17,100
∴ Share of Y in the joint expenses =		<u>34,350</u>

Dr.		<i>X (Main Product) Account</i>		Cr.	
		Amount		Amount	
		Rs.		Rs.	
To Materials :			By Product Y a/c.		
Joint	96,000		Joint expenses transferred	34,350	
Separate	<u>36,800</u>		By Cost of X (142 tonnes)		
		1,32,800	(@ Rs. 1550 per tonne)	2,20,100	
To Labour :					
Joint	58,500				
Separate	<u>38,400</u>				
		96,000			
To Overheads :					
Joint	17,250				
Separate	<u>7,500</u>				
		24,750			
		<u>2,54,450</u>		<u>2,54,450</u>	

Dr.		<i>Y (By-Product) Account</i>		Cr.	
		Amount		Amount	
		Rs.		Rs.	
To X a/c.	34,350	By Cost of Y (49 tonnes)			
To Materials	900	(@ Rs. 1,050 per tonne)	51,450		
To Labour	13,750				
To Overheads	<u>2,450</u>				
		<u>51,450</u>		<u>51,450</u>	

12) The product of a Company passes through two processes called Preliminary and Final respectively. From the past experience the percentage of loss, which computed on the number of units entering the process concerned is as follows :

Preliminary process 2%; Final Process 5%.

The loss of each process possesses a scrap value. The loss of Preliminary process is sold at Rs. 20 per 100 units and that of final process at Rs. 30/- per 100 units. The following information is available for the year ending on 31-12-2002.

40,000 units of crude materials were introduced in the preliminary process at a cost of Rs. 32,000.

	Preliminary Process	Final Process
	Rs.	Rs.
Materials consumed	16,000	5,600
Direct Labour	24,400	28,000

Manufacturing expenses	.....	6,160	1,000
	.....	units	units
Final products	.....	39,000	38,000
Stock:			
January 1st	.....	4,000	6,000
December 31st	.....	3,000	8,000
Stock valuation on Jan. 1st (per unit)	.....	Rs. 2	Rs. 3

Stock on December 31st is to be value at the cost known by the year's Process accounts.  
Prepare the necessary accounts.

### Solution

Dr. Preliminary Product Account						Cr.	
	Units	Amount		Units	Amount		
		Rs.				Rs.	
To Inputs	40,000	32,000	By Normal Loss	800	160		
To Materials		16,000	By Abnormal loss	200	400		
To Labour		24,400	By Stock account :	39,000	78,00		
To Expenses		6,160					
	<u>40,000</u>	<u>78,560</u>		<u>40,000</u>	<u>78,560</u>		

$$\text{Abnormal Loss} = \frac{78,400}{39,200} \times 200 = \text{Rs. } 400$$

Dr. Preliminary Process Stock Account						Cr.	
	Unit	Amount		Unit	Amount		
		Rs.			Rs.		
To Balance b/d	4,000	8,000	By Balance c/d	3,000	6,000		
To Preliminary Process	39,000	78,000	By Final Process	40,000	80,000		
	<u>43,000</u>	<u>86,000</u>		<u>43,000</u>	<u>86,000</u>		

Dr. Final Process Account						Cr.	
	Units	Amount		Units	Amount		
		Rs.			Rs.		
To Preliminary Process			By Normal Loss	2,000	600		
Stock a/c	40,000	80,000	By Final Process stock a/c	38,500	1,15,500		
To Materials		5,600					
To Labour		28,000					
To Expenses		1,000					
To Abnormal Gain	500	1,500					
	<u>40,500</u>	<u>1,16,100</u>		<u>40,500</u>	<u>1,16,100</u>		

$$\text{Abnormal gain} = 1,14,000 \div 38,000 \times 1000 = \text{Rs. } 3,000$$

Dr.		<i>Final Process Stock Account</i>				Cr.	
	Units	Amount		Units	Amount		
		Rs.			Rs.		
To Balance b/d	6,000	18,000	By Balance c/d	8,000	24,000		
To Final Process a/c	38,500	1,15,500	By Cost of sales	36,500	1,09,500		
	<u>44,500</u>	<u>1,33,500</u>		<u>44,500</u>	<u>1,33,500</u>		

Dr.		<i>Final Process Stock Account</i>				Cr.	
	Units	Amount		Units	Amount		
		Rs.			Rs.		
To Balance b/d	6,000	18,000	By Balance c/d	8,000	24,000		
To Final Process a/c	38,500	1,15,500	By Cost of sales	36,500	1,09,500		
	<u>44,500</u>	<u>1,33,500</u>		<u>44,500</u>	<u>1,33,500</u>		

Dr.		<i>Normal Loss Account</i>				Cr.	
	Unit	Amount		Unit	Amount		
		Rs.			Rs.		
To Preliminary Process	800	160	By Abnormal gain	500	150		
To Final process	2,000	600	By Cash	2,300	610		
	<u>2,800</u>	<u>760</u>		<u>2,800</u>	<u>760</u>		

Dr.		<i>Abnormal Gain Account</i>				Cr.	
	Units	Amount		Units	Amount		
		Rs.			Rs.		
To Normal Los	500	150	By Final Process	500	1,500		
To Costing P & L a/c.		1,350					
	<u>500</u>	<u>1,500</u>		<u>500</u>	<u>1,500</u>		

Dr.		<i>Abnormal Loss Account</i>				Cr.	
	Units	Amount		Units	Amount		
		Rs.			Rs.		
To Preliminary process	200	400	By Cash	200	40		
			By Costing P & L a/c		360		
	<u>200</u>	<u>400</u>		<u>200</u>	<u>400</u>		

## E. OPERATING COSTING

1) Calculate the passenger Kilometres covered by a fleet of 8 taxis run by M/s. Ahlada Travels in between two towns, which are 90 Kms. apart from each other. They run four round trips each day with five passengers on an average on each vehicle during the month of March, 2003.

**Solution :** Number of Taxis : 8; Distance between the towns : 90 Km. Distance covered in one round trip :  $90 \times 2 = 180$  Kms. No. of days in the month of March : 31 days; No. of passengers travelled on an average 5

Calculation of Total Passenger Kms. = No. of Taxis X Distance X No. of trips X 2 X No. days in the months X No. of passengers travelled on an average in each taxi =

$$8 \times 90 \times 4 \times 2 \times 31 \times 5 = 8,92,800$$

No. of passenger Kms. covered by the fleet of 8 Taxis = 8,92,800 Kms.

2) Mr. Jaidka owns a fleet of taxis and the following information is available from the records maintained by him :

i) Number of taxis	10	
ii) Cost of each taxi	Rs. 20,000	p.m.
iii) Salary of manager	600	p.m.
iv) Salary of accountant	500	p.m.
v) Salary of cleaner	200	p.m.
vi) Salary of mechanic	400	p.m.
vii) Garage rent	600	p.m.
viii) Insurance premium 5% p.a		
ix) Annual Tax	600	per taxi
x) Driver's salary	200	p.m. per taxi
xi) Annual repair	1,000	per taxi

Total life of a taxi is about 2,00,000 km. A tax runs in all 3,000 km in a month of which 30% it runs empty. Petrol consumption is one litre for 10 km @ Rs. 1.80 per litre. Oil and other sundries are Rs. 5 per 100 km. Calculate the cost of running a taxi per kilometer.

**Solution**

	(Effective km 2,100)	
	Amount per month	Cost per km
	Rs.	Rs.
Fixed expenses (for the whole fleet) :		
Salary of manager	600	
Salary of accountant	500	
Salary of cleaner	200	
Salary of mechanic	400	
Garage rent	600	

Insurance premium : 5% on Rs. 2,00,000

	$\frac{10000}{12}$	833.33
Driver's salary Rs. 200 x10		2,000
Tax $\frac{600 \times 10}{12}$		500
Total fixed expenses		<u>5,633.33</u>

Effective kilometres 2,100 x 10 = 21,000

Fixed expenses per km.		0.268
Running expenses (per taxi) :		
Depreciation $\frac{20\ 000}{1\ 40\ 000}$		0.143
Repairs $\frac{1\ 000}{12 \times 2\ 100}$		0.040
Petrol $\frac{3\ 000 \times 1.80}{10 \times 2\ 100}$		0.257
Oil and other sundries $\frac{5 \times 3000}{100 \times 2\ 100}$		0.071
Cost per km.		<u>0.779</u>

3) Union Transport Company supplied the following details in respect of a truck of 5-tonne capacity :

Cost of truck	Rs. 90,000
Estimated life	10 Years
Diesel, oil, grease	Rs. 15 per trip each way
Repairs, and maintenance	500 per month
Drivers' wages	500 per month
Cleaner's wage	250 per month
Insurance	4,800 per year
Tax	2,400 per year
General supervision charges	4,800 per year

The truck carries goods to and from the city covering a distance of 50 km each way.

On outward trip freight is available to the extent of full capacity and on return 20% of capacity.

Assuming that the truck runs on an average 25 days a month, work out :

(a) Operating cost tonne-km.

(b) Rate per tonne per trip that the company should charge if a profit of 50% on freight is to be earned.

**Solution**

	(tonne - km 7,500)	
	Cost per month	Per tonne-km
	Rs.	Rs.
<b>Fixed costs :</b>		
Driver's wages	500	
Cleaner's wages	250	
Insurance	400	
Taxes	200	
General Supervision	400	
	<u>1,750</u>	
		0.233
<b>Variable running costs</b>		
Diesel, oil grease	750	
Depreciation	750	
Repairs & Maintenance	500	
	<u>2,000</u>	
(a) Operating costs	3,750	<u>0.267</u>
(b) Freight rate :		0.500
Cost per tonne-km	Re. 0.50	
Profit per tonne-km	0.50	
	<u>1.00</u>	

Freight per trip (both ways 300 tonnes km @ Re. 1) Rs. 300

(Truck makes only one trip a day - tonne-km covered in a trip would be 7,500/25)

**Working Notes :**

\* Tonne-k.m. per month = 6 tonnes x 50 km. x 25 days = 7,500 k.m.

(5 tonnes on outward trip one tonne on return trip)

or Outwards Trip tonne k.m.  $5 \times 50 \times 25 = 6,250$

Inward Trip Tonne-k.m.  $1 \times 50 \times 25 = 1,250$

7,500

8 Assumed that trucks makes one trip a day and no scrap value at end.

\* Depreciation  $\frac{90,000}{10} = 9,000$

4) M/s. Iswarya Thermal Power Corporation provides the following information for the year ended 31st March, 2003 and requests you to prepare a Cost Sheet showing the cost of electricity generated per unit of K.W.H. During the year the Corporation has generated 20 Lakh K.W.H. Coal consumed per K.W.H during the year 5 Kg. @ Rs. 0.50 per kg; and depreciation charges at 5 percent on capital cost of Rs. 10,00,000.

	Rs.
Administrative Overheads	1,00,000
Plant supervision	1,50,000
Wages of employees	2,50,000
Repairs and maintenance	2,50,000
Spares, Stores and Lubricants	2,00,000

**Solution**

**OPERATING COST SHEET**

	Annual Exp. Rs.	Per KWH Unit
<b>I. Fixed Charges :</b>		
Plant supervision	1,50,000	
Administrative overheads	1,00,000	
Depreciation @ 5% on Rs. 10,00,000	<u>50,000</u>	
Total - I	<u>3,00,000</u>	0 - 15
<b>II. Running Cost :</b>		
Coal (5 x 0.50 x 20,00,000)	50,00,000	
Wages to employees	2,50,000	
Repairs and maintenance	2,50,000	
Spares, stores & lubricants	2,00,000	
Total - II	<u>57,00,000</u>	2 - 85
Grand total I & II	60,00,000	
<b>Cost per K.W.H. of Electricity Generated :</b>		<u>3 - 00</u>

5) M/s. Amogha Transport Company runs Four buses between two cities, which are 500 Km. apart from each other. The seating capacity of each bus is 40 passengers, and actual passengers carried were on an average 80 percent of the seating capacity. All the Four buses ran on all the days in the month of April, 2003. The company provides the following information for the same month :

	Rs.
Salaries of drivers, conductors, cleaners, etc.	1,20,000
Salaries of Office and Supervisory staff	88,000

Diesel, oil, etc.	2,00,000
Repairs and maintenance	40,000
Insurance and taxation	90,000
Interest and other charges	1,00,000
Depreciation	1,30,000

Each bus made one round trip per day. Find out the Cost per passenger Km.

**Solution**

**M/s. Amogha Transport Company**

Calculation of number of Passenger Km.  $500 \times 40 \times 2 \times \frac{80}{100} \times 4 = 1,28,000$  Passenger Kms.

**Operating Cost Statement - April, 2003**

	Rs	Rs.
<b>I. Fixed Charges :</b>		
Salaries of office & Supervisory staff	88,000	
Taxes and insurance	90,000	
Interest and other charges	<u>1,00,000</u>	2,78,000
<b>II. Maintenance Costs :</b>		
Repairs and maintenance	<u>40,000</u>	40,000
<b>III. Operating &amp; Running Cost :</b>		
Salaries of drivers, conductors etc.,	1,20,000	
Diesel and oil	2,00,000	
Depreciation	<u>1,30,000</u>	<u>4,50,000</u>
<b>Total Expenditure :</b>		<u>7,68,000</u>
Cost per Passenger KM :	$\frac{7,68,000}{1,28,000}$	= Rs. 6

- 5) A Truck costs Rs. 5,15,200. Its life estimated five years. Its scrap value after five years is estimated to be Rs. 35,200. The standing charges per year are estimated as follows : Driver and attendant salary Rs. 7,500 per month; Administrative expenses per year Rs. 42,000; Licence Rs. 18,000 and Insurance Rs. 24,000.

The running charges are as follows : Fuel costs Rs. 30 per litre; The consumption of fuel is worked out as 15 Kms. per litre. The estimated annual Kilometre running is 60,000 Km. The cost of lubricant is Rs. 6,000 per year. Cost of tyres is Rs. 12,000 and their expected life is 20,000 Km. Repairs over the life of the vehicle are estimated at Rs. 1,50,000.

Find out the total operating cost per Km.

**Solution**

**Statement showing the operating cost of Truck per Km.**

	Total Cost	Cost per Km.
	Rs.	Rs. Ps.
<b>I. Standing Charges :</b>		
Salaries of driver & Attendent :		
per annum : 7,500 x 12	90,000	1-50
Administrative expenses	42,000	0-70
Licence	18,000	0-30
Insurance	<u>24,000</u>	<u>0-40</u>
<b>Total Standing Charges :</b>	<b>1,74,000</b>	<b>2-90</b>
<b>II. Running Charges :</b>		
Fuel	1,20,000	2-00
Depreciation (5,15,200 – 35,200/5)	96,000	1-40
Tyres	36,000	0-60
Lubricants	6,000	0-10
Repairs (150,000/5)	30,000	0-50
<b>Total Operating Cost</b>	<b>4,62,000</b>	<b>7-70</b>

Total Operating cost per Km : Rs. 7-70

7) From the following information extracted from the books of M/s Geethanjali Travels, calculate the cost per Kilometer and cost per passenger Kilometer of a vehicle for the year ended 31-12-2002.

	Rs.
Cost of the vehicle	4,00,000
Road Licence fee per annum	6,000
Insurance charges per annum	2,000
Garrage rent per annum	8,000
Salaries of drivers per month	2,500
Cost of Diesel per Litre Rs. 18	
Diesel consumption @ 10 Km. per Litre	
Tyres and maintenance charges per Km. Re 1	
Estimated life of the vehicle 1,00,000 Km.	
Average run of the vehicle per annum 10, 000 Km.	
Number of the passengers travelled during the year 1,140	

**Solution :**

Operating Cost Sheet of M/s. Geethanjali Travels for the year ended 31-12-2000.

Particulars	Cost per annum 10,000 Km. run Rs.	Cost per Km.	Cost per Passenger Rs.
<b>I. Standing Charges :</b>			
Depreciation			
$\frac{4,00,000}{1,00,000} \times 10,000$	40,000	4-00	
Road Licence fee	6,000	0-60	
Insurance Charges	2,000	0-20	
Garrage rent	8,000	0-80	
Salaries of drivers per year	30,000	3-00	
	86,000	8-60	
<b>II. Running Charges :</b>			
Tyres and maintenance	10,000	1-00	
Diesel	18,000	1-80	
	1,14,000	11-40	0-01

$$\text{Operating cost per Km.} = \frac{1,14,000}{10,000} = \text{Rs. } 11-40$$

$$\text{Operating cost per Passenger Km.} = \text{Rs. } \frac{1,14,000}{10,000 \times 1,140} = 0-01. = 1 \text{ Paise.}$$

8) From the particulars given here under for the year ended 31st March, 2003, relating to M/s. Godavari Thermal Power Station prepare an Operating Cost Sheet showing the cost of electricity generated per unit of KWH.

	Rs.
Coal consumed for generating 40,00,000 KWH	4,00,000
Salaries and Wages	2,00,000
Repairs and maintenance	2,00,000
Lubricants, spares and stores	1,60,000
Plant supervision	1,20,000
Administrative overheads	80,000
Charge depreciation @ 10% on capital cost of	4,00,000

**Solution**

**M/s. Godavari Thermal Power Station**

**Operating Cost Sheet of the Power Station for the year ended 31st March, 2003**

Particulars	Total Cost Rs.	Cost per Rs.
<b>I. Standing charges :</b>		
Depreciation @ 10% on Rs. 4,00,000	40,000	
Administrative overheads	80,000	
Plant Supervision	<u>1,20,000</u>	
Total I :	2,40,000	0-06
<b>II Running Charges :</b>		
Coal consumed for generating 40,00,000 units of electricity	4,00,000	
Salaries and Wages	2,00,000	
Repairs and maintenance	2,00,000	
Lubricants, spares and stores	<u>1,60,000</u>	
Total of II :	<u>9,60,000</u>	0-24
Grand Total I & II :	<u>12,00,000</u>	<u>0-30</u>

9) M/s. Anuraga Taxi Service Syndicate has been running a fleet of 10 Taxis of Rs. 1,50,000 each. The life of each taxi is 4,00,000 Km., and its estimated scrap value is Rs. 30,000. On an average each taxi runs 4,000 Km. per month of which 20 percent it runs empty. The syndicate provides the following information :

	Rs.
Driver's salary per taxi per month	6,000
Salary of Office staff per month	15,000
Salary of garage staff per month	20,000
Garage rent per month	10,000
Road tax and repairs per taxi per annum	21,600
Insurance @ 4 percent of cost per annum	
Petrol consumption is 10 K.m. per litre costing Rs. 20 per litre Oil and other expenses Rs 48 per 100 Km.s	

Calculate the effective cost of running a taxi per Km.

**Solution****M/s. Anuraga Taxi Service Syndicate : Operating Cost Sheet**

	Rs.
<b>I. Fixed cost per month :</b>	
Salary of Office staff	15,000
Salary of Garage staff	20,000
Garage rent	10,000
<b>Fixed Cost for 10 Taxis p.m.</b>	<u>45,000</u>
Fixed cost per taxi per month (45,000/10 4,500)	4,500
+ Insurance per taxi per month	500
+ Road tax & repairs per taxi p.m.	1,800
Drivers salary per taxi p.m.	6,000
<b>Total Fixed Cost per taxi p.m.</b>	<u>12,800</u>
<b>Fixed cost per K.M. (12800/3200)</b>	4-00
<b>II. Variable cost per KM :</b>	
Depreciation per effective Km.	0-40
petrol per effective Km.	2-50
Oil & other exp. per effective Km.	0-60
<b>Cost per K.M. Per Tax :</b>	<u>7-50</u>

10) Amulya Travels, a transport Company, runs a fleet of six buses between two cities situated 150 Km. apart from each other. Each bus made one trip per day covering a distance of 300 km. The seating capacity of each bus is 40 passengers. The following particulars are available for the month of April, 2003 :

	Rs.
Wages of Drivers, conductors & cleaners	72,000
Diesel and other oils	2,06,400
Repairs and maintenance	24,000
Salaries to office and supervisory staff	30,000
Taxes, insurance, etc.	48,000
Depreciation	78,000
Interest and other charges	60,000

Actual passengers carried on an average were 80 percent of the seating capacity. All buses ran on all the days of the month. Find out the cost per passenger Km.

**Solution :**

**M/s. Amulya Travels  
Operation Cost Statement**

	Rs.	Rs.
I. Standing Charges		
Wages of drivers, conductors & cleaners	72,000	
Salaries of Office and Supervisory staff	30,000	
Taxes and insurance	48,000	
Interest and other charges	<u>60,000</u>	2,10,000
II. Maintenance Charges :		
Repairs and maintenance		24,000
III. Operating Charges :		
Diesel & other oils	2,06,400	
Depreciation	<u>78,000</u>	2,84,400
Total expenditure :		<u>5,18,400</u>

**Calculation of Total Passenger Km :**

$$40 \times 6 \times 300 \times 80\% \times 30 = 17,28,000 \text{ Passenger Km.}$$

$$\text{Cost per passenger Km.} = \frac{5,18,400}{17,28,000} = 30 \text{ Paise.}$$

## UNIT - 28 : PROBLEMS WITH SOLUTIONS ON RECONCILIATION AND MARGINAL COSTING

### I. Reconciliation of Cost and Financial Accounts.

1. X Ltd., manufactures two products, A and B. The following data refers to the year ending on 31st of December, 2001

	A	B
Production (units)	125	400
Sales (Units)	120	360
Material Cost per unit (Rs.)	15	12
Wages cost per unit (Rs.)	40	30
Selling price per unit (Rs.)	125	90

Actual works overhead during the year amounted to Rs. 9,000 and office overheads to Rs. 10,000.

In fixing the selling price it was estimated that works overhead should be taken at 50% of wages and office overhead at 33 1/3% on works cost. You are required (i) to prepare a statement of cost to show the net profit for the year in the cost books; (ii) to compute the net profit for the year by the financial accounts, valuing unsold stocks at actual material and wages cost plus works overhead at 50% on wages and (iii) to reconcile the Profits of cost and financial books.

#### Solution

Statement of Cost (Cost Books)

	Product A		Product B		Total Rs.
	Per unit Rs.	Total Rs.	Per unit Rs.	Total Rs.	
Materials	15	1875	12	4800	6,675
Wages	40	5000	30	12000	17,000
Prime Cost	55	6,875	42	16,800	23,675
Works Overheads 50% of wages	20	2,500	15	6,000	8,500
Works Cost	75	9,375	57	22,800	32,175
Office Overhead 1/3 of works cost	25	3,125	19	7,600	10,725
(-) Closing Stock	100	12,500	76	30,400	42,900
		500		3,040	3,540
Cost of Sales		12,000		27,360	39,360
Sales		15,000		32,400	47,400
Profit		3,000		50,40	8,040

**Financial Books**  
**Profit and Loss Account**

To Materials	By Sales		
A      1,875	A      15,000		
B <u>4,800</u>	B <u>32,400</u>		
	6,675		47,400
" Wages	" Closing Stock *		
A      5,000	A      375		
B <u>12,000</u>	B <u>2,280</u>		
	17,000		2,655
" Work expenses	9,000		
" Office expenses	10,000		
To Net Profit	7,380		
	<u>50,055</u>		<u>50,055</u>

\* Valuation of closing stock

	A Rs.	B Rs.
Material	15	12
Wages	<u>40</u>	<u>30</u>
	55	42
Works overhead 50% of wages	<u>20</u>	<u>15</u>
	75	57
No. of units of closing stock	<u>5</u>	<u>40</u>
Value of Stock	<u>375</u>	<u>2,280</u>

*Reconciliation Statement*

Profit as per Financial Books :	Rs. 7,380
Add : Under-recovery of works overheads (Rs. 9,000–Rs. 8,500)	<u>500</u>
	7,880
Add : Over-valuation of closing stock in cost accounts (Rs. 3,530 – Rs. 2,655)	<u>885</u>
	8,765
Less : Over-recovery of office overhead (Rs. 10,725 – Rs. 10,000)	<u>725</u>
Profit as per Cost Books	<u>8,040</u>

2. The following figures are available from the financial accounts for the year ended 31st March 2002 :

	Rs.
Direct Materials used	62,500
Direct Wages	25,000

Factory overhead	95,000
Administration overheads	62,500
Selling and Distribution overheads	1,20,000
Bad Debts	5,000
Preliminary expenses written-off	2,500
Legal charges	1,250
Dividends received	12,500
Interest received	2,500
Sales 1,20,000 units	1,75,000
Closing Stocks :	
Finished stock 40,000 units	30,000
Work-in-progress	20,000

The cost accounts revealed :

Direct material consumed : Rs. 70,000.

Factory overhead recovered @ 20% on prime cost

Administration overhead @ 75 p. per unit of production

Selling & Distribution overheads @ Re. 1 per unit sold.

Find out the profits as per cost and financial books and reconcile the same :

**Solution**

Dr.		Profit and Loss A/c for the year ended 31st March 2002		Cr.	
		Rs.			Rs.
To Direct Materials	62,500	By Sales		1,75,000	
To Direct wages	25,000	By Closing stock			
To Factory overheads	95,000	– Work-in-Progress		20,000	
To Administrative Overheads	62,500	– finished goods		30,000	
To Selling & Distn. overheads	1,20,000	By Dividends		12,500	
To Bad debts	5,000	By Interest		2,500	
To Preliminary Expenses	2,500	By Net Loss		1,33,750	
To Legal charges	1,250				
	<u>3,73,750</u>				<u>3,73,750</u>

*Statement of Cost*

Direct Materials		Rs.
		70,000
Direct Wages		25,000
	Prime Cost	<u>95,000</u>
Factory Overhead 20% on prime cost		<u>19,000</u>
		1,14,000
(-) Closing works in progress		<u>20,000</u>
Factory Cost		94,000
Administration overhead (1,20,000 + 40,000) x 75 p.		<u>1,20,000</u>
Cost of Production		<u>2,14,000</u> 281

(-) Closing stock of finished goods (2,14,00 ÷ 4)	53,500
Cost of goods sold	<u>1,60,500</u>
Selling & Distribution overhead 1,20,00 x Re. 1	1,20,000
Cost of sales	<u>2,80,500</u>
Sales	1,75,000
Net Loss	<u>1,05,500</u>

*Reconciliation Statement*

	Rs.	Rs.
Net Loss as per Cost Accounts		1,05,500
Add: Under recovery of factory Overhead	76,000	
Bad debts not shown in cost accounts	5,000	
Preliminary expenses not recorded in cost books	2,500	
Legal charges not shown in cost books	1,250	
Under valuation of closing stock in financial books	<u>23,500</u>	
		<u>1,08,250</u>
		<u>2,13,750</u>
Less: Excess use of materials in cost a/c	7,500	
Over recovery of Admn. Overheads	57,500	
Dividends recd. but not shown in the cost accounts	12,500	
Interest recd., but not shown in the cost accounts	<u>2,500</u>	
		<u>80,000</u>
Net Loss as per Financial Accounts		<u>1,33,750</u>

3. A firm whose financial year ended on the 31st of March, 2002 shows profit according to its financial books amounting to Rs. 2,57,510 while its cost books revealed a profit of Rs. 3,44,800 for the same period. While reconciling the profits the following differences have been noticed :

	Rs.
Under absorption of factory overheads	6,240
Over-absorption of office overheads	3,400
Depreciation charge in financial accounts	22,400
Depreciation charge in cost accounts	25,000
Interest on Investments not included in cost accounts	16,000
Loss included in financial accounts	11,400
Income tax	80,600
Dividends received	2,450
Loss due to depreciation in stock value in financial accounts	13,500
Reconcile the two profits	

**Reconciliation Statement**

	Rs.	Rs.
Profit as per financial accounts		2,57,510
Add: Under absorption of factory overheads	6,240	
Loss included in financial accounts	11,400	
Income tax	80,600	
Loss in stock value not recorded in cost accounts	13,500	
		1,11,740
		3,69,250
Less: Over-absorption of office Overheads	3,400	
Excess depreciation charged in cost accounts	2,600	
Interest on investments not included in cost accounts	16,000	
Dividends received not included in cost accounts	2,450	
	24,450	
<b>Profit as per Cost Accounts</b>		<b>3,44,800</b>

4. During the year a company's Profits have been estimated from the costing system to be Rs. 23,063 whereas the final accounts prepared by the auditors disclose a profit of Rs. 16,624. Given the following information, you are required to prepare a reconciliation statement.

*Profit and Loss Account for the year ended 31st of March, 2002*

	Rs.		Rs.
To Opening Stock	2,47,179	By Sales	3,46,500
To Purchase	82,154	By Closing stock	75,121
To Wages	23,133		
To Factory expenses	20,826		
To Gross Profit c/d	48,329		
	4,21,621		4,21,621
To Admn. expenses	9,845	By Gross Profit	48,329
To Selling expenses	22,176	By Sundry income	316
To Net profit	16,624		
	48,645		48,645

To costing records show :

- i) a stock ledger closing balance of Rs. 78,197
- ii) direct wages absorption of Rs. 24,867
- iii) factory Overheads absorbed : Rs. 19,714
- iv) administration expenses calculated as 3% of the selling price
- v) selling prices include 5% for selling expenses
- vi) no mention of sundry income.

**Solution :**

	Cl. stock Rs.	Direct wages Rs.	Factory expenses Rs.	Admn. expenses Rs.	Selling expenses Rs.	Sundry income Rs.
Cost Books	78,197	24,867	19,714	10,395	17,325	—
Financial Books	75,121	23,133	20,826	9,845	22,176	316
Difference	3,076	1,734	1,112	550	4,851	316

*Reconciliation Statement*

	Rs.	Rs.
Profit as per financial accounts		16,624
Add : Excess value of closing stocks in cost books	3,076	
Under-recovered factory expenses	1,112	
Under-absorbed selling expenses	<u>4,851</u>	
		<u>9,039</u>
		25,663
Less : Excess wages charged in cost books	1,734	
Over-recovered administration expenses	550	
Sundry income not shown in cost accounts	<u>316</u>	
		<u>2,600</u>
Profit as per cost accounts		<u>23,063</u>

5. From the following particulars prepare a Reconciliation Statement :

*Profit and Loss Accounts for the year ending on the 30th June, 2002*

	Rs.		Rs.
To Office salaries	11,282	By Gross profit b/d	54,648
To Office expenses	6,514	By Dividends received	400
To Salesman's salaries	4,922	By Interest on deposits	150
To Sales expenses	9,304		
To Distribution expenses	2,990		
To Loss on sale of machinery	1,950		
To Fines	200		
To Discount on debentures	100		
To Net profit c/d	<u>17,936</u>		
	<u>55,198</u>		<u>55,198</u>
To Income tax	8,000	By Net Profit b/d	17,936
To Reserve	1,000		

To Dividen	4,000	
To Balance c/d	4,936	
	<u>17,936</u>	<u>17,936</u>

The cost accountant of the company has ascertained a profit of Rs. 19,636 as per his books

**Solution**

*Reconciliation Statement*

	Rs.	Rs.
Profit as per Financial accounts		17,936
Add : Expenses and losses not recorded in accounts :		
Loss on sale of machinery	1,950	
Fines	200	
Discount on debentures	<u>100</u>	
		2,250
		<u>20,186</u>
Less : Incomes not recorded in cost accounts :		
Dividends received	400	
Interest on deposits	<u>150</u>	
		550
Profit as per Cost Accounts		<u>19,636</u>

6. M/s MRPLtd. Made a profit of Rs. 23,000 during the year 2001 as per costing records, whereas their financial accounts disclosed a profit of Rs. 15,000. From the following profit and loss account for the year ended 31-12-2001, as per the financial books you are required to prepare a reconciliation statement.

*Dr. Profit and Loss Account for the year ended 31st of March, 2001*

Dr.	Rs.	Cr.	Rs.
To Opening Stock	1,00,000	By Sales	1,75,000
To Purchases	80,000	By Closing Stock	80,000
To Direct Wages	20,000		
To Factory Expenses	15,000		
To Administrative expenses	10,000		
To Selling expenses	15,000		
To Net Profit	15,000		
	<u>2,55,000</u>		<u>2,55,000</u>

The costing records show the following :

- Stock ledger closing blance Rs. 89,000
- Factory overhead Rs. 13,000
- Administrative overheads calculated at 8% of sales
- Selling expenses calculated at 8% of sales.

Solution

*Reconciliation Statement as on 31-12-2001*

	Rs.	Rs.
Profit as per Cost Records		23,000
Add: Administrative overhead over absorbed (14,000-10,000)		<u>4,000</u>
Less i) Factory overheads under absorbed (15,000-13,000)	2,000	27,000
ii) Over - Valuation of closing stock in cost records (89,000-80,000)	9,000	
iii) Under-Recovery of selling expenses (15,000-14,000)	<u>1,000</u>	<u>12,000</u>
Profit as per financial books		15,000

7. Prepare a memorandum Reconciliation Account from the following particulars :

Profit shown by Cost Books Rs. 30,114 and by financial books Rs. 19,760. On reconciling the following information is available :

(i) Overhead absorbed in cost books Rs. 7,500 and incurred Rs. 6,932 (ii) Director's fees not included in cost books Rs. 750. (iii) Provision for bad debts Rs. 600 (iv) A new work was taken for Rs. 12,000 and depreciation of 5% was provided for only in the financial books. (v) Transfer fees Rs. 28 (vi) Income-tax Rs. 9,000.

Solution

Dr.	<i>Memorandum Reconciliation Account</i>		Cr.
	Rs.		Rs.
To Director's fees excluded in cost books	750	By Profit as per Cost Book	30,114
To Provision for bad debts excluded in cost books	600	By Overabsorbed Overheads	568
To Depreciation not provided for in cost books	600	By Transfer fees	28
To Income - Tax	9,000		
To Profit as per Financial Books	19,760		
	<u>30,710</u>		<u>30,710</u>

8. Ascertain the profit as per profit and loss account by preparing Memorandum Reconciliation Account.

	Rs.
(i) Profit as per cost records	1,50,300
(ii) Factory overhead under recovered in cost books	4,000
(iii) Office overhead under-recovered in financial books	1,500
(iv) Depreciation shown excess in cost books	950
(v) Interest on investment	495
(vi) Receipt of income from share transfer	1,120
(vii) Provision made for income tax	28,500

Solution :

Dr.	<i>Memorandum Reconciliation Account</i>		Cr.
	Rs.		Rs.
To Factory overhead		By Profit as per cost records	1,50,000
under recovered in cost books	4,000	By Office overheads	
To Provision for income-tax	28,500	over-recovered in cost books	1,500
		By Excess depreciatio in	
		ncost books	950
To profit as		By Interest on investmetns	495
per financials books	1,21,860	By Share transfer fees	1,120
	<u>1,54,365</u>		<u>1,54,365</u>

## 2. MARGINAL COSTING

1. A factory manufacturing printing machines has the capacity to produce 600 machines per annum. The marginal cost of each machine is Rs. 300 and each machine is sold for Rs. 375. Find overheads are Rs. 30,000 per annum. Calculate the Break-Even point for output and sales.

**Solution**

$$\begin{aligned} \text{Break-Even point (for output)} &= \frac{\text{Fixed Cost}}{\text{Contribution}} \text{ per unit} \\ &= \frac{30,000}{375 - 300} = \frac{30,000}{75} = 400 \text{ machines} \end{aligned}$$

$$\text{Break - Even point (for sales)} = \frac{\text{Fixed Cost}}{\text{P/v Raio}}$$

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{75}{375} \times 100 = 20\%$$

$$\therefore \text{B.E.P (Rs.)} = \frac{30,000}{0.20} = \text{Rs. } 1,50,000$$

2. From the following data, Calculate the Break-Even point :

	Rs.
Sales	60,000
Direct Material	284 20,000
Direct Labour	12,000
Direct Expenses	8,000
Overheads (Fixed) :	
Factory	10,000
Administration	5,000
	15,000

**Solution :**

$$\text{Break-Even Point (Rs)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{20,000}{60,000} \times 100 = 33.33\%$$

$$\therefore \text{B.E.P} = \frac{15,000}{0.3333} = \text{Rs. } 45,000$$

3. From the following information, calculate the Profit-volume Ratio :

	Rs.,
Sales	12,00,000
Profit	2,40,000
Fixed Cost	3,60,000

If in the next period, the company suffered a loss of Rs. 1,20,000 calculate the sales volume.

**Solution**

$$\text{P/v Ratio} = \frac{\text{Contribution}}{\text{Sales}} \quad (\text{OR}) \quad \frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales}}$$

$$= \frac{3,60,000 + 2,40,000}{12,00,000} \times 100 = 50\%$$

$$\text{Sales required at a loss of Rs. } 1,20,000 = \frac{\text{Fixed Cost} - \text{Loss}}{\text{P/v Ratio}}$$

$$= \frac{3,60,000 - 1,20,000}{0.50} = \text{Rs. } 4,80,000$$

4. From the following data relating to a Company, Calculate :

(i) The Break-Even Sales ; and

(ii) Sales required to earn a profit of Rs. 6,000 per period :

Period	Total Sales Rs.	Total Cost Rs.
I	42,500	38,700
II	39,200	36,852

**Solution**

Difference in sales : Rs. 42,500 – 39,200 = Rs. 3,300

Difference in total cost = Rs. 38,700 – 36,852 = Rs. 1,848

Hence, ratio of variable cost of sales =  $\frac{1,848}{3,300} \times 100$

∴ P/v Ratio = 100% – Variable Cost %  
= 100% – 56% = 44%

**Fixed Cost :**

Total cost in Period I	39,200
Less : Variable Cost (56% of 42,500 (sales))	23,800
Fixed Cost	14,900

(i) Break-Even Sales =  $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$$= \frac{14,900}{0.44} = \text{Rs. } 33,864$$

(ii) Sales required to earn a profit of Rs. 6,000

$$= \frac{\text{Fixed Cost} + \text{Profit}}{\text{P/V Ratio}}$$

$$= \frac{14,900 + 6000}{0.44}$$

$$= \text{Rs. } 47,500$$

5. From the following data calculate :

(a) P/v Ratio (b) Profit when sales are Rs. 20,000 and (c) New-Break-Even point if selling price is reduced by 20%

	Rs.
Fixed expenses	4,000
Break-Even point	10,000

**Solution :**

At B.E.P., fixed expenses and contribution are equal. Hence, contribution : Rs. 4,000

(i)  $P/V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{4,000}{10,000} \times 100 = 40\%$

(ii) Profit when sales are = Rs. 20,000 .

Contribution = 20,000 x 40% = Rs. 8,000

Profit = Contribution - Fixed expenses

= 8,000 - 4,000 = Rs. 4,000

(iii) New B.E.P if selling price is reduced by 20% present P/v Ratio = 40%

When sales are 20,000, Contribution = Rs. 8,000

or variable cost = Rs. 12,000

If selling price is reduced by 20%

New Sales will be Rs. 20,000 - 20% = Rs. 16,000

∴ Contribution = Rs. 16,000 - 12,000 = Rs. 4,000

New P/v Ratio =  $\frac{4,000}{16,000} \times 100 = 25\%$

Hence, New BEP =  $\frac{\text{Fixed Cost}}{\text{New P/v Ratio}}$

=  $\frac{4,000}{0.25}$  Rs. 16,000

6. From the following information, Calculate the Break-Even point and the sales required to earn to profit of Rs. 60,000

	Rs.
Fixed overheads	42,000
Variable Cost = Rs. 4 per unit	
Selling Price = Rs. 10 per unit	

If the company is earning a profit of Rs. 80,000 express the margin of safety available to it.

**Solution :**

$$(i) \text{ BEP (Rs)} = \frac{\text{Fixed Cost}}{\text{P/v Ratio}}$$

$$\text{P/v Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{10 - 4}{10} \times 100 = 60\%$$

$$\text{BEP} = \frac{42,000}{0.60} = \text{Rs. } 70,000$$

(ii) Sales required to earn a profit of Rs. 60,000

$$\text{Desired Sales} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}}$$

$$= \frac{42,000 + 60,000}{0.60} = \text{Rs. } 1,70,000$$

(iii) Margin of safety at Rs. 80,000 profit.

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}} = \frac{80,000}{0.60} = \text{Rs. } 1,33,333$$

7. Given :

Fixed Cost = Rs. 8,000

Profit earned = Rs. 2,000

Break-Even Sales = Rs. 40,000

Find out the actual sales

**Solution**

$$\text{Break - Even Sales} = \frac{\text{Fixed Cost}}{\text{Contribution}} \times \text{Sales}$$

$$\text{or Rs. } 40,000 = \frac{8,000}{8,000 + 2,000} \times x$$

$$(40,000 \times 10,000) = 8,000 \times x$$

$$\therefore x = \frac{40,00,000}{8,000} = \text{Rs. } 50,000$$

8. From the following particulars, find out the selling price per unit if B.E.P is to be brought down to 9,000 units.

Fixed expenses

Rs.

2,70,000

Variable cost per unit = Rs. 75

Selling price per unit = Rs. 100

Solution Let the contribution per unit be x for Break-Even sales of 9,000 units.

$$\text{B.E.P} = \frac{\text{Fixed Cost}}{\text{Contribution}}$$

$$9,000 \text{ units} = \frac{2,70,000}{x}$$

$$9,000x = 2,70,000$$

$$\therefore x = \frac{2,70,000}{9,000} = \text{Rs.}30$$

Contribution should be Rs. 30 per unit instead of Rs. 25 being at present. It means selling price should be increased by Rs. 5. Therefore, the selling price should be Rs. 105.

BRAOU

# SYLLABUS

## **BLOCK-I : COST ACCOUNTING : NATURE AND SCOPE**

Unit - 1 : Introduction to Cost Accounting

Unit - 2 : Importance and Installation of Cost Accounting

Unit - 3 : Elements of Cost

## **BLOCK-II : MATERIAL AND LABOUR COST**

Unit - 4 : Material Cost : Meaning and Control

Unit - 5 : Purchasing and Storing :  
Procedure and Accounting

Unit - 6 : Inventory Control

Unit - 7 : Pricing and Accounting of Material Issues

Unit - 8 : Labour Cost : Meaning and Control

Unit - 9 : Time Keeping, Time Booking, Idle and Overtime

Unit - 10 : Labour Turnover and Absenteeism (Theory only)

Unit - 11 : Pay-roll Accounting

Unit - 12 : Methods of Remuneration and Incentives

## **BLOCK-III : OVERHEADS**

Unit - 13 : Nature, Scope and Importance of Overheads

Unit - 14 : Factory Overheads

Unit - 15 : Administration, Selling and Distribution Overheads  
(Theory only)

#### **BLOCK-IV : METHODS OF COSTING**

Unit - 16 : Introduction to Methods of Costing

Unit - 17 : Unit Costing

Unit - 18 : Job and Batch Costing

Unit - 19 : Contract Costing

Unit - 20 : Process Costing

Unit - 21 : Operating Costing

#### **BLOCK-V : RECONCILIATION OF ACCOUNTS AND COST CONTROL TECHNIQUES**

Unit - 22 : Reconciliation of Cost and Financial Accounts

Unit - 23 : Marginal Costing

Unit - 24 : Budgetary Control (Theory only)

Unit - 25 : Standard Costing (Theory only)

#### **BLOCK-VI : REVISIONARY PROBLEMS**

Unit - 26 : Problems with Solution on Materials, Labour and Overheads

Unit - 27 : Problems with Solution on Reconciliation and Marginal Costing

Unit - 28 : Problems with Solution on Methods of Costing

**Dr. B.R. AMBEDKAR OPEN UNIVERSITY**  
**UNDERGRADUATE COURSES - III YEAR**  
**SUBJECT : COMMERCE**

**COURSE : COST ACCOUNTANCY**

**ASSIGNMENT-I**

**N.B.**

1. Do not copy the answer directly any of the books.
2. As far as possible try to answer the questions independently in your own words.
3. If it is necessary to quote from any source, give the correct reference.
4. Use your own foolscap pages for writing the assignment.
5. Leave sufficient margin for the comments of the evaluator.
6. Completion of this assignment normally should not take more than two hours time.

**PART - A**

Answer the following questions in about 30 lines each.

1. What do you understand by the term Material Control ? Explain briefly the important aspects of Material Control.
2. A product passes through two distinct Process A and B, and then to finished stock. The normal wastage of each process is as follows :

Process A - 3% of the units entering the process.

Process B - 5% of the units entering the process.

Wastage of Process - A was sold at 50 paise per unit, and that of Process-B at Re. 1 per unit. 10,000 units were issued to Process-A at a cost of Rs. 2.00 per unit. The other expenses were as under.

	Process -A	Process-B
	Rs.	Rs.
Sundry Materails	2,000	3,000
Wages	10,000	16,000
Manufacturing expenses	2,100	2,375

The actual outputs were :

Process-A - 9,500 units

Process-B - 9,500 units

Prepare Process Accounts assuming that there was no opening or closing stock.

3. During first week of April 2003 a worker manufactured 300 articles. He receives wage for a guaranteed 48 hours a week at the rate of Rs. 4 per hour. The estimated time to produce one article is 10 minutes and under incentives scheme the time allowed is increased by 20%. Calculate his Gross Wages according to :-

- i) Rown premium bonus
- ii) Halsey premium bonus

### PART - B

Answer the following questions in about 15 lines.

1. What are Variabe Costs ?
2. Record the following transactions in the Stores Ledger using FIFO method:

		Units	Price per Unit Rs.
2003			
May	1 Balance	350	2.00
"	2 Issues	250	2.20
"	4 Issues	200	--
"	6 Purchases	250	2.30
"	11 Issues	200	--
"	19 Issues	250	--
"	22 Purchases	250	2.40
"	22 Issues	200	--

3. From the following particulars find out the amount of profits :

	Rs.
Sales	1,20,000
Direct Materials	40,000
Direct Labour	25,000
Variable Overheads	10,000
Fixed expenses	20,000

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**ASSIGNMENT-II**

N.B.

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**PART - A**

Answer the following questions in about 30 lines each.

1. Distinguish between centralised stores and decentralised stores systems.
2. From the following figures prepare a reconciliation statement :

	Rs.
Net loss as per financial records	2,08,045
Net loss as per costing records	1,71,400
Works overhead under-recovered in costing	3,120
Administrative overhead recovered in excess	1,700
Depreciation charged in financial records	11,200
Depreciation recovered in costing	12,500
Interest received but not included in costing	8,000
Obsolescence loss charged in financial records	5,700
Income-tax provided in financial books	40,300
Bank interest credited in financial books	750
Stores adjustments (Credit) financial books	475
Value of opening stock in :	
Cost account	52,600
Financial accounts	54,000
Value of closing stock in :	
Cost accounts	52,000
Financial accounts	49,600
Interest charged in cost accounts but not in financial accounts	6,000
Preliminary expenses written off	800
Provision for doubtful debts	150

3. A company has three production departments A, B and C two service departments X and Y. The expenses incurred by them during the month May 2002 are :

A :	Rs. 8,000
B :	Rs. 7,000
C :	Rs. 5,000
X :	Rs. 2,340
Y :	Rs. 3,000

The expenses of service departments are apportioned to the production departments on the following basis :

	A	B	C	X	Y
Expenses of	20%	40%	30%	--	10%
Expenses of	40%	20%	20%	20%	--

Show clearly as to how the expenses of X and Y departments would be apportioned to A, B and C departments.

### PART - B

Answer the following questions in about 15 lines

1. Define minimum inventory level.
2. From the following particulars, calculate the earnings of workers under straight piece rate basis and Taylor's differential piece rate system.

- Standard Time per piece	:	20 minutes
Normal rate per hour	:	Re. 0.90
In a 9 hours day	:	A Produced 25 units B Produced 35 units

Differentials to be applied 80% of piece rate below standard, 120% of piece rate above standard.

3. Compute the machine hour rate from the following particulars :

	Rs.
Cost of machine	1,20,000
Installation expenses	12,000
Estimated scrap value after the exprie of tis 10 years life	2,000
Estimated working hours per annum	2,000
Rent for the shop per annum	800
Repairs per annum	1,000
Insurance premium per annum	400
Power consumption - 10 units per hour	--
@ 6 paise per unit	10
Lubrication oil, consumable stores for 8 hours day	
Foreman's salary per month he maintains same type of another machine also.	600
Wages of worker per day	12

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**ASSIGNMENT-III**

**N.B.**

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6. Completion of this assignment normally should not take more than two hours time.

**PART - A**

**Answer the following questions in about 30 lines each.**

1. Explain the various bases of apportionment of overheads to departments.
2. In a factory two types of radios are manufactured viz., Brand A and Brand B. From the following particulars prepare a statement showing the cost per radio, and profit per radio sold. There is no opening or closing stock.

	Brand A	Brand B
Materials	81,900	1,08,680
Labour	46,800	62,920

Works expenses are charged at 80% of labour and office on cost at 15% on works cost. Brand A radios sold during the period are 234 at Rs. 1,000 each and Brand B radios sold are 286 at Rs. 1,100 each.

If the actual works expenses are Rs. 87,000 and office expenses Rs. 58,000 find out the profit as per financial accounts and reconcile the profits.

3. A company has four departments A, B and C which are production departments and D which is a service department. Cost of the department D is apportioned on the basis of wages paid.

The actual costs for the year 2003 were :

	Rs.
Rent	21,000
Repairs to plant	1,26,000
Depreciation of Plant	9,450
Light and power	2,100
Supervision etc.	31,500
Repairs to buildings	8,400

The following information about departments is available and is used as a basis for distribution of costs.

Departments	Area Sq. metres	No. of Employees	Wages Paid Rs.	Value of Plant Rs.
A	1,500	20	1,26,000	3,15,000
B	1,100	15	84,000	1,89,000
C	900	10	63,000	1,26,000
D	500	5	42,000	—

Apportion these costs to production departments.

#### PART-B

Answer the following questions in about 15 lines

1. What is standard costing ?
2. From the following information, prepare a statement showing (i) Material consumed, (ii) Prime cost, (iii) Factory cost, (iv) Cost of goods sold; and (v) Net profit.

	On June 1 2003 Rs.	On June 30 2003 Rs.
Cost of Material	30,000	25,000
Cost of work-in-progress	12,000	15,000
Cost of Stock of Finished Goods	60,000	55,000
Transactions during the month are :		
Purchase of Raw Material		4,50,000
Wages paid		2,30,000
Factory Overhead		92,000
Administrative overhead		20,000
Selling and Distribution Overhead		20,000
Sales		9,00,000

3. Calculate the break-even point in terms of physical units from the following :

Fixed Cost	-	Rs. 80,000
Variable Cost	-	Rs. 4 per unit
Selling Price	-	Rs. 20 per unit

**MODEL EXAMINATION QUESTION PAPER**

**FACULTY OF COMMERCE  
B.COM. III YEAR (3 Y.D.C.) EXAMINATION  
GROUP-III : PAPER-1  
COST ACCOUNTANCY**

**Time : 3 Hours**

**Max. Marks : 100  
Min. Marks : 35**

**SECTION-A (Marks : 4 x 15 = 60)**

***Instructions to the candidates***

- (i) Answer any FOUR of the following questions in about 30 lines each.  
(ii) Each question carries 15 marks.

1. Explain the limitations of Financial Accounting. Do you think that these limitations have been overcome by the introduction of Cost Accounting ?
2. Explain the need for pricing material issues and discuss in detail any two methods of pricing material issues.
3. Explain briefly the different methods used for absorption of Factory overheads.
4. M/s. Kumudini Co., Ltd., manufactures refrigerators. The following information is provided by the company for the year ended 31st March, 2002 :

Materials Rs. 28,00,000; Wages Rs. 22,00,000; Factory Overheads Rs. 6,60,000 and Administrative overheads Rs. 4,52,800. There were no opening or closing stocks of materials. A profit of 20 per cent on sales is earned during the year.

What price should the company quote for a new refrigerator "KAUMUDI" - if it requires material of the value of Rs. 8,000; and Wages Rs. 6,000; absorb factory overheads on basis of labour; and administrative overheads on the basis of works costs; and profit at 20 per cent on selling price is to be earned.

5. M/s. Upendra Construction Ltd., has undertaken a contract for the construction of a bridge for Rs. 96 lakhs and it commenced the work on 1st April, 2001. The following information relating to the contract is given to you for the year ended 31.3.2002:

	Rs.
Materials Issued	26,88,000
Wages paid	27,20,000
Plant purchased (1-4-2001)	4,80,000

General overheads	2,56,000
Direct expenses	64,000
Material at site on 31-3-2002	32,000
Wages outstanding (31-3-2002)	22,400
Direct expenses outstanding (31-3-2002)	9,600
Cost of work done but not certified	1,12,000
Value of work certified	60,00,000

80 percent of work certified is received in cash.

life of plant purchased is five years and its scrap value at the end of the fifth year is zero.

Prepare contract account for the year ended 31st March 2002, showing the portion of the profit which might reasonably be taken to the Profit and Loss account.

6. M/s. Abinandana Road Transport Company keeps a fleet of lorries. The company provides the following information relating to the month of April, 2002.

	Rs.
Distance run during the month	40,000 Km.
Salaries of drivers and cleaners	8,000
Diesel, oil, etc.,	10,000
Original cost of lorries	<del>4,80,000</del>
Repairs	24,000
Garrage rent	4,000
Licence and insurance for the year	24,000
Depreciation to be allowed at 25 per cent per annum on original cost of lorries.	
Prepare a statement for April, 2002 showing the cost per running km.	

- 7) The final product of M/s. Soujanya Co. Ltd., passes through three distinct processes: Spandana, Chandana and Vandana. During the year 2001, 3,000 units were produced. The Costing books of the Company furnishes the following information:

	SPANDANA	CHANDANA	VANDANA
	Rs.	Rs.	Rs.
Direct material	80,000	40,000	30,000
Direct wages	60,000	50,000	40,000
Direct expenses	13,000	6,400	10,000
Cost of cans	---	30,600	---
Cost of packing	---	---	9,000

The indirect expenses of the period were Rs. 30,000. These are to be distributed to the processes on the basis of wages. The scrap obtained in each process is sold for Rs. 6,000 Rs. 8,000 and Rs. 10,000, respectively. Prepare the process accounts of the three processes, showing the cost of each process and the finished product

- 8) The cost records of M/s. Kaumudi Enterprises reveals a profit of Rs. 4,31,250. The following information is available from the books of the Enterprise :

	Cost Accounts Rs.	Financial Accounts Rs.
Opening stock of materials	9,1500	95,000
Closing stock of materials	1,05,000	99,000
Overhead charges	1,92,500	2,03,000

During the year Rs. 3,000 is received as dividends; and on sale of investments there was a loss of Rs. 5,000; Goodwill at Rs. 12,500 and preliminary expenses at Rs. 15,000 were written off.

Prepare a Reconciliation statement, reconciling the profit as per both the sets of accounts.

### SECTION-B (Marks : 5 x 8 = 40)

#### Instructions to the candidates

(i) Answer any FIVE of the following questions in about 15 lines each.

(ii) Each question carries 8 marks.

9. Define (a) Cost (B), Cost Accounts (c) Cost Accounting; and (d) Cost Accountancy.
10. Explain briefly a) Minimum stock level b) Maximum stock level; and c) Reorder level.
11. Explain briefly any two different methods of remunerating labour.
12. Define Budgetary control and explain briefly its advantages and limitations.
13. Define standard costing and briefly explain its advantages and limitations.
14. From the following information, calculate Economic Order Quantity (EOQ) :
 

Annual consumption of material :	14,400 units
Cost of placing an order	Rs. 50
Carrying cost per unit per annum	Rs. 16
15. From the following information, calculate the Break-even point and the P/V Ratio:
 

Fixed overheads	: Rs. 1,08,000
Variable costs	: Rs. 4,20,000
Sales	: Rs. 6,00,000

Also find out the profit on sales of Rs. 9,00,000

- 16) The following information is extracted from the books of M/s. Sobhitia Co., for the year ended 31st March, 2002.

	Rs.
Stock of raw materials (1-4-2001)	1,82,000
Stock of finished goods (1-4-2001)	83,200
Direct labour	12,92,200
Purchases of raw material	18,98,00
Works overheads	3,23,050
General overheads	1,75,400
Sales of finished goods	38,48,000
Stock of raw materials (31-3-2002)	88,400
Stock of finished goods (31-3-2002)	1,95,000

Prepare a statement showing the total cost, cost of goods sold and profit.

- 17) With the following information, calculate the wages of a worker under the Rowans Plan :

Standard time	.....	9 hours
Time taken	.....	6 hours
Normal wage rate	.....	Rs. 3 per hour.

- 18) From the following information relating to the purchases and issues of a material during the month of April 2002, prepare a Stores Ledger Account, pricing material issues according to FIFO method.

Purchase : 2nd April, 800 units at Rs. 4 per unit  
 10th April, 1200 units at Rs. 5 per unit.  
 18th April, 1000 units at Rs. 6 per unit.

Issues : 15th April, 1500 units.  
 20th April, 900 units.  
 25th April, 200 units