UNIT 1 NATURE AND SCOPE

Structure

1.0 OBJECTIVES

After studying this unit, you should be able to :

- describe the need for costing in modern economy
- define 'costing' and 'cost accounting'
- specify the object's of costing
- differentiate between cost accounting and financial accounting
- explain the importance of costing
- state the major considerations in the installation of a costing system.

1.1 INTRODUCTION

You know that Cost Accounting is a specialised branch of accounting. It is concerned with classifying, recording and appropriate allocation of expenditure for the determination of costs of products and services and the ascertainment of the profitability. It also embraces the preparation of periodical statements and reports for purposes of controlling costs and managerial decision-making. In this unit we shall introduce you to the nature and scope of cost accbunting and discuss in detail the need for cost accounting, its definition and objects, the difference between cost accounting and financial accounting, the advantages of cost accounting, and the installation of a costing system in an organisation.

1.2 NEED FOR COSTING

Every economic activity, particularly an activity involved in the production of goods or in rendering service, involves some expenditure. The expenditure may be in terms of materials, labour and other direct or indirect expenses. The major purpose of such activities in a business enterprise is to earn profit. It is, therefore, necessary that all the three elements of the transaction (i.e. cost, profit and price) are clearly identified.

For example, a shoe factory launches a new sport shoe. It has to incur Rs. 20 for material, Rs. 30 for labour and Rs. 25 for other expenses (overheads) on every pair of shoes produced by the factory and supplied in the market. The factory has fixed the selling price of the shoes at Rs. 100 per pair. Thus, the cost of a pair of shoes is Rs. 75 (20 + 30 + 25), its selling price is Rs. 100, and the profit per pair is Rs. 25 (100 – 75). The management requires such information in respect of each product manufactured and each activity undertaken by the organisation for purposes of planning, cost control and decision-making. But, the records maintained under

financial accounting fail to provide the necessary information. Hence, the accountants developed a new system of accounting called 'cost accounting' under which records of transactions are maintained in such a manner that detailed cost information is readily available in respect of each product, job, department, process, etc. In fact, various deficiencies and limitations of financial accounting gave rise to the need for cost accounting.

1.2.1 Limitations of Financial Accounting

1) It does not provide detailed operating information for each department, process, product, or other unit of activity within the organisation. It simply provides information in terms of income, expenses, assets and liabilities for the enterprise as a whole.

2) It does not classify expenses into direct and indirect or fixed and variable. The costs are not assigned to the products at each stage of production so as to reveal controllable and uncontrollable items.

3) It does not set up a proper system of control over the main elements of cost viz., materials and labour. Hence, the wastages and losses of materials go unchecked and utilisation of labour time remains uncontrolled.

4) It does not establish standards or norms against which different cost items can be compared.

5) It does not provide adequate costing information for fixation of selling price of various products manufactured or services provided by the organisation.

6) It contains historical cost information which is compiled at the end of the accounting period. Hence, it becomes difficult to compile cost data at frequent intervals.

7) Since product-wise cost and profit information is not available from financial accounts, the analysis of causes for profit or loss cannot be effectively done. Financial accounts are at best like a thermometer which can only indicate the temperature of the body but cannot help diagnosis or cause analysis of its health.

1.2.2 Costing and the Economy

Let us now analyse the need for costing in a relatively wider perspective. Modern economy has a few characteristic features which further establish the necessity of costing. These can be summarised as follows :

1) Global Competition : There is an ever increasing amount of competition in the market both internally and externally. Only those producers can meet the challenge who exercise stringent control over costs and follow sound pricing policies.

2) Limited Resources: There has been an acute scarcity of resources which require an effective and economic utilisation by curtailing wastages and losses.

3) Complex Management : The management of industrial organisations has become an extremely complex process demanding attention and action at every stage of operation and in every area of production.

4) Fast Decisions : Correct and quick decisions are required on the basis of adequate information supported by reliable data.

5) Special Responsibility : Every business shares a heavy social responsibility in terms of proper quality, reasonable prices, regular supply, etc.

6) Optimum Profit : All business ventures aim at maximisation of profit which is mainly based on an efficient performance in financial, personnel, production and marketing activities.

If we correlate the above factors, costing appears to be the only underlying link between different factors and the only unifying force behind business success. Costing aids pricing, checking of wastage, control of resources, management of processes, flow of data for decisions, discharge of social obligations and provides an opportunity for profit growth in the organisation. A large number of industrial establishments, therefore, have been showing an increasing confidence and reliance in the system of costing and have been applying it to the management of their different economic assignments.

1.3 DEFINITIONS OF COSTING AND COST ACCOUNTING

The term 'Costing' refers to the technique and process of ascertaining costs. It consists of principles and rules which are applied for ascertaining the cost of products manufactured and services rendered. The term 'Cost Accounting' refers to the process of accounting for costs. It begins with the recording of all incomes and expenditures and ends with the preparation of periodical statements and reports for ascertaining and controlling costs. Thus, cost accounting is more comprehensive a term which includes costing. **In actual practice, however, these two terms are used interchangeably.** Wheldon, after expanding the ideas contained in the definitions of 'Costing' and 'Cost Accounting' has given an exhausting definition of Costing which reads as follows :

Costing is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services; and for the presentation suitably of arranged data for purposes of control and guidance of management.

At initial stages of the development of cost accounting, the Terminology published by the Institute of Cost and Management Accounts (ICMA) of U.K. even distinguished between 'cost accounting' and 'cost accountancy' and defined the latter as "the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability as well as the presentation of information for the purpose of managerial decision-making." But, now-a-days the term,,'Cost Accountancy' is not used at all. Most of the authors use the term "Cost Accounting" and do not even recommend the use of 'Costing'. According to the latest Terminology published by the Institute of Cost and Management Accountants, "Cost accounting is that part of management accounting which establishes budgets and standard costs and actual costs of operations, processes, departments or products and the analysis of variances, profitability or social use of funds." Thus, we can say that

a) Cost accounting is a process of accounling for costs.

b) It incorporates incomes and expenditures relating to the production of goods or services.

c) It provides statistical data on the basis of which future estimates may be prepared.

d) It serves as a basis of ascertainment and control of costs of products and services.

e) It involves the functions of (i) analysis, (ii) recording, (iii) establishment of budgets and standards, (iv) comparison, and (v) reporting.

Check Your Progress A

1) What is Costing?

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2) Define Cost Accounting?

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3) Give four examples of expenses which constitute cost in a ready-made garments factory.

a) .....

b) .....

c) .....

d) .....

4) State whether each of the following statements is True or False.

i) Cost Accounting gets its basic data for estimates from the financial accounting system. .....

ii) Cost Control means a lower amount of profit to the company. .....

iii) Customers get more satisfaction when they buy goods at reasonable prices. .....

iv) If resources are scarce, cost of production will be low. .....

v) Cost Accounting is a comprehensive term which includes costing. .....

vi) Cost Accounting provides data for managerial decision-making. .....

1.4 OBJECTS OF COST ACCOUNTING

The main objects of cost accounting are as follows :

1) To ascertain the cost of products and services;

2) To aid in fixation of selling price or quotation for tenders;

3) To analyse and classify the different elements of cost which constitute the total cost;

4) To identify causes of wastage and apply appropriate course of action for checking the wastage;

5) To control costs by analysis and comparisons;

6) To communicate to the management all information relating to costs and facilitate managerial decision-making;

7) To judge the relative efficiency of different departments, branches, products, units, plants and machinery and devise means of increasing their productivity; and

8) To produce cost statements as and when required by the management for an interim review of production, sales and profit or to plan future activities.

Thus the objects of costing establish the fact that it is an essential branch of accounting. It is the key to economy in cost of production and is an essential technique of ensuring efficiency in management.

1.5 DIFFERENCE BETWEEN COST ACCOUNTING AND FINANCIAL ACCOUNTING

The difference between Cost Accounting and Financial Accounting is as follows :

	Cost Accounting	Financial Accounting
1)	Ascertains the cost of goods or services.	Presents the operational results and financial position of the business.
2)	Serves the information needs of the management.	Provides financial information about the company to its shareholders, creditors, employees and the society at large.
3)	Need not be followed by a system of external audit.	Needs a system of independent audit to ensure that the financial statements give a true and fair view of the state of affairs.
4)	Classifiesexpenses into material cost, labour cost, fixed overheads and variable overheads.	Transactions relating to all receipts and payments of the business are classified into debit end credit entries.
5)	Shows expenses in a cost sheet, process account, contract account or some other statement of account.	Consolidates all transactions into two financial statements i.e., Trading and Profit & Loss Account and Balance Sheet.

6)	Does not form a basis for tax assessment because this is not a record.	Acts as a basis fordetermination of tax liabilities of the business.
7)	Requires variance analysis to identify the favourable or adverse differences between the standard cost and actual cost.	Records only the actual transactions occurring in course of business operations.
8)	Presents the cost information at frequent intervals.	Presents financial information once or twice a year.
9)	Finds out the profit or loss on specific products, branches, departments, jobs, or processes.	Gives the operational results of the entire business.
10)	Maximises future efficiency of operations with the help of cost data used to exercise control and check wastage.	Uses accounting ratios to compute the major trends which havealready taken place in the previous accounting period.
11)	Accounts also for physical units such as labour hour, machine hour, etc.	Follows only monetary units for recording transactions in the books of account.

Common Goal : Despite the differences of purpose and approach between Cost Accounting and Financial Accounting, both the systems have a common goal of continuously assisting the organisation they serve. In fact, the two are complementary to each other. In a developing enterprise, therefore, both the systems operate to the advantage of the organisation and contribute to the smooth running of the business.

1.6 ADVANTAGES OF COST ACCOUNTING

Having learnt the need for costing, its meaning and objects, and the difference between Cost Accounting and Financial Accounting, it should not be difficult for you to list the advantage's of Cost Accounting-and appreciate it as an invaluable aid to management.

An effective and organised system of costing helps :

1) Continuous flow of information regarding production, cost, materials, labour, stores, plant capacity, etc., which assist output planning.
2) Identification of unproductive activities, losses or wastage of resources, obsolete machinery and points of inefficiency which demand a quick remedial action.
3) Compilation of correct and reliable cost data.
4) Preparation of budgets and business forecasts.
5) Measurement of efficiency of operations through establishment of standards and analysis of variances.
6) Fixation of selling prices.
7) Cost comparisons between different periods, products, departments or firms.
8) Estimates of costs and revenue in advance.
9) Inventory control and periodical stock-taking.
10) Identification of idle capacity and the cost of working below the installed capacity.
11) Ascertainment of cost and profit more frequently and examination of their causes in detail.
12) Decisions on the basis of facts and figures and formulation of suitable policies for various matters such as
    i) level of output
    ii) make or buy decision
    iii) replacement or modernisation of old equipment
    iv) shut down or continue during depression'
    v) introduction of new products or elimination of old ones
    vi) acceptance of a special order
    vii) replacement of labour with machinery

Because of the above' advantages of cost accounting, its use is no more restricted to manufacturing establishments. Now-a-days, costing is used by various institutions such as hospitals, transport undertakings, local authorities, offices, banks, educational institutions; etc.

Besides, costing is of considerable advantage to the consumers. They get products at reasonable prices due to proper costing system. To the employees of the organisation, costing is beneficial in granting incentives to good work, bonus and higher wages. Costing helps the investors, bankers, lenders and shareholders in evaluating the past profitability and future prospects of the company. It ultimately benefits the economic development of the country as a whole because of efficiency in industrial operations, effective mobilisation of resources, balanced utilisation of funds and timely achievement of targets.

Check Your Progress B

1) Give **four** main objects of costing.

a) .....

b) .....

c) .....

d) .....

2) State **four** major differences between Cost Accounting and Financial Accounting.

i) .....

ii) .....

iii) .....

iv) .....

3) Select and tick the most appropriate alternative to fill in the blanks.

i) Cost Accounting can ..... the future cost of production
   a) ascertain
   b) forecast
   c) analyse
   d) estimate

ii) Cost Accounting gives information to the management for the purpose of .....
   a) employees' welfare
   b) decisions
   s) efficiency
   d) profitability

iii) Cost statements form part of the ..... accounts of a company.
   a) published
   b) statutory
   c) internal
   d) taxation

iv) Costing is based on ..... figures.
   a) estimated
   b) actual
   c) accurate
   d) projected

v) Costing records must also be ..... by management.
   a) audited
   b) prepared
   c) verified
   d) analysed

1.7 INSTALLATION OF A COSTING SYSTEM

In view of the growing size and variety of organisations a single system of costing cannot suit every business. The principles and procedures of costing, therefore. have to be applied in each organisation according to its own characteristics and environment. In other words, it is only a properly designed system of costing suitable to the organisation which can help its successful operation.

Before introducing a system of costing, it would be advisable to conduct a preliminary investigation to assess the exact requirements of the business in respect of : (a) product, (b) organisation, (c) manufacturing process, and (d) selling and distribution methods. Moreover, it should ensure that

i) the existing organisation is disturbed to the minimum;
ii) the system is implemented gradually;
iii) the process of costing designed for the organisation is compact and goes into meaningful details only;
iv) the procedure is simple and economical to operate; and
v) the system is able to generate periodical reports to various levels of management.

The two other aspects which need a proper assessment before the installation of a system of costing are :

1) What are the major objectives of costing in the business? For example, whether it is being introduced for fixing the prices or for instituting a system of cost control, or for both.

2) What are the practical difficulties in the process of introduction of the system?

1.7.1 Possible Difficulties

We must be conscious of the difficulties in introducing the system of costing and that they have to be overcome. These difficulties usually are :

1) Inadequate support from top management and opposition to the system by some officers.

2) Resistance from staff associated with the operation of the financial accounting system.

3) Resentment at other levels in view of the additional work expected due to the costing system.

4) Shortage of trained and qualified staff to handle the new system.

5) Heavy costs involved in the process of installation.

1.7.2 Factors to be Considered

The following factors should be considered before the installation of a system of costing :

1) Objective of the costing system

2) Nature of the business

3) Quality of the management

4) Size and type of organisation, scope of authority, sources of information and reports to be submitted

5) Technical aspect of the business

6) Attitude and behaviour of the staff in extending co-operation to the systemand the organisation

7) Impact of different operations on variable expenses

8) Manner of reconciliation between cost and financial accounts and the possibilities of developing them into an integrated system of accounting through control accounts

9) Quantum of information'needs and the process of collecting the data without much labour

10) Nature of the product and the type of costing system which will suit the product

11) Extent to which the importance of the system can be appreciated by the supporting staff and an awareness'created among them about the relevance bf regular data collection

1.7.3 Success of the System

The requisites of an effective system of costing are as follows :

1) It suits the nature and requirements of the business.

2) It is simple and easy to operate. For this purpose, standard forms should be used and the objective of every record and report should be clear to all Concerned.
3) It receives full cooperation of the staff.
4) It ensures promptness and regularity in flow of required information for the preparation and presentation of costing reports.
5) It is closely linked with the financial accounting system and makes it easier to reconcile the results obtained by cost accounts and financial accounts.
6) It contributes to cost control effectively.
7) It provides for comparison of estimates with the actual results.
8) There is considerable amount of flexibility in the system so that it can easily adjust with the changing conditions or requirements of the business.
9) The cost of installation and operation of the costing system is justified by the benefits derived from the system.

Thus, the system of costing proposed to be installed in an organisation must be properly planned and introduced carefully so that it is competent enough to deliver the desired results. Much depends upon the manner in which the system operates so as to derive its best advantage.

Check Your Progress C

1) State four major factors which you will take into account for installation of a costing system in an organisation.
   i) .....
   ii) .....
   iii) .....
   iv) .....

2) State the possible difficulties faced in introducing a costing system in an organisation.
   .....
   .....
   .....
   .....

3) Answer YES or NO in case of the following statements.
   i) Costing produces information which may also be useful to the competitors of the business. Yes/No
   ii) Wastage of labour need not be checked in an effective system of costing. Yes/No
   iii) Cost records can assist verification of results shown by the financial accounts. Yes/No
   iv) There is a standard system of costing which suits all types of organisations. Yes/No
   v) The cost of the costing system should be justified by the benefits derived from the system. Yes/No
   vi) The costing system should be independent of the financial accounting system. Yes/No

1.8 LET US SUM UP

Costing is a specialised branch of accounting which is responsible for the ascertainment and control of costs of goods produced and the services provided by the business. Its need arose because of the limitations of the financial accounting and the complexities of managing a modern enterprise.

Cost Accounting refers to the principles, methods and techniques used for the ascertainment and control of costs as well as the presentation of information for managerial decision-making. Its main objects are (i) ascertainment of costs, (ii) fixation of prices, (iii) control of costs, and (iv) providing cost data for managerial use. Cost Accounting differs from Financial Accounting in respects of (i) the interests it serves, (ii) the objectives to be achieved, (iii) analysis of cost and profit, (iv) mode of presenting information, and (v) the periodicity of reporting.

For installation of a costing system in any organisation, it must be ensured that (i) it suits the nature of the business, (ii) it is simple to understand and easy to operate, (iii) it is introduced gradually, (iv) it provides the necessary information promptly and regularly, (v) it is economical, and (vi) it is flexible.

1.9 KEY WORDS

Allocation : Distribution of expenditure among various cost centres.

Budget : An estimate of allocations in respect of expenditure and/or revenue during a given future period.

Costing : The technique and process of ascertaining costs.

Cost Sheet :A statement showing different elements of cost relating to a particular product or a job for a particular period.

Cost Centre : A location, person, equipment or department for which costs may be ascertained and used for purposes of control.

Direct Expenses : Expenses incurred in connection with material, labour, etc. which can be directly identified with items produced.

Fixed Expenses : Expenses which do not increase or decrease with a change in volume of output.

Idle Capacity : Unutilised production capacity of an enterprise.

Installed Capacity : Total production capacity of an enterprise.

Indirect Expenses : Overheads relating to manufacturing, administration, distribution or selling which cannot be directly identified with items produced and so have to be allocated on some rational basis.

Overheads : All types of indirect expenses.

Quotation : Minimum acceptable price offered for the supply of goods or services.

Reconciliation : Matching two results by locating the causes of difference and making them agree through appropriate adjustments.

standard : Pre-determined level of performance or cost based on previous experience and a realistic assessment of the present situation.

Unit Cost : Total cost divided by the output quantity.

Variance : Difference between standard cost and actual cost.

Variable Expenses : Expenses which increase or decrease in the same proportion as the increase or decrease in the output.

1.10 ANSWERS TO CHECK YOUR PROGRESS

A 3 (a) Wages (b) Cloth (c) Buttons (d) Package
4 (i) True (ii) False (iii) True (iv) False
(v) True (vi) True

B 1 (a) Cost ascertainment (b) Cost control
(c) Fixation of prices (d) Providing data for management decisions
3 (i) d (ii) b (iii) c (iv) a (v) c

C 3 (i) No (ii) No (iii) Yes (iv) No (v) Yes (vi) No

1.11 TERMINAL QUESTIONS

1) Why do we need an effective system of cost accounting in a business enterprise?

2) Define 'Cost Accounting'. State its main objects.

3) State the importance of costing in a modern economy.

4) Differentiate between Cqst Accounting and Financial Accounting.

5) What are the major advantages of Cost Accounting to a manufacturing concern?

6) How can you instal a system of costing in a biscuit producing factory? What are the possible difficulties in installing such system?

7) "Financial Accounting procedures are generally designed to ascertain the periodic profit or loss, but there are important limitations and deficiencies in the system." Discuss.

8) How do Cost Accounting records help in the planning and control of business operations of an enterprise?

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 2 CONCEPT OF COST AND ITS ASCERTAINMENT

Structure

2.0 OBJECTIVES

After studying this unit, you should be able to :

- define the term cost
- explain the concepts of cost unit and cost centre
- classify costs
- describe the elements of cost
- give a proforma of cost sheet and identify the components of total cost
- describe different methods of costing and identify the industries to which each method is applicable.

2.1 INTRODUCTION

In Unit 1 you have learnt about the nature and scope of costing, the difference between Cost Accounting and Financial Accounting, and the advantages of installing a costing system in an organisation. You learnt that costing is the technique and process of ascertaining costs. In order to understand this process, one must gain. familiarity with certain concepts like cost, cost unit, cost centre, classification of costs, elements of cost and components of total cost. This unit mainly covers these aspects and gives a proforma of cost sheet prepared for ascertaining cost and profit of each product manufactured by an organisation during a particular period. This unit also discusses various methods of costing and identifies the industries for which each method is considered suitable.

2.2 MEANING OF COST

Cost means the amount of expenditure (actual or notional) incurred on, or attributable to, a given thing. In other words, cost indicate: : (i) an actual or estimated expenditure, (ii) a direct or indirect expenditure, and (iii) it is related to a job, process, product or service. Examples of expenses which constitute cost arc :

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(a) materials, (b) labour, (c) factory overheads, (d) administrative overheads, and (e) selling and distribution overheads.

Cost is a wide concept. It does not give an exact meaning unless it is properly qualified. It is necessary, therefore, that both who ascertain cost and who use it as a base for certain decisions, interpret the meaing and contents of cost in a similar manner. The main characteristics of cost are :

1) The term 'cost' is not complete unless it is fully identified with its nature and category.
2) Costs do not represent the same contents under every situation.
3) No cost is true, exact or accurate. It is a flexible concept; it does not mean the same thing under all circumstances.
4) Cost may be ascertained in different ways by different persons.
5) Costs vary with time, volume, firm, method or purpose.

Thus cost has no fixed, certain or definite meaning. This may change according to its interpretation and the manner in which, or the purpose for which, it is ascertained. Cost must indicate its purpose and the conditions under which it is computed. If not, it may be vague, giving different meaning to different people. Hence, it must be related to a particular activity or commodity and expressed for a given quantity or unit of goods produced or services performed.

Cost and Loss : You should be able to distinguish between the terms 'cost' and 'loss'. Cost actually signifies an expenditure incurred for securing some benefit to the business. If no benefit is derived from a particular expenditure, it is regarded as a loss. Cost of materials destroyed by fire or salary paid to a foreman during the period of strike are not regarded as cost. These are examples of loss to the business.

2.3 CLASSIFICATION OF COSTS

We often come across a wide variety of costs. Unless we are fully familiar with their meaning and utility, we may not be effective in their computation, analysis comparison and control.

There are various bases according to which costs have been classified. These are (1) according to functions to which they relate, (2) accordtng to their identifiability with jobs, products, or services, (3) according to their variability with changes in output, (4) according to their association with product, or period, (5) according to their controllability, and (6) according to their relevance to decision making. The first three bases are considered important at the introductory stage and., therefore, have been discussed here in detail.

2.3.1 Functional Classification

The most common classification of costs in a manufacturing establishment is on the basis of functions to which they relate because costs have to be ascertained for each of these functions. On this basis, costs are classified into four categories :
(i) manufacturing costs (production costs), (ii) administrative costs, (iii) selling costs, and (iv) distribution costs.

Manufacturing Costs : Manufacturing costs refer to all expenditure incurred in the course of production from acquisition of materials to primary packing (packaging) of the finished product. It includes cost of materials, cost of labour, other direct expenses and factory overheads. These are also termed as 'production costs'.

Administration Costs : Administrative costs include all costs that are incurred for general administration of the organisation and for the operational control. Some examples of such costs are : salaries of the office staff, rent of the office building, depreciation and repairs of the office furniture, etc. In fact, any expenditure which is not related directly to production, selling, distribution, research or development forms part of the administrative costs.

Selling Costs : Selling costs are those costs which are incurred in connection with the sale of goods. Some examples of such costs are: cost of warehousing, advertising, salesmen salaries, etc. .

Distribution Costs : Distribution costs are those costs which are incurred on despatch of the finished products to customer including transportation. Some examples of such costs are : packing, carriage, insurance, freight outwards, etc.

2.3.2 On the Basis of Identifiability with Products

On this basis costs are divided into (i) direct costs, and (ii) indirect costs.

Direct Costs : Direct costs refer to expenses which can be directly identified with a product, job or process. For example, in case of materials used and labour employed, we can easily ascertain as to which product or job or process they relate. The same thing is not true of expenditure like rent of the building which is a common cost for various products manufactured in the factory and will have to be allocated to all products on some rational basis.

Indirect Costs : Indirect costs refer to those expenses which cannot be easily identified with a particular product, job or process. These are of a general, common or collective nature which are to be allocated to various products manufactured in the factory. Some examples of such costs are : rent of the factory building, salary of the production manager, wages paid to chowkidar, etc. These costs have to be apportioned among different products on some rational basis. These are known as 'overheads' or 'oncosts' and can be subdivided into factory overheads, administrative overheads, selling and distribution overheads.

2.3.3 On the Basis of Variability

On this basis costs are classified into (i) fixed costs, (ii) variable costs, and (iii) semi-variable (or semi-fixed) costs.

Fixed Costs : Costs which remain unaffected by changes in volume of output are termed as 'fixed costs'. For example, whether we produce 10,000 units or 15,000 units of a particular product during a particular period, the rent of the factory building or salary of the production manager will remain the same. Hence, the rent or salary is regarded as fixed cost. It should, however, be noted that fixed costs do not remain fixed for all times to come. They remain fixed only upto a certain level of production capacity. If there is a change in the production capacity which require additional building and equipment, such costs will also increase.

Variable **Costs** : Costs, which increase or decrease in direct proportion to changes in the volume of output are termed as 'variable costs'. For example, for 10,000 units of output, cost of materials consumed comes to Rs. 1,50,000. If the production is increased to 12,000 units (increase of 20%) the cost of materials will increase to Rs. 1,80,000 (increase of 20%). It should be noted that the cost of material per unit of output has not changed. It remains the same i.e., Rs. 15 per unit. But, it is the total cost of materials which changes because of the change in the volume of output.

Semi-variable Costs : Costs which increase or decrease with a change in volume of output but not in the same proportion as the change in the volume of output are termed as 'semi-variable costs'. In other words, these costs are partly variable and partly fixed and, as such, are also known as 'semi-fixed costs'. Depreciation and repairs of machinery are the best examples of such costs. Depreciation on machinery is caused partly by passage of time and partly by its usage. Hence, when production is increased the amount of depreciation also increases, but not in the same proportion as the increase in the volume of output. Take another example. If the quantity of goods sold increases, the remuneration of salesman may also increase. But, such increase will not be in direct proportion to the increase in sales because his commission on sales will increase while his salary remains the same.

The classification of costs into fixed, variable and semi-variable is very helpful in estimating the total cost at various levels of activity and also in various managerial decisions,

Check Your Progress A

1) What do you mean by the term 'cost'.

.....

.....

2) Distinguish between 'cost' and 'loss'

.....

.....

3) Give three examples of semi-variable costs.

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.....

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4) Distinguish between direct costs and indirect costs.

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.....

5) State whether the following statements are True or False.

i) Costs may be ascertained in different ways by different persons.

ii) The term 'cost' has a fixed, certain and definite meaning.

iii) Rent of a factory building is a variable cost.

iv) Salesmen salary is a fixed cost.

v) All factory expenses can be identified directly with the products manufactured by a factory.

vi) Bad debts are selling costs.

2.4 COST UNIT

You know one of the main functions of costing is to ascertain cost per unit of output. This means that each economic activity has to be measured in identifiable units which may serve as the basis of costing. Such units for the purpose of costing may be as follows :

1) unit of product (e.g., cost per book)
2) unit of time (e.g., cost of generating electricity per hour),
3) unit of weight (e.g., cost per kilogram of biscuits)
4) unit of measurement (e.g., cost per metre of cloth or per square foot of construction),
5) operating unit of service (e.g., cost of running a bus per kilometer).

Thus, **a cost unit is a unit of product, service or time in terms of which costs are ascertained or expressed.** Cost unit will normally be the quantity of a product for which price is quoted to the customers.

Selection of a cost unit, however, must be appropriate. Firstly, it should offer convenience in cost ascertainment. Secondly, it should be easier to associate expenses with cost units. Thirdly, it should be according to the nature and practice of the business.

Some examples of cost unit for different products and services are given below

Product/Activity	Cost Unit
Wire	per metre
Power	per kilowatt hour
Telephone	per call
Iron	per tonne/quintal
Transport	per passenger per kilometer/ per kilogram per kilometer
Bricks	per thousand
Cement	per bag/per tonne
Paper	per ream/per kilogram
Computer	per hour
Printing	per thousand impressions
Cars	per car

Petrol	per litre
Television	per set
Pencils	per dozen
Gold	per gramme
Ship-building	per ship
Nursing Home	per bed per day

2.5 COST CENTRE

A Cost Centre is a location, person or item of equipment (or group of these) for which costs may be ascertained and used for the purposes of cost control. In other words, a cost centre may consist of either or a combination of the following :

LOCATION : Factory, Office, Warehouse, Stores, Sales Depot, etc.

PERSON : Foreman, Salesman, Customer, etc.

EQUIPMENT : Machine, Car, Truck, Crane, etc.

In fact, the entire organisation may be divided into specified cost centres which jointly contribute to the total cost. Identification of cost centres helps us in

1) ascertaining the centre-wise costs,
2) comparing the centre-wise costs periodically,
3) finding out the major trends of variance, and
4) applying the techniques of control to check undue, undesirable or unexpected movements in costs.

A cost centre is a convenient unit of the organisation. It segregates operations, demarcates activities, and distributes expenses. This helps in fixing responsibilities for every cost centre.

Types of Cost Centres : Cost centres may be divided into the following four types :

1) Process Cost Centre (based on sequence of operations)
2) Production Cost Centre (for regular production in a factory)
3) Operation Cost Centre (where various operations are involved in the production process)
4) Service Cost Centre (for activities supporting the main production)

Thus, identification or selection of cost centres depends on the nature and type of industry,

Check Your Progress B

1) Match the cost unit appropriate to the activity/product.

i) Transport	a) per sq, centimeter
ii) House Construction	b) per job
iii) Furniture	c) per contract
iv) Advertising	d) per piece
v) Nursing Home	e) per ton kilometer
vi) Ice Cream	f) per bed per day
vii) Shirt	g) per kilogram

2) Define Cost Unit.

.....

.....

.....

3) What do you mean by Cost Centre?

.....

.....

.....

4) State the objectives of identifying cost centres.

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.....

2.6 ELEMENTS OF COST

There are three main elements of cost : (1) materials, (2) labour, and (3) expenses.

2.6.1 Materials

The term 'materials' refers to those commodities which are used as raw materials, components, or consumables for manufacturing a product. Materials can be direct or indirect.

Direct Materials : All materials used as raw-materials or components for a finished product are known as 'direct materials'. Sugarcane for sugar, cloth for ready-made garments, tyres for car are some examples of direct materials. Packaging is also an item of direct materials cost.

Indirect Materials : Consumables like lubricating oil, stationery, spare parts for machinery are termed as indirect materials. Such commodities do not form part of the finished product.

2.6.2 Labour

The workers employed for converting material into finished product or for doing various odd jobs in the business are known as 'labour'. Labour can also be direct or indirect.

Direct Labour : The workers who are directly involved in the production of goods are known as 'direct labour'. They may be labourers producing manually or workers operating machinery. The wages paid to such workers are known as 'direct wages' or 'manufacturing wages'.

Indirect Labour : The workers employed for carrying out tasks incidental to production of goods or those engaged for office work and selling and distribution activities are known as 'indirect labour'. The wages paid to such workers are known as 'indirect wages'.

2.6.3 Expenses

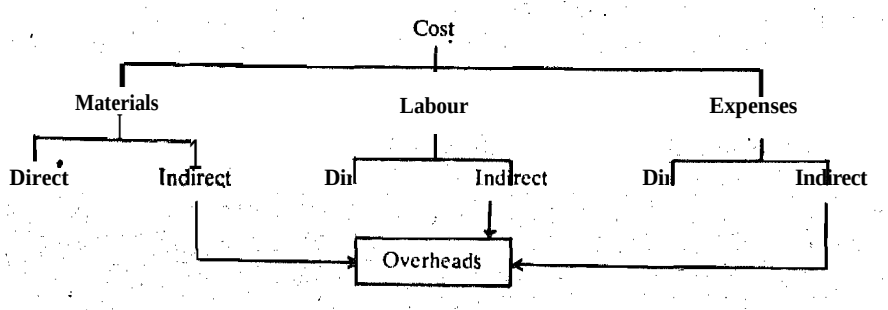
All expenditure other than material and labour are termed as 'expenses'. Expenses can also be direct and indirect.

Direct Expenses : Other expenses which are incurred specifically for a particular product, job or service are termed as 'direct expenses'. Some examples of such expenses are : carriage inwards, production royalty, hire charges of special equipment, cost of special drawings, etc. These are also known as 'chargeable expenses'.

Indirect Expenses : All expenses other than indirect materials and labour which cannot be directly attributed to a particular product, job, or service are termed as 'indirect expenses'. Rent of building, repairs of machinery, lighting and heating, insurance are some examples of indirect expenses.

The various elements of cost have been presented in the form of a chart in Figure 2.1

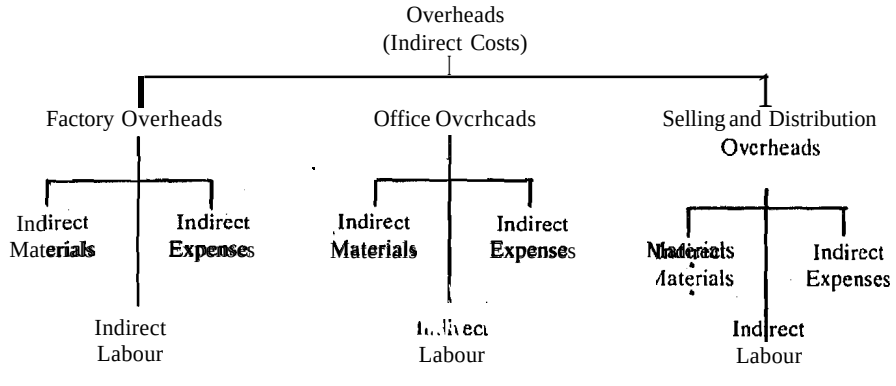
Figure 2.1 : Elements of Cost



Concept of Overheads : All material, labour and expenses which cannot be identified as direct costs are termed as 'indirect costs'. The three elements of indirect costs viz., indirect materials, indirect labour and indirect expenses are collectively known as 'Overheads' or 'Oncosts'.

Overheads are grouped into three categories : (1) factory (or manufacturing) overheads, (2) office (or administrative) overheads, and (3) selling and distribution overheads as shown in Figure 2.2.

Figure 2.2 : Categories of Overheads



Conversion Cost : The cost of converting raw materials into finished goods is termed as 'conversion cost'. This includes direct wages, direct expenses and factory overheads.

2.7 .COMPONENTS OF TOTAL COST

Total cost of a product is the combination of direct costs (also known as prime cost) and indirect costs (also known as overheads).

Thus, the two main components of total cost are : (1) Prime Cost. and (2) Overheads. The prime cost which represents all direct costs, therefore, consists of direct materials, direct labour and other direct expenses. Overheads, on the other hand, consists of factory overheads, office overheads, and selling and distribution overheads?

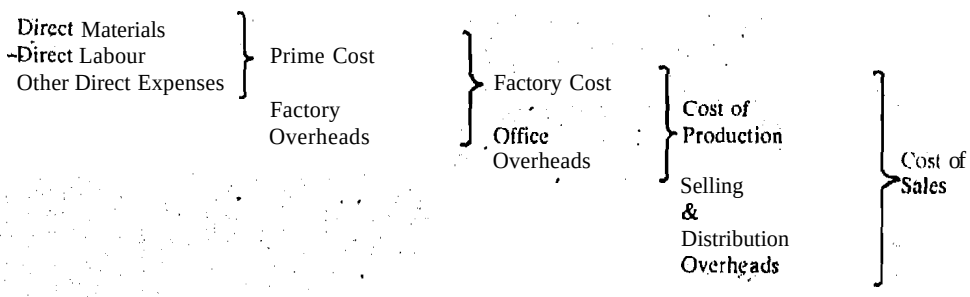
Total Cost **Build Up**

If we add various costs step by step, we get the following framework of total cost build-up.

1) Direct Material + Direct Labour + Other Direct Expenses = PRIME COST
2) Prime Cost + Factory Overheads = WORKS COST
3) Works Cost + Office and Administrative Overheads = COST OF PRODUCTION
4) Cost of Production + Selling and Distribution Overheads = TOTAL COST or COST OF SALES

The above framework of total cost build-up is shown in Figure 2.3.

Figure 2.3 : Total Cost Build-up



Thus, we get the following components of total cost:

1) Prime Cost (also known as Direct Cost or First Cost)
2) Works Cost (also known as Factory Cost)
3) Cost of Production (also known as Office Cost)
4) Cost of Sales

Check Your Progress C

1) Give four examples of other direct expenses.

.....

.....

2) Give four examples of indirect expenses.

.....

.....

3) Distinguish between direct and indirect wages.

.....

.....

4) Fill in the blanks.
   i) Direct Materials + ... + Other Direct Expenses = Prime Cost
   ii) Prime Cost + ... = Works Cost
   iii) Works Cost + Office Overheads = ...
   iv) Prime Cost + ... + ... + ... = Cost of Sales

2.8 COST SHEET

A Cost Sheet is a statement showing various components of total cost which acts as a guide to pricing decisions and a basis for cost control.

It is a presentation of cost data incorporating its various elements in a classified manner. In view of its valuable contents, a cost sheet should be prepared properly. and at frequent intervals (weekly or monthly).

Possible information which may be incorporated into a cost sheet in accordance with the requirements of the business are :

1) Name of the product cost centre or cost unit
2) Period to which the statement relates
3) Output for the period
4) Details of various components of total cost
5) Item-wise cost per unit
6) Changes in stock position
7) Cost of goods sold
8) Profit or loss position

Proforma of cost sheet is given in Figure 2.4.

Figure 2.4 : Proforma of Cost Sheet

COST SHEET OF .....
for the month ending .....
Output : .....units

	Total Rs.	Per Unit Rs.
Raw Materials Consumed		
Opening stock of raw materials		
Add : Purchases of raw materials		
Less : Closing stock of raw materials		

Direct Labour		
Other Direct Expenses		
PRIME COST		
Factory Overheads		
WORKS COST		
Office & Administrative Overheads		
COST OF PRODUCTION (..... units)		
Add : Opening Stock of Finished Goods (..... units)		
Less : Closing Stock of Finished Goods (..... units)		
COST OF GOODS SOLD (..... units)		
Selling & Distribution Overheads		
COST OF SALES (..... units)		
PROFIT (LOSS)		
SALES/SELLING PRICE		

Look at Illustration 1 and see how cost sheet is prepared from given costing data.

Illustration 1

From the following particulars of a manufacturing firm, prepare the Cost Sheet showing (i) Prime Cost, (ii) Works Cost, (iii) Cost of Production, and (iv) Cost of Sales.

	Rs.
Stock of materials on 1.1.1989	40,000
Purchase of Materials	11,00,000
Stock of finished goods on 1.1.1989 (5,000 units)	50,000
Productive wages	5,00,000
Finished goods sold (1,74,000 units)	24,36,000
Works overheads	1,50,000
Office expenses	1,00,000
Selling and Distribution expenses	1,74,000
Stock of materials on 31.12.1989	1,40,000
Stock of finished goods on 31.12.1989 (6,000 units)	60,000

Solution

Before preparing the Cost Sheet, we should work out the number of units produced during the year,

Closing Stock	6,000
Number of units sold	1,74,000
	1,80,000
Less : Opening Stock	5,000
Number of units produced	1,75,000

COST SWEET
for the year ending 31.12.1989

Output : 1,75,000 units

		Total Rs.	Per Unit Rs.
Raw Materials Consumed :			
Opening Stock	40,000		
Add : Purchases	11,00,000		
	11,40,000		
Less : Closing Stock	1,40,000	10,00,000	
Direct Wages		5,00,000	
Other Direct Expenses			
PRIME COST		15,00,000	
Works Overheads		1,50,000	
WORKS COST		16,50,000	
Office Overheads		1,00,000	
COST OF PRODUCTION (1,75,000 units)		17,50,000	10.00
Add : Opening Stock of Finished Goods (5,000 units)		50,000	
Less : Closing Stock of Finished Goods (6,000 units)		18,00,000	
		60,000	
Cost of Goods Sold (1,74,000 units)		17,40,000	10.00
Selling and Distribution Overheads		1,74,000	1.00
COST OF SALES		19,14,000	11.00
PROFIT		5,22,000	3.00
SALES		24,36,000	14.00

2.9 METHODS OF COSTING

Though, in all cases, the basic principles and procedure of costing remain the same, but on account of the nature and peculiarities of their business, different industries follow different methods of ascertaining cost of their products and services. These methods can be summarised as follows :

Job Costing : Under this method, costs are ascertained for each job or work-order separately. It is suitable for industries like printing, car repairs, foundries, painting and decoration, where each job has its own specifications.

Contract Costing : This method is used in case of big jobs described as 'contracts'. The contract work usually involves heavy expenditure, stretches over a long period, and is undertaken at different sites. Hence, each contract is treated as a separate unit for purposes of cost ascertainment and control. Contract costing (also termed as Terminal Costing) is most suited to industries like ship-building, construction of buildings, roads and bridges.

Batch Costing : Where work-orders are arranged in batches and the units produced in a batch are-uniform in nature and design, each batch is regarded as a job and treated as a separate unit for purposes of costing. In such a situation, the method of costing adopted is known as 'batch costing.' It is generally used in industries like pharmaceuticals, bakery, toy manufacturing, etc.

Unit Costing : Under this method costs are ascertained for convenient units of output. It applies to products which are turned out by continuous manufacturing activity and can be expressed in identical quantitative units. It is suitable for industries like brick ,

making, mining, cement manufacturing, dairy, flour mills; etc. This method is also called 'Single Output Costing'.

Process Costing : In case of some industries, a product passes through different stages of production called 'processes' and each process is distinct and well-defined. The output of each process is used as a raw material for the next process and may also be a marketable commodity. Take the case of cotton textile mill where the finished product (cloth) passes through three distinct processes viz., spinning, weaving and finishing. The output of spinning process is yarn which is used as a raw material for the weaving process and the output of weaving process (coarse cloth) is transferred to finishing process. Yarn and coarse cloth can also be sold to other textile mills which may not have adequate spinning or weaving facilities. In such a situation, it becomes necessary to ascertain the cost at each stage. This helps in comparing cost with the market price as well as in cost control. The method employed for ascertaining the cost at each stage of production is termed as 'Process Costing'. It is used in case of chemicals, paints, textile and food products.

Operating Costing : This method is used for ascertaining the cost of operating a service such as bus, railways, water supply, nursing home, etc. In such organisations, the unit of cost is a service unit e.g., in case of buses the unit of cost is passenger kilometer, in case of nursing home it is per bed per day. According to the latest Terminology, this is called 'Service Costing'.

Multiple Costing : Where a produce comprises many assembled parts (or components) as in cases of motor car, typewriter, television, refrigerators, etc., costs have to be ascertained for each component as well as for the finished product. This may involve use of different methods of costing for different components and so it is known as 'multiple' or 'composite' costing.

Uniform Costing : The practice of using a common method of costing by a number of firms in the same industry is known as 'Uniform Costing'. Thus, **it is not a separate method of costing. It simply refers to a common system using agreed concepts, principles and standard accounting practices.** This helps in making mter-firm comparisons and fixation of prices.

It should be noted that the **two basic methods** of costing are : **(1)** Job Costing, and (2) Process Costing. The other methods discussed above are simply variants of these two methods.

Check Your Progress D

4) Name the two basic methods of costing.

.....

.....

2) Which method of Costing would you recommend for the following industries?

i) ship-building .....
ii) Toy Making .....
iii) Oil Refinery. .....
iv) Sugar .....
v) Brick Making .....
vi) Construction of Bridge .....
vii) Road Transport .....
viii) Furniture .....

2.10 TYPES OF COSTING

While method of costing refers to the process and practice of ascertaining costs of products and services, the type of costing refers to the technique of analysing and presenting costs for purposes of control and managerial decisions. The types of costing (also known as techniques of costing) generally used are as follows :

Marginal Costing : It refers to the technique of costing which emphasises the distinction between fixed and variable costs and calculates the cost of a job or a product without taking fixed costs into account. It allocates only variable costs (direct materials, direct labour, other direct expenses and variable overheads) to production and is also known as 'Variable Costing'.

Absorption Costing : It refers to the technique of costing under which full costs are charged to production i.e., both fixed and variable costs are included in the cost of products.

Historical Costing : It refers to a system of cost accounting under which costs are ascertained only after they have been incurred. In other words, the accounting is done in terms of actual costs and not in terms of predetermined or standard costs. Most organisations follow this system of accounting for costs.

Standard Costing : It refers to the system of cost accounting under which costs are determined in advance on certain predetermined standards. These are known as standard costs which indicate the level of costs that should be attained under a given set of operating conditions. The standard costs are compared periodically with the actual costs and underlying causes for variances are analysed so that corrective action may be taken where necessary.

Thus, having adopted a method of costing suited to the nature of activity in which the undertaking is engaged, there is then a choice open with regard to the way in which the costing information is to be presented for control purposes. Either 'marginal costing' or 'absorption costing' may be employed and either 'actual costs' or 'standard costs' may be adopted to ascertain and account for costs.

2111 LET US SUM UP

Cost ascertainment is an important process of accounting. Cost means an amount of expenditure (actual or notional) incurred or attributable to a product, job, process, or service. Cost is a flexible concept. It may vary with time, volume, firm, method or purpose. It should also be distinguished from the term 'loss' which refe s an expenditure incurred without deriving any benefit therefrom.

Costs can be classified in various ways. On the basis of functions to which they relate, costs are classified into manufacturing costs, administrative costs, and selling and distribution costs. On the basis of their identifiability with products, costs can bc classified into direct costs and indirect costs. On the basis of their variability in relation to nature of output, costs can be classified into fixed costs, variable costs and semi-variable (or semi-fixed) costs.

The two concepts which serve as the basis for cost computation are : (i) cost unit, and (ii) cost centre. Cost unit refers to that quantity of a product in terms of which costs are ascertained e.g., per kilogram, per dozen, per piece, etc. Cost centre refers to the division of organisation into convenient segments with defined responsibilities to which initial allocation and apportionment of various costs can be made and which can be used for the purpose of cost control. It can be a department, a person or an item of equipment.

There are three basic elements of cost : (i) materials, (ii) labour, and (iii) expenses. They may be direct or indirect. Indirect costs including indirect materials, indirect labour and indirect expenses are known as 'overheads'. Overheads are usually classified into factory overheads, office overheads, and selling and distribution overheads.

The main components of total cost are prime cost, works cost. cost of production and cost of sales. These are actually the stages to determine the total cost and facilitate control.

There are various methods of costing. These are (i) job costing, (ii) contract costing, (iii) batch costing, (iv) unit costing, (v) process costing, (vi) operating costing, (vii) multiple costing, and (viii) uniform costing. Every organisation adopts the method which suits the nature of its products and the technique of production used.

2.12 KEY WORDS

Conversion Cost : Cost of converting materials into finished products. It includes direct labour, direct expenses and factory overheads.

Cost Centre : A convenient costing segment to which initial allocation and apportionment of various expenses can be made.

Cost of Sales : Total cost of a product including selling and distribution expenses.

Cost Unit : The quantity in terms of which the cost of a product is ascertained.

Prime Cost : Cost of direct expenses including those of materials and wages.

Semi-variable Cost : Expenses which change with changes in output, but not in the same proportion.

Standard Cost : **A** predetermined cost based on a technical estimate for material, labour and overheads for a selected period of time and for prescribed set of working conditions.

Works Cost : Prime cost plus factory overheads.

2.13 ANSWERS TO CHECK YOUR PROGRESS

A 5 (i) True (ii) False, (iii) False (iv) True
(v) False (vi) True

B 1 (i) e (ii) c (iii) b (iv) a
(v) f (vi) g (vii) d

C 4 (i) Direct Wages (ii) Factory Overheads (iii) Cost of Production
(iv) Factory Overheads, Office overheads, Selling and Distribution Overheads

D 2 (i) Contract Costing (ii) Batch Costing
(iii) Process Costing (iv) Process Costing
(v) Unit Costing (vi) Contract Costing
(vii) Operating Costing (viii) Job Costing

2.14 TERMINAL QUESTIONS

1) Define the term 'Cost Centre'. Analyse the importance of selecting suitable cost centres.

2) Why do we need to qualify 'cost'? Discuss.

3) "Costs may be classified according to their nature and characteristics." Elaborate on this statement and clarify the meaning of fixed, variable and semi-variable costs with examples.

4) What are the different methods of costing? State the industries to which they can be applied.

5) State tlie main characteristics of the following methods of costing and indicate in which industry each would be suitable :

a) Process Costing
b) Job Costing
c) Output Costing

6) The following figures relate to Rising Star Co. :

	Rs.
Wages	3,000
Factory Expenses	4,000
Office Expenses	5,000
Materials	6,000
Selling Expenses	3,000
Distribution Expenses	3,000
Sales	24,000
Output	2,000 units
Number of units sold	1,500 units

You are required to compute :

a) Prime Cost
b) Works Cost
c) Office Cost (Cost of Production)
d) Total Cost
e) Cost per unit
f) Profit during the period
g) Profit per unit

Answer : a) Rs. 9,000 b) Rs. 13,000 c) Rs. 18,000
d) Rs. 24,000 e) Rs. 12 f) Rs. 6,000
g) Rs. 3.

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice,only.

SOME USEFUL BOOKS

Arora, M.N. 1988. A ***Text Book of Cost Accountancy.*** Vikas Publishing House Pvt. Ltd., New Delhi (Chapter 1–2).

Bhar, B.K. 1990. ***Cost Accounting : Methods and Problems.*** Academic Publishers, Calcutta (Chapter 1–2).

Maheshwari, S.N. and S.N. Mittal. 1990. ***Cost Accounting : Theory and Problems.*** Shree Mahavir Book Depot, Delhi (Chapter 1).

Nigam B.M.L. and G.L. Sharma. 1990. *Theory and Techniques of Cost Accounting.* Himalaya Publishing House, Bombay (Chapter 1–3).

Owler- L.W.J. and J.L. Brown. 1984. ***Wheldon's Cost Accounting. ELBS,*** London (Chapter 1–2).

ECO-10 ELEMENTS OF COSTING
Course Components

BLOCK	UNIT NO.	PRINT MATERIAL
1		**Basic Concepts**
	1	Nature and Scope
	2	Concept of Cost and its Ascertainment
2		**Materials** and Labour
	3	Procurement, Storage and Issue of Materials
	4	Inventory Control
	5	Pricing Issue of Materials
	6	Labour
3		Overheads
	7	Classification and Distribution of Overheads
	8	Absorption of Factory Overheads
	9	Treatment of other Overheads
4		Methods **of Costing**
	10	Unit Costing
	11	Reconciliation of Cost and Financial Accounts
	12	Job and Contract Costing
	13	Process Costing

UNIT 3 PROCUREMENT, STORAGE AND ISSUE

Structure

3.0 OBJECTIVES

After studying this unit you should be able to:

- define and distinguish between direct and indirect materials
- define material control and state its objectives
- explain the steps involved in connection with the purchase of materials
- explain the objectives and functions of storekeeping
- explain the procedure involved in connection with the issue of material.

3.1 INTRODUCTION

Material constitutes an important part of the cost of production of an article. It is, therefore, necessary to exercise proper control over the procurement, storage and issue of materials. In this unit you will study the procedure and documents involved regarding the purchase of materials, its storage and issue to the various production orders.

3.2 DIRECT AND INDIRECT MATERIALS

If you analyse the cost of production of any articles, you will find that materials constitute an important component of the cost of production. They account for nearly 60 per cent of the cost of production of a large number of private and public sector organisations. The materials can be divided into two categories: (1) Direct materials; and (2) Indirect material's,

The materials which can easily be identified and attributed to the individual units are known as 'direct materials'. These materials form part of the finished product. Leather used in the mgnufacture of shoes and yarn required for the production of cloth are examples of direct materials. All costs which are incurred to obtain direct materials are known as 'direct material cost'. Indirect materials, on the other hand,

do not form part of the finished product and cannot be conveniently and accurately allocated to a particular unit of product. Examples of such materials are: consumable stores, cotton waste and lubricating oils, required for the maintenance of machines, etc. Costs associated with indirect materials arc known as 'indirect material costs'

The grouping of materials into direct and indirect sometimes become a matter of convenience. Materials of small value which should actually be termed as direct may be treated as indirect for the sake of simplicity. For instance, in the manufacture of shirts, the thread forms part of the shirts and hence should be classified as direct materials. But, considering the time and expense involved in measuring the thread required for each shirt, it is desirable that the cost of thread be treated as indirect material cost. Similarly in the manufacture of shoes, the cost of nails used is treated as indirect material cost.

3.3 MATERIAL CONTROL

As stated earlier, materials constitute an important part of the cost of production of a product. It is, therefore, important to keep a strict control over the cost of materials. Any savings made in the cost of material? will go a long way in reducing the cost of production and improving the profitability of the concern. It is essential to keep a proper control over materials and supplies from the time orders for materials are placed with the suppliers until they have been consumed. Proper control of material can make asubstantial contribution to the efficiency of a business.

3.3.1 Definition

Material control may be defined as the regulation of the functions of an organisation relating to procurement, storage and usage of materials in such a way as to maintain an even flow of production without excessive investment in material stock. Thus, materials control involves control of three important functions viz., procurement, storage and usage. It has been rightly pointed out that just as the handling of cash is of utmost important in the case of a non-manufacturing business, an efficient handling of materials is of vital importance in tha case of a manufacturing business.

3.3.2 Objectives

The following are the main objectives of material control.

1) There should be a continuous availability of all types of materials in the factory so that production may not be help up for want of any material.

2) Over stocking of materials should be avoided. By doing so the various losses caused by overstocking can be avoided.

3) Materials should be purchased on the most favourable terms. This helps in effecting maximum economy in the cost of buying of course, the quality should not be sacrificed at the cost of lower price.

4) Purchase of materials should be of the right quality consistent with the standards prescribed in respect of the finished product.

5) Materials should be properly stored so as to prevent losses during storage.

6) The management should'be frequently provided with information regarding the cost of materials and the availability of stock.

3.3.3 Advantages

The main advantages of a good system of material control are as follows:

1) It ensures unrestricted and continuous supply of materials and may be greatly helpful in preventing production delays.

2) It minimises capital investment in the stock of materials.

3) It considerably reduces the cost of storage and issuing of materials.

4) It eliminates wastage and loss of materials arising on account of spoilage, filferage, theft, etc.

5) It is immensely helpful in introducing the system of perpetual inventory control by which accurate ascertainment and valuation of closing stock are facilitated.

6) It ensures the purchase of materials at reasonable prices.

7) It aids management in initiating and formulating proper purchase policies regarding materials.

3.3.4 Basic Requirements

Materials control extends to all spheres of materials management viz., buying, receiving, inspection, storage consumption and accounting. The following are the basic requirements of a good system of materials control.

1) There should be proper co-ordination of all departments which are involved in the purchasing, receiving, testing, approving, storage of materials and payment of price.

2) The purchase of materials should be centralised.

3) Proper forms should be used with regard to receipt, issue and transfer of materials from one job to another.

4) There should be a budget for materials and supplies so that economy in purchasing and use of materials is realised.

5) A system of internal check should be introduced in order to have proper check on the purchases of materials, and supplies.

6) A well arganised system of storage of materials should be undertaken in order to avoid deterioration, pilferage, wastage and evaporation of materials.

7) There should be a system of perpetual inventory so that it is possible to find out the quantity and value of materials in stock at any point of time.

8) Minimum limit for each item of material should be fixed below which the stock is not allowed to drop. Similarly, the maximum limit should be fixed above which the stock should not be kept.

9) There should be a proper system for the issue of materials so that there will be delivery of materials on requisition to the department, processes or jobs in the right quantity and at the moment they are needed.

10) Information about availability of materials should be made continuously available to the management so that planning of production may be done keeping in view the inventory balances in stores. Information about obsolete and defective stock should also be given to the management from time to time so that steps may be taken for the disposal of such stock.

Check Your Progress A

1) Select the correct answer in each of the following cases:

i) In most of the industries, the most important element of cost is
   a) Material
   b) Labour
   c) Overheads

ii) Direct material is a
   a) Fixed cost
   b) Variable cost
   c) Semi-variable cost

iii) Direct material is a
   a) Manufacturing cost
   b) Administration cost
   c) Selling and distribution cost
   d) Any of the above

iv) Which of the following items of cost should not be treated as direct material
   a) Electricity representing 90% of the total cost
   b) Sand paper used in production
   c) Thread used in stitching garments
   d) All of the above

2) Define materials control.

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3.4 PURCHASE PROCEDURE

You should know that purchasing is the most significant step in the process of material control. In order to ensure that the required materials are available at the right time, in the right quantity and at the right price, there should be a separate purchase department under the control of a purchase manager.

Keeping in view the size and the requirements of an organisation. The function of purchasing can be either centralised or decentralised. Let us study these two systems in detail.

3.4.1 Centralised Purchasing

Under centralised purchasing purchases are made at one central point for the whole organisation and from that central point materials are issued to respective departments or jobs as and when required. In other words, centralisation of purchasing refers to the placement of authority for the whole purchasing function in the purchasing department headed by the purchase manager. In medium sized and big companies purchasing function is generally centralised.

Advantages

1) Centralised purchasing brings about economies in purchasing. Higher trade discount or economies in transport can be obtained because the quantity involved will be large.

2) The buying staff concentrates on purchases alone and develops specialised knowledge and skill leading to expert and economical buying.

3) It ensures consistent policy with regard to purchases. It avoids haphazard buying and the consequent effect on the finances of the concern.

4) Centralised purchasing facilitates the maintenance of one complete set if records for purchase transactions which enables the management to exercise a better and effective control over purchases.

5) It relieves the departmental heads of the responsibility of procuring variety of materials. They can thus concentrate on the functions assigned to them.

6) Centralisation of purchasing is helpful to the vendors. Their selling costs are reduced as they can easily co-ordinate and supply goods to a single buyer instead of large number of buyers.

Disadvantages

1) The procedure adopted for the purchase of materials is less flexible which may cause undue delays in obtaining supplies.

2) The administrative cost of setting up a separate purchase department is likely to be quite high.

3) There are chances of misunderstanding between the department which requires the material and the purchasing department with the result that wrong purchase of material can be made.

3.4.2 Decentralised Purchasing

Decentralised purchasing is the reverse of centralised purchasing. Each department makes its own purchases. Decentralised purchasing is also known as 'localised purchasing'.

Advantages

1) It is quite flexible and can be quickly adjusted in accordance with the changed requirements of a particular plant.
2) In case of emergency, localised purchasing is best suited and purchases can be procured more quickly.
3) Technical requirements of each plant can be ascertained.

Disadvantages

1) As compared to centralised buying, it offers lesser economy in purchasing.
2) There are problems of co-ordination among various departments of the organisation and it usually leads to unplanned buying.
3) Uniformity in prices may not be ensured because every departmental head may not posses the calibre of an expert buyer.

After analysing the merits and demerits of both the systems, it can be said that centralised purchasing is decidedly better than decentralised purchasing. However, neither of them is considered wholly satisfactory in the case of all types of concerns. Centralised purchasing is eminently suited to a concern operating only one plant. It is also suitable for a concern operating two or more plants located not far away from one another and producing more or less homogeneous products. However, a manufacturing concern which operates several branches or factories at different places and manufactures different products requiring different types of materials, can have decentralised purchasing and different factories can meet their requirements by making purchases in the local markets.

3.4.3 Steps Involved in Purchase

Although the details of the purchase procedure may very with individual concerns, the following are the various steps which are usually followed in connection with the purchase of materials.

1 Purchase Requisition

A form known as 'purchase requisition' is commonly used as a formal request to the purchase department to order goods or services. The purchase requisition serves the dual purpose of authorising the purchasing department to make a purchase and provides a record of the description and quantity of materials required.

The purchase requisition is prepared by the storekeeper for regular stock materials and by the departmental head for special materials not stocked as regular items. Regular purchase requisitions are prepared when stock is reduced to re-order level, i.e., the level when the order for replenishment should be placed. The requisition is approved by an executive.

Purchase requisitions are generally prepared in triplicate. The original copy is sent to the purchase department, the record is retained by the storekeeper or the executive initiating the purchase requisition and the third copy is sent to the costing department.

The purchase requisition contains the requisition number, date, department, code number, description and quantity of materials required, signature of the person initiating the requisition and signature of one or more executives approving the purchase requisition.

Specimen form of purchase requisition is given in Figure 3.1.

Figure 3.1: Specimen **of** Purchase Requisition

PURCHASE REQUISITION

No..... Date .....
Date by which materials are required .....

Serial No.	Description	Code No.	Quantity	Remarks

Requested by ..... Checked by ..... Approved by .....

2 Selecting the Supplier

Having decided to purchase the material, the purchase department invites tenders or quotations for the supply of materials. On receipt of the quotations from the suppliers, a comparative statement known as 'schedule of quotations' should be prepared so that a suitable supplier may be selected.

While making the selection, the purchase manager should not machanically identify the supplier whose quotation is the lowest. He should judiciously decide with whom he has to place the order and in doing so he must consider such factors as price, quality, time of delivery, dependability of the supplier, discount, credit facility, terms of payment, etc.

The specimen of the comparative statement of quotations is given in Figure 3.2

Figure 3.2: Specimen **of** Schedule **of** Quotations

COMPARATIVE STATEMFNT OF QUOTATIONS

Tender No. .....
Material ..... Date .....

Serial No.	Name of the supplier	Quantity	Rate	Terms of delivery	Time of delivery	Remarks

Purchasing clerk _____ Purchase Officer _____

3 Purchase Order

After choosing the supplier, the purchase department prepares a purchase order for the supply of stores. The order is the written authorisation to the supplier to supply the particular material or materials. The'purchase order is an important document not only from the legal point of view, but from the accounting point of view also. It is the evidence of the contract between the buyer and the supplier that binds both the buyer and the supplier to the terms under which the order is placed. It also gives authority to the receiving department to receive the materials ordered for and to the account department to accept the bill from the supplier for payment.

The purchase order should contain such particulars as date, name and address of the supplier, description and specification of the material, quantity ordered, date, time and place of delivery, price, terms of payment, transport charges, packing and shipping instructions, the name and address of the buyer, and the signature of the purchase manager.

The number of copies of the purchase order depends upon the size of the organisation. A large concern usually issues five copies. Of these the original copy is sent to the supplier, the second to the receiving department, third to the department initiating the purchase requisition, the fourth to the accounts department and the fifth copy is retained in the purchase department. The copy retained in the purchase department is used to check the progress of the order and to ensure that the delivery promise's are adhered to.

A specimen of the purchase order is given in Figure 3.3.

Figure 3.3: Specimen of Purchase Order

PURCHASE ORDER

To
.....

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Date .....

Requisition No.

(Name and address of supplier)

Please supply the following items in accordance with the terms and conditions mcntioncd hcrcin.

Item No.	Description .	Quantity	Code No.	Price	Total	Remarks

Packing and despatching instructions .....

Discount .....

Terms of payment .....

Condition regarding empties .....

Excise duty and sales tax .....

For X Y Z Co. Ltd.

(Signature)
Chief Purchasing Officer

4 Receiving and Inspection of Materials

The receiving department is responsible for taking delivery of packages and to get a physical verification of the contents. When the packages are received, the receiving official gets them opened and makes a detailed verification of the contents. After the contents of the packages have been checked, the details of the materials received are entered in a Goods Received Note. Five copies of the note are prepared. One copy is kept by the receiving department while the remaining copies are routed to the purchase department, the department originating the purchase requisition, the stores department, and the accounts department.

The form of the Goods Received Note is given in Figure 3.4.

Figure 3.4 : Specimen of Goods Received Note

GOODS RECEIVED NOTE

Supplier's name .....

G.R. No.....

Purchase order No. .....

Date .....

Item No.	Description	Code No,	Quantity ordered	Quantity received	Amount	Remarks

Received by .....

Inspected by .....

Storekeeper .....

Stores ledger posted by .....

Where the factory has a separate inspection department, its main function is confined to testing the material received, for quality and specifications. The engineer or the chemist may be called to check the quality of the materials. He is to ensure that the quality is according to the purchase order. After checking the quality of the materials, the department will submit a report as to the quality and if some of the materials are

rejected, the reasons therefore. An unfavouable inspection report is utilised by the-purchasing department in obtaining adjustments or an authority for the return of goods to the vendor. This forms the basis for' the issue of a debit note.

5 Checking and Passiug of Bills for Payment

Invoice is the document giving details of goods supplied and the amount to be paid. Invoice received by the purchase department is forwarded to the Accounting Department to check the authenticity as well as the arithmetical accuracy. The quantity and the price mentioned in the invoice are checked with reference to goods received note and the purchase order respectively. For Adjustment of discrepancies. the inspection report and goods returned note should be compared with the invoice, It is equally necessary to check extensions and totals.

If the contents of the invoice are found to be correct, an endorsement to that effect is made on it with a rubber stamp. With the signature of the purchase manager, the invoice is passed on to the accounts department for payment.

Check Your Progress B

1) Indicate whether the following statements are True or False.

   i) Purchase requisition note is prepared by the purchasing department.

   ii) Purchase order is prepared by the stores department.

   iii) Original copy of the purchase order is sent to the supplier.

   iv) Goods received note is prepared by goods receiving department.

   v) Payment of the invoice is made by the purchase department.

2) List the steps involved in purchase of materials.

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3) What do you mean by centralised purchasing?

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3.5 STORAGE OF MATERIALS

After the purchase, receipt and inspection of materials, the next most important step in the process of material control is concerned with' the storage of materials which is termed as 'storekeeping', Storekeeping is that aspect of material control which is concerned with the physical storage of goods. For carrying the task of storekeeping, a separate stores department under the charge of a storekeeper'is set up. The storekeeper should have the technical knowledge and experience in stores routine and the ability of organising various activities relating to the storage of goods. An efficient system of storekeeping should:

1) . Ensure uninterrupted supply of materials and stores without delay to various production and service departments of the organisation.

2) Prevent overstocking and understocking of materials.

3) Minimise the cost of storage.

4) Prevent all kinds of stores from theft, deterioration, evaporation and,pilferage.

5) Ensure an effective utilisation of available storage space and workers engaged in the process of storekeeping.

6) Develop a system of providing necessary information about the material items in the stores as and when required.

3.5.1 *Functions of* Storekeeping

The following functions are performed by the stores department:

1 Receipt of material from the goods receiving department and ensuring that every item of stores received by a storekeeper is duly supported by a indent, a purchase order, an inspection note and a goods received note.

2) Issue purchase requisition to the purchase department when the stock of material reaches the re-order level.

3) Maintain proper record of receipt, issue and balance of all items of materials, and check the bin card balances with the physical quantities in the bins.

4) Placing and arranging materials received at proper and appropriate places and adhering to the golden principle of storekeeping, i.e., a place for everything and everything in its place.

5) Issue stores, against proper authorisation, in right quantity of right specification, and at the right time.

6) Minimising the storage handling and maintaining costs.

7) Ensuring that the stocks neither exceed the maximum level nor go below the minimum level at any point of time.

8) Preventing the entry of unauthorised persons into the stores.

9) Co-ordination and supervision of staff in the stores department.

10) Carrying out a regular review of the items of stores in hand for locating slow moving and non-moving items so that the necessary steps may be taken for their disposal before they become obsolete.

3.5.2 *Location* and *Lay-out of Stores*

The location of stores department should be undertaken very carefully. The management should keep in mind various important considerations before selecting proper site for locating the stores department. It should be close to the receiving department so that the transportation charges can be minimised. At the same time, there should be an easy access to all other departments of the factory, roads, railways siding and wharf.

Proper lay-out of stores is also of vital importance. Lay-out refers to the internal arrangement or placement of materials inside the stores. It aims at effective utilisation of space available for storage of materials. The stores should be divided into racks which should be sub-divided into small spaces. All these spaces are known as bins. For every kind of material a bin is allotted. All bins should be serially numbered.

The stores department should be equipped with racks, shelves, boxes crates, barrels, drums, cylinders and other receptacles for storing the different items. The receptacles should be arranged in such a way as to make the fullest utilisation of available space. At the same time, they should be easily accessible. Enough space should be provided for the movement of trucks, conveyors, lifts and other mechanical devices.

A proper location and lay-out would ensure economy in materials handling, transportation costs, minimise wastage, ensure effective supervision and control.

3.5.3 Issue *of Materials*

All items in stores are meant issuance to various production departments. The procedure for the issue of material is normally laid down by the management.

The storekeeper should not issue the materials unless a properly authourised ***material requisition*** is presented to him. The requisition is prepared by the foreman or the head of the department. It is prepared in triplicate, two copies are sent to the stores department and the third copy is retained by the requisitioning department for its own reference. On receipt of the materials requisition, the storekeeper issues the necessary materials against the signatures of the person receiving the materials. One of the copies of the materials requisition is used by the storekeeper for making the necessary entries in the bin card. The other copy is sent to the costing office for pricing the issues and making the necessary entries in the stores ledger.

A specimen of the materials requisition is given in Figure 3.5

Figure 3.5: Specimen of Materials Requisition

MATERIALS REQUISITION

Department ..... Serial No. .....

Job No..... Date .....

Quantity	Description	Code No.	Bin card No.	Stores ledger folio No.	Rate	Amount

Authorised by ..... Received by .....

Storekeeper's signature ..... Checked by .....

You will notice in the above specimen of materials requisition that it contains information regarding the date, requisition number, description, quantity of the material, name or job order number or work order number or process on which material is to be used, and the signatures of the person receiving the materials. The entries in the rate and amount columns of the requisition slip are made by the costing office.

Bill of materials

Material requisition slip considerably increases the work-load, both in the production department and the stores department. Production may be delayed if requirements are not submitted in time or if the materials are not available in stock. The use of the bill of materials overcomes all these difficulties.

A bill of materials is a standard list (also called specification list) of all materials required for a particular work order, job or process. It is prepared by the production department on receiving the order. It can be used as a substitute for materials requisition. It provides advance intimation to the storekeeper about the requirements of different jobs or work orders.

The bill of materials serves the following purposes:

1) The clerical work involved in preparing a number of requisitions is considerabably reduced and there is economy in the use of stationery.

2) The cost of transportation involved in receiving the required quantity of every type of material is also proportionately reduced since all the materials required for a particular job can be transported to the receiving department only once.

3) It serves an advance intimation to the storekeeper and constitutes an authorisation for the issue of materials.

4) It may also be used as an authorisation for procurement of materials if these are not available in stock. Thus it eliminates the need for the issue of purchase requisitions for procuring materials not available in stock.

5) It may be used as a basis for passing accounting entries in the stores ledger.

6) The procurement and issue of materials can be planned in advance to avoid delays in production and deliveries.

3.5.4 Treatment of Surplus Materials

Sometimes materials may be issued in excess of the requirement for a particular job or work order. This may be done either to facilitate convenient handling or sometimes it may not be possible always to ascertain exactly the quantity of material that will be required. This would result in a surplus of material at the work site. We can dispose of the surplus in two days. We can either return the surplus material to the stores or transfer the material to some other job or jobs where those materials have been requisitioned.

Return of Materials: The document used for return of excess materials to the stores is known as **'materials returned note' or 'shop credit note'.** The form of the materials returned note is similar to that of material requisition slip. But to distinguish between the two, forms of different colours are generally used. The materials returned note is prepared in duplicate. One copy is retained by the department returning the material and the other copy is kept by the storekeeper who gets it along with the material returned. The materials returned note is forwarded to the costing office where the necessary credit for value of materials returned is given to the particular job.

Transfer of materials: Sometimes excess materials in relation to a job or work order may become useful to another job. In such a case, a material transfer note should be prepared transferring the material from one job to another. This obviates the need to return the excess materials to stores and draw the same again.

You should note that the direct transfer of material from one job to another is undesirable and should be discouraged as far as possible. It is, however, justified when an urgent job has to be completed and it is necessary to appropriate the surplus materials in order to avoid the delay which may be caused if the normal routine of returning the material to stores and then getting them reissued is followed. But, all such transfer of materials must be accompanied by a **Materials Transfer Note** which is signed by the foreman of the sending and receiving departments and forwarded to the costing office where the necessary adjustments shall be made in the respective job accounts. If a transfer of the material is made without the knowledge of the costing office, it will result in excess debit to one job and lower debit to another. As such the true costs of jobs cannot be ascertained and cost comparison would be misleading.

Check Your Progress C

1) Fill in the blanks in the following.
   i) ..... items should be stored as near as possible to the department requiring them.
   ii) Materials should be issued by the storekeeper against .....
   iii) A list of all materials and parts required for a particular job is called .....
   iv) ..... is a document which records the return of unused materials.
   v) ..... is a document on which is recorded the transfer of materials from one job or department to another.

2) List any three functions of store keeping.

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3.6 LET US SUM UP

Materials are divided into two broad categories: direct and indirect. Direct materials can be easily identified with the finished product whereas indirect materials cannot be

so identified. However, sometimes materials of small value, though forming part of the finished product are treated as *indirect* for the sake of simplicity.

Since materials constitute an important part of the cost of production, it is important to keep a proper control over them from the time orders for materials are placed with the suppliers until they have been consumed. Proper control over material can make a significant contribution to the efficiency of business. Materials control involves the control over the procurement, storage and usage of materials.

The responsibility for the purchase of materials is entrusted to a separate purchase department under the charge of a purchase manager. The purchase function may be centralised or decentralised. Centralised buying is decidedly better than the decentralised buying due to relative merits of the former over the latter. However, neither of them can be considered as wholly satisfactory in the case of all types of concerns; The purchase department adopts a standard procedure for the purchase of materials. It involves (i) receiving purchase requisition (ii) inviting quotations (iii) (iii) selecting the supplier, (iv) placing the order, (v) receiving the materials and transferring them to stores, and (vi) passing bills for payment.

Storage is the art of preserving raw materials and finished goods in the stores in the best possible manner. The stores department should be located as near as possible to the goods receiving department. It should have facilities for the storage of all types of goods in such a manner so as to avoid the possibility of loss in storage. The issue of materials from stores should be on the basis of properly authorised materials requisition slip. Surplus materials issued to a job may either be returned to stores or transferred to some other job where the same materials are required. Accordingly, the shop will prepare the materials returned note or the materials transfer note.

3.7 KEY WORDS

Bill of Materials : A standard list of materials and components required for a particular work order.

Centralised Purchasing : Purchase of materials by a specialised department.

Decentralised Purchasing : Purchases to be made by individual departments.

Goods Received Note : A document prepared by the receiving department on receipt of materials.

Lay-out of Stores : Internal arrangement or placement of materials inside the stores.

Material Control : Regulating the functions of procurement, storage and usage of materials in such a way as to maintain an even flow of materials to production and avoid excessive investment in stock of materials.

Materials Returned Note : A document used for the return of excess materials to the stores.

Materials Requisition Slip : A document on the basis of which materials are issued by the storekeeper.

Materials Transfer Note : A document used for the transfer of materials from one job to another.

Purchase Order : A request made by the purchaser to a supplier to deliver certain goods of requisite quality and quantity at the terms and conditions agreed upon.

Purchase Requisition Slip : A document requesting the purchasing department to purchase certain materials.

Storekeeping : Function of maintaining stores.

3.8 ANSWERS TO CHECK YOUR PROGRESS

A 1 i) a ii) b iii) a iv) d

B 1 i) False ii) False iii) True iv) True v) False

C 1 i) Bulky
ii) Materials Requisition
iii) Bill of Materials
iv) Materials Returned Note
v) Materials Transfer Note

3.9 TERMINAL QUESTIONS

1) What do you understand by direct material and indirect material? Give examples.

2) What do you understand by materials control? Give its main objectives.

3) What are the important requirements of an efficient system of material control?

4) Distinguish between centralised purchasing and decentralised purchasing.

5) Outline the routine for the purchase and receipt of stores noting the important documents involved.

6) What is a Goods Received Note? Give its specimen form and state the purpose it serves.

7) Describe the functions of the stores department.

8) State the procedure for the issue of materials.

9) State the documents used in connection with receipt, issue, transfer and return of materials from production to stores.

10) Under what circumstances should surplus material be transferred to another job?

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These arc for your practice only.

UNIT 4 INVENTORY CONTROL

Structure

4.0 OBJECTIVES

After studying this unit, you should be able to:

- define the term inventory control and List its objectives
- enumerate the various techniques of inventory control
- explain the various stock levels, and the methods of their calculation
- define the term ordering quantity and list the factors on which it depends
- explain the record maintained by the store keeper and the costing department
- define perpetual inventory system and explain its advantages
- determine the stock turnover ratio to determine the fast and slow moving stocks.

4.1 INTRODUCTION

You have learnt that inventories constitute a significant part of the total production cost of a product. An inadequate stock of inventory leads to holding up of production thereby leading to customer dissatisfaction, loss of revenue etc. Excessive investment in inventory, on the other hand,leads to locking up of capital results in losses due to deterioration and obsolescence of products. Thus, control of inventory will go a long way in reducing the cost of production and improving the profitability of a concern. In this unit you will study the various methods by which a firm exercises proper control over inventories and avoids losses arising from understocking and overstocking of materials.

4.2 MEANING AND OBJECTIVES OF INVENTORY CONTROL.

4.2.1 Meaning

Inventory control includes control over raw materials, stores supplies, space parts, partly finished goods and finished goods. It is a system which ensures the required quantity of inventories of the required quality, at the required time and with the minimum amount of capital. The function of inventory turnover is to obtain maximum iaventory turnover with sufficient stock to meet all requirements. The quantum of inventory to be kept is decided after taking into consideration the availability of finance, the quantum of discount allowed, the cost of storage and storage space available etc.

4.2.2 Objectives

The main objectives of inventory control are as follows:

i) To provide continuous flow of inventory for efficient and uninterrupted flow of production .

ii) To avoid excessive investment in inventory and consequently reducing carrying costs

iii) To keep ,surplus and obsolete items to the minimum

iv) To relieve.the management in taking inventory decisions for various items of inventory from time to time.

4.3 TECHNIQUES OF INVENTORY CONTROL

The following are the common techniques of inventory control:

1) ABC analysis
2) Setting of various stock levels
3) Economic order quantity
4) Use of perpetual inventory records and continuous stock verification
5) Use of control ratios and review of slow and non-moving items.

4.3.1 ABC Analysis

For the purpose of exercising selective control over materials, manufacturing concerns find it useful to divide materials into three categories. An analysis of the annual consumption of materials of any organisation would indicate that a handful to top high value items (less than 10 per cent of the total number) will account for a substantial portion of about 70 per cent of total consumption value. Similarly, a large .number bottom items (over 70 per cent of the total number of items) account for only about 10 per cent of the consumption value. Between these two extremes will fall those items the percentage number of which is more or less equal to their consumption value. Items in the top category are treated as 'A' items, items in the bottom category are called as *'C'* category items and the items that lie between the top and the bottom are called 'B' category items. Such an analysis of materials is known as 'ABC analysis' or 'Proportional parts value analysis'.

The logic behind this kind of anlaysis is that the management should study each item of stock in terms of its usage, lead time, technical or other problems and its relative money value in the total investment in inventories. Critical i.e., high value items deserve very close attention and low value items need to be devoted minimum expense and effort in the task of controlling iventories.

The material manager by concentrating on 'A' class-items is able to control inventories and show visible results in a short span of time. By controlling 'A' items and doing a proper inventory analysis, obsolete stocks are automatically pinpointcd. ABC analysis also helps in reducing the clerical costs and results in better planning and improved inventory turnover. ABC analysis has to be resorted to because equal attention to A, B and C items will not be worthwhile and would be very expensive.

The following steps will explain to you the classification of the items into A, B and C categories.

1) Calculate the unit cost and the usage of each material over a given period.
2) Multiply the unit cost by the estimated usage to obtain the net value.
3) List out all the items by rupee annual issues and arrange them in the descending value.
4) Accumulate value and add up number of items and calculate percentage on total inventory in value and in number.

5) Draw a curve of percentage items and percentage value.

6) Mark off from the curve the rational limits of A,B and C categories.

The graphical representation of ABC analysis is shown in Figure 4.1.

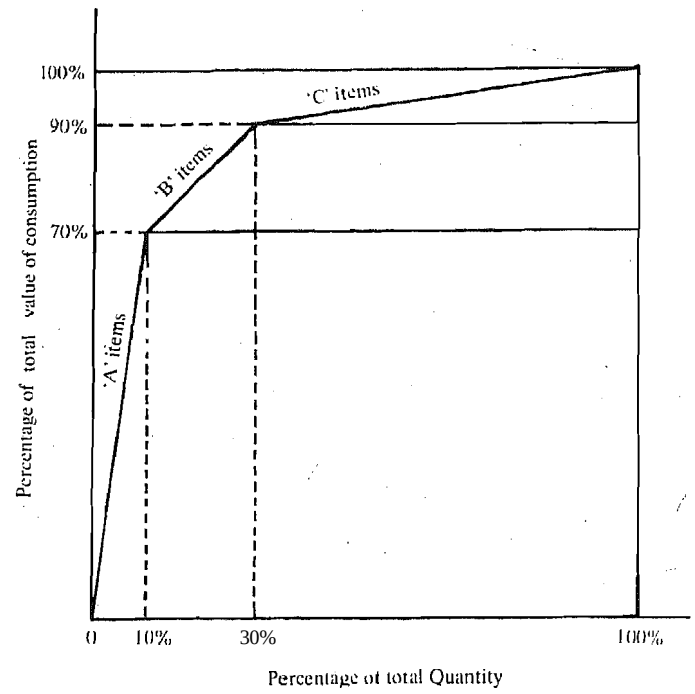

Figure 4.1: ABC Analysis

Check Your Progress A

1) Indicate whether the following statements are True cr False:

i) In ABC analysis **'A'** group of items consist of those inaterials the vlaue of which is not high but which are used in large quantities .....

ii) ABC analysis is based on the principle of management by exception. .....

2) Define Inventory Control.

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3) List the main objects of inventory control.

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4.3.2 Stock Levels

You know that the maintenance of proper stock of each item of stores is one of the main functions of stores department. If large quantity of stores is maintained it would lead to huge investment, large space coverage, dangers of deterioration in quality, etc. On the other hand, less stock will result in frequent purchases, higher costs, loss of production etc. It implies that there is always a limit to the minimum and maximum quantity of materials in stores.

In order to ensure that the optimum quantity of material is purchased and stored, neither more nor less, the storekeeper applies scientific technique of material management. Fixation of certain levels for each item of materials is one of such techniques. The following levels are generally fixed:

1) Minimum stock level
2) Maximum stock level
3) Re-ordering level
4) Danger level

Re-ordering level
You should know the level at which the storekeeper will initiate the requisition for the purchase of materials for fresh supplies. This level is referred to as 're-order level' or 'ordering level'. This level normally lies between the maximum and minimum stock level. This level will usually be higher than the minimum stock level to cover for emergencies as abnormal usage of material or unexpected delay in delivery of fresh supplies. The fixation of this level normally takes into consideration the lead 'time (period of supply or re-order period), rate of consumption and the economic ordering quantity.

Re-ordering level can be calculated according to any one of the following formulas:

Re-order level = Maximum consumption x Maximum re-order period

OR

Re-order level = Minimum level + consumption during the time required to get fresh deliveries

The following illustrations 1 and 2 will explain to you the calculation of the re-order level.

Illustration 1
Calculate the re-order level from the following information:

Maximum consumption	=	400 units per week
Minimum consumption	=	250 units per week
Re-order period	=	4 to 6 weeks

Solution
Re-order level = Maximum consumption × Maximum re-order period
= 400 × 6 = 2,400 units

Illustration 2
Find out the order level from the following information:

Maximum stock	=	2,500 units
Minimum stock	=	1,000 units
Time required for receiving the material	=	10 days
Daily consumption, of material	=	50 units

Solution
Re-order level = Minimum stock level + consumption during the period required for fresh delivery
= 1,000 + 50 × 10
= 1,000 + 500 = 1,500 units

Minimum Stock level
Minimum stock level points to the level of an item of material below which the stock in hand is not normally allowed to fall. In other words, it refers to the minimum quantity of a particular item of materials which must be kept in stores at all times.

This limit is fixed so as to avoid the possibility of suspension of production due to shortage of material. In **fixing** this level the following important factors, among others are taken into consideration:

i) Lead time i.e., time lag between indenting and receiving of material

ii) Rate of consumption of material during the lead time

iii) Re-order level

Minimum stock level can be determined by applying the following formula:

Minimum'stock level = Re-order level—(Normal consumption X Normal re-order period)

Illustraion 3 will explain to you the calculation of the minimum stock level.

Illustration 3
Calculate the minimum stock level from the fallowing data:

Net normal consumption	=	400 units per week
Normal re-order period	=	5 weeks
Re-order level	=	3,500 units
Minimum stock level	=	Re-order level—(Normal consumption X Normal re-order period)
	=	3,500 – (400×5)
	=	3,500 – 2.000 = 1,500 units

Maximum stock level
It is that quantity of material above which the stock of any item should not be allowed to exceed. The main object of fixing the maximum stock level is to avoid undue investment in stock and to use the working capital in a proper way.

Maximum stock level is fixed by taking into consideration the following factors:

1) Amount of working capital available
2) Normal rate of consumption of materials during the lead time
3) Time necessary to obtain deliveries
4) Availability of storage space
5) Economic ordering quantity
6) Cost of carrying the inventory
7) Possibility of loss due to evaporation, deterioration etc.
8) Extent to which price fluctuations may be important.
9) Possibility of change in fashion, habit etc., which may necessitate the change in the specification of materials
10) Incidence of insurance costs which may be important for some materials.

The following formula is generally used for the calculation of mximum stock level.

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

Danger level
This is generally a level below the minimum level. When stock reaches this level, urgent action is needed for replenishment of stock. If no emergency steps are taken to restock the materials, the stores will be completely exhausted and normal production stopped. At this level no further issues are made by the storekeeper except on special requisition approved by the works manager. The level is generally calculated by taking into account the time required to get the materials by the

quickest possible means of transport i.e., minimum time required for obtaining supplies from any possible source. It is calculated as follows:

Danger level = Average consumption × Maximum re-order period for emergency purchases

Average stock level

Average stock level is usually calculated with the help of the following formula:

$\frac{1}{2}$(Minimum stock level + Maximum stock level)

Depending upon the availability of information average stock level can also be calculated as follows:

Average stock-level = Minimum stock level + $\frac{1}{2}$ Re-order quantity

Illustration 4 will explain to you the calculation of the various stock levels.

Illustration 4

From the following information, calculate:

a) Re-ordering level

b) Minimum stock level

c) Maximum stock level

Re-order quantity	=	30,000 units
Time required for delivery	=	2-4 months
Maximum consumption	=	8,000 units per month
Normal consumption		5,000 units per month
Minimum consumption	=	3,000 units per month

Solution

a) Re-ordering level
   = Maximum consumption × Maximum re-order period
   = 8,000 × 4 = 32,900 units

b) Minimum stock level
   = Re-order level—(Normal consumption × Normal re-order period)
   = 32,000 – (5,000 × 3)
   = 32,000 – 15,000 = 17,000 units

   NOTE: Normal re-order period = $\frac{2+4}{2}$ = 3 months

c) Maximum stock level
   = Re-order level + Re-order quantity—(Minimum consumption × Minimum re-order period)
   = 32,000 + 30,000 – (3,000 × 2)
   = 32,000 + 30,000 – 6,000
   = 62,000 – 6,000 = 56,000 units

4.3.3 Re-Order Quantity

It is helpful to determine in advance to how much should the storekeeper buy when the stock reaches the re-order level. This quantity is known as 're-order quantity' (ROQ). The quantity ordered must be such that when the same is received the stock level will not exceed the maximum stock to be carried at any point of time.

The re-order quantity is also referred to as the economic order quantity. It is called 'economic order quantity' (EOQ) because the purchase of this size of materials is most economical. Purchase of material larger than the economic order quantity of material will result in increase in the carrying cost. If on the other hand small quantities of materials are purchased at frequent intervals the ordering cost will increase and will lead to disruption in the production due to inadequate inventory. The economic order quantity is fixed at such a level as to minimise the cost of

ordering and carrying the stock. It is the size of the order which produces the lowest cost of material ordered.

Carrying cost includes the interest on investment, obsolescence losses, space costs, storage charges such as warehouse rent, insurance, heating and lighting expenses on stores staff, pilferage, breakage etc. The cost of ordering is independent of the size of the order and includes costs due to extra purchasing, handling and transportation costs, higher price due to small order quantities, frequent stock outs, resulting in disruption of production schedules, overtime and extra set up time, loss of sales and customer goodwill etc.

The economic order quantity can be calculated by making use of the following formula:

$$EOQ = \sqrt{\frac{2UO}{I}}$$

where EOQ = Economic order quantity
U = Annual usage in units
O = Cost of placing one order including the cost of receiving the goods
I = Cost of carrying one unit of inventory for one year

Diagram representing the Economic Order Quantity is shown in Figure 4.2

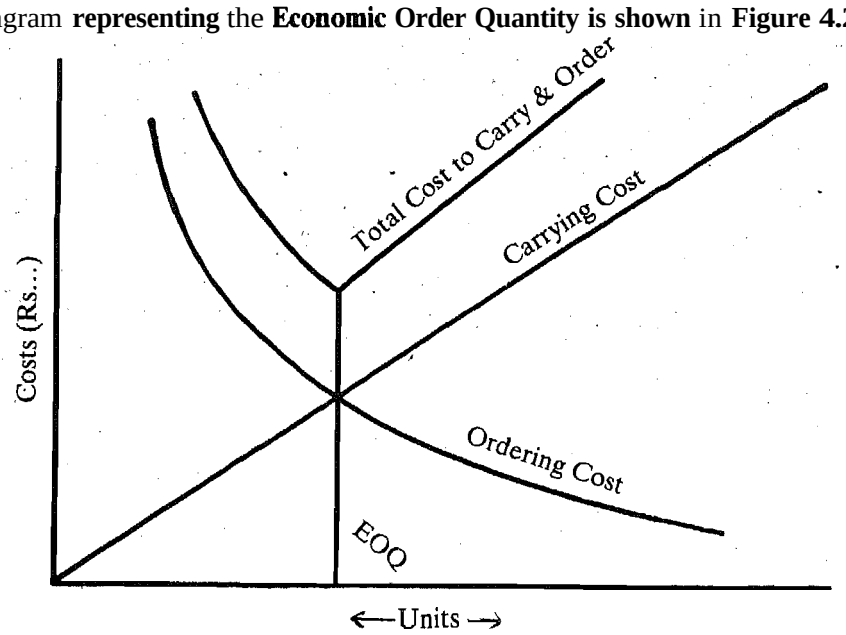

Figure 4.2: Economic Order Quantity

Assumptions in the calculation of economic order quantity

The calculation of economic order quantity is subject to the following conditions:

1) The quantity of the item to be consumed during a particular period is known.
2) Cost per unit is known and is constant. Further quantity discounts are not involved
3) Ordering cost and carrying cost are known. They are fixed per unit and will remain the same throughout
4) Quantity ordered is delivered immediately. The following illustration will explain to you the calculation of economic order quantity.

Illustration 5

From the following particulars calculate the economic order quantity

Annual usage	=	6,000 units
Cost of the material per unit	=	Rs. 2.50
Cost of placing and receiving one order	=	Rs. 15.00
Annual carrying cost of one unit	=	20% of inventory value

Solution

Economic order quantity $= \sqrt{\frac{2UO}{I}}$

U = **6,000** units

O = Rs. **15.00** per unit

I = 20% of **Rs. 2.50** to Rs. **0.50**

Substituting the values in the above formula

$$EOQ = \sqrt{\frac{2 \times 6,000 \times 15}{0.50}}$$

$$= \sqrt{\frac{1,80,000}{0.50}} = \sqrt{3,60,000}$$

= **600** units

Check Your Progress B

1) Indicate whether the following statements are True or False:

i) When **maximum** stock level is fixed, the stock in hand should never exceed this level. .....

ii) Re-ordering level is always fixed some where between maximum and **minimum** stock levels. .....

iii) Minimum **stock level** is the level of materials at which a new order for material is to be placed. .....

iv) Economic order quantity is **the re-order** quantity. .....

2) How do you compute average stock level?

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3) **List the** assumptions made **while** fixing the re-order **quantity.**

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4.3.4 Stores Records

In order to exercise **proper** control over materials, it is necessary to record the physical movement of every item of materials. One of the main functions of the storekeeper is to maintain records for receipts, issues and balances of various items of materials. Bin card and stores ledger are the **two important** stores records that are generally kept for **making** a record of the various items of stores.

Bin Card

A bin card **provides** a quantitative record of the receipts issues and balance of material. A bin is a place where the goods are stored. A bin may be a shelf, an almirah, open space etc. depending upon the nature of **the** commodity. These cards are **usually attached** to or place near the bin so that receipts and the issues may be entered therein as soon **as** they take place. **Separate bin** cards **are prepared for each item of stores** and if two different materials are kept in one **almirah, two** bin cards one for each item are prepared, treating the almirah as two bins.

The bin card provides a continuous record of **the stock** in each bin and assist the storekeeper to control the stock. For each material the maximum stocks to be held are noted on the card. Where the materials are **of** a kind requiring advance ordering,

an ordering level is also indicated therein so that fresh supplies may be ordered before the minimum is reached. These cards also provide an independent check on the stores ledger.

In large organisations, the storekeeper also maintains 'store control cards' which are similar to bin cards and are kept by him close at hand. This obviates the difficulty of going to bins for obtaining the necessary information as and when required.

A specimen of the bin card is given in Figure 4.3.

Figure 4.3 : Specimen of Bin Card

BIN CARD

Name .....
Description .....
Bin No. .....
Location code .....
Stores ledger folio .....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....
Unit .....

Receipts			Issues			Balance	Audit	
Date	G. R. No.	Qty.	Date	Req. No.	Qty.	Quantity	Date	Initials

Stores ledger

This ledger is kept in the costing department and is identical with the bin card except that **the receipts, issues and balances are shown along with their money values.** Stores ledger contains an account for each class of material and facilitates ascertainment of all details relating to the material in minimum time. It provides a continuous record of stores received and issued and discloses the balance in hand at any time both in quantity and value. It thus furnishes management with a perpetual inventory.

Stores ledger is generally maintained in the form of loose leaf cards. These cards should be serially numbered to obviate the risk of removal or loss.

A specimen of the stores ledger is given in Figure 4.4.

Figure 4.4: Specimen of Stores Ledger

STORES LEDGER
ABC Co. Ltd.

Name .....
Description .....
Location code'.....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....
Unit .....

Date	Received				Issued				Balance			Remarks
	G.R.N. No.	Quantity	Rate	Amount	Reqn. No.	Quantity	Rate	Amount	Quantity	Rate	Amount	

	Bin Card		Stores Ledger
1	Bin Card is not an accounting record	1	Stores ledger is the basic accounting record.
2	It is a record of quantity only	2	It is a record of both quantity and value
3	It is kept inside the stores	3	It is kept outside the stores
4	It is maintained by the storekeeper	4	It is maintained by the costing department
5	Each transaction is Individually posted	5	Transaction may be posted Periodically and in total.

It should be noted that documents like goods received note, materials requisition slip, materials returned note, etc. also form part of stores records.

Check Your Progress C

1) Fill in the blanks.

i) Stores ledger is maintained in the .....

ii) Bin Card is a record of .....only.

iii) Bin Card is maintained by .....

iv) Quantities of materials on hand as shown by bin cards should agree with quantities actually on .....

2) Indicate whether the following statements are True or False:

i) Bin Card shows the quantity and value of material at any moment of time .....

ii) Bin cards are not a part of accounting records .....

iii) The bin card and stores ledger are written up with the help of same basic documents .....

iv) Stores control card is used as an alternative to bin card. .....

v) Documents like materials requisitidn and goods received note also form part of stores records .....

4.3.5 Perpetual Inventory System

In order to facilitate regular checking and to obviate closing down of work for stock taking, a method of recording stores balances after each receipt and issues, is adopted. This method is known as perpetual inventory system. Bin cards and the stores ledger help the management in maintaining this system as they make a record of the physical movements of the stock on the receipts and issues of materials and also reflect the balance in the stores. **To ensure the accuracy of perpetual inventory records, physical verification of stores is made by a programme of continuous stock taking.**

It is advisable that a number of items should be counted and checked daily or at frequent intervals and compared with the bin cards or stores ledger.

The actual stock of material should not differ from the recorded stock under normal circumstances. However, differences do arise on account of the following reasons which may be classified as unavoidable and avoidable causes.

The usual **unavoidable causes** are:

i) Shrinkage and evaporation

ii) Climatic conditions causing deterioration, e.g., absorption of moisture, etc.

iii) Losses arising out of breaking up bulk material as in case of sawing wood.

iv) Losses due to accident, fire, etc.

The avoidable causes are:

i) Errors in posting or calculation of receipts, issues or balances on bin cards or on stores ledger.

ii) Pilferages and breakages

iii) Entering transactions in the wrong bin card or in wrong stores ledger.

Advantages

The following are the advantages of the perpetual inventory method:

1) It is possible to prepare monthly and quarterly profit and loss statements and balance sheet without physical inventory being taken for all the items. This is possible because the figure of the closing stock can be taken from the bin cards or the stores ledger.

2) It obviates the necessity for physical checking of all items of stores at the end of the year and thereby avoids dislocation of production.

3) Actual stock can be compared with the authorised maximum and minimum levels, thus keeping the stock within the prescribed limits. The disadvantages of excess stock are avoided and capital tied up in stores material cannot exceed the target.

4) The method has a moral effect on the staff, makes them disciplined and careful and acts as a check against dishonest actions.

5) As the work or recording and continuous stock taking is carried out systematically and without undue haste, the figures are more reliable.

6) Discrepancies and errors are promptly discovered and remedial action can be taken to prevent their reoccurrence in the future.

7) A detailed and more reliable check on the stores is obtained.

8) Stock figures are available for insurance purposes.

9) It reveals the existence of surplus, obsolate and slow moving material and hence remedial action can be taken.

10) A system of internal check remains in operation. Bin card and stores ledger act as a cross check on each other. As such the errors are detected as and when they are committed.

4.3.6 Inventory Turnover Ratio

It is one of the techniques for exercising control over inventory. The ratio expresses the relationship between the cost of the material consumed to the average inventory held during that period. The ratio is calculated as follows:

$$\text{Inventory turnover ratio} = \frac{\text{Cost of material consumed during the period}}{\text{Cost of average stock held during the period}}$$

Average stock can be calculated by adding opening and closing stocks and then dividing it by two.

$$\text{Average Stock} = \frac{\text{Opening stock} + \text{Closing stock}}{2}$$

The inventory turnover ratio indicates the index of the efficiency or inefficiency with which inventories are maintained. It is in the best interest of the organisation to compare the turnover of different types and grades of material as a measure of detecting stock which does not move regularly thereby minimising capital or investment in undesirable stock. A low ratio indicates bad buying, accumulation of obsolete stock, carrying of too much stock etc. On the other hand a high ratio is an indicator of fast moving stock and less investment in stock.

Illustration 6 will explain to you the calculation of inventory turnover ratio and indicate the period for which the average inventory is held.

Illustration 6

Calculate the inventory turnover ratio for the year 1989 from the following information and express the same in number of days the average inventory is consumed for each material and comment on the purchasing procedure.

	Material X Rs.	Material Y Rs.
Opening stock	40,000	60,000
Purchases during the period	2,80,000	80,000
Closing stock	20,000	40,000

Solution

	Material X	Material Y
Cost of material consumed		
opening stock	40,000	60,000
Add purchases	2,80,000	80,000
	3,20,000	1,40,000
Less closing stock	20,000	40,000
	3,00,000	1,00,000
Average stock		
opening stock	40,000	60,000
Closing stock	20,000	40,000
Average stock	$= \frac{60,000}{2} = \text{Rs. } 30,000$	$\frac{1,00,000}{} = \text{Rs. } 50,000$

Inventory turnover ratio

$$\frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

$$= \frac{3,00,000}{30,000} = 10 \text{ times } \frac{1,00,000}{50,000} = 2 \text{ times}$$

Thus material X is fast moving and material Y is slow moving. Stock level of material Y may be refixed considering the turnover ratio and purchases of this time may be reduced.

Check Your Progress D

1) Fill in the blanks.

i) A method of recording stores balances after every receipt and issue to facilitate regular checking and to obviate the closing down for stock taking is know as ..... .

ii) The two perpetual inventory records are ..... .

iii) Perpetual inventory system acts a ..... on staff in the stores.

iv) Physical verification of stores under perpetual inventory system is called ..... .

v) Difference in actual stock and recorded stock arises on account of some ..... causes and ..... causes.

2) What is the purpose of calculating inventory turnover rate?

.....

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4.4 LET US SUM UP

Inventory control is a system which ensures the required quantities of inventories in stores so that materials are available at the required time and with the minimum amount of investment. A proper control over inventory goes a long way in reducing the cost of production and improving the profitability of concern.

Some of the common techniques of inventory control are (i) ABC analysis (ii) Setting of various stock levels, (iii) Economic order quantity (iv) Use of perpetual inventory records and continuous stock verification (v) Use of control ratios and review of slow and non-moving stock.

Under the ABC analysis, the material manager by concentrating on **'A'** class items is able to control inventories and show visible results in a short span of time. ABC analysis helps in reducing clerical cost and results in better planning and improved inventory turnover.

Fixation of various stock levels for each item of material is one of the scientific techniques of material management, and helps to ensure that optimum quantity of material is purchased, **and** stored neither more nor less.

The fixation of economic order quantity helps in the determination of the quantity of material for which order should be placed when the stock reaches the re-order level. The economic order quantity is fixed at a level which minimises the cost of ordering and carrying the stock.

The perpetual inventory control system is a method of recording stores balances after each receipt and issue, to facilitate regular checking and to obviate closing down of work for stock taking.

lnventory turnover ratio expresses the relationship between the cost of the material consumed to the average inventory held during that period. The number of times an inventory is used within a particular period is a good measure of the efficiency of material control and material utilisation. Thus knowing the turnover of different items it is possible to avoid keeping capital locked up in undesirable stocks.

4.5 KEY WORDS

Inventory control: A system which ensures the provision of the required quantity of inventories of the required quality at the required time with the minimum amount of investment.

ABC analysis: A system of stock control based on the annual consumption value.

Maximum level: It represents the maximum quantity above which stock should not be held at any time.

Minimum level: It represents the minimum quantity of stock that should be held at all times.

Danger level: Normal issues of stock are usually stopped at this level and made only under specific instructions.

Ordering level: The level of stock at which indents should be placed for replenishing stocks.

Re-order quantity: It is the quantity to be ordered when the stock reach the re-order level. It is also called economic order quantity.

Lead time: Time lag between the indenting and receipt of material. It is also called re-order period.

Carrying cost: Cost of holding the material in the stores.

Ordering cost: Cost of placing an order for the purchase of materials.

Bin card: Is a card which provides a continuous record of the receipt, issues and balance of each item of materials.

Stores ledger: A record kept in the costing department which contains information

regarding receipts, issues and balance of each item of material along with their money values.

Perpetual inventor.' system: A system of ascertaining current balance after recording every receipt and issues of materials through stock records.

Stock turnover ratio: Ratio of the value of material consumed during a period to the average value of inventory during the period.

4.6 ANSWERS TO CHECK YOUR PROGRESS

A 1 i) False ii) True

B 1 i) True ii) True iii) False iv) True

C 1 i) Cost Accounting Department ii) quantitites iii) storekeeper iv) hand

2 i) False ii) True iii) True iv) False v) True

D 1 i) perpetual inventory system ii) bin card and stores ledger iii) moral check iv) continuous stock taking v) avoidable, unavoidable

4.7 TERMINAL QUESTIONS/EXERCISES

Questions

1) What do you understand by inventory control? What are its objectives?

2) What do you understand by ABC analysis'? How is the cvntrol of stores items effected through ABC analysis?

3) Explain the terms minimum level, maximum level, and ordering level of stock, What are the factors that govern the fixation of these levels.

4) What is economic order quantity? How is it calculated'?

5) What is a bin card? Give its specimen form and discuss its utility.

6) What is meant by perpetual inventory control system. Describe its advantages.

7) What is meant by inventory turnover? Discuss the importance of inventory turnover ratio in the control of inventory.

Exercises

1) Two components A and B are used as follows:

Normal usage	50 per week each
Minimum usage	25 per week each
Maximum usage	75 per week each
Re-order quantity	A 300 B 500
Rc-order period	A 4 to 6 weeks, B 2 to 4 weeks

Calculate for each component

a) Re-order level b) Minimum level c) Maximum level.

(Answer: A a) 450 units b) 200 units c) 650 units
B a) 300 units b) 150 units c) 750 units

2) Calculate economic ordering quantity from the following particulars:

Annual usage	6,000 units
Cost of material per unit	Rs. 20.00
Cost of placing and receiving one order'	**Rs.** 60.00
Annual carrying cost of one unit	10 per cent of inventory value

(Answer 600 units)

3) From the following data for an accounting year calculate the inventory turnover and express the same in number of days the average inventory is consumed for each material

	Material X Rs.	Material Y Rs.
Opening stock	1,000	1,200
Purchases during the year	5,200	4,600
Closing stock	600	1,600

(Answer: Inventory turnover ratio X = 7 times Y = 3 times
Number of days average inventory is consumed X = 52 days,
Y = 122 days)

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.

UNIT 5 PRICING THE ISSUE OF MATERIALS

Structure

5.0 OBJECTIVES

After studying this unit you should be able to:
- ascertain the cost of materials issued for production
- identify the problems associated with pricing the issue of materials
- list the various methods of pricing
- assess the pros and cons of FIFO, LIFO and weighted average methods of pricing
- prepare the stores ledger under FIFO, LIFO and weighted average ,methods.

5.1 INTRODUCTION

You have learnt that the stores ledger is one of the important store records which is maintained by the costing department and that in addition to quantities it also records the prices at which the materials have been received and issued. As for the receipts of materials, they may be recorded at prices at which they are purchased after making necessary adjustment for discounts, transportation charges, cost of containers, etc. But, when it comes to the issues of materials, the problem arises with regard to the price at which each issue should be recorded because different consignments of materials might have been purchased at different prices. For this purpose, accountants have developed a number of methods based on various materials flow assumptions. In this uniit, you will learn about these methods of pricing the issue of materials and also the preparation of stores ledger account according to some of the prominent methods.

5.2 ASCERTAINING THE COST OF MATERIALS

The basic document used for ascertaining the cost of materials received is invoice. It contains the basic price as well as the items like discount, freight, insurance, sales tax, cost of containers, etc. Theorganisation also incurs some expenditure of cartage, receiving, inspecting and storage of materials. Now the question arises as to which of these items should be taken into account in arriving at the cost of materials. Let us discuss them one by one.

Cash biscount: Cash discount represents an allowance made by the supplier if the payments of bills are made within the specified period. Opinions differ as regards the

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(Answer: Inventory turnover ratio X = 7 times Y = **3** times
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Cash Discount: Cash discount represents an allowance made by the supplier if the payments of bills are made within the specified period. Opinions differ as regards the

method of treatment of such discount in cost accounts. One view is that cash discount, being in the nature of purely a financial transaction, should be completely excluded from cost accounts. The other view is that if cash discount is always earned for prompt payments, it may be considered in finding out the final rate for materials in cost accounts.

Trade Discount: Trade discount is shown in the invoice as a deduction from the purchase price. If the consignment consists of one item only, the entire trade discount is deducted from purchase price. Hence, no difficulty arises with regard to its treatment. If, however, the consignment consists of a number of items, the amount of discount should be apportioned among all the items covered by the consignment on the basis of the purchase price of each item. In any case, **the net amount after deduction of trade discount is taken as the purchase price.**

Quantity Discount: Quantity discount is allowed as an incentive for bulk purchasing. The rate of discount varies with the quantity purchased. From the point of view of the supplier, an order for a large quantity reduces his selling and distribution cost. Thus, a part of the savings enjoyed by a supplier out of the large orders is passed on to the purchaser by means of quantity discount. From the point of view of the buyer, quantity discount is in the nature of a price reduction. Hence, the amount of discount may be adjusted in the same manner as the trade discount.

Transportation Charges: Sometimes, the terms of supply provide for free delivery at the premises of the purchaser. In that case, the price is inclusive of the transportation charges. But, in most cases, the transport costs are paid by the purchaser. These. should be added to the invoice price in order to arrive at the cost of materials. But, for the sake of convenience, the transportation charges may be regarded as an item of factory overheads and absorbed accordingly.

Custom, excise duty, sales tax, etc.: As stipulated in the contracts, the supplier adds several items such as sales tax, excise duty, custom duty, octroi, etc. to the invoice price. These expenses should be added to the cost of purchases, if they can be directly allocated to the particular materials.

Receiving, inspection, storage, material accounting and purchase department expenses: These expenses cannot be easily allocated to the materials. Hence, they are treated as factory overheads and recovered on the basis of the value of direct materials issued or as general overheads to be apportioned to the various cost-centres on the basis of the value of materials issued.

Cost of Containers

Materials are normally supplied by the suppliers in containers. They may or may not make a separate charge for them. Then, these containers may be either returnable or non-returnable. The cost of the containers can be treated in any of the following ways:

a) If the supplier has not charged the cost of containers in which materials have been supplied, there is no need to add any amount in this regard to the cost of materials. But, if the containers have some realisable value, the same should be estimated and deducted from the cost of materials. Alternatively, it may be deducted from factory overheads.

b) If the supplier has charged the cost of containers and these containers are non-returnable, their cost (minus realisable value, if any,) should be included in the cost by materials.

c) Where the cost of the containers has been charged by the supplier and these containers can be returned to the supplier, the difference between the cost of the containers and the amount credited by the supplier on the return, will be added to the purchase price of the materials.

d) where the supplier agrees to give full credit for the cost of the containers charged by him on their return, the cost of these containers will not be added to the purchase price of the materials on the assumption that the containers will be returned to the supplier and their amount recovered fully.

Illustration 1 will explain to you the calculation of purchase price of materials.

Illustration 1

From the following invoice received from a supplier, calculate the material cost per unit:

Quantity	Particulars	Rate	Amount
		Rs.	Rs.
150 kgs	Material x	10.00 per kg	1,500
100 kgs	Material y	12.00 per kg	1,200
			2,700
	Less trade discount		90
			2,610
Add:			
Cost of containers (capacity of each 50 kgs)			60
Cartage and carriage			75
Octroi duty @ 1%			27
			2,772

Terms

i) 5% cash discount for payment within a week

ii) Return value of containers Rs.9 each

Solution

Statement showing the calculation of material cost:

		Material x	Material y
		Rs.	Rs.
Invoice price		1,500	1,200
Less: Trade Discount (divided in the ratio of invoice price i.e., 5:4)		50	40
		1,450	1,160
Add i) Cost of containers (divided in the ratio of quantity i.e., 150:100)		9	6
,Actual cost	60		
Return value	45		
	15		
ii) Cartage and carriage (in the ratio of quantity i.e. 150:100)		45	30
iii) Octroi duty (in the ratio of invoice price)		15	12
		1,519	1,208
Cost per kg.		1,519	1,208
		150 kgs.	100 kgs.
		= Rs. 10.13	= Rs. 12.08

Notes:

i) Cash discount being a financial item, has been ignored.

ii) It has been assumed that containers have been returned.

5.3 PROBLEM IN PRICING THE ISSUE OF MATERIALS

The fixation of the price at which issues of materials are to be charged to production is important from the point of view of ccst accounting. If prices remain constant for a long time, there is little difficulty in pricing the issue of materials. But, in practice, we find that the prices of materials continue to fluctuate on account of changes in the value of money, changes in the world commodity prices, buying from different sources, and differences in the quantity discounts. Hence, different consignments of materials may be bought at different prices during an accounting period. The problem, therefore, is that which of these prices should be used for pricing the materials issued to production from time to time. Is it the price of the first, or the second consignment or the average of the two?

For example, 200 kg. of materials K was bought at Rs. 30 per kg. On January 10 and 300 kg. was bought at Rs 32 per kg. on January 16. On January 18,250 kg. was issued to production. Now the question arises as to whether the 250 kg. of material K be charged to production at Rs.30 or Rs.32 or Rs.31, the average price. To solve this problem, a number of methods based on certain materials flow assumptions, have been developed. You will study these methods in detail in Section 5.4 of this unit. However, a good method of valuing material issues should satisfy the following conditions:

a) The issue price should recover the cost of materials.

b) The issue price must reflect the current market price.

c) The issue price should not cause any significant variation in cost from period to period and from job to job.

d) The issue price should not necessitate heavy adjustments at the time of valuation of closing stock.

e) It should be simple and easy to operate.

5.4 METHODS OF PRICING

The various methods used for the pricing of the material issues can be classified as follows:

I) Actual Cost Methods
   a) First in First out (FIFO)
   b) Last in First out (LIFO)
   c) Specific price
   d) Highest in First out (HIFO)
   e) Base stock method

II) Average cost methods
   a) Simple average
   b) Weighted average
   c) Periodic simple average
   d) Periodic weighted average
   e) Moving simple average
   f) Moving weighted average

III) Notional cost methods
   a) Standard price
   b) Inflated price

IV) Market price methods
   a) Replacement price
   b) Net Realisable price

Of the methods listed above, FIFO, LIFO and weighted average are the most common methods. Hence we shall discuss them here in detail.

5.4.1 First in **First *Out*** Method

This method assumes that materials received first are to be issued first. Under this method the price of the earliest consignment is taken first and when that consignment is exhausted, the price of the next consignment is adopted, and so on. In other words, when a requisition for a certain type of materials is presented to the storekeeper, he will apply the cost price of the first lot of materials received, provided the same is still on hand. If the quantity required is more than the units remaining from the first lot, he uses the cost price of the second lot, then the third and fourth until the total quantity requisitioned is issued. **This method is based on the principle that materials should be issued in the order of receipts and at the actual cost.**

It should be noted that the physical issue of stores need not be in the above order, as generally it is neither possible nor necessary to do so. This arrangement is only for the purpose of accounting. As the materials purchased first are charged off first, the value of closing stock conforms, more or less, to the current market price.

Solution ,

STORES LEDGER ACCOUNT
(Under weighted average method)

Name .....
Description .....
Location code .....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
Jan 1	—	500	5.00	2,500	—	—	—	—	500	5.00	2,500
Jan. 8	—	300	5.10	1,530	—	—	—	—	800 {500 {300	5.00 5.10	4,030
Jan. 13	—	—	—	—	—	600 {500 {100	3,010	3,023	200	5.10	1,020
Jan. 18	—	400	5.20	2,080	—	—	—	—	600 {200 {400	5.10 5.20	3,100
Jan. 23	—	—	—	—	—	300 {200 {100	1,540	1,544	300	5.20	1,560
Jan. 25	—	500	5.10	2,550	—	—	—	—	800 {300 {500	5.20 5.10	4,110
Jan. 31	—	—	—	—	—	200	1,040	1,023	600 {100 {500	5.20 5.10	3,070
		1,700		8,660		1,100		5,590	600		3,070

This method is suitable in times of falling prices because the materials charge to production will be high while the cost of stock replacement will be low. But in case of rising prices, if this method is followed, the charge to production will be low leading to higher profits and higher tax liability.

Illustration 2 will explain to you as to how the issue of the materials are priced under this method.

Illustration 2

In a factory, the following purchase and issues were made during the month of Account January, 1988. Prepare the stores Ledger Account under FIFO method.

Date	Purchases		Issues
	Units	Rate (Rs.)	
Jan.1	500	5.00	—
Jan. 8	300	5.10	—
Jan. 13	—	—	600
Jan. 18	400	5.20	—
Jan. 23	—	—	300
Jan. 25	500	5.10	—
Jan. 31	—	—	200

Advantages

The following are the advantages of FIFO Method:

1) It is simple to understand and easy to operate.

2) Since materials are charged to production at actual cost, no profit or loss arises by reason of adopting this method.

3) It is a good inventory management system since the oldest units are used first and inventory consists of latest stock.

4) Closing stock generally represents fair valuation of stock, as it would consist of recent purchases of materials.

Disadvantages

This method suffers from the following disadvantages:

1) The number of calculations complicates the accounts if the prices of material purchased fluctuate considerably and increases the possibilities of errors.

2) Usually more than one price has to be adopted for each issue.

3) Comparison of one job with another may be difficult because issues to one job may be charged at prices different from the other.

4) In a fluctuating market, the effect of the current market price is not revealed in the cost of issues.

5.4.2 Last in First Out Method

Under this method, the price of the latest consignment is taken into consideration for pricing the issues of materials. This method is based on the assumption that materials received last are issued first. Thus, when a requisition is received for certain materials, the storekeeper will charge the cost price of the latest consignment. If the quantity required is more than the units remaining from the latest consignment, he will apply the cost price of the consignment immediately preceding the last lot and so on.

This method is suitable in times of rising prices because the materials charged to production will be higher leading to lower profits and lower tax liability. The cost of production will also be closer to current prices.

Look at Illustration 3 and see how issues of materials are priced under LIFO method.

Solution

STORES LEDGER ACCOUNT
(Under LIFO Method)

Name .....
Description .....
Location code .....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
Jan. 1	—	500	5.00	2,500	—	—	—	—	500	5.00	2,500
Jan. 8	—	300	5.10	1,530	—	—	—	—	800 {500 300	5.00 5.10	4,030
Jan. 13	—	—	—	—	—	600 {300 300	5.10 5.00	3,030	200	5.00	1,000
Jan. 18	—	400	5.20	2,080	—	—	—	—	600 {200 400	5.00 5.20	3,080
Jan. 23	—	—	—	—	—	300	5.20	1,560	300 {200 100	5.00 5.20	1,520
Jan. 25	—	500	5.10	2,550	—	—	—	—	800 {200 100 500	5.00 5.20 5.10	4,070
Jan. 31	—	—	—	—	—	200	5.10	1,020	600 {200 100 300	5.00 5.20 5.10	3,050
		1,700		8,660		1,100		5,610	600		3,050

Illustration 3
Based on data given in Illustration 2, prepare the Stores Ledger Account under th LIFO method.

Advantages
The following are the advantages of pricing the material issues under LIFO method.

1) It is simple and useful when transactions are few.
2) Since issues are based on the actual cost, no profit nor loss arises by using this method.
3) Production is charged at most recent prices so that cost of production reflects current price levels.
4) During the period of rising prices, profits ace lowered down since production is charged at current prices. The tax liability is thus reduced.
5) This method will iron out fluctuations in profits over a period of changing price levels.

Disadvantages
1) Sometimes more than one price has to be adopted for pricing a single requisition.
2) As in the case of FIFO method, calculations become complicated and cumbersome when rates of receipts are highly fluctuating.
3) When prices are falling, it will lead to low charge to production.
4) As in the case of FIFO method, a substantial difference is likely to be shown in the cost of two jobs, solely because the stock of one happened to be drawn a few minutes before those for the other. Thus it makes the comparison between different jobs very difficult.
5) Closing stock is valued at a cost which does not represent current conditions.

5.4.3 Weighted Average Price Method

Under actual cost methods whether it is FIFO or LIFO, you have to assume certain order of the outflow of materials which may or may not be observed in actual practice. Hence, it is advocated that the issue of materials should be valued at. average price. This average may be a simple average or a weighted average. The weighted average is considered more desirable as it also takes into account the quantities bought at each price. The weighted average price is calculated by dividing the total cost of materials in stock by the total quantity in stock prior to each issue. Thus,

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

It is important to note the average price under weighted average method has to be calculated each time materials are received in stores and not when they are issued. Thus, under this method, as soon as a fresh lot is received, a new price is calculated and all the issues are then taken at this price until the next lot of material is received.

In periods of heavy fluctuations in prices, the weighted average method gives' better results because it tends to smooth out the fluctuations in prices by taking the average of the prices of various lots in stock. This method of pricing of material also recovers the cost price of materials from production.

Illustration 4 should help you to understand the pricing of issues of materials at weighted avenge price.

Illustration 4
Based on the data given in Illustration **2,** prepare the stores Ledger Account on weighted average price method.

Solution:

STORES LEDGER ACCOUNT
(Under Weighted Average Method)

Name .....
Description .....
Location code .....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Kate Rs.	Amount Rs.
Jan. 1	—	500	5.00	2,500	—	—	—	—	500	5.000	2.500
Jan. 8	—	300	5.10	1,530	—	—	—	—	800	5.0375 5.0375	4,030
Jan. 13	—	—	—	—	—	600	5.0375	3,023	200	5.1458	1,007
Jan. 18	—	400	5.20	2,080	—	—	—	—	600	5.1458	3,087
Jan. 23	—	—	—	—	—	300	5.1458	1,544	300		1,543
Jan. 25	—	500	5.10	2,550	—	—	—	—	800		4,093
Jan. 31	—	—	—	—	—	200	5.1172	1,023	600	5.1178 5.1178	3,070
		1.700		*8.660*		1.100		5,590	600		3.070

Advantages

1) It is logical and consistent.
2) Cost comparisons are rendered easier.
3) When prices fluctuate considerably, it will smooth out fluctuations.
4) Calculation of the new price arises only with the new receipt in stock, all subsequent issues are then charged at this price until the next Lot is received.

Disadvantages

1) This method requires tedious calculations. For instance to get the benefit of the method, average prices are to be calculated upto four or five decimal points which is very much laborious.
2) Material cost does not represent the current prices.
3) Closing stock also may not represent current market prices.
4) Fresh calculations will have to be made every time fresh purchases are made. This will mean much of arithmetical work and is likely to cause error.

It is the weighted average cost method which is mostly used by different organisations because it satisfies most of the conditions of a good method of valuing material issues.

5.4.4 Pricing of Materials Returned to Vendors

Materials which are not according to specifications or are found to be of substandard quality, are returned to the vendor. If such materials are not sent to the stores and are returned to the vendor by the receiving section itself, a debit note is sent to the vendor after making the necessary adjustments in the invoice value of the goods. However, if such goods have been included in stock, the returns have to be recorded in the issue column of the stores ledger account and valued at the price at which they were received. Alternatively, they may be treated as a normal issue of materials and valued according to the method of pricing used. Thus,

i) If FIFO method is followed, the price will be that of the oldest stock on the date of return.

ii) If LIFO method is followed, the materials will be valued at the price of the latest receipt.

iii) If the average price is followed, the returns should be valued at the average price.

5.4.5 Pricing of Materials Returned to Stores

Some materials issued to a job may become surplus. These should be returned to the stores. The materials so returned are recorded in the bin card as well as in the stores ledger. The general rule for recording such returns in stores ledger account is to value them at the price at which they were originally issued and then they should be included in the next requisition and issued at the same price, unless given otherwise. However, if the company is following the weighted average price method, the returned materials should be recorded at the price at which they were originally issued and then a new average cost should be worked out as if the materials returned were a new purchase. Sometimes, the rate of original issue is not given. In such a situation, it should be taken as belonging to the latest issue of materials and recorded accordingly.

5.4.6 Treatment of Shortage of Materials

If any shortage of materials is noted on making a physical verification of stock of materials, it should be entered in the issue column of stores ledger and valued in accordance with the method adopted for pricing material issues.

Look at Illustration 5 and study how returns and shortage are recorded in the stores Ledger Account.

Illustration 5

The particulars of receipts and issues of materials in a factory in August 1987 are as under:

August 01 Opening balance 1,500 kgs. @ Rs. 12 per kg.
" 02 Issued 100 kgs.
" 03 Issued 250 kgs.
" 04 Issued 300 kgs.
" 05 Purchased 400 kgs. @ Rs 12.50 per kg.
" 09 Issued 300 kgs.
" 10 Purchased 200 kgs @ Rs. 12.50 per kg.
" 11 Issued 300 kgs.
" 12 Returned from workshop issued on 3rd August 20 kgs.
" 13 Issued 450 kgs.
" 16 Purchased 500 kgs. @ Rs. 13.00 per kg.
" 18 Issued 400 kgs.
" 20 Returned from workshop issued on 9th August 60 kgs.
" 22 Issued 300 kgs.
" 26 Purchased 400 kgs. @ Rs. 12.00 per kg.
" 29 Issued 200 kgs.

Pricing of issues is to be done on FIFO basis. A shortage of 10 kgs. was noticed on 16th August. Prepare the Stores Ledger Account for the month of August, 1987.'

NOTES: Returned from Workshop: The returns from workshop are entered in the receipt column and valued at the rate at which they were originally issued. In this illustration, there are two returns from workshop on 12th and 20th August respectively. These are to be valued at the rates at which they were originally issued, that 'is, rates charged (Rs. 12) on 3rd and 9th August respectively. Further, the 20 units returned on 12th August have been included in the issue made on 13th August; and 60 units returned on 20th August have been included in the issue made on 22nd August.

2) **Shortage:** Shortage has been entered in the issue column and has been treated just like other issues. It is to be valued at the rate as per the method adopted, the FIFO, LIFO etc. treating the shortage as one of the issues,

Illustration 6

From the following record of the receipt and issues of coal and stores verification report, calculate the prices of issues charged out under weighted average method.

1990
April 1 Opening balance: 100 tons @ Rs. 50 per ton
" 5 Issued 60 tons
" 6 Received 120 tons @ Rs. 50.50 per ton
" 7 Issued 50 tons (the stock verification report reveals a loss of 1 ton)
" 8 Received back from completed job 2 tons previously issued @ Rs. 50.25 per ton.
" 9 Issued 80 tonnes.

Check Your Progress A

1) State whether the following statements are True or False.

First in First Out method of valuing materials issues is suitable in times of rising prices. .....

According to LIFO method of pricing, issues are close to current economic values. .....

Weighted-average method of pricing stores involves adding ill the different prices and dividing by the number of such prices. .....

2) Fill in the blanks.

i) First in First Out method of valuing material issues is suitable in times of ..... prices.

ii) Last in First Out method is suitable in times of .....prices.

iii) Weighted average method of valuing material issues is suitable when prices .....

Advantages

1) It is logical and consistent.
2) Cost comparisons are rendered easier.
3) When prices fluctuate considerably, it will smooth out fluctuations.
4) Calculation of the new price arises only with the new receipt in stock, all subsequent issues are then charged at this price until the next lot is received.

Disadvantages

1) This method requires tedious calculations. For instance to get the benefit of the method, average prices are to be calculated upto four or five decimal points which is very much laborious..
2) Material cost does not represent the current prices.
3) Closing stock also may not represent current market prices.
4) Fresh calculations will have to be made every time fresh purchases are made. This will mean much of arithmetical work and is likely to cause error.

It is the weighted average cost method which is mostly used by different organisations because it satisfies most of the conditions of a good method of valuing material issues.

5.4.4 Pricing of Materials Returned to Vendors

Materials which are not according to specifications or are found to be of substandard quality, are returned to the vendor. If such materials are not sent to the stores and are returned to the vendor by the receiving section itself, a debit note is sent to the vendor after making the necessary adjustments in the invoice value of the goods. However, if such goods have been included in stock, the returns have to be recorded in the issue column of the stores ledger account and valued at the price at which they were received, Alternatively, they may be treated as a normal issue of materials and valued according to the method of pricing used. Thus,

i) If FIFO method is followed, the price will be that of the oldest stock on the date of return.
ii) If LIFO method is followed, the materials will be valued at the price of the latest receipt.
iii) If the average price is followed, the returns should be valued at the average price.

5.4.5 Pricing of Materials Returned to Stores

Some materials issued to a job may become surplus. These should be returned to the stores. The materials so returned are recorded in the bin card as well as in the stores ledger. The general rule for recording such returns in stores ledger account is to value them at the price at which they were originally issued and then they should be included in the next requisition and issued at the same price, unless given otherwise. However, if the company is following the weighted average price method, the returned materials should be recorded at the price at which they were originally issued and then a new average cost should be worked out as if the materials returned were a new purchase. Sometimes, the rate of original issue is not given. In such a situation, it should be taken as belonging to the latest issue of materials and recorded accordingly.

5.4.6 Treatment of Shortage of Materials

If any shortage of materials is noted on making a physical verification of stock of materials, it should be entered in the issue column of stores ledger and valued in accordance with the method adopted for pricing material issues.

Look at Illustration 5 and study how returns and shortage are recorded in the stores Ledger Account,

Illustration 5

The particulars of receipts and issues of materials in a factory in August 1987 are as under:

August 01 Opening balance 1,500 kgs. @ Rs. 12 per kg.
" 02 Issued 100 kgs.
" 03 Issued 250 kgs.
" 04 Issued 300 kgs.
" 05 Purchased 400 kgs, @ Rs 12.50 per kg.
" 09 Issued 300 kgs.
" 10 Purchased 200 kgs @ Rs. 12.50 per kg.
" 11 Issued 300 kgs.
" 12 Returned from workshop issued on 3rd August 20 kgs.
" 13 Issued 450 kgs.
" 16 Purchased 500 kgs. @ Rs. 13.00 per kg.
" 18 Issued 400 kgs.
" 20 Returned from workshop issued on 9th August 60 kgs.
" 22 Issued 300 kgs.
" 26 Purchased 400 kgs. @ Rs. 12.00 per kg.
" 29 Issued 200 kgs.

Pricing of issues is to be done on FIFO basis. A shortage of 10 kgs. was noticed on 16th August. Prepare the Stores Ledger Account for the month of August, 1987.'

NOTES: Returned from Workshop: The returns from workshop are entered in the receipt column and valued at the rate at which they were originally issued. In this illustration, there are two returns from workshop on 12th and 20th August respectively. These are to be valued at the rates at which they were originally issued, that 'is, rates charged (Rs. 12) on 3rd and 9th August respectively. Further, the 20 units returned on 12th August have been included in the issue made on 13th August; and 60 units returned on 20th August have been included in the issue made on 22nd August.

2) **Shortage:** Shortage has been entered in the issue column and has been treated just like other issues. It is to be valued at the rate as per the method adopted, the FIFO, LIFO etc. treating the shortage as one of the issues.

Illustration *6*

From the following record of the receipt and issues of coal and stores verification report, calculate the prices of issues charged out under weighted average method.

1990
April I Opening balance: 100 tons @ Rs. 50 per ton
" 5 Issued 60 tons
" 6 Received 120 tons @ Rs. 50.50 per ton
" 7 Issued 50 tons (the stock verification report reveals a loss of 1 ton)
" 8 Received back from completed job 2 tons previously issued @ Rs. 50.25 per ton.
" 9 Issued 80 tonnes.

Check Your Progress A

1) State whether the following statements are True or False.
First in First Out method of valuing materials issues is suitable in times of rising prices. .....
According to LIFO method of pricing, issues are close to current economic values. .....
Weighted-average method of pricing stores involves adding all the different prices and dividing by the number of such prices. .....

2) Fill in the blanks.
i) First in First Out method of valuing material issues is suitable in times of ..... prices.
ii) Last in First Out method is suitable in times of ..... prices.
iii) Weighted average method of valuing material issues is suitable when prices .....

Solution

STORES LEDGER ACCOUNT
(Under FIFO Method)

Name .....

Description .....

Location code .....

Maximum level .....

Minimum level .....

Ordering level .....

Re-order quantity .....

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
August 1	—	1,500	12.00	18,000	—	—	—	—	1500	12.00	18,000
August 2	—	—	—	—	—	100	12.00	1,200	1400	12.00	16,800
August 3	—	—	—	—	—	250	12.00	3,000	1150	12.00	13,800
August 4	—	—	—	—	—	300	12.00	3,600	850	12.00	10,200
August 5	—	400	12.50	5,000	—	—	—	—	1250 {850 {400	12.00 12.50	15,200
August 9	—	—	—	—	—	300	12.00	3,600	950 {550 {400	12.00 12.50	11,600
August 10	—	200	12.50	2,500	—	—	—	—	1150 {550 {400 {200	12.00 12.50 12.50	14,100
August 11	—	—	—	—	—	300	12.00	3,600-	850 {250 {400 {200	12.00 12.50 12.50	10,500

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
August 12	—	20	12.00	240	—	—	—	—	870 { 20 250 400 200	12.00 12.50 12.50 12.50	10,740
August 13	—	—	—	—	—	450 { 20 230 200	12.00 12.00 12.50	240 } 5,500 2,760 2,500	420 { 20 200 200	12.00 12.50 12.50	5,240
August 16	—	500	13.00	6,500	—	—	—	—	920 { 20 200 200 500	12.00 12.50 12.50 13.00	11,740
August 18	—	—	—	—	—	400 { 10 200 190	12.00 12.50 12.50	120 2,500 } 4,995 2,375	910 { 20 200 200 500	12.00 12.50 12.50 13.00	11,620
August 20	—	60	12.00	720	—	—	—	—	510 { 10 500	12.50 13.00	6,625 7,345
August 22	—	—	—	—	—	300 { 60 10 230	12.00 12.50 13.00	720 125 } 3,835 2,990	570 { 60 10 500 270	12.00 12.50 13.00 13.00	3,510
August 26	—	400	12.00	4,800	—	—	—	—	670 { 270 400	13.00 12.00	8,310
August 29	—	—	—	—	—	200	13.00	2,600	470	13.00	5,710
		3,080		37,760		2,610		32,050	470		5,710

Solution

STORES LEDGER ACCOUNT
(Under weighted average method)

Name .....
Description .....
Location code .....

Maximum level .....
Minimum level .....
Ordering level .....
Re-order quantity .....

Date	Receipts				Issues				Balance		
	G.R.N. No.	Qty.	Rate Rs.	Amount Rs.	R.S. No.	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
1990											
April 1	—	100	50.00	5,000.00	—	—	—	—	100	50.0000	5,000.00
April 5	—	—	—	—	—	60	50.0000	3,000.00	40	50.0000	2,000.00
April 6	—	120	50.50	6,060.00	—	—	—	—	160	50.3750	8,060.00
April 7	—	—	—	—	—	50	50.3750	2,518.75	110	50.3750	5,541.25
April 7	—	—	—	—	—	1 (loss)	50.3750	50.38	109	50.3750	5,490.87
April 8	—	2	50.25	100.50	—	—	—	—	111	50.3727	5,591.37
April 9	—	—	—	—	—	80	50.3727	4029.81	31	50.3727	1,561.56
		222		11,160.50		191		9,598.94	31		1,561.56

5.5 LET US SUM UP

For ascertaining the cost of materials, the purchase price of materials needs certain adjustments like cash discount, cost of transportation, cost of containers, etc.

Materials may be purchased at different rates from time to time. Hence, when they are issued to production a problem arises with regard to the price at which they should be recorded. This can be done at actual cost, at average cost, at notional cost or at market price. Accordingly, a number of methods of pricing the issues have been developed. Of these, FIFO, LIFO, and weighted average price are the three prominent methods.

Under FIFO (First in First Out) method of pricing the materials, the cost of the earliest consignment is taken first and when that consignment is exhausted, the price of the next consignment is adopted and so on. This method of pricing is suitable in times of falling prices.

Under LIFO (Last in First Out) method, the cost of the latest consignment is taken first and when that consignment is exhausted, the price of previous consignment is adopted. Materials cost under this method is closer to current price level.

Under weighted average method, the price is calculated by dividing the total cost of the materials in stock by the total quantity. This method of pricing of materials gives better results because it tends to smooth out fluctuations in prices by taking the average of prices of various lots in stock. This method is mostly used by several organisations because it satisfies most of the conditions of a good method of valuing material issues.

5.6 KEY WORDS

FIFO (First in First out): A method of pricing the issue of materials at actual cost in the chronological order of the purchases.

LIFO (Last in First Out): A method of pricing the issue of materials at actual cost in of the latest purchase and when that lot is exhausted, the price of the previous consignment is adopted, and so on.

Weighted Average Price: The price which is calculated by dividing the total cost of materials in stock from which the materials are issued by the total quantity of materials in that stock.

5.7 ANSWERS TO CHECK YOUR PROGRESS

A 1 (i) False (ii) True (iii) False
2 (i) falling prices (ii) rising prices (iii) fluctuate considerably

5.8 TERMINAL QUESTIONS/EXERCISES

Questions

1) Discuss how you would treat discount, transportation costs, and the cost of containers for acscertaining the cost of materials.

2) Indicate the different methods used for pricing the issue of materials.

3) Explain with examples the following methods of pricing the issues of materials:
   a) LIFO.
   b) FIFO
   Under conditions of rising prices, which of these two methods would you recommend and why?

4) What is meant by weighted average method of valuing stores issues? What are its advantages?

Exercises

1) The following quotation is received from a supplier in respect of material X.

	Rate per kg. Rs.
Lot price 100 kg.	5.00
500 kg.	4.50
1,000 kg.	4.00

Trade discount is 20%. Cash discount of 5% is allowed if payment is made within 15 days. One container is required for every 100 kg of material and containers are charged at Rs. 10.00 each but credited at Rs. 9.00 if returned within three months.

	Rs.
Transport charges for any order	50
Storage charges	15

Calculate the total material cost for 500 kgs. and ascertain the rate per kg of the material when the purchaser decides to purchase 500 kgs. of the material.

(Answer: Total cost Rs. 1,870; Cost per kg Rs. 3.74)

2) From the following transactions, prepare separately the stores ledger accounts using the following pricing methods:

i) FIFO and ii) LIFO

January 1 Opening balance 100 units @ Rs. 5 each
" 5 Received 500 units @ Rs. 6 each
' 30 'Issued 300 units

February 5 Issued 200 units
" 6 Received 500 units @ Rs. 5 each

March 10 Issued 300 units
" 12 Issued 250 units

(Answer: Closing balance under both methods 50 units @ Rs. 5 each. Total cost Rs. 250).

-3) Following transactions are recorded in respect of a store item.

Date	Receipts kg.	Rate per unit Rs	Issues kg.
3-12-1984	400	1.00	—
11-12-1985	600	1.20	—
16-12-1984	—	—	500
19-12-1984	500	1.30	—
30-12-1984	—	—	400

Prepare a stores ledger account pricing the issues at weighted average method.

(**Answer:** Balance qty. **600** units, Rate Rs. 1.21 per unit Total Rs. 726).

4) The following receipts and issues were made of a new item of stores:

	Receipts		Issues
	(units)	Cost (Ws)	(units)
1st January	1,000	15,000	—
1st February	1,000	12,000	—
28th February	—	—	1,200
1st March	1,000	18,000	—
31st March	—	—	1,200

'Tabulate the values of:

i) Issue made on 28 February
ii) Resulting stock on 28 February
iii) Issue made on 31st March
iv) Resulting stock on 31st March

according to:

a) LIFO basis
b) FIFO basis
c) Weighted average cost basis

Answers:

	(a) Rs.	(b) Rs.	(c) Rs.
i)	15,000	17,400	16,200
ii)	12,000	9,600	10,800
iii)	21,000	16,800	19,200
iv)	9,000	10,800	9,600

5) The following information is available from the records of oil company for the month of June 1989.

Opening stock of oil 1,00,000 litres at Rs. 3 per litre. Purchases (Including freight etc.) made

June 01 2,00,000 litres @ Rs. 2.85 per litre
June 30 1,00,000 litres @ Rs. 3.03 per litre

Closing stock June 30	1,30,000 litres
Sales	Rs. 9,45,000
Administration cost	25,000

Compute the following under FIFO Method

a) Value of inventory on June 30;
b) Cost of goods sold for the month of June;
c) Profit or loss for the month

Answer: (a) Rs. 3,88,500 (b) Rs. 7,84,500 (c) Rs. 1,35,500

6) The following is an extract of the record of receipts and issues of a chemical coded as chemical 0 during the month.

February 01 Opening balance 500 tonnes @ Rs. 200
" 03 Issue 70 tonnes
" 04 Issue 100 tonnes
" 08 Issue 80 tonnes
" 13 Received from supplier 200 tonnes @ Rs. 190
" 14 Returned from works 15 tonnes
" 16 Issue 180 tonnes
" 20 Received from supplier 240 tonnes @ Rs. 190
" 24 Issue 300 tonnes
" 25 Received from supplier 320 tonnes @ Rs. 190
" 26 Issue 115 tonnes
" 27 Returned from works: 35 tonnes
" 28 Received from supplier 100 tonnes @ Rs. 190

Issues are to be priced on FIFO method. Stock verifier found shortage of 10 tonnes on 22nd. Draw up priced stores ledger card.

(Answer: Closing balance 555 units Rs. 1,05,450)

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 6 LABOUR

Structure

6.0 OBJECTIVES

After studying this unit you should be able to:

- explain the meaning of direct and indirect labour
- explain the concepts of time keeping and time booking
- describe the system of payroll accounting
- explain the concepts of idle time and overtime and describe their treatment in cost accounts
- discuss the implications of labour turnover
- describe the methods of wage payment
- explain various incentive plans used to reward labour efficiency.

6.1 INTRODUCTION

Labour is an essential factor of production. They make contribution to the organisation through their time and energy. This needs adequate compensation to labour by way of wages for the work done by them which constitutes another important element of cost. In this unit you will learn about the concepts of direct and

indirect labour, the method of their time keeping and time booking, the methods of wage payment and payroll accounting, and the treatment of idle time and overtime in cost accounts. You will also learn about a few important incentive plans that are commonly used by industrial establishments.

6.2 DIRECT AND INDIRECT LABOUR

Labour is an essential factor of production. It is a human resource and participates in the process of production. The remuneration paid to labour is a significant item of cost. For costing purposes, labour may be classified into two broad categories (i) direct labour, and (ii) indirect labour.

6.2.1 Direct Labour

Direct labour refers to labour engaged directly in the manufacture of a product or in a particular job. Some examples of direct labour are:

a) Labour engaged in converting raw materials into manufactured articles

b) Labour employed on a construction job

c) Helper attending a machine-operator

d) Compositors working in a printing press

The main features of direct labour are as follows:

1) It can be easily identified and allocated to cost units.

2) It varies directly with the volume of output.

3) It can be easily ascertained and controlled because of its close proximity to the output.

Wages paid to direct labour are termed as 'direct labour cost' and **forms part of prime cost.**

6.2.2 Indirect Labour

There are a number of workers who are not engaged directly in the manufacture of a product or in a particular job. They may be employed as supervisors, repair workmen, inspectors, security men, foreman, cleaners, messengers, timekeepers, etc. or engaged in purchasing, stores, factory office or maintenance job. Wages and salaries paid to such staff are treated as 'indirect labour cost' which is **included in overheads.**

The importance of distinction between direct labour and indirect labour lies in the fact that whereas direct labour can be identified with, and charged directly to, the product or a job, the indirect labour is not so identifiable and is, therefore, included in overheads which may be allocated to different products on some suitable basis.

6.3 TIME KEEPING

Time Keeping is a system of recording the time of arrival and departure of workers. This provides a record of total time spent by the workers in the factory. **It is on the basis of this record that their total entitlement for work under time rate system is determined.**

The process of time keeping is to maintain an accurate record of time of every worker when he is in and out of the factory i.e., a record of when he reports for duty and when he leaves his duty. This also provides a basis for distinction between regular time and overtime.

6.3.1 Forms of Time Keeping

Normally, two sets of time records are maintained in a factory:

i) **Attendance** Time showing the total number of hours spent by each worker in the factory. This record is used for determining the amount of wages payable to the workers.

ii) lob Time showing the number of hours spent on the jobs. This record helps in computing the labour cost for each job, product or process.

6.3.2 Purpose of Time Keeping

The purpose of time keeping is to provide information for

1) Preparation of pay rolls;
2) Calculation of labour cost per unit of operation, production or service;
3) Allocation of overhead cost based on wages or labour hours;
4) Attendance record of workers to meet statutory requirements;
5) Control of labour cost;
6) Determination of productivity of labour in the factory; and
7) Promotion of punctuality and discipline among the workers.

6.3.3 Methods of Time Keeping

Attendance of workers in a factory on the basis of the time of their arrival and departure may be recorded through either, or a combination, of the following three methods:

	Method of Time Keeping		Main Features
1	**HANDWRITTEN METHOD**	a)	Names of the workers are entered in an attendance register maintained for the purpose of time keeping.
		b)	They are required to sign the register at the time of their arrival for duties in the factory and at the time they leave.
		c)	Some time after theactual time scheduled for reporting for duties, workers arc marked 'late' or 'absent' as the case may he.
		d)	Though this is a simple and common method, the possibilities of fake attendance or fraudulant marking of attendance may not be ruled out under this method.
2	CHECK, TOKEN OK **DISC METHOD**	a)	Each worker is allotted an identification or token number.
		b)	At the time of arrival, the worker collects his token from the board and drops it in a box kept for the purpose at the factory gate.
		c)	After 10 or 15 minutes of the normal arrival time, the box is removed by the Time Keeper or it is substituted by another box.
		d)	The late comers are required to report directly to the Time Keeper
		e)	On the basis of the tokens dropped in the box, necessary entries regarding attendance of the workers are made in the Time Book which is passed on to the Wages Section for payroll accounting.
		f)	The method needs proper supervision to ensure that a worker does not put in the box more than one token.
3	**MECHANICAL OR** CLOCK **METHOD**	a)	Each worker is given a Clock Card which is placed in racks at the factory gate.
		b)	The time of arrival and departure of a worker is recorded with the help of dock recorders.
		c)	When workers report for duties, they take out their cards From rack one, get them punched by the Time Recording Clock maintained at the factory gate, and place them in rack two.
		d)	When they leave, they again get their cards punched with*the time of departure and put them back in rack one.
		e)	It is a quick, safe, scientific, reliable and accurate method of time keeping.

6.3.4 Importance of Time Keeping

Time keeping is a significant aspect of labour accounting. The process of time keeping

1) Ensures punctuality of workers and identifies late-comers;
2) Improve discipline among workers;
3)) Boosts morale of personnel;
4) Promotes a productive environment in the organisation;
5) Checks idle time and increases output by adherence to production schedules;
6) Helps recording of time for statistical purposes;
7) Maintains a record of work performed by the people; and
8) Assists computation of labour cost per unit or per process of production.

Check Your Progress A

1) What is Direct Labour?

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2) What is Indirect Labour?

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3) What are the objects of Time Keeping?

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4) State whether each of the following statements is True or False.

i) A fast worker is more profitable than a quality conscious worker. .....

ii) A good system of wage payment is one which ensures maximum possible payment to workers. .....

iii) Commission to salesmen is a direct labour cost. .....

iv) Labour cost control must be such which can ensure efficiency and satisfaction. .....

v) There is no need for keeping a record of time for those who get monthly salary. .....

6.4 TIME BOOKING

Under time keeping methods we simply record the time spent by a worker in the factory. Such record does not show how that time was utilized by him i.e., how much time he spent on the jobs entrusted to him and for how much time he remained idle. Hence, in addition to recording his time of arrival and departure, it is also necessary to record the time he spent on each job, order or process. The system of maintaining such record is termed as 'time booking'. In other words, time booking is a method of recording time devoted by a worker on a job, order or process.

6.4.1 Purpose of Time Booking

The major purposes of time booking are:

1) To assist in ascertaining the cost of a job, order or process performed;

2) To check wastage of time by the worker after he enters the factory;

3) To assess the cost of idle time; and

4) To ensure that the time spent by the worker in the factory has been properly utilised.

6.4.2 Methods of Time Booking

The system of time booking may be maintained either manually or mechanically. In relatively bigger organisations, where a large number of labourers work, or where there is a wide variety of jobs being performed every day, Time Recording Clocks may be used to enter the time of starting and finishing each job separately on the Job Cards.

The other methods of booking the time taken on separate jobs are:

1) **Daily Time Sheets:** This is a record for each worker separately in respect of time spent by him on each job during the day. Daily Time Sheets" (also known as time cards) include details relating to:
   a) Name of the worker,
   b) Work Order Number,
   c) Description of Work,
   d) Quantity Produced,
   e) Time of starting and finishing the job,
   f) Total hours consumed on the job,
   g) Rate of Wages per hour, and
   h) Amount of wages.

2) **Weekly Time Sheets:** It contains similar details of the record of time for all jobs done by the workers during a complete week.

3) **Job Cards:** It is prepared for each operation to be carried out on every order. This helps in computing the exact time taken by a worker on a particular job, operation or service. A job card authorises a worker to carry out the specified assignment. It also assists in having a correct allocation of wages to jobs, operations or processes.

As a matter of fact, time card (daily time sheet) and job card are similar in nature and content. Both help in ascertaining how each worker utilised his time while he was in the factory and enable the organisation to reconcile the time spent by the worker on each job with the time paid as per the attendance record. **Another advantage of these cards is that they provide complete record as to the labour content of each job so that the computation of labour cost is greatly facilitated.** The difference between these two types of cards lies only in the form in which the analysis of worker's time is recorded. In time card the analysis of time is made with reference to each worker whereas in job card, the analysis of time is made with reference to each job. Figures 6.1 and 6.2 should help you to understand this difference.

Figure 6.1 Dialy Time Sheet

DAVAR CO. LTD.
Daily Time Sheet

Name of worker ..... No. .....

Token No. of worker ..... Date .....

Department .....

Job or work order No.	Work done	Description of work done	Time		Total Hours		Cost	
			On	Off	Ordinary	Overtime	Rate	Amount

Total hours ..... Worker .....

Total cost ..... Foreman .....

Figure 6.2 Job Card

DAVAR CO. LTD.
Job Card for Each Job

Job order No. .....

Job description ..... Completed on ..... at .....

Started on ..... at .....

Day	Token No. of worker	Name of worker	Deptt.	Work done	Time		Total Time	Wage Rate	Amt.
					On	Off			

Checked and verified

Deptt. Foremen

Total time for the job

Total Amount for the job

6.5 PAYROLL ACCOUNTING

Each organisation has to maintain a system of payroll accounting for the purpose of computating wages payable to workers. This involves (i) the calculation of gross wages and net amount payable to the employees after making all deductions, and (ii) the preparation of wages sheet (also known as payroll) according to the specified method of wage payment.

6.5.1 Computation of Wages

The **gross wages** payable to each worker are computed with the help of Time Sheets, Job Cards, or Piece Work Cards. Under the time wage system, the amount of gross wages is calculated by taking into account the total number of hours worked multiplied by the hourly rate of wage payment, plus overtime premium. Under the piece wage system, the amount of gross wages is calculated by taking into account the number of units produced multiplied by the rate per unit.

For calculating the **net wages** payable to each worker, following deductions are usually made from the gross wages:

i) Fines and deductions for absence from duty

ii) Damages or loss of goods or money

iii) House rent and cost of other amenities or services

iv) Recovery of loans or advances

v) Income tax

vi) Provident fund

vii) Welfare fund

viii) Co-operative society dues

ix) Life insurance premium

x) Contribution to employees' state insurance

xi) Deductions on the basis of court order or the directive of some other authority.

6.5.2 Preparation of wages Sheet

The wages sheet (payroll) is a consolidated statement showing the gross wages, deductions and net wages payable to workers. It is prepared at periodical intervals according to the time of wage payment. Large concerns, these days make use of computers for preparing the wages sheets.

A wages sheet should generally contain the following information:

1) Name of the Department
2) Period—Month/Week
3) Worker's Number
4) Name of the Worker
5) Number of Hours worked
6) Normal Hours of Duty
7) Overtime Hours
8) Bonus Earned
9) Rate of Payment
10) Gross Wages plus Allowances
11) Deductions
12) Net Wages Payable

Normally, payrolls or wages sheets are prepared separately for each department. But they must be checked properly to minimise the possibilities of wrong payments either deliberately or inadvertently. Detection and prevention of both errors and frauds, including the checking for dummy workers in wages sheets, need attention to ensure accuracy in wage payments.

6.5.3 Purposes of Payroll Accounting

Payroll Accounting system helps the organisation in

1) Providing relevant data for cost control;
2) Determining the net amount of wages payable to each employee individually;
3) Knowing the total amount of wages payable by the organisation weekly, fortnightly or monthly for the different departments of the unit;
4) Minimising the possibilities of errors and frauds in wage payments; and
5) Issuing pay slips to every worker showing in detail the amount of gross wages and the deductions made therefrom for ascertaining the net amount payable for the period.

6.6 IDLE TIME

When workers are paid on the basis of time, there may be some difference between the time paid for and the time actually spent on production. This difference is known as 'idle time'. In other words, idle time is a period or duration for which workers have been paid but they have not worked towards production in the factory. This is a wastage which needs some effective control so that payment of wages without actual work may be minimised.

Idle time may be of two categories: (i) normal idle time due to unavoidable factors in the factory, and (ii) abnormal idle time caused by avoidable factors.

6.6.1 Causes of Idle Time

The reasons for idle time may be multiple. Some of the examples of situations which cause idle time are presented as follows.

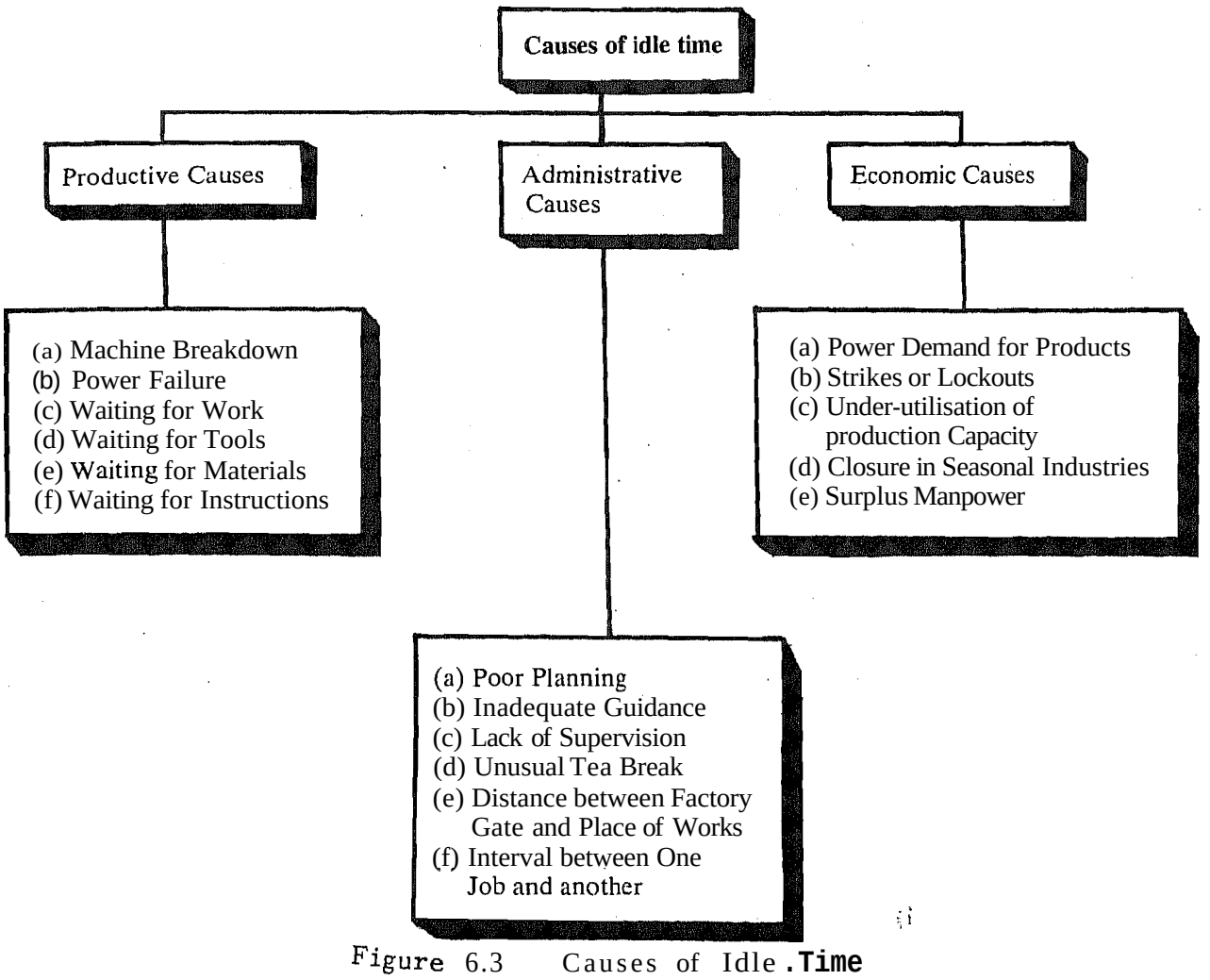

Figure 6.3 Causes of Idle .Time

6.6.2 Control of Idle Time

In order to reduce losses owing to idle time, the following measures may be adopted:

1) Fix responsibilities for various activities associated with production and for the control of idle time occurring at different stages in the organisation.

2) Introduce a preventive maintenance system for machines with periodical check-ups.

3) Maintain adequate stock of raw materials and a proper system of stores control to ensure continuity of production.

4) Use planning, give clear instructions in advance, define job participation by workers and apply proper supervision at every stage of performance.

5) Obtain periodical reports on idle time, identify the-causes of time loss and exercise quick corrective action.

6.6.3 Treatment of ldle Time Cost

Cost of idle time should be treated in the following manner:

Item	Charged to
1) Cost of Normal and Controllable Idle Time	FACTORY OVERHEAD
2) Cost of Normal but Uncontrollable Idle Time	JOBS (by inflating the rates of wages)
3) Cost of Abnormal and Uncontrollable or Unavoidable Idle Time	COSTING PROFIT AND LOSS ACCOUNT

Check Your Progress B

1) State the purpose of Time Booking.

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2) What do you mean by Payroll Accounting?

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3) Give four examples of items determining the wages payable to a worker.

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4) Distinguish between Active Time and Idle Time.

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5) Give five major causes of Idle Time.

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6) State whether each of the following statements is True or False.

i) Wages Sheet containing dummy names on the payroll, but fully passed for payment, form part of labour cost. .....

ii) Idle time is a deliberate wastage of time. .....

iii) One of the techniques of minimising idle time is to keep the tools and materials ready for use.. .....

iv) The difference between gross wages and net wages represents deductions. .....

v) Job Cards can be used for the purpose of time booking. .....

6.7 OVERTIME

When workers have to work beyond their normal duty hours, the additional period is treated as 'Overtime'. Overtime is an extra time over and above the scheduled hours of work or beyond the usual working hours. When workers are detained for overtime, they are normally paid at double the usual rate for extra hours.

Overtime may be considered useful under the following circumstances:

1) When the urgency of work demands an immediate completion of the job for the customer;
2) When the organisation desires to make up any shortfall in production;
3) When the company needs extra production to meet additional market demand or seasonal rush; or
4) When the number of workers is less than the requirement.

Since overtime involves an extra cost, it needs proper authorisation and control. One has to ensure that the system is not put to misuse. This will expect a careful scrutiny of (i) the justification for overtime; and (ii) the workers who are required to be retained for this purpose.

Treatment of Overtime Cost: Additional payment for overtime should be charged as follows:

	Nature of Overtime	Charged to
1)	Due to customers' request to complete a job within a specified period	JOB directly
2)	Due to general pressure of work	GENERAL OVERHEAD
3)	Due to delayed schedule	DEPARTMENT
4)	Due to loss of time for unavoidable reasons	COSTING PROFIT AND LOSS ACCOUNT
5)	Due to seasonal rush and peak load	PRIME COST

6.8 LABOUR TURNOVER

Workers often change their jobs for better prospects and better environment. In any organisation, therefore, there is a continuous flow of labour—some old ones are leaving and new ones are joining. Though it is a normal process, the frequent changes in the composition of labour affect the continuity as well as the productivity of the organisation. This, in turn, affects the labour cost. Hence, every effort is made to reduce the labour turnover, which is **defined as the rate of change in the labour force of an organisation during a particular period.** It can be measured by the following two methods:

$$\frac{\text{Number of Workers Left}}{\text{Average Number of workers on Roll}}$$ **Separation Method**

OR

$$\frac{\text{Number of Workers Replaced}}{\text{Average Number of workers on Roll}}$$ **Replacement Method**

6.8.1 Causes of Labour Turnover

Factors which cause labour turnover can be grouped into two categories: (i) avoidable causes, and (ii) unavoidable causes.

Examples of avoidable causes of labour turnover are as follows:

1) Workers and jobs not matching with each other
2) Low wages
3) Bad working conditions
4) Poor treatment by employers
5) Lack of job satisfaction
6) Absence of planning and foresight in management
7) Psychological reasons Like nature, behaviour, habit of change, jumping preferences, militant attitude, etc.
8) Poor relationship with fellow workers
9) Unfavourable or odd hours of work
10) Bad relationship with supervisors
11) Poor promotion policy
12) Inadequate protection against accidents
13) Discrimination between one worker and another
14) Lack of proper incentives
15) Absence of a sound recruitment and training policy
16) Lack of recreational and medical facilities

Among the **unavoidable causes** of labour turnover are the following:

1) Opportunities of better prospects
2) Sickness
3) Accident or disability
4) Change of place of stay
5) Marriage
6) Death
7) Retirement
8) Problems of accommodation and transport
9) Resignation
10) Retrenchment
11) Domestic problems and family responsibilities
12) Seasonal nature of the business
13) Shortage of raw materials, power supply, market demand, etc,

6.8.2 Effects of Labour Turnover

A high rate of labour turnover means that workers often leave and do not stay for long. Old workers generally possess more experience than new workers. Replacement of workers, therefore, declines the overall efficiency. Moreover, the engagement of new workers needs recruitment and training which involves additional cost. This gap between the old and the new labour often brings down both the quality and quantity of output. **Undue labour turnover, thus, involves an additional cost to the organisation** owing to:

1) Cost of recruitment of substitute workers;
2) Cost of training new workers;
3) Cost of declihe in production due to reduced efficiency and disturbed schedule;
4) Loss on Account of defective work and increased wastage in production;

5) Breakage of tools and equipment due to mishandling by new workers; and

6) Wastage of materials in handling by new workers.

The overall effect of labour turnover, therefore, is a higher cost of production and lower profitability.

6.8.3 Control of Labour Turnover

Since labour turnover is a loss to the organisation, every effort is required to minimise its frequency. Some of the measures to minimise labour turnover are:

1) Institute proper machinery to attend promptly to the grievances of workers;

2) Create congenial working conditions in the factory;

3) Provide adequate welfare facilities to the workers;

4) Improve employees' morale;

5) Give opportunities for workers' participation in management;

6) Follow a suitable policy of promotion and transfers; and

7) Develop a sound system of recruitment and training.

Control of labour turnover, therefore, needs proper job satisfaction to workers so that they continue to serve the organisation in stead of taking a decision to change.

Check Your Progress C

1) What is Overtime?

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2) Why do we need to control overtime?

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3) What do you is mean by Labour Turnover?

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4) Judge whether the following are GOOD or BAD as a trend in a manufacturing enterprise:

i) Rising Wages with stable output .....

ii) High labour turnover .....

iii) Declining market prices but without any change in labour cost .....

iv) Workers' decision to work extra for compensating the loss due to strike .....

v) Workers work independently without any supervision .....

vi) Substantial bonus is declared by the company to the workers .....

6.9 METHODS OF WAGE PAYMENT

One of the basic incentives to job satisfaction and labour efficiency is adequate wages. Unless people get proper remuneration for their services, they are not

encouraged to participate actively in discharging their duties or in completing their assignment effectively.

There are various methods of remunerating labour. Each method has its merits and demerits, However, a good method of wage payment should

1) Guarantee a minimum wage for the time devoted by the worker,
2) Easy to understand and simple to operate,
3) Balance the interests of both the employers and the employee,
4) Allow proper supervision and control over the quality of output,
5) Maintain a reasonable distinction between efficient workers and inefficient workers in terms of their wages,
6) Reward efficiency by additional payment for time saved or target exceeded,
7) Avoid disparity of pay in similar nature and level of operations, and
8) Incorporate flexibility to adjust with the changing circumstances of the business

It is to incorporate all such considerations that two main methods of wage payment have been developed. These are:

1 Time Wage System
2 Piece Wage System

Let us now discuss the characteristics, merits and demerits of these two systems separately.

6.9.1 Time Wage System

This is the most popular method of payment to workers. Under this system, wages are based on the amount of time spent by a worker inside the factory. He is paid at a specified rate per unit of time (for example, per hour, per day, per week or per month) for his services rendered to the organisation.

Calculation of wages under this method of remuneration takes into account: (i) the time for which the workers are engaged on the job and, (ii) the rate per unit of time fixed for payment. For example, if a worker gets Rs.5 per hour, he works for 8 hours per day and has been present for duties on 25 days during the month, his wage for the month on the basis of Time Rate will be: Rs $5 \times 8 \times 25 =$ Rs.1,000.

The main **advantages** of Time Rate method of wage payment are:

1) It offers a fixed minimum wage to the worker for a defined period of time.
2) It simplifies calculation of the payable amount of wages.
3) It makes a stable and secure return to the workers.
4) It encourages the workers to do their jobs with utmost quality, care and efficiency and in the best possible manner.
5) It promotes a sense of equality and unity among the workers.
6) It is an economical system to the organisation in respect of wage administration, material use, plant operation and quality control.

The major **disadvantages** or limitations of Time method of wage payment are:

1) It ignores the individual quality and quantity of output.
2) It reduces personal initiative to work faster.
3) It treats both efficient and inefficient workers at par.
4) It increases the cost of labour per unit because of the tendency to consume more time in finishing a job.
5) It needs a close supervision to ensure continuity of operations.

6.9.2 Piece Wage System

When workers are paid on the basis of their output, irrespective of the time consumed in completing the work, it is termed as Piece Wage. The rate of payment under this method is related to the quantity of work done i.e. per unit of output, per article, per job or per commodity. Under this system, the total units produced or manufacturerd by the worker during a given period form the basis of computation of his wages for the period. For example, if the rate of labour per chair is Rs.50 and the worker has completed 10 chairs during a week, his wages for the week on the basis of piece rate will be:

Rs. 50 × 10 = Rs. 500

The major **advantages** of Piece Wages system are that it

1) places greater reliance on the merit and efficiency of workers;
2) induces workers to be efficient, produce more and earn higher wages;
3) ficilitates prompt computation of cost for quotations; and
4) maintains plant and equipment properly so as to avoid disruption in work.

The main demerits or **disadvantages** of the piece wage system of wage payment are that it:.

1) ignores quality of products in an effort to maximise output;
2) kills a long-term interest and continuity of engagement in the organisation of the workers;
3) treats workers as unsecure and uncertain in terms of wages payable during different periods;
4) creates dissatisfaction among workers owing to disparity in wages;
5) needs a continuous supervision over the quality of operations;
6) enhances wastage of materials, wear and tear of machines and absenteeism of workers; and
7) declines the level of labour discipline.

6.9.3 Balance of Debt System

In order to retain the merits of both Time Wage and Piece Wage systems, as also to minimise their demerits, a balanced system of wage payment is recommended in developing units. This is known as 'Balance of Debt system' which is a compromise between the Time Wage and Piece Wage.

The two **main features** of Balance of Debt system are:

i) **Minimum Payment:** The worker is paid on the basis of a piece rate per unit of output. In case, due to some unavoidable factors, the earnings of a worker at piece rate are less than his earnings at time rate, he is paid on time basis.

ii) **Recoupment:** Thedifference between the time rate and piece wage paid to the worker is treated as an extra payment to be recouped from his subsequent earnings when his piece rate wages are more than time rate wages. This grants protection to workers to earn a minimum wage on the basis of time rate even if he completes a job in longer hours due to some unavoidable reasons. The recovery of extra payment too may not be felt inconvenient by the worker when his piece wage earnings exceed the time rate wages.

Under the Balance of Debt Systein, therefore, a worker gets fixed wages for the time he works, plus extra payment for his performance beyond a certain prescribed limit Of output.

4.10 INCENTIVE PLANS

You have learnt that wages are paid to labour on time rate or piece rate basis. But individual performance must also receive attention in a structure of wages so that an

appreciable difference is maintained between a good worker, an average worker and a bad worker. Not only that, efficiency of labour usually saves time and cost. Hence, it would be justified that a portion of the benefit which goes to the organisation through labour efficiency is also shared by those who generate this benefit. **Incentive plans are used to compensate the efficiency of labour for his extra efforts used in minimising the time or cost.** It may be in the form of a bonus or premium. Incentive plans are devised to compensate the worker through an additional payment over and above their guaranteed wages. The plans also aim at keeping efficient workers satisfied with their employment. The standard time and standard performance are determined in advance so as to judge individual contribution. In case there is a gain on time saved, it is distributed between the employers and workers.

The **main features** of most incentive plans are:

1) The standard time and standard performance are determined in advance.
2) Time wages are guaranteed to all workers.
3) Efficient workers are given incentive by way of bonus for the time saved.
4) Wages per hour increase but not in the same proportion as the output.
5) Labour cost per unit of output decreases. The employer also shares the benefit of efficiency which induces him to improve the methods and equipment.

Some of the prominent plans are discussed here in detail.

6.10.1 Halsey Premium Plan

The main features of Halsey Premium Plan as a method of incentive to efficient workers are as follows:

1) Standard time and standard work are prescribed in advance.

2) Workers are paid for the actual time they take to complete the job as per the time rate.

3) If **a** worker completes the job in less than the pre-determined standard time, he is given a bonus for the time saved. This is in addition to his wages for the actual time spent on the job.

4) **A** bonus equal to 50 per cent of the wages of time saved is paid to the worker as a reward to his good work.

5) Workers who fail to reach the prescribed standard get the time wage.

The rate of bonus under the Halsey Premium Plan may vary according to the policies of the organisation. In some cases, it may be 1/3 of the wages of time saved,

It is a simple system to operate. It guarantees the hourly wages to workers for the actual time. But fixation of standard time is a difficult process. Workers however, feel that they do not get the full benefit for the time saved under this system.

Method of Computation

Total Earnings of the worker = (Time Rate × Time Taken) + $\frac{1}{2}$ × Time Saved × Time Rate

or, $(T \times R) + \frac{1}{2} \times (S - T) \times R$

Where S = Standard Time
T = Actual Time Taken
R = Rate of Wages per Hour

Now, if the Standard Time for a Job = 8 hours
Actual Time = 6 hours
Rate per hour = Rs. 7

Then, Total Earnings of the worker are

$= (6 \times 7) + \frac{1}{2} \times 2 \times 7$
= Rs. 49

This includes time wages of Rs.42 and Rs.7 as bonus for time saved. It is to be noted here that the worker gets Rs. 49 for 6 hours, which comes to Rs. 8.16 per hour.

6.10.2 Rowan Premium Plan

Rowan Premium Plan is similar to Halsey Plan. The main features of Rowan Plan are:

1) Workers are paid for the actual time taken by them in completing the job on the basis of time rate.

2) They are paid a bonus for the time saved i.e., for the difference between the standard time and actual time.

3) Bonus under this method is calculated as a proportion of the time wages as time saved bears to the standard time.

Method of Computation

$$\text{Bonus} = T \times R \times \frac{\text{Time saved}}{S}$$

$$\text{Total Earnings} = (T \times R) + (T \times R \times \frac{S - T}{S})$$

In the above example, it will be $= (6 \times 7) + (6 \times 7) \times \frac{8 - 6}{8}$

$= -$Rs. 52.50

This includes time wages of Rs. 42 and Rs. 10.50 as bonus for time saved. Since the worker gets Rs. 52.50 for 6 hours, it amounts to Rs.8.75 per hour.

The merits and demerits of Rowan Plan are similar to those of Halsey Plan. An additional advantage under Rowan Plan is that the worker is not induced to rush through the work because if time saved is more than 50 per cent of the standard time, the bonus will decrease. However, the calculation of honus is complicated.

Look at Illustration 1 and study how total wages of a worker are calculated under different plans.

Illustration 1

The standard time allowed to complete a job is 100 hours and the hourly rate of wage payment is Rs. 5. The actual time taken by the worker to complete the job is 80 hours.

Calculate the total wages of the worker on the basis of

i) Time Rate

ii) Piece Rate

iii) Halsey Plan

iv) Rowan Plan

Also compare the effective earnings per hour under the above methods.

Solution

i) **Time Rate**
Total Wages $= 80 \times 5 =$ Rs. 400

ii) **Piece Wage**
Total Wages $= 100 \times 5 =$ Rs. 500

iii) **Halsey Plan**
Basic Wages for 80 hours at Rs. 5 per hour = Rs. 400
Bonus ($\frac{1}{2}$ of Basic Wages for Time Saved) $= 20 \times 5 \times \frac{1}{2} =$ Rs. 50
Total Wages = Rs. 450

iv) **Rowan Plan**
Basic Wages for 80 hours 4 Rs. 5 per hour = Rs. 400
Bonus for Time Saved $= \frac{20}{100} \times 80 \times 5 =$ Rs. 80

Total Wages = Rs. 480

Comparative Earnings per Hour
Time Rate = Rs. 400 —80 = Rs. 5
Piece Wage = Rs. 500 i 8 0 = Rs. 6.25
Halsey Plan = Rs 450 ÷80 = Rs. 5.62
Rowan Plan = Rs 480 —80 = Rs. 6

6.10.3 Differential Piece Rate System

Besides Halsey and Rowan Premium Plans; there is yet another line of thought in respect of incentive methods. This system believes in payment of wages to labour on the basis of piece rates varying with the level of efficiency of workers.

Some of the exponents of differential piece rate system are:

i) Taylor

ii) Gantt

iii) Emerson

iv) Merrick

Let us now study the main features of their suggestions regarding the exact basis on which the rates of payment should be distinguished between one worker and another.

Taylor System
The **main** features of this system are:

a) It offers a higher piece rate to workers beyond a defined level of output;

b) It distinguishes between workers through two types of piece rates: (i) a lower rate for sub-standard performance (e.g. 80% of piece rate), and (ii) a higher rate for standard and above standard performance, which is much more than time wages (e.g. 120% of piece rate)

c) It acts as an additional incentive to expert workers towards maximisation of production; and

d) It ignores any form of guaranteed day wages.

Illustration 2

Standard Time allowed	10 units per hour
Normal Piece Rate	Rs. 5

Differential Piece Rate:
80% of Piece Rate for Output below standard
120% of Piece Rate for output at or above standard
A produces 75 units in a day of 8 hours
B produces 100 units in a day of 8 hours

Compute wages of **A** and B under Taylor Differential Piece Rate System.

Solution
Piece Rate will be 5 ÷10 = Re. 0.50 per unit
Standard Output in 8 hours is 8 × 10 = 80 units
So A's performance is below standard and B's above standard

Earnings of **A** $= 75 \times 0.50 \times \frac{80}{100}$ = Rs. 30

Earnings of B $= 100 \times 0.50 \times \frac{120}{100}$ = Rs. 60

Labour Cost per unit—
A = 30 i 7 5 = 0.40 per unit
B = 60 —100 = 0.60 per unit

Gantt Task Bonus Plan
This system combines the (a) Time Wage, (b) Piece Wage, and (c) Bonus Plan. It mainly follows **a** differential piece rate basis of remuneration with the following method of computation:

a) Output below standard to be paid at guaranteed Time Rate

b) Output at standard to be paid with 20 per cent of Time Rate as Bonus

c) Output above standard to be paid at high piece rate on the entire output of the worker.

Gantt System, therefore, offers an incentive to efficient workers for increased production. It means lesser the time consumed in completing the job, higher the earnings per hour. The standard output within a specified period is pre-determined. Bonus is paid at the rate of 20% for 100% efficiency. Those workers who complete their job in the standard time are treated as 100 per cent efficient. They get wages for time taken plus bonus at a fixed percentage of wages. If a worker completes his job in less than the standard time, he gets wages for standard time plus bonus at a fixed percentage of wages earned (which is usually 20%). Slow workers, however, still get the guaranteed wage for the day.

Illustration 3

Standard Rate = Rs 5 per hour
Standard Hours for the Job = 8 hours
Bonus = 20% of Standard Time
Worker **A** completes the work in 10 hours
Worker B completes the work in 8 hours
Worker C completes the work in 6 hours

Compute the earnings of **A,** B and ***C*** under Gantt Task Bonus Plan.

Solution

The comparative earnings per hour of the three workers will be computed as follows:

A: Wages for 10 hours at Rs. 5 per hour = Rs. 50

B: Wages for 8 hours at Rs. 5 per hour = Rs. 40 + 20% of 8 hours
= 40 + 8 = Rs. 48

C: Wages for 6 hours =
Wages for 8 hours at Rs. 5 per hour = Rs. 40 + 20% of 8 hours = Rs. 48

A's earnings per hour = Rs. 5′
B's earnings per hour = Rs. 6
C's earnings per hour = Rs. 8

Emerson Efficiency Scheme

The main features of this scheme arc:

a) It combines minimum day wages with the differential rate of bonus related to the level of efficiency of workers.

b) It rewards efficiency according to the actual time taken in completing the job.

c) The standard output is pre-determined i.e., a standard task for a unit of time or standard time tor a job is fixed and then the level of efficienoy of workers is determined on that basis.

d) If a job is completed in standard time, it is treated as 100% efficiency. If it takes double time, it is 50% efficiency.

e) Bonus is paid to workers when their level of efficiency is $66\frac{2}{3}\%$ or more.

f) The rate of bonus increases gradually with increase in the output; the scheme contains about 32 differentiating rates at different levels of efficiency.

g) Those workers who fail to attain $66\frac{2}{3}\%$ level of efficiency are paid at Time Rate.

Look at the following two tables to understand the level of efficiency and its relationship with the rates of bonus under this scheme..

STANDARD TIME: 20 hours	
Time taken to complete the job	Level of Efficiency
20 hours	100%
16 hours	125%
40 hours	50%

Level of efficiency	Bonus Rate
66⅔%	Guaranteed Time Rate
90%	10%
100%	20%
Above 100%	Time Wages + 20% of wages earned + wages for Time Saved
125%	Time Wages + 20% Bonus + 25% of Time Saved

Look at Illustration 4 and see how bonus and wages are calculated under the Emersion Efficiency Scheme.

Illustration 4
Standard Output: 2,000 units per day
Worker A produces 1,200 units
Worker B produces 1,600 units
Worker C produces 2,000 units
Worker D produces 2,400 units

Indicate the bonus rate for A, B, C and D under Emersion Efficiency System.

Solution

Worker	Std. Output	Production	Efficiency Level	Payment
A	2,000	1,200	60%	Wages at Time Rate
B	2,000	1,600	80%	Daily wage at Time Rate + 4% Bonus
C	2,000	2,000	100%	Time Rate for hours worked + 20% Bonus
D	2,000	2,400	120%	Day wage + 20% Bonus + 20% for Time Saved

Merrick Differential Piece Rate System
The main features of this system are as follows:

a) It is a multiple piece rate system.

b) All workers under this scheme are paid only on the basis of their output.

c) Time Rate wages are not guaranteed to the workers; they are paid on the basis of their efficiency.

d) The rates of payment under this system are:

Level of Efficiency	Payment
up to 83% of the standard	Normal Piece Rate
83% to 100%	110% of Normal Piece Rate.
Above 100%	120% of Normal Piece Rate

Illustration 5
Piece Rate—Rs 20 per unit
Standard Output—24 units per day of 8 hours

Output of A—16 units
Output of B—21 units
Output of C—25 units

Compute wages for A, B and C under Merrick Differential Rate System.

Solution

A : Efficiency = 16 ÷24 X 100 = 67%
As this level is below 83%, wages = 16 X 20 = Rs.320

B : Efficiency = 21 —24 X 100 = $87\frac{1}{2}$%
Efficiency level is above 83% but below 100%
Wages = 21 X 22 = Rs.462

C : Efficiency = 25 ÷24 X 100 = 104%
Efficiency level is above 100%. Rate per unit will be Rs.24
Wages = Rs.600 (25 × 24)

A gets Rs.20 per unit, B Rs.22 per unit and C Rs.24 per unit.

6.10.4 Group Bonus Scheme

This system rewards a group associated with production rather than the individual workers. The main characteristics of this system are:

a) Bonus is paid for collective efficiency in production.

b) Bonus is payable to a group of workers for their joint output over and above the given target.

c) Distribution of bonus to the individual members of the group is made on some agreed basis or in specified proportions.

d) Production is considered to be a team effort governing the efficiency of performance.

e) It is a method of payment by results based on group productivity being shared by the workers either equally or in different specified proportions bctwecn workers of different skills.

f) The aim is to create a team spirit for increased production and lower cost per unit through healthy competition between different groups.

This system gives an opportunity also to foremen and supervisors to share the rewards of efficiency in output and to take adequate initiative in this area.

Check Your Progress D

1) How can you determine wages under the time rate system?

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2) Why do we pay labour on piece wage basis?

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3) State the need for labour incentives through bonus and premium.

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4) Which one of the following alternatives should be the most advantageous choice of objective in a company?

i) Increased production

ii) Minimum wages

iii) .Effective supervision

iv) Extended hours of duty

v) . Uniform rates of payment to all staff

vi) Fully mechanised operations

vii) Labour satisfaction

viii) Industrial peace

ix) Optimum efficiency

x) Tight control over punctuality of workers.

5) State whether each of the following statements in True or False.

i) A good method of wage payment should guarantee a minimum wage to all workers. .....

ii) Time wage system motivates the worker to work faster. .....

iii) Under piece wage system, the worker maintains the plant and equipment properly. .....

iv) Balance debt system is a compromise between time wages and piece wages systems. .....

v) Under incentive plans wages per hour increase in the same proportion as the output. .....

vi) Rowan premium plan is more complicated than the Halsey premium plan. .....

vii) Taylor differential piece rate does not ignore guaranteed day wages. .....

viii) Gantt task bonus plan combines time wage system, piece wage system and bonus plan. .....

6.11 LET US SUM UP

Labour is an important element of cost. For costing purposes, labour may be classified into direct and indirect. Direct labour cost forms part of the prime cost while indirect labour is included in overheads.

Recording of time of arrival and departure of Recording the workers is termed as 'time keeping' for which various' methods like attendance register, token or disc method, or clocks cards ark used. Such record does not show how each worker's time was utilised. For this purpose a system of time booking is maintained with the help of time cards or job cards. Job cards help in ascertaining how each worker utilised his time while he was in the factory and also in computing the labour cost of each job or operation.

Payroll accounting refers to the system of computing net wages payable to each worker and preparing the wages sheet according to the specified method of wage payment. It helps in providing relevant data for cost control and minimising the possibilities errors and frauds.

Idle time refers to the time during which workers were not engaged on production and for which they have been paid. For costing purposes such time may be classified

into normal idle time and abnormal idle time. Wages paid for normal idle time are.' charged to jobs by inflating the hourly wage rates. But, the wages paid for abnormal idle time carried by un-controllable factors like machine break-down, power failure, strike etc. are charged to the Costing Profit and Loss Account. Overtime involves an extra cost because the workers are paid higher wages for such time. The additional payment for overtime should be charged to general overheads if it is done due to general pressure of work or to the job directly if it is done for completing a specific job within a specified period.

Labour turnover refers to the rate of change in the labour force during a particular period. It may be caused by some unavoidable factors like retirement, marriage, disability, etc. or by avoidable factors like poor work environment, poor labour policies, low wages, etc. Undue labour turnover involves additional cost and low profitability and should, therefore, be avoided.

There are two basic methods of wage payment viz., time wages, and piece wages. Both have their advantages and limitations. Most organisations, these days, use time wage system and provide for incentive plans to improve the productivity of labour. The prominent plans used are (i) Halsey Premium Plan (ii) Rowan Premium Plan, (iii) Differential piece rate system, and (iv) Group bonus scheme.

6.12 KEY WORDS

Balance of Debt System: A system of wage payment under which a worker is paid on the basis of piece rate subject to a minimum wage based on the time spent by him in the factory. The extra payment is recouped from his subsequent extra earnings.

Clock Card: A card given to each worker on which his time of amval and departure is recorded with the help of clock records.

Differential Piece Rate System: A system under which piece rate vanes according to the efficiency of workers.

Direct Labour: Labour directly engaged in the manufacture of a product or in a particular job.

Idle Time: Wages paid for unproductive time due to circumstances beyond the ,control of the workers.

Indirect Labour: Labour employed as supervisors, repair workmen, security men, etc.

Job Card: A card maintained for each Job on which the time spent by different workers on that job is recorded.

Labour Turnover: Rate of change in the labour force of an organisation during a particular period.

Overtime: Extra time spent in the factory over and above the scheduled hours of work.

Payroll: Wages sheet recording gross wages and net wages payable to each worker

Payroll Accounting: A system of computing net wages payable to each worker.

Piece wage'system: A system under which wages payable to workers are based on their output.

Standard time: Pre-determined time allowed for completing a particular task.

Time Booking: Recording utilisation of worker's time on various jobs, operations etc.

Time Card: A card maintained for each worker on which the time spent by him on different jobs is recorded.

Time Keeping: Recording the time of arrival and departure of workers.

Time Wage system: A system under which wages payable to workers are based on the time spent by workers ih the factory.

6.13 ANSWERS TO CHECK YOUR PROGRESS

A 4 i) False ii) False iii) False iv) True v) False

B 6 i) False ii) False iii) True iv) True v) True

C **4** **i)** Bad ii) **Bad** iii) **Bad** iv) Good v) Bad vi) Good

D **4** (ix)

5 i) True ii) False iii) True iv) True v) False vi) True vii) False viii) True

6.14 TERMINAL QUESTIONS

1) Distinguish between Direct Labour and Indirect Labour.

2) Bring out the salient features of Time Keeping and Time Booking.

3) What do you mean by idle time? How are wages paid for idle time treated in cost accounts?

4) 'Overtime is an evil'. Do you agree? Give reasons and explain extra wages paid for overtime treated in cost accounts.

5) What is Labour Turnover? State the major causes of Labour turnover.

6) Name the various methods of remunerating labour and explain any one of them in detail.

7) What are the different methods of incentives? Discuss any one of the systems of bonus or premium which you consider as effective.

8) Comment on the relative utility of:
   a) Halsey Premium Plan
   b) Rowan Premium Plan
   c) Differential Piece Rate System
   d) Group Bonus Scheme.

Note: These questions will help you lo understand the Unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

SOME USEFUL BOOKS

Arora, M.N. 1988. *A Text Book of Cost Accountancy,* Vikas Publishing House Pvt. Ltd.: New Delhi. (Chapter **3-8).**

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Owler, L.W.J. and J.L. Brown, 1984. *Wheldon's Cost Accounting,* ELBS: London. (Chapter 3-7).

ECO-10 ELEMENTS OF COSTING
Course Components

BLOCK	UNIT NO.	PRINT MATERIAL
1		**Basic Concepts**
	1	Nature arid Scope
	2	Concept of Cost arid its Ascertainment
2		**Materials and Labour**
	3	Procurement, Storage and Issue of Materials
	4	Inventory Control
	5	Pricing Issue of Materials
	6	Labour
3		**Overheads**
	7	Classification and Distribution of Overheads
	8	Absorption of Factory Overheads
	9	Treatment of other Overheads
4		**Methods of Costing**
	10	Unit Costing
	11	Reconciliation of Cost and Financial Accounts
	12	Job and Contract Costing
	13	Process Costing

UNIT 7 CLASSIFICATION AND DISTRIBUTION OF OVERHEADS

Structure

7.0 OBJECTIVES

After studying this unit you should be able to :

- explain the concept of overheads
- classify overheads element-wise, function-wise and behaviour-wise
- describe the sources from which overheads under different standing order numbers are collected
- explain various bases of allocation and apportionment of factory overheads
- prepare distribution summary showing the allocation and apportionment of various factory overheads.

7.1 INTRODUCTION

You have learnt that all indirect costs are collectively termed as 'overheads' and that they, constitute an important component of total cost of a product, a job or a process. In this unit, you will learn about the meaning of overheads, the various categories into which they can be classified, and the procedure of collecting them under different standing order numbers, You will also learn about the various bases of allocation and apportionment of factory overheads to different production and service departments and the preparation of distribution summary.

7.2 CONCEPT OF OVERHEADS

A cost is composed of three elements — (a) material, (b) labour, and (c) expenses. Each of these costs can be further classified as (1) direct and (2) indirect. Direct costs are costs Which can be easily identified directly with a particular product, process or department. Indirect costs, on the other hand, refer to costs which cannot be conveniently identified with a particular product, process or department. These are common costs like rent, repairs, salaries, lubricating oil, which are incurred for the benefit of a number of cost units or cost

centres. The total of all indirect costs i.e., indirect material, indirect labour and indirect expenses, is termed as 'overheads'. Other terms in use for overheads are 'oncosts', 'overhead costs', 'supplementary costs', 'overhead expenses or charges', etc.

The National Association of Accountants (USA) defines overheads (overhead costs) as follows :

(A) **Fundamental concept :** Costs that have to be incurred although they have no directly measureable, observable relationship to specific activity units, production or cost objectives.

(B) **Application definition :** While related to the accomplishment of the firm's objectives, overhead costs are costs which cannot, as a practical matter, be assigned to those objectives in a direct fashion. A consistent method of cost allocation, which by some measure approximates the economic sacrifices incurred, must be adopted.

It is evident from the above that they cannot directly be identified to units of output and that they have to be suitably allocated or absorbed so as to determine the product cost, both total cost and unit cost.

7.3 CLASSIFICATION OF OVERHEADS

Overhead classification refers to the process of grouping the overheads according to their common characteristics so as to provide the managers with information that will enable them to manage the business effectively.

The overheads can be classified according to :

1 Elements

2 Functions and Departments

3 Behaviour.

7.3.1 Element-wise Classification

According to elements overhead is divided into :

i) Indirect materials
ii) Indirect labour
iii) Indirect expenses

i) **Indirect** materials : It is that material which does not form a part of the finished product or saleable service. Examples of indirect materials are : coal, lubricating oil, grease, sand paper used in polishing, etc. There are some items which may become a part of the finished product like nuts, screws, bolts, pins, etc., but these are still considered as indirect materials for costing purposes as their cost is comparatively small.

ii) **Indirect labour :** Indirect labour is not directly engaged in the production operations. They only assist or help in production operations. Examples of indirect labour are supervisor, clerk, cleaner, inspector, peon, watchmen, etc. Remuneration paid to these employees is considered as indirect labour cost.

iii) **Indirect expenses :** All indirect costs, other than indirect materials and indirect labour are considered to be indirect expenses like rent, depreciation, lighting and power, advertising, insurance etc.

7.3.2 Function-wise Classification

This method of classification is based on the major functions/departments of a business organisation. They are

i) Production overheads
ii) Administration overheads
iii) Selling overheads
iv) Distribution overheads

i) Production overheads : These include indirect material cost, indirect wages and indirect factory expenses incurred from the stage of procurement of materials till the completion of the finished product, They are the expenses incurred in maintaining and operating a manufacturing division of an organisation. Indirect materials like cotton waste, coal, oil, grease; indirect wages like salaries of store keeper, supervisor, and indirect expenses like factory rent, idle time, overtime, normal loss of material, factory light, etc. are the items of production overheads. These are also known as 'manufacturing overheads', 'works overheads', 'factory overheads'.

ii) ,Administration overheads : These include all those expenses connected with the managerial functions of planning, directing, coordinating and controlling the operations of a business other than those related to production, selling, distribution and research and development. Examples are office rent and rates, office staff salaries, office lighting, depreciation, and repairs to office building and equipment, telephone charges, auditors' fees, legal expenses, etc.

iii) Selling overheads : These include the costs incurred for creating demand for the product, for securing and servicing orders. Advertising, bad debts, salaries and commission to selling agents, travelling expenses, show room expenses are the examples of selling overheads.

iv) Distribution overheads : These include the costs incurred in connection with the delivery of goods to customers. Some examples of distribution overheads are : packing cost, carriage outwards, maintenance, repairs and depreciation of delivery vans, warehouse expenses, wastage of finished goods, etc.

7.3.3 Behaviour-wise Classification

This classification is made on the basis of variability nature of overheads with production, Accordingly, they are classified into :

i) Fixed overheads
ii) Variable overheads
iii) Semi-variable overheads

i) Fixed overheads : These overheads remain fixed or unaffected by changes in the level of production. An increase or decrease in the output has no effect on the total amount of overheads. As a result, an increase in the volume of output will result in a decrease in the fixed cost per unit, owing to its spread over a large number of units and vice-versa. Some examples of fixed overheads are rent and rates, salaries, legal expenses, bank charges, etc.

ii) Variable overheads : These overheads vary in direct proportion to changes in the volume of output. Variable overheads per unit remain fixed. Some examples of variable overheads are : indirect materials, fuel, power, stationery, salesmen commission, etc.

iii) Semi-variable overheads : These are the expenses that stand midway between fixed and variable overheads. They are partly fixed and partly variable. They vary with change in the volume of output but not in the same proportion as the change in the volume of output. Examples of such overheads arc : telephone charges, depreciation, repair and maintenance, cost of supervision, etc.

Check Your Progress A

1 What do you mean by overheads .

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2 Based on functional classification, list various types of overheads.

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3 Give two examples of semi-fixed overheads.

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4 Fill in the blanks.

i) According to elements of cost, the overheads are classified into indirect material .....

ii) The costs other than direct costs are known as.....

iii) Semi-variable overheads are.....fixed and ..... variable.

iv) Symbols or code numbers of overheads are known as.....

v) Journal gives information relating to..... items like depreciation, notional rent, etc,

7.4 COLLECTION OF FACTORY OVERHEADS

As mentioned earlier, overheads are not directly attributable to a particular cost unit, process or department. Hence, there is a need for distribution of overheads to different products manufactured or to the different departments. There are four steps in overheads distribution. They are :

i) Collection of overheads
ii) Allocation and apportionment to production and service departments
iii) Re-apportionment of service department costs
iv) Absorption of overheads

The first step in overhead distribution is the collection of overheads. This means the ascertainment of the total amount spent on each item of overheads during a particular period.

7.4.1 Standing Order Numbers

After the classification of overheads, each group of expenses should be given a distinct symbol or number so that each such group is easily distinguished from that of the other. Such symbols or numbers are the codes for overheads and are known as 'standing order numbers.' Each standing order' number represents a particular type of expenditure and as and when the expenditure is incurred, it is appropriately classified. The code numbers may be alphabetical (Mnemonic method), numerical or a combination of both.

Numerical method : Number from 01 to 10 may be for indirect materials; 11 to 20 for indirect labour and so on.

Mnemonic method :

S may be represent sales

SA for sales-advertising

SAS . Sales-Advertising-South India.

Combination of alphabets and numbers system : Alphabet represent the main group and numbers denote the sub-group.

R — Repairs

R_1 — Repairs to machinery

R_2 — Repairs to building

R_3 — Repairs to vehicles

Thus, the manufacturing overhead costs are analysed and classified by the code numbers on the documents. Now, for the collection of factory overheads, these various documents have to be processed from which the necessary data can be extracted.

7.4.2 Sources

The sources from which overhead costs are collected are as follows :

a) Invoices : These are documents received for sundry purchases against purchase requisition made by a particular department. The name or code number of the department will be indicated in the invoice itself. At the end of the month the total amount of purchases will be debited to Factory Overhead Account and credited to Cost Ledger Control Account.

b) Stores Requisitions : Materials would be issued from stores only on receiving stores requisition from the departments. On the stores requisition, the code number of the department making the requisition would be indicated. This helps in charging the indirect materials to the particular department using them.

c) Wages Analysis Book : This book gives information relating to indirect wages, overtime, bonus etc. When wages are paid to indirect workers, they are entered against the standing order numbers on the basis of job cards, time cards etc.

d) Cash Rook : The overheads which are paid in cash but not recorded anywhere else can be collected from this book.

e) Journal : It gives the information relating to non-cash items like depreciation, notional rent, accruals and payments in advance. Therefore, it is necessary to scrutinise the journal for the accumulation of manufacturing overheads,

f) Subsidiary Records : It is necessary to look into the reports regarding scrap, waste, spoiled materials, idle time and idle facilities for ascertaining their costs to be adjusted in overheads.

7.5 ALLOCATION AND APPORTIONMENT OF FACTORY OVERHEADS

After the overheads are classified and collected under various standing order numbers, the second step in overhead distribution is allocation and apportionment of overheads to production and service departments.

7.5.1 Allocation

According to the ICMA Terminology, allocation is "the allotment of whole items of cost to cost centres or cost units". It refers to charging to the cost centre those overheads that have been incurred for that cost centre. It means that overheads have been incurred because of the existence of that cost centre. For example, if canteen is treated as a separate cost centre, salary paid to canteen manager can be allocated to canteen. If indirect wages and salaries are paid to the employees in each department, they can be wholly attributed to the concerned departments and charged accordingly. When separate meters are installed in departments, from meter reading, power charges for each department can be easily known and as such they are allocated to the concerned departments.

Thus, it can be said that, an overhead can be allocated to a cost centre if the following two conditions are satisfied :

1 The overhead must have been incurred because of the existence of that particular cost centre.

2 The exact amount of overhead incurred in a cost centre must be known.

7.5.2 Apportionment

Apportionment refers to the distribution of common items of cost to two or more cost centres on some appropriate basis. When the costs which are incurred for the factory as a whole and benefit two or more cost centres, then it is necessary to apportion them to different departments that receive benefit from such costs. For example, factory rent benefits all the departments. Hence, it should be apportioned to all the departments on the basis of the floor area occupied by each department in the factory.

The common factory overheads have to be apportioned to various production and service departments in the factory on some equitable basis.

A production department is one that engages in the actual manufacture of the product. Examples of production departments are weaving, spinning, crushing, mining, grinding, etc.

A service department is one which renders a service that contributes indirectly in the manufacture of a product. It renders service to the production as well as other service departments. Examples of service departments are purchasing, stores, time keeping, personnel inspection, elc.

Principles of Apportionment

As stated earlier, the common factory overheads (common costs) have to be apportioned to various production and service departments on some equitable basis. In determining the basis to be adopted, the following guiding principles can be followed :

1 Actual benefit : According to this principle, overheads are distributed over various departments on the basis of the actual benefit received. This can be adopted where it is possible to measure the actual benefit derived from a particular expense. For example, rent can be apportioned to different departments on the basis of area occupied. Similarly, machine shop expenses may be apportioned on the basis of actual time devoted to each job for which proper job cards are maintained.

2 Potential benefit : It would be ideal to distribute common costs on the basis of actual benefit received, but, in most cases, the measurement of actual benefit may not be possible or it may be too cumbersome to keep the necessary records. Hence, it is advocated that the apportionment may be done on the basis of potential benefit (benefit likely to be received). For example, if lighting costs were to be apportioned on the basis of actual benefit received, you will have, to keep record of the number of lighting points in each department, the wattage of bulbs used in each lighting point, and the amount of time for which each point was on. This is rather impractical. Hence, lighting costs can be apportioned simply on the basis of lighting points in each department. Similarly, cost of transport for workers can be apportioned on the basis of the number of employees in each department. This method is also called 'service or use' method.

3 Specific criteria : According to this principle, the overheads can be apportioned to different departments in a given ratio which may be determined after careful survey for different service functions. This method, therefore, is also known as 'survey method' and it is particularly useful where it is difficult to select a suitable basis for apportionment. For example, for the apportionment of works manager's salary, it may be difficult to identify a suitable basis. Hence a survey may be conducted to ascertain the time and attention given by him to different cost centres and a reasonable ratio fixed for the purpose.

4 Ability to pay : This method is based on the principle that more the revenue of a department, the higher should be the proportionate charge fqr the services, For

example, the cost of maintaining stores may be apportioned to different production departments on the basis of the value (not the volume) of materials consumed.

Basis of Apportionment : In the light of the above principles, the usual basis for apportioning common items of factory overhead can be as follows :

	Expenses	Basis
1	Rent, Rates, and taxes, insurance, depreciation and repairs of buildings	Floor area occupied
2	Canteen, welfare expenses, time keeping, personnel office	No. of employees
3	Depreciation, repairs and insurance to plant and machinery	Capital cost of plant and machinery
4	Power/Steam consumption, lighting	Technical estimates (i.e HP hours, number of light points)
5	Store keeping expenses	Weight/value of Materials
6	Internal transport,	Number of requisitions, weight/ Value of materials
7	Compensation to workers, ESI and PF contribution	Direct wages

7.6 PREPARATION OF OVERHEADS DISTRIBUTION SUMMARY

The allocation and apportionment of overheads to production and service departments is also known as 'departmentalisation or primary distribution of overheads'. It is done by preparing an overheads distribution summary. .

For the preparation of overheads distribution summary, all those overheads which can be directly identified with a particular department, will be taken/allocated to the concerned department and those which cannot be identified with a particular department will be apportioned i.e., distributed on equitable basis to different departments,

The proforma of overhead distribution summary is given in Figure 7.1.

Figure 7.1 : Proforma of Overhead Distribution Summary
Departmental Overhead Distribution Summary

Expenses	Basis of Apportionment	Total	Production Departments			Service Departments	
		Rs.	A Rs.	B Rs.	C Rs.	D Rs.	E Rs.

Look at Illustration 1 and study how departmental overheads distribution summary is prepared.

Illustration 1

The following information is supplied from the costing records of a company :

	Rs.
Rent	4,000
Maintenance	2,400
Depreciation	1,800
Lighting	400
Insurance	2,000
Employer's contribution to Provident Fund	600
Energy	3,600
Supervision	6,000

	Departments			
	Spinning	*Weaving*	*Stores*	*Time Keeping*
Floor space (sq. ft.)	300	220	180	100
Number of workers	48	32	24	16
Total direct wages (Rs.)	16,000	12.000	8,000	4,000
Cost of machinery (Rs.)	48,000	36,000	24,000	12.000
Stock of goods	30.000	18,000	12,000	—

Prepare a statement showing apportionment of costs to various departments.

Solution:

Departmental Overheads Distribution Summary

Expenses	Basis of apportionment	Total Rs.	Departments			
			Spinning Rs.	Weaving Rs.	Stores Rs.	Time keeping Rs.
Rent	Floor space (300: 220: 180 : 100)	4,000	1,500	1.100	900	500
Maintenance	Cost of machine (48 : 36: 24: 12)	2.400	960	720	480	240
Depreciation	—do—	1,800	720	540	360	180
Lighting	Floor space (300 : 220 : 180: 100)	400	150	110	90	50
Insurance	Stock of goods (30 : 18 : 12 : 00)	2,000	1,000	600	400	—
Employer's contribution	Direct wages (16 : 12 : 8 : 4)	600	240	180	120	60
Energy	Cost of machine (48 : 36 : 24 : 12)	3,600	1,440	1,080	720	360
Supervision	No. of workers (48 : 32 : 24 : 16)	6,000	2,400	1,600	1,200	800
Total overheads as per primary distribution		20,800	8,410	5,939	4,270	2,190

Re-Apportionment of Service Department Costs : Once the overheads have been allocated and apportioned to production and service departments, next step in overhead distribution is to re-apportion the service department total costs to production departments. As the ultimate object is to charge the overhead to cost units, and na cost units pass

through service departments, it becomes necessary to apportion the service departments costs also to production departments on some equitable basis. This is known as secondary distribution.

The common basis of secondary distribution are given below :

	Service Department	Basis
1	Purchase department	Number of purchase orders or number of purchase requisitions or value of materials purchased
2	Stores department	Number of material requisitions or value of materials issued
3	Time-keeping department, Pay-roll dcparlment	Number of employees or total labour or machine hours
4	Personnel department, canteen, welfare, medical, recreation and security departments	Number of employees or total wages
5	Repairs and Maintenance	Number of hours worked in each department
6	Power House	Meter reading or H.P. Hour for powers Meter reading or floor space for lighting, heat consumed
7	Inspection	Inspection hours or value of items inspected
8	Drawing Office	Number of drawings made or man-hours worked
9	Accounts department	Number of workers in each department or time denoved
10	Tool Room	Direct labour or Machine hours or wages

Illustration 2

From the following information, prepare the departmental overhead distribution summary.

Item	*Production Depts.*			*Service Depts.*	
	A	B	C	X	Y
Direct wages (Rs.)	60,000	90.000	1,20,000	30,000	60,000
Direct Material (Rs.)	30,000	60,000	60,000	44,000	45,000
Staff Number,	3,000	4,500	4,500	1,600	1,400
Electricity KWh	12,000	9,000	6,000	3,000	3,000
Asset Value (Rs.)	1,20,000	80,000	60,000	20,000	20,000
Light points	20	32	8	12	8
Area (Sq. Yards)	300	500	100	100	100

The expenses for the period were

	Rs.		Rs.
Power	2,200	Depreciation	60,000
Lighting	400	Repairs	12,000
Stores	1,600	General Overheads	24,000
Welfare to staff	6,000	Rent & taxes	1,100

Apportion the expenses of service department Y according to direct wages and those of service department X in the ratio of 5 : 3: 2 to the production departments.

Solution

Departmental Overhead distribution Summary

Expenses	Basis	Total	Production Depts.			Service Depts.	
			A	B	C	X	Y
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Power	KWh	2,200	800	600	400	200	200
Lighting	Light points	400	100	160	40	60	40
Stores Overhead	Direct Material	1,600	2M)	402	402	295	301
Welfare to the Staff	Staff Number	6,000	1,200	1.800	1.800	640	560
Depreciation	Asset value	60,000	24,000	16,000	12,000	4,000	4,000
Repairs	Asset value	12,000	4,800	3.200	2,400	800	800
General overhead	Direct wages	24,000	4,000	6,000	8,000	2,000	4,000
Rent & taxes	Area	1,100	3M)	500	100	100	100
Wages	Allocated	90.000	—	—	—	30.000	60,000
Material		89,000	—	—	—	44,000	45,000
Total as per primary distribution		2,86,300	35,400	28,662	25,142	82,095	1,15,001
Department Y Wages			25,556	38,334	51,111	—	(1,15,001)
Service Department X 5 : 3 : 2			41,048	24,628	16,419	(82,025)	—
Total as per secondary distribution			1,01,990	81.626	92,684	—	—

Note : Service departments' total cost (Direct cost + Overhead cost) has to be re-apportioned to production departments, direct wages and direct material cost of service departments is taken in overhead distribution summary.

Illustration 3

Calicut Soaps Limited supplied you the following information for the month ending January 1988. You are required to apportion the overheads to production departments.

Item	*Production Departments*			*Service Departments*	
	A	B	C	X	Y
Direct Wages (Rs.)	14,000	12,000	10,000	2,000	2,000
Direct Material (Rs.)	6,000	5,000	4,000	3,000	2,000
Employee Numbers	400	300	300	100	100
Electricity - KWh	16,000	12,000	12,000	4,000	6,000
Light points - Numbers.	20	30	30	10	10
Asset Value (Rs.)	1,00,000	60,000	40,000	20.000	20,000
Area Occupied (Sq. yards)	1,600	1,200	1,200	400	400

The expenses for the month were :

	Rs.		Rs.
Stores overhead	800	Repairs and Maintenance	2,400
Motive power	3,000	General overheads	20,000
Lighting	4M)	Rent and taxes	1,200
Labour welfare	6,000		
Depreciation	12,000		

Apportion the expenses of Department X in the ratio of 4 : 3 : 3 and that of the Department Y in proportion to direct wages to Department A, B & C respectively.

Solution :

Department Overhead Distribution Summary

Expenses	Basis	Total	Production Depts.			Service Depts.	
			A	B	C	X	Y
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Direct wages	Allocation	4,000	—	—	—	2,000	2,000
Direct Material	Allocation	5,000	—	—	—	3,000	2,000
Stores Overhead	Material	800	240	200	160	120	80
Power	KWh	3,000	960	720	720	240	360
Lighting	Light points	400	80	120	120	40	40
Labour Welfare	Employees	6,000	2.000	1,500	1,500	500	500
Depreciation	Asset value	12,000	5,000	3,000	2,000	1,000	1,000
Repairs & Maintenance	"	2,400	1,00	600	400	200	200
General overhead	D. Wages	20,000	7,000	6,000	5,000	1,000	1,000
Rent & Taxes	Area	1,200	400	300	300	100	100
Total as per primary distribution		54,800	16,680	12,440	10,200	8.203	7,280
Service Department X	4 : 3 : 3		3,280	2,460	2,460	(–8,200)	—
Service Department Y	Direct Wages		2.831	2,427	2,022	—	(–7,280)
Total as per Secondary distribution			22,791	17,327	14,682	—	—

Check Your Progress B

1 What is allocation of overheads ?

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2 What do you mean by apportionment of overheads ?

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3 What is re-apportionment ?

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4 State whether each of tlic following statements is True or False,

i) Rent *is* apportioned on the basis **of** direct wages.

ii) Power house is a production department.

iii) The basis for apportionment of canteen and welfare expenses is the number of' employees.

iv) The basis for re-apportionment of repairs and maintenance department is the number of machine in each department.

v) The most practical method of apportionment is the potential benefit,

7.7 SUMMARY

Overheads refer to all indirect costs including indirect materials, indirect labour and indirect expenses. **These** can be classified according to the functions to which they relate and according to their variability in relation to the volume of output.

Overheads are also taken into consideration while calculating the total cost per **unit.** But, they cannot be directly **identified** with particular products. Hence, they are **distributed among** different products in an indirect manner.

The first step in overhead distribution is the collection of overheads **(ascertainment** of the total amount) under various standing order numbers. The next step is to allocate and apportion them to various **production** and service departments on some suitable basis. The guiding principles of apportionment are : (i) actual benefit **(ii) potential** benefit **(iii)** specific benefit (iv) ability to pay. **The** third step is **to re-apportion** the cost of service departments to production departments to facilitate the distribution of overheads among different **products** manufactured in the factory.

The last and final stage in overhead distribution is the absorption of overheads. This will **be** discussed in Unit 8.

7.8 KEY WORDS

Allocation : Allotment of whole **amount** of overhead **cost** to a particular cost centre.

Apportionment : **Distribution** of common **costs** to various cost centres on some equitable basis.

Common Costs : Overheads incurred jointly for various cost **centres.**

Departmentalisation (Primary Distribution) : Allocation and **apportionment** of overheads to production and service departments.

Overheads Distribution **Summary** : A **statement** showing allocation and apportionment of various items of **overheads.**

Re-apportionment (Secondary Distribution) : Apportionment of service department's cost to production department.

7.9 ANSWERS TO CHECK YOUR PROGRESS

A 2 factory overheads, administrative overheads, selling overheads and distribution overheads.

4 i) indirect labour **ii)** overheads **iii)** partly, partly iv) standing order numbers v) non-cash

B 4 i) False ii) False iii) **True** iv) False **v) True**

7.10 TERMINAL QUESTIONS/EXERCISES

Questions

1 Define overheads. What are the various methods of classifying overheads. Discuss functional classification.

2, Name various steps involved in the distribution of overheads and explain them briefly.

3 How and why the service departments costs are apportioned to production departments?

4 What are standing order numbers ? Explain various sources used for collection of overheads.

5 Discuss various principles of apportionment of overheads. Give a few examples of the bases used for apportionment and re-apportionmenl.

Exercises

1 Following figures have been extracted from the accounts of a manufacturing concern for the month of Deccrnber 1989.

Indirect Materials :

		Rs.
Production Departments	X	1,000
	Y	1,800
	Z	500
Maintenance Dept.	P	3,000
Stores Dept.	Q	800

Indirect Wages :

Production Dept.	X	1,400
	Y	1,900
	Z	400
Maintenance Dept.	P	2,000
Stores Dept.	Q	1,300
Power and Light		12,000
Rent		5,600
Insurance on assets		2,000
Med charges		6,000

Depreciation @ 6% on capital value of assets. From the following additional information, calculate, the share of overheads of each department.

Item	*Production*			*Service*	
	X	Y	Z	P	Q
Area (sq. ft.)	4,000	4,000	3,000	2,000	1,000
Capital value of asset (Rs.)	2,00,000	2,40,000	1,60,000	1,20,000	80,000
K.W. hours	4,000	4,400	1,600	1,500	*500*
No. of employees	180	240	60	80	40

(Answer: X : Rs. 11,300; Y : Rs. 13,900; Z : Rs. 5,500; P : Rs. 9,000; Q : Rs. 4,000.)

2 M. Co. Ltd., bas three: production departments A, B, and C and two service Departments D and E. The following figures are extracted from the records of the company :

	Rs.
Rent and rates	10,000
Indirect Wages	3,000
Dcprccialion	20,000
Lighting	1,200
Power	3,000
Sundries	20,000

The following further details are available :

	Total	A	B	C	D	E
Floor space (sq. ft.)	20.000	4,000	5,000	6,000	4,000	1,000
Light points	120	20	30	40	20	10
Direct wages (Rs.)	20,000	6,000	4,000	6,000	3,000	1,000
H.P. of machines	300	120	60	100	20	—
Value of machines (Rs.)	5,00,000	1,20,000	1,60,000	2,00,000	10,000	10,000

Apportion the costs to various departments on the most equitable basis.

(Answer: A: Rs. 15,100; B: Rs. 14,400; C: Rs. 19.300; D: Rs. 9,250; E: Rs. 3,150)

3 A factory has two production departments A and B and two service departments- Purchasing Department C and Time keeping department D.

	A	B	C	D
Wages (Rs.)	16,000	12,000	6,000	6,000
Area sq. meter.	1,500	1,100	900	500
Number of employees	80	60	40	20
Value of Plant and Machinery (Rs.)	32,000	24,000	16,000	8,000
Value of direct materials purchased (Rs.)	10,000	20,000	—	—
Lighting units	5,000	3,000	1,500	500

The following costs have been incurred :

	Rs.		Rs.
Supervision	6,000	Rent	1,600
Repairs to Plant and Machinery	2,400	Depreciation to Plant and Machinery	4,000
Light	2,000	Power	2,000
Employer's contribution to ESI	400	Canteen expenses	200

From the above information apportion the service departments costs to production departments, ignoring inter-service department transfer.

(Answer : A : Rs. 15,220,;B : Rs. 15,280)

4 Calculate the overheads applicable to production departments A & B. There are also two Service Departments X & Y. X renders service worth Rs. 24,000 to Y and the balance to A & B as 3 : 2. Y renders service to A and B as 9 :1.

	A	B	X	Y
Floor space (Sq. ft.)	10,000	8,000	2,000	4,000
Assets (Rs. in lakhs)	20	10	6	2
H.P. of machines	2,000	1,000	800	200
Number of workers	200	100	100	50
Light points	100	60	40	40

Expenses are :

	Rs.
Depreciation	3,80,000
Rent, Rates etc.	72,000
Insurance	30,400
Pcwer	40,000
Canteen expenses	20,000
Electricity	9,600

(Answer : A : Rs. 3,73,560 ; B : Rs. 1,79,940)

5 Tho R.T. Engineering Industries produced products P and Q during January 1980. Direct Department Expenses of the 3 services sections and 2 production sections through which the products pass and other relevant information are furnished below :

Section1 Departments	*Expenses* Rs.	*Number of workers*	*Labour Hour*	*Labour cost* Rs.	*Installed capacity*
Service Section X (Personnel and amenities)	30,000	12	—	—	—
Service Scction Y (Elecrical)	40,000	10	—	—	—
Service Section Z (Mill weight)	10,000	10	600	—	—
Production Section A	70,000	50	6,000	26,000	40 HP.
Production Section B	80,000	50	12,000	36,000	60 HP.

Expenses under Service Section Y represent Departmental Expenses directly apportioned on electric power used on installed capacity of electric motors in Departments A and B.

Of the 600 effective hours of Mill weight in Section Z, 240 hours relate to Section A and 360 to Section B.

Show the apportionment of Service Sections to Production Sections.

(Answer : A : Rs. 1,04,500 ; B : Rs. 1,25,500)

Note : Thesequcstions will help you to understand the unit better. Try lo write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 8 ABSORPTION OF FACTORY OVERHEADS

Structure

8.0 OBJECTIVES

After studying this Unit, you should be able to :

- explain the meaning and need for absorption of overheads
- describe different methods of absorption and their relative merits and demerits
- decide on a suitable method of absorption
- explain the meaning of over-absorption and under-absorption and their treatment in cost accounts.

8.1 INTRODUCTION

In Unit 7 you learnt about the first three steps in overhead distribution viz., (i) collection of overheads, (ii) allocation of overheads, and (iii) apportionment of overheads. You also learnt about the preparation of overhead distribution summary whereby the cost of operating each production department could be ascertained. You know that the basic purpose of this exercise is to ultimately distribute various overheads to different products manufactured in the factory. For this purpose, another step in overhead distribution is followed. This is termed as absorption of overheads. In this unit, you will study the various methods of absorption of overheads, their merits and demerits, calculation of overhead rate under each method, and the treatment of over-absorption and under-absorption of overheads in cost accounts.

8.2 MEANING OF ABSORPTION

Once the total overhead cost of various production departments is ascertained by means of allocation, apportionment and re-apportionment, these costs should be charged to the cost units i.e., the products that pass through these production cost centres. As the ultimate objective is to find out the cost of production it is necessary to distribute the overhead costs of production departments/cost centres to the cost units.

$$\frac{\text{Production overheads}}{\text{Material cost}} \times 100 = \frac{1,00,000}{2,00,000} \times 100 = 50\%$$

Now, if the direct material cost of a job or cost unit is Rs. 3,000, the overhead to be absorbed by the cost unit will be 50% of Rs. 3,000 i.e. Rs. 1,500.

This method is suitable when (a) the production units are uniform in size and make, (b) require same type of material in equal quantities, (c) where material cost constitutes a substantial proportion of prime cost, and (d) where overhead contains a large proportion of costs related to materials like purchasing, receiving, storing, etc.

The limitations of this method arc :

i) When there are wide fluctuations in material prices, it gives rise to misleading overhead absorption rates because overheads are not necessarily accompanied by similar changes;

ii) If different materials are required for different jobs, job cost comparisons would give misleading results and a wrong idea of profitability because of difference in the prices of materials.

iii) This mcthod does not recognise the importance of time factor. Two jobs using the same raw material would absorb the same amount of overhead though the time consumed by the jobs differ.

iv) This method does not recognise the difference between the work donc by skilled and unskilled workers.

8.3.3 Direct Wages Method

Under this method, the absorption rate is ascertained by taking direct wages as the base and expressing it as a percentage of direct wagcs.

For example, production overheads are Rs. 1,60,000 and the direct labour cost is Rs. 2,00,000, the overhead rate will be 80% of direct wages calculated as follows :

$$\text{Overhead rate} = \frac{\text{Production overheads}}{\text{Direct labour cost}} \times 100$$

$$= \frac{1,60,000}{2,00,000} \times 100 = 80\%$$

Now, if the direct wages of job are Rs. 4,000, the absorption of production overheads by the job will be 80% of Rs. 4,000 i.e. Rs. 3,200.

It is particularly suited when (a) the rates of wages are the same, (b) similar nature of work is done by the labour, (c) the workers are of same or equal efficiency, and (d) the use of machines is negligible.

Though this method is simple, easy to understand and duly recognises the time factor, it suffers from the following limitations:

i) No distinction is made between skilled and unskilled workers. The work done by unskilled workers should bear a higher charge of factory overheads as they take more time and utilise factory facilities for a longer period. But, under this method, more amount of factory overhead is charged to the work donc by skilled workers, as the skilled workers are paid at a higher rate.

ii) The difference between the work done by machines and hand workers is nor recognised. Certain machine expenses like depreciation, power etc., should be charged only to the work done on machines. But, total factory overhead is absorbed by all the units whether done by machines or by hand workers.

iii) The relationship between direct wages and overhead is less close.

Despite the above limitations, it is most commonly used method for the absorption of factory overheads.

8.3.4 Prime Cost Method

Prime cost is the aggregate of direct materials and direct wages. In order to combine the advantages of both the methods, sometimes prime cost is taken as the basis for the overhead absorption rate.

$$\text{Overhead rate} = \frac{\text{Production overhead}}{\text{Prime cost}} \times 100$$

Production overhead Rs. 80,000

Prime Cost Rs. 1,00,000

$$\text{Overhead rate} = \frac{80,000}{1,00,000} \times 100 = 80\%$$

If the prime cost of a job is Rs. 500, production overheads to be absorbed by the job will be 80% of Rs. 500 i.e., Rs. 400.

Though, overheads are more related to labour cost than material cost, the method gives equal importance to both materials and labour. If the cost of material is a considerable item. of prime cost, the time factor will be ignored under this method, and this is the main limitation of this method.

8.3.5 Direct Labour Hour Method

Under this method, the overhead absorption rate is calculated per labour hour. It is done by dividing the total overheads in the production department by the number of hours worked by labour in that department. The overhead pertaining to a job or product is ascertained by muliplying the hourly rate with the number of labour hours spent for that job or product.

This method tries to eliminate the defects of direct wage method. It takes into consideration time factor and the difference in wage rate does not affect its validity. It is suited to those concerns which are labour oriented.

Illustration 1

Compute labour hour rate from the information given below :

Total number of operators working in the department of a factory is 20. The department works for 300 days in a year and number of hours per day worked is 8. Idle time is 5% of the total number of days. Total departmental overheads are Rs. 22,800.

Solution ...

Labour hour rate $= \frac{\text{Total overheads}}{\text{Net working labour hours (effective)}}$

Number of days in a year = 300

No. of labour hours per day = 8

Total Iabour hours in a year = No. of days in a year x No. of labour hours per day.

= 300 x 8 = 2,400 hours

Less 5% idle time (5% of 2,400) = 120 hours

Net/Effective labour hours = 2,280 per operator

Total net working hours in a year = Net labour hours in a year × No. of operators

= 2,280 × 20 = 45,600

Total works overhead = Rs. 22,800

Direct labour hour rate $= \frac{22,800}{45,600} = \text{Rs. } 0.50$

If time taken by the workers to complete a job is 80 hours, then the factory overhead to be charged to that job would be Rs. 40 i.e. 0.50 labour hour rate x 80 labour hours.

8.3.6 Machine hour method

This method is similar to labour hour method. But, instead of taking labour hours as the base, machine hours forms the basis of calculating overhead rate. The absorption rate is calculated by dividing the factory overheads apportioned to a machine by the number of hours the machine has been worked. Thus, we will get the rate per machine how. This is called machine hour rate. In other words, it is the cost of running a machine for one hour. A separate rate is calculated for each machine or a group of similar machines.

Here, the overheads will be apportioned to the machines instead of the departments. Each machine is considered to be a cost centre. The total overheads of the machine will be divided by the number of hours worked by it. Thus, we get the absorption rate per machine hour. This rate will be multiplied with the number of machine hours spent for a particular job to get the cost to be absorbed, by that job.

If production overheads of machine 1 Rs. 5,000

No. of machine hours 500

Machine hour rate will be $= \frac{\text{Production overhead's}}{\text{No. of machine hours}}$

$= \frac{5,000}{500} = \text{Rs. } 10$

If machine 1 has been used for 5 hours for a job, overheads to be absorbed by that job will be Rs. 50 (Rs. 10 x 5).

This method is suitable where work is carried on mostly by the machine because in such cases the overheads are more related to the machines.

Let us take an example (Illustration 2) involving calculation of overhead absorption rates under various methods of absorption and see how it affects the total cost of a job or a product.

Illustration 2

The production department of a factory furnishes the following information for the month of October, 1990.

	Rs.	*Hours*
Materials used	54,000	
Direct wages	45,000	
Overheads	36,000	
Labour hours worked		36,000
Machine hours worked		30,000

For an order executed by the department during October, the relevant data is as follows:

	Rs.	*Hours*
Materials used	6,000	
Direct wages	3,200	
Labour hours worked		3,200
Machine hours worked		2,400

Calculate the overheads chargeable to the job by (a) Direct Materials Cost Method, (ii) Direct Labour Cost Method, (iii) Labour Hour Rate, and (iv) Machine Hour Rate.

Solution

Overhead Absorption Rates

i) Direct Materials Cost Method $= \frac{36,000}{54,000} \times 100$

$= 66\frac{2}{3}\%$

ii) Direct Labour Cost Method $= \frac{36,000}{45,000} \times 100$

$= 80\%$

iii) Labour I-Iour Rate $= \frac{36,000}{36,000}$

$=$ Re. 1.00

iv) Machine Hour Rate $= \frac{36,000}{30,000}$

$=$ Rs. 1.20

Statement Showing Cosl of the Job under different Methods of Absorption

	Direct Materials Cost Method	Direct Labour Cost Method	LHR	MHR
	Rs.	Rs.	Rs.	Rs.
Direct Materials	6,000	6,000	6,000	6,500
Direct Wages	3,200	3,200	1,200	3,200
Overheads (applied)	4,000	2,560	3,200	2,880
Cost of Production	13,200	11,760	12,400	12,580

Working **Note**

Overheads chargeable to the job have been worked out under different methods of absorption as follows :

i) Direct Material Cost Method $= 66\text{-}\frac{2}{3}\%$ of Rs. 6,000

$=$ Rs. 4,000

ii) Direct Labour Cost Method $=$ 80% of Rs, 3,200

$=$ Rs. 2,560

iii) Labour Hour Rate $= 3,200 \times$ Re. 1.00

$=$ Rs. 3,200

iv) Machine Hour Rate $= 2,400 \times$ Rs. 1.20

$=$ Rs. 2,880

8.4 REQUISITES OF A GOOD METHOD OF ABSORPTION

A good method of absorption should possess the following characteristics :

1 It should be simple to understand and easy to operate.

2 It should take into consideration the time factor.

3 It should distinguish between work done by manual labour and the work done by machine.

4 It should distinguish between the work done by skilled and unskilled workers.

5 The method should provide an equitable basis for overhead absorption. It should not cause under or over-absorption of overheads to any cost centre.

6 The method should not involve much clerical work and should be economical in application.

Check Your Progress A

1 What do you mean by absorption of overheads ?

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2 What are the two steps involved in the absorption of overheads ?

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3 List four important methods of absorption of factory overheads.

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4 State whether each of the following statements is True or False.

i) Absorption is the last step in overhead distribution.

ii) The allotment of overheads to each department is called 'absorption'.

iii) Direct wages method of absorption of factory overheads duly takes time factor into account.

iv) The actual overhead absorption rate is the actual overheads divided by the estimated machine hours.

v) Machine hour rate is the best method of absorption of overheads under all conditions.

8.5 COMPUTATION OF MACHINE HOUR RATE

As explained earlier, Machine hour rate is the overhead rate for one hour of machine worked. The first step in the computation of machine hour rate is the departmentalisation of overheads. Next, these overheads of the department are allocated and apportioned to different machines in that department treating each machine or a group of machines as separate cost centre. Then, the total overheads pertaining to the machine are divided by the

effective working hours of the machine to know the machine hour rate. The time required for setting of the machine and its idle time are deducted from the total working hours of the machine so as to get the effective working hours of the machine.

The overhead concerning a machine are divided into fixed and variable/running ovcrheads. The total fixed overheads (also called standing charges) are taken and divided by the machine hours for the period concerned to get the fixed overhead hourly rate. For each variable overhead, per hour rate is directly computed. The total of fixed and variable hourly rate gives the machine hour rate. It should be' noted that while calculating the machine hour rate (MHR), one should take all expenses for a particular period (a year or a month) and the machine hour should also relate to the same period.

The proforma for computation of machine hour rate is given in Figure 8.1.

Figure 8.1 : Computation of Machine Hour Rate

Standing charges	*Amount*	*Per hour*
	Rs.	Rs.
Rent	xxx	
Lighting	xxx	
Salary	xxx	
Insurance	xxx	
Cotton waste	xxx	
Total	xxx	
Hourly rate = Total / No. of machine hours		
Variable Expenses		xxx
Depreciation		xxx
Repairs		xxx
Power		x M
Machine hour rate		xM

Look at Illustration 3 to 6 and study how MHR is computed under different situations.

Illustration 3

Compute the machine hour rate from the following data :

	Rs.
Cost of machine	1,00,000
Installation charges	10,000
Scrap value after 15 years	5,000
Rent of the shop per month	200
Gcncral alighting for the shop per month	300
Insurance for the machine p.a.	960
Repairs p.a.	1,000
Power 10 units per hour	
Rate of power per 100 units	20
Shop supervisor salary p.m.	600
Estimated working hours p.a. are	1,000

The machine occupies one-fourth of total area of the shop, Supervisor devotes one-third of his time for this machine.

Solution

Computation of Machine Hour rate

	p.a. Rs.	per hour Rs.
Standing charges :		
Rent 200 p.m. x 12 months = Rs. 2.400 Machine occupies 114th area only (2,400 x 1/4)	600	
Lighting 300 p.m. x 12 months = Rs. 3,600 Machine occupies 114th area '(3,600 x 114)	900	
Insurance	960	
Supervisor's salary 600 x 12 months =Rs. 7,200 He devotes 1/3rd of his time (7,200 x 1/3)	2,400	
Total standing charges p.a.	4,860	
Hourly rate 4,860 ÷ 1,000 hours		4.86
Variable charges :		
Depreciation*		7.00
Repairs Rs. 1000 ÷ 1000 hours p.a.		1.00
Power for 100 units = Rs. 20 for 10 units = $\frac{10 \times 20}{100}$		2.00
Machine hour rate		14.86

*Depreciation		Rs.
	Cost of the machines	1,00,000
	Add : Installation	+ 10,000
		1,10,000
	Less : scrap value	— 5,000
		1,05,000

$= \frac{1,05,000}{15 \text{ yrs.}} =$ Rs. 7,000 p.a.

Working hours p.a. 1,000

Depreciation per hour = 7,000 ÷ 1,000 = Rs. 7

For More Than One Machine

Illustration 4

A machine shop contains four newly purchased machines each occupying equal amount of space and costing A Rs. 40,000, B Rs. 50,000 ; C Rs. 60,000 and D Rs. 80,000.

Expenses per annum of the Machine shop are :

	Rs.		Rs.
Rent	20,000	Power A	10,200
Rates	8,500	B	10,000
Light	6,300	C	24,000
Administration	19,000	D	29,000
Running expenses	40,000		

Prepare a machine hour rate for each machine assuming (i) 45 hours in a week and 50 weeks a year, (ii) 80% utilisation and life of machine being 10 years without any scrap value.

Solution

Working hours : 45 hours in a week and 50 weeks a year with 80% utilisation.

$45 \text{ hours} \times 50 \text{ weeks} \times \frac{80}{100} = 1{,}800 \text{ hours.}$

Depreciation = $\frac{\text{Cost}}{\text{Life}}$

A = $\frac{40{,}000}{10}$ = Rs. 4,000 p.a.

B = 50,000 ÷ 10 = Rs. 5,000 p.a.

C = 60,000 ÷ 10 = Rs. 6,000 p.a.

D = 80,000 + 10 = Rs. 8,000 p.a.

Computation of Machine Hour Rate

	A	B	C	D
	Rs.	Rs.	Rs.	Rs.
Standing charges				
Rent apportioned equally (space)	5,000	5,000	5,000	5,000
Rates —do—	2,125	2,125	2,125	2,125
Light —do—	1,575	1,575	1575	1,575
Administration —do—	4,750	4,750	4,750	4,750
Total expenses p.a.	13,450	13,450	13,450	13.450
Running charges :				
Depreciation	4,000	5,000	6,000	8,000
Power	10,200	10,000	24,000	29,000
Other running expenses (equally)	10,000	10,000	10,000	10,000
	37,650	38,450	53,450	60,450
Machine hour rate (Total expenses ÷ 1,800 hrs.)	20.92	21.36	29.69	33.58

Hourly Rate with Setting **up** Time

Illustration 5

Calculate machine hour rate from the following **data** :

Total machine hours worked **p.a.** 4,400

Setting up Lime 400 hours.

Expenses for the machine p.a.
Rent Rs. 12,000 ; Lighting Rs. 1,200 : Repairs Rs. 2,400 ; Supervision Rs. 4,800.

Two attendants looking after 4 Machines were paid Rs. 120 per month each.

Power consumed by the machine 10 units per hour @ Rs. 40 per 100 units.

Cost of the Machine Rs. 17,200.

Scrap value Rs. 1,200.

Life period 16,000 hours.

Sundry supplies for the machine shop are Rs. 480 p.m. There are four identical machines in the machine shop. Supervisor is expected to devote his time equally for all the machines.

Computation of Machine hour rate

	p.a. Rs.	per hour Rs.
Standing charges :		
Rent	12,000	
Light	1,200	
Supervision 4 identical machines equal time 1/4th x 4800	1,200	
Attendants salary 2 Attendants 120 p.m. x 12 months = 2880 for four machines For 1 machine 2880 ÷ 4	720	
Sundry supplies for the shop 480 p.m. × 12 months = 5,760 for four machines For one machine 5760 ÷ 4	1,440	
Total	16,560	
Hourly rate 16,560 ÷ 4000		4.14
Running charges :		
Depreciation $\frac{17,200 - 1,200}{16,000 \text{ hours (Life time)}}$		1.00
Repairs 2,400 14,000 .		0.60
Power for 100 units — Rs. 40 For 10 Units per hour = $\frac{10 \times 40}{100}$		4.00
Machine hour rate		9.74

Effective working hours p.a. = 4,400 hours p.a. — 400 hours set up time = 4,000 **hours.**

When **Annual Working Hours Are Not Given**

Illustration 6

Compute a machine hour rate for the month of January.

Cost of machine	Rs. 64,000
Scrap value	Rs. 4,000
Effective working hours	10,000

Repairs and maintenance over the life period of Machine Rs. 5,000. Standing charges allocated to this Machine Rs. 1,000 for January. Power consumed by the Machine at Re. 0.60 per unit Rs. 1,200 p.m. The machine consumes 10 units of power per hour.

Solution :

Calculation of annual working hours by taking power as the basis.

For Re 0.60 = 1 unit.

For Rs. 1,200 — ?

$\frac{1,200}{0.60}$ = 2,000 units

For 10 units of power — time is 1 hour.

For 2000 ,, ,, ? $\frac{2,000}{10}$ = 200 hours p.m.

Computation of machine hour rate

	p.m.	per hour
	Rs.	Rs.
Standing charges	1,000	
Hourly rate 1000 ÷ 200 hours		5.00
Variable charges :		
Depreciation $\frac{64,000 - 4,000}{10,000}$		6.00
Repairs 5,000 ÷ 10,000 life hours		0.50
Power 10 units @ 0.60		6.00
	Machine Hour Rate	17.50

Comprehensive Machine Hour **Rate**

You know that direct wages arc not included in production overhead. Hence, these are not considered while calculating the machine hour rate. But, sometimes, the direct wagcs of a machine operator arc also included while calculating the machine hour rate. In that case it is known as 'comprehensive machine hour rate'. Thus, overheads and direct wages are absorbed in one single rate in the cost of a product. In Illustration 6, if the wages of machine operator were Rs. 800 p.m., then direct wages rate per machine hour would be Rs. 4 (800 ÷ 200). The machine hour rate as per Illustration 6 is Rs. 17.50. The comprehensive machine hour rate will be Rs. 21.50 (17.50 + 4).

8.6 OVER-ABSORPTION AND UNDER-ABSORPTION OF FACTORY OVERHEADS

Overhead absorption rate may bc actual rate or pre-determined rate. Actual rate is arrived at by dividing the actual overheads by the actual output or actual labour hours or actual machine hours [or the period. But the actual rate cannot be computed till the end of the accounting period resulting in delay in computing the cost of a product. This causes a problem in fixing the selling price for quotations and tenders, To solve this difficulty,

pre-determined overhead absorption rates are calculated by dividing the estimated amount of overheads by the estimated production units or labour hours or machine hours.

When actual rates are used, the absorbed overheads will be exactly equal to the actual overheads incurred. There will be no under-absorption or over-absorption of overheads. But, when pre-determined rates are used, the overheads absorbed may be more than or less than the actual overheads. This will result in over-absorption or under-absorption of overheads. In other words, if the absorbed amount of overheads by the cost units is less than the actual amount of overheads, it is a case, of under-absorption, and if, the absorbed amount of overheads by the cost units is more than the actual amount of overheads, then it is a case of over-absorption of overheads. This point will become clear by Illustration 7 as given below :

Illustration 7

Estimated annual overheads in department X were Rs. 3,500 fixed ; Rs. 6,500 variable. Estimated machine hours were 10,000. Actual machine hours worked were 9,500 and actual overheads incurred were

Fixed	Rs. 4,000
Variable	Rs. 5,000

Find out under or over-absorption based on pre-determined rates.

Solution

$$\text{Re-determined rate} = \frac{\text{Estimated overheads}}{\text{Estimated working hours}}$$

$$\text{Fixed overheads} = \frac{3,500}{10,000} = \text{Re. } 0.35 \text{ per hour}$$

$$\text{Variable overheads} = \frac{6,500}{10,000} = \text{Re. } 0.65 \text{ per hour}$$

	Actual overheads	Overhead absorbed at pre-determined rate	Over-absorbed	Under-absorbed
	Rs.	Rs.	Rs.	Rs.
Fixed	4,000	3,325*	675	—
Variable	5,000	6,175*	—	1,175
Total	9,000	9,500	675	1,175

*Fixed Pre-determined rate × Actual hours worked
Fixed 0.35 x 9,500 = Rs. 3,325

*Variable 0.65 x 9,500 = Rs. 6,175

8.6.1 Causes of under or Over absorption

Under or over absorption of overheads may be the result of any one or more of the following causes :

1 Error in estimating overhead cost

2 Error in estimating the base i.e. quantity of output or labour hour or machine hours

3 Unexpected changes in production capacity

4 Unexpecled changes in the method of production resulting in change in the amount of overheads

5 Seasonal fluctuations in the amount of overheads from period to period in certain industries

8.6.2 Disposal of Under-absorption and Over-absorption

Under or over-absorption of overheads will affect the cost of production. Under-absorption understates the cost of production to the extent of the amount unabsorbed (Rs. 1,175 in Illustration 7). Over-absorption inflates the cost of production to the extent the amount absorbed is more (Rs. 675 in Illustration 7). The under or over-absorbed amounts are disposed off according to any of the following methods :

1 Use of supplementary rates : If the amount of under or over-absorbed overheads is significant, the difference between absorbed overheads and actual overheads will be adjusted by computing the supplementary rates.

Supplementary rates are computed by dividing the difference between actual and absorbed overheads, by the actual base. In case of under-absorption, adjustment is done by adding this rate to the pre-determined rate whereas in case of over-absorption, this supplementary rate is deducted from the pre-determined rate. Illustration 8 clarifies this fully.

Illustration 8

Predetermined overheads	Rs. 10,000
Predetermined Machine hours	
Actual overheads	Rs. 9,000
Actual Machine hours	

Calculate under or over-absorption of overheads using pre-determined rates. and correct the situation using supplementary rates.

Solution :

Predetermined rate $= \frac{\text{Estimated overheads}}{\text{Estimated hours}}$

$= \frac{10,000}{5,000 \text{ Hours}} = \text{Rs. 5 per machine hour.}$

Overhead absorbed on pre-determined rate = Pre-determined rate x Actual hours
$= 5 \times 1,500 = \textbf{Rs. 7,500}$

Actual overheads = Rs. 9,000

Under-absorbed overheads = Actual − Absorbed overhead
9,000 − 7,500 = **Rs. 1,500**

Supplementary rate $= \frac{\text{Difference}}{\text{Actual hours}} = \frac{1,500}{1,500} = \text{Re. 1 per hour}$

This is a plus rate as it is a case of under-absorplion. Now the rate would be Rs. 5 + Re. 1 = Rs. 6 per hour. The overhead absorbed would be 1,500 hours x 6 = Rs. 9,000 equal to actual overheads.

2 Writing off to Costing Profit and Loss Account : If the under or over-absorbed amount is not significant, or even if significant it is due to abnormal factors such as idle capacity, defective planning etc., the under or over-absorbed amount is transferred to Costing Profit and Loss Account. The main defect of this system is that the cost of production will be under or overstated which also affects the valuation of stocks of work in progress as well as finished goods.

3 Carry over to the next year : Under this method, the under or over-absorbed amount of overheads is transferred to Suspense or Overhead Reserve Account add carried forward to the next year. This is against the costing principle which states that the overhead of a particular year should be absorbed during the year in which it is incurred. However, it is considered suitable for seasonal factories in case of business where the normal business cycle extends over and the overheads are determined on a

long term basis. This method can also be adopted during the initial years ol'a new project.

Check Your Progress B

1 State two requisites ol'a good method of absorption of factory overheads.

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2 What is comprehensive machine hour rate ?

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3 State whether each of the following statements is True or False.

i) Direct wages of a machine operator are included in comprehensive machine hour rate.

ii) Machine hour rate is simple and is easy to operate.

iii) Effective machine hours arc ascertained by adjusting the setting up time in the total working hours of a machine.

iv) Under-absorption results when charged overheads are less than the actual overheads.

v) Transfer of under or over-absorption of overheads to Costing Profit and Loss Account is considered suitable when their amount is significant.

8.7 LET US SUM UP

Absorption of overheads is the last step in the distribution of overheads. It is the process of apportioning the total expenses of the cost centres to cost units. There are six methods of absorption of factory overheads. These are : (1) production units method, (2) direct materials cost method, (3) direct wages cost method, (4) prime cost method, (5) direct labour hour method, and (6) machine hour method. All methods have their merits and demerits. In view of the requisites of a good method of absorption of overheads, the machine hour is considered to be the best method of absorption of factory overheads. But direct wage method is most commonly used because it is simple, easy to operate and duly recognises the time factor.

Machine hour rate is calculated by dividing the total overheads of a machine by the number of effective machine hours worked during a particular period. For this purpose, the overheads may be divided into fixed and variable overheads.

The overhead absorption rate may be the actual rate (based on actual overheads) or the pre-determined rate (based on estimates).' When overheads are absorbed on the basis of pre-determined rate, there may be some difference between the overheads absorbed and the actual overheads incurred. This difference is termed as under-absorption and over-absorption as the case may be. This requires an adjustment in cost accounts which may be done by using a supplementary rate, or by transferring the difference to the Costing Profit and Loss Account, or by carrying it over to the next accounting period through Suspense Account or Overhead Reserve Account.

8.8 KEY WORDS

Absorption : The process of charging the overheads of cost centres to cost units.

Comprehensive Machine Hour Rate : Overhead and direct wages absorbed by the cost units in one single rate.

Labour Hour Rate : The overhead rate for one labour hour worked.

Machine Hour Rate : The overhead rate for one hour of machine worked.

Over-Absorption : Excess of absorbed amount of overheads over the actual amount of overheads incurred.

Setting Up Time : Time spent by labour on making necessary adjustments in machine before work is commenced on the next job.

Under-Absorption : Excess of aclual amount of overheads incurred over the absorbed amount of overhcads.

8.9 ANSWERS TO CHECK YOUR PROGRESS

A 4 i) Truc ii) Falsc iii) True iv) False v) Falsc

B 3 i) Truc ii) Falsc iii) Truc iv) True v) Falsc

8.10 TERMINAL QUESTIONSIEXERCISES

Questions

1 What do you mean by 'absorption of ovcrhcads' ? Describe briefly the various methods of absorption of factory ovcrhcads.

2 Explain the computation of machine hour rate with the help of an cxamplc.

3 Why direct wnge cost method is the most commonly used method of absorption of factory ovcrheads ?

4 A factory which executes job orders has two departments : Dcpl. A which has 60 workcrs and machines worth Rs. 6,00,000, and Dept. B which has 600 workcrs and machines worth Rs. 60,000. Whal usc would you make of this data in selection of overhead absorption rate.

5 What d o you understand by under-absorption and over-absorption of ovcrheads. How are they treated in cost accounts.

Exercises

1 The following is the budget of 'Superb Engineering Works' for the year 1988.

Factory Overheads		Rs. 62,000
Direct Labour Cost	:	Rs. 1,24,000
Direct Labour Hours		1,55,000
Machine Hours		10,000

From these figures, ascertain the overhead application rates, using the following methods (a) Direct Labour Hour ; (b) Direct Labour Cost ; and (c) Machinc Hour Rate.

Prepare a comparative statement of cost showing the result of applications of each of the above rate of job order Number 555 from the undermentioned data :

Direct Matcrials Rs. 90 ; Direct wages Rs. 25 ; Direct labour 20 hours ; Machine hours = 30

(Answer : Direct Labour hour rate = Rc. 0.40 ;
Direct Labour Cosl method = 50%
Machinc hour rate = Rs. 6.20
Cost of Job No. 555 under LHR = Rs. 123 ;
undcr labour cost method = Rs. 127.50 ; and undcr MHR = Rs. 301

2 Mayur Limited has three manufacturing departments A, B and C and one Service Department S. The following figures are available for one month of 25 working days of 8 hours per day. All these departments work for all the days and with full attendance.

Expenditure	*Total*	*Departments*			
		S	A	B	C
	Rs.	Rs.	Rs.	Rs.	Rs.
Power and lighting	1,100	200	240	360	300
Supervisor's salary	4,000	—	—	—	—
Rent	500	—	—	—	—
Welfare	400	—	—	—	—
Others	1,200	400	400	200	200
	7,200				
Supervisor's salary		20%	30%	20%	30%
Number of workers		10	30	20	40
Floor area in Sq. ft.		400	200	300	100
Service rendered by Service Dept.		—	30%	50%	20%

Calculate labour hour rate for each of the Departments A, B and C.

(Answer : A : Re. 0.43 per how.
B : Re. 0.60 per hour
C : Re. 0.18 per hour)

3 Calculate Machine Hour Rate for Machine A.

Consumable Stores	600	for Machine A
Consumable stores	1,000	for Machine B
Repairs	800	for Machine A
Repairs	1,200	for Machine B
Lighting and Heating	360	
Rent	1,200	
Insurance of Building	4,800	
Insurance of Machines	800	
Depreciation of Machines	700	
Room Service	60	
General Charges	90	

Additional Information :

	Working Hours	*Area (Sq. ft.)*	*Book Value (Rs.)*
Machine A	1,000	100	12,000
Machine B	2,500	500	20,000

.(Answer : Rs. 2.91)

(Hint : Insurance and depreciation of Machines should be apportioned on the basis of book values of machines and all other expenses on the basis of floor area covered).

4 : Calculate the machine hour rate to recover the overhead expenses given below :

	Per Hour	*Per annum*
Electric Power	75 Ps.	
Steam	10 Ps.	
Water	2 Ps.	
Repairs		Rs. 530
Rent		Rs. 270
Running hours		Rs. 2,000
Original cost	Rs. 12,500	
Book value	Rs. 2,870	
Replacement value	Rs. 11,500	
Depreciation	$7\frac{1}{2}$ % p.a.	

(Answer : Rs. 1.74)

(Hint : Depreciation to be charged on original cost)

5 Calculate Machine Hour Rate from the following data :

	Rs.
Cost of Machine	1,00,000
Installation charges	10,000
Estimated scrap value (after working life of 15 years)	5,000
Rent and Rates, for the shop p.m.	200
Lighting for the shop p.m.	300
Insurance of machine p.a.	960
Repairs p.a.	1,000
Power consumption – 10 units per hour	
Rate of power per 100 units	20
Estimated working hours p.a. — 2,200 (This includes selling up time of 200 hours)	
Shop supervisor's salary p.m.	600

The machine occupies 1/4 of the shop. The supervisor is expected to devote 1/5 of his time for supervising the machine.

(Answer : Rs. 7.95)

Note : These questions will help you to understand the unit better: Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 9 TREATMENT OF OTHER OVERHEADS

Structure

9.0 OBJECTIVES

After studying this unit you will be able to :

- explain the methods of absorption of administration overheads
- explain the methods of absorption of selling and distribution overheads
- describe the,treatment of certain items of overheads like interest, depreciation, research and development expenditure in cost account.
- identify the items that are excluded from cost accounts.

9.1 INTRODUCTION

In Unit 8 you learnt about the distribution of production overheads including the methods of their absorption in cost units. In this unit you will learn about the distribution of non-production overheads viz., administrative overheads and selling and distribution overheads. This unit also discusses the treatment of certain peculiar items of overheads like interest, depreciation, research and development cost, labour welfare expenses, royalties, etc.

9.2 OFFICE AND ADMWISTRATION OVERHEADS

You know that administration overheads are the costs of formulating the policy, directing the organisation and controlling the operations of an undertaking. They have no direct connection with production or sales. The examples of such expenses are salaries of office staff, legal charges, audit fees, depreciation of office machines and building, office rent, stationery, postage, typing charges, etc.

Administration overheads are collected and classified in the same way as production overheads. These are usually apportioned to various administrative departments which act as cost centres for the purpose of collection and control of administration overheads. The cost centres may be general office ; accounts department, personnel department. law department, etc. Some people argue that there are only two basic functions of a business i.e., production and sales. As administration overheads are incurred for the benefit of these two functions, they should be apportioned between production and sales department on some equitable basis. But, generally it is advocated that **administration is also a separate function like production and sales and, therefore, the administration overheads should be taken as an independent item of cost and added to the cost of a job or a product.**

There are various methods of absorption of administration overheads. These are : (1) production units method (absorption rate worked out per unit of output), (2) as a percentage of conversation cost, (3) & a percentage of sales, and (4) as a percentage of works cost. Of these, the most commonly used method is the percentage of works cost. Under this method, the absorption rate is worked out as follows :

$$\frac{\text{Total Administration Overheads}}{\text{Total Works Cost}} \times 100$$

For example, if the works cost is Rs. 10,000 and the total administration overheads are Rs. 2,000, the absorption rate will be 20% $\left(\frac{2,000}{10.000} \times 100\right)$ of works cost. Now, if works cost of a particular product is Rs. 600, the administration expenses to be added to its cost will be Rs. 120 (20% of Rs. 600).

Though administration overheads are fixed in nature and are incurred as a matter of policy of the management, some control can be exercised through budgets, standard costing and by comparison with part performance.

9.3 SELLING AND DISTRIBUTION OVERHEADS

Selling and distribution overheads are also non-production costs and they are incurred after the production of products or services is completed and hence known as 'after-production costs'. You know that selling overhead is the cost incurred to create and stimulate demand and increase the sales to the existing and potential customers e.g., advertisement, free gifts, salesmen's remuneration, etc. Distribution overhead is the cost incurred to take the finished goods from the place of production to the place of resale or consumption, e.g., carriage outwards, insurance, etc.

9.3.1 Classification

Selling and distribution overheads are classified into the following sections :

1 **Direct Selling expenses**

- a) Remuneration of salesmen (salaries, bonus, commission, etc.)
- b) Remuneration of technical staff (for products like machines, television sets, etc.)
- c) Expenses of show rooms, sales depts., branches, etc.
- d) Expenses on sales quotations, tenders, estimating, etc.
- e) After sales service costs

2 **Advertising and Sales Promotion** : These expenses include costs of advertising (by newspapers, radio, etc,) pamphlels, free gifts, samples, exhibition or display, etc.

3 **Transportation Expenses** : The expenses relate to transportation which include upkeep of delivery vans, salaries of running and maintenance staff of delivery vans, and insurance of goods in transit.

4 **Warehousing and Storage** : It includes cost of storage of finished goods like warehouse rent, salaries of warehouse staff, packing costs for storage purpose, and insurance of finished stock in warehouse.

5 Credit and collection : Bad debts and debt collection expenses, legal expenses in connection with debt realisation. Generally these expenses are treated as selling overheads.

6 Financial and general administration : Costs such as royalty on sales, invoicing, accounts maintenance for selling and distribution sales statistics etc.

9.3.2 Distribution

The distribution of selling and distribution overhead can be discussed in three stages :

1 Collection and analysis : Firstly, the overheads must be collected under standing order numbers provided for this purpose,

2 Allocation and apportionment to cost centres : This is similar to the apportionment of production overheads to cost centres. The selling and distribution overheads are apportioned to different cost centres like warehouse, transportation etc. Common bases for apportionment are as follows :

	Expenses	*Basis*
i)	Salesmen remuneration	Direct allocation
ii)	Advertising :	
	Door to door	Direct allocation
	Radio, TV, Press.	Space used or value of sales
iii)	Show room expenses	Floor area
iv)	Insurance	Value of goods
v)	Packing	Direct allocation
vi)	Catalogues'	Direct allocation or space used

3 Absorption of Selling and Distribution overhead : After apportionment, these overheads must be absorbed by cost units. Selling and distribution overheads fall into two categories. These are as follows :

a) Those which are incurred only when the article is sold. They vary in direct proportion to sales value or volume of sales representing variable overheads. They represent a definite amount per unit sold and so charged accordingly,

b) Those which are incurred whether an article is sold or not. They do not vary with units sold. They have to be absorbed in any one of the following ways :

i) Rate per unit sold : The total selling and distribution overheads are divided by the number of units sold to get a rate per unit. This method is followed when the units sold are uniform.

ii) Percentage of Selling Price : The formula for calculating percentage of selling and distribution expenses to sales is as follows :

$$\frac{\text{Selling and Distribution Overheads}}{\text{Sales}} \times 100$$

For example, if sales are Rs. 2,00,000 p.a. and selling costs are Rs. 50,000, then, selling overheads to be absorbed will be 25% $\left(\frac{50,000}{2,00,000} \times 100\right)$ of selling price of each article sold. This method is usually followed for the absorption of selling and distribution overheads.

iii) Percentage of works cost

$$\frac{\text{Selling and Distribution Overheads}}{\text{Works Cost}} \times 100$$

If selling costs are Rs. 20.000 and works cost is Rs. 1,00,000 then selling costs will be absorbed at 20% $\left(\frac{20,000}{1,00,000} \times 100\right)$ of works cost. This method is

successful if only one type of product is sold. If there are more than one product, this method cannot be used as it does not recognise the different efforts involved in selling different products.

These rates are pre-determined and applied. As a result, there may be under or over-absorption of overheads. The treatment will be the same as discussed in Unit 8.

Illustration 1 clarifies how selling and distribution overheads are distributed over different products manufactured by an organisation.

Illustration 1

Show the distribution of expenses and the cost per unit of A, B, and C from the following particulars:

	Rs.
Sales salaries	20,000
Sales commission	12,000
Sales office expenses	4,000
Advertising — general	5,000
Advertising — specific	11,000
Packing expenses	1,500
Delivery van expenses	2,400
Warehouse expenses	1,800
Credit collection expenses	3,000
	60,700

Additional Information

		Total	Size A	Size B	Size C
1	Number of salesman (all paid same salary)	10	4	5	1
2	Units sold	2,000	1,000	500	500
3	Number of orders	1,000	400	200	400
4	Percentage of specific advertising	100%	40%	30%	30%
5	Sales turnover	Rs. 2,00,000	1,20,000	40,000	40,000
6	Volume in cubic ft. per unit of finished product	—	15	10	5

Solution:

Statement Showing Apportionment of Selling and Distribution Overheads

Item	Basis of apportionment	Total	Sizes A	B	C
		Rs.	Rs.	Rs.	Rs.
Sales salaries	Number of salesmen (4 : 5 : 1)	20,000	8,000	10,000	2,000
Sales commission	Sales turnover (3 : 1 : 1)	12,000	7,200	2,400	2,400
Sales Office Expenses	No. of orders (4 : 2 : 4)	4,000	1,600	800	1,600
Advertisement General	Sales turnover (3 : 1 : 1)	5,000	3,000	1,000	1,000

Advertisement specific	Direct allocation (40%, 30%. 30%)	11,000	4,400	3,300	3,300
Packing expenses	Volume in cubic.ft. of products sold (3 : 2 : 1)	1,500	750	500	250
Delivery expenses	—do— (3: 2: 1)	2,400	1,200	800	400
Warehouse expenses	—do—	1.800	900	600	400
Credit collection expenses	No. of orders (2 : 1 : 2)	3,000	1,200	600	1,200
	Total	60,700	28,250	20,000	12.450
	Units sold		1,000	500	500
Cost per unit (Total divided by units sold)			28.25	40	24.90

Check Your Progress A

1 Name the four methods of absorption of administration overheads.

.....

.....

.....

.....

2 Give two examples of distribution overheads.

.....

.....

3 Under what circumstances you would regard 'Rate per unit sold' as the suitable method of absorption of selling and distribution overheads ?

.....

.....

4 Fill in the blanks

i) Selling and distribution expenses are ..... costs

ii) Overheads are collected under ....

iii) Advertisement is an example of ..... overheads.

iv) Show room expenses are apportioned on the basis of .....

v) Bad debts are treated as ..... costs.

9.4 TREATMENT OF CERTAIN ITEMS IN COST ACCOUNTS

There are certain items of overheads the treatment of which vary from concern to concern depending upon the size of the concern, the method of production used and the policy followed by managemcnt. Let us examine such items more closely and study how they are to be treated in cost accounts.

9.4.1 Interest on Capital

There is a great deal of controversy regarding the inclusion of interest on capital in the cost accounts. There are arguments both in favour and against it. These are summarised below :

For inclusion

1 Interest is as much a production cost as wages. Wages are the reward for labour and interest is the reward for capital.

2 Real profit cannot be ascertained until interest on capital (paid or provided) is charged to cost units.

3 Results of different activities cannot be comparable unless interest factor is taken into account.

4 The true cost of maintaining stocks cannot be ascertained without taking into account the interest on capital invested in stocks.

5 Where management has to decide about the replacement of manual labour by machines, a true comparison cannot be made unless interest on capital investment in machine is taken into account.

Against Inclusion

1 The argument that wages are the reward of labour and interest is the reward of capital, holds good in economics and not in costing.

2, Interest is purely a matter of finance, hence excluded from cost.

3 It is difficult to ascertain the fair rate if interest due to frequent charges in market rates and so also the exact amount of capital on which interest is to be calculated.

4 Calculated interest in cost accounts creates unnecessary complications in managerial decisions and comparisons involving interest can be done on separate statements.

After considering the above arguments bolh for and against the inclusion of interest in cost accounts, it can be concluded

a) that interest need not be rewarded in cost accounts, and

b) that it should be taken into consideration while making cost comparisons and submitting cost dates for managerial decisions.

9.4.2 Depreciation

Depreciation is the diminution in the value of a fixed asset due to constant use or passage of time. In order lo work out the exact cost of manufacturing, depreciation of the fixed assets like machinery and factory building must be taken into account. In order to determine the amount of depreciation chargeable to productions it is necessary to estimate the working life of the asset in terms of years or production hours and ascertain its total cost by adding installation charges to its original cost minus estimated scrap value.

There are various methods that can be used for calculating depreciation such as straight line method, written down value method, sum of years digits method, annuity method, production hours or production units method. The choice of method usually depends upon the type of asset and the nature of business. But, in cost accounts, mostly straight line method or production hours method is used because of their simplicity and convenience,

9.4.3 Research and Development Costs

The costs incurred on discovery of new product or improved product ideas or improved method are considered to be research costs. The costs incurred in implementing the decision to produce the new or improved product are considered as development costs,

If research is conducted in the methods of production, the cost is taken as production. overheads and if it relates to administration, the costs are treated as administration overheads. Market research expenses are, charged to selling and distribution overheads. If research is conducted in bringing a new or an improved product, the costs are charged directly to that product. In case research proves to be unsuccessful,its cost is treated as deferred revenue expenditure and charged to Costing Profit and Loss Account.

The cost of regular research and development (R & D) activity incurred out of a separate financial provision is excluded from cost accounts.

9.4.4 Royalties and Patent Fees

If royalties and patent fees are payable on the basis of output, the amount should be regarded as a direct expense and, therefore, included in the prime cost of the product concerned. But, if they are payable on the basis of units sold (as in case of books), the same is treated as a selling expense and so included in selling and distribution overheads.

9.4.5 Drawing Office Expenses

Expenses on the work of drawing office is the preparation of production plans, drawing and designs. If drawings or designs are prepared for a specific job, drawing costs will be treated as direct expenses and charged to the job concerned. In case drawings are made to educate the customers or enclosed with sales tenders, the cost of drawings will be treated as selling overheads. But, if the services are of a geperal nature meant for the concern as a whole, the expenses are treated as production overheads and apportioned to production departments on the basis of service rendered i.e., man hours worked or number of drawings made.

9.4.6 Fringe Benefits

Besides basic wages and cash allowances like DA, HRA and CCA, some indirect monetary benefits such as medical facilities, canteen facilities, housing facilities (called fringe benefits) arc enjoyed by the workers in factories. They are not related to the quantity of work done. Hence, the costs of such benefits will be treated as production overheads and allocated to different departments on the basis of number of workers employed.

9.4.7 Costing Office Expenses

They are generally charged to administration overheads. Sometimes, they may be apportioned to various functions like production, administration and selling and distribution on the basis of estimated benefits obtained by each.

9.4.8 Defective/Spoiled Work

If the defective work and spoilage is inherent in the process of manufacture, such loss should'be included in the cost of production. It is treated as normal loss and charged as an overhead. If these are due to abnormal factors like fire, accident, machine break-down etc., the net loss (sale/value realised by selling the spoiled work/scrap) should be charged to Costing Profit and Loss Account.

Defective work is sometimes sent back to production department for correction. In tnat case, the cost of remedying the defect may be treated as production overheads.

9.4.9 Packaging Expenses

Packaging is necessary for handling the products like medicines, oil, liquid products, etc. Their packaging costs are treated as manufacturing cost and is included in direct materials. But the fancy/decorative packaging meant to attract customers is a sales promotional activity and may be charged as selling overheads. It should be noted that packaging is not synonymous to packing. Packing is used for transportation or delivery of goods to customers' place. Hence, it is treated as distribution overhead.

9.4.10 Patterns and Dies

The patterns, moulds or dies are made for a particular job or work order. Hence their costs should be charged to that job or work order as a direct expense and included in its prime cost. However, if these are meant for production in general, their cost (or depreciation) should be treated as an item of factory overheads.

9.4.11 Idle Capacity

Normally the plant capacity should be fully utilised. But, it is difficult to achieve it in practice. In other words, some capacity may remain unutilised (idle). This may be due to a variety of factors such as defective planning and scheduling of work, over expansion of capacity, seasonal fluctuations of demand, etc. Remedial measures are devised once the

cause of idle capacity is established. The overhead costs arising from avoidable idle capacity are generally charged to Costing Profit and Loss Account. However, certain amount of idle capacity is considered normal (setting up time or maintenance period). Its overhead cost is duly taken into account while calculating the hourly rate for production overheads.

9.4.12 Cash Discount

Cash discount is the discount allowed for prompt payment by debtors. It is regarded as a financial cost and, therefore, excluded from the costs.

9.5 ITEMS EXCLUDED FROM COST ACCOUNTS

There are certain items which are excluded from cost accounts. These are :

a) **Purely** financial **charges**
Loss on sale of fixed assets
Discounts on issue of shares, debentures, etc.
Loss on sale of investments
Fines and penalties
Donations
Interest on bank loans and mortgages
Cash discount

b) **Purely** financial incomes
Profit on sale of fixed assets
Interest and dividends received on inveslments
Transfer fees received
Kent received

c) Appropriations **of** profit
Dividends paid
Amounts written off like goodwill
Preliminary expenses
Income tax
Transfer to reserves

Check Your Pi-ogress I3

1 Give two reasons why interest on capital is excluded from costs.

.....

.....

.....

.....

2 Name two methods of computing depreciation that arc commonly used in cost accounts.

.....

.....

3 State whcthcr each of the following statements arc True or False.

i) If cxperimcnt proves unsuccessful its cost is charged to Costing Profit and Loss Account.

ii) Royalties are trcatcd as production overheads.

iii) Costing office expenses are treated as selling overheads.

iv) Packing is a distribution overhead. .

v) Cash discount allowed is not included in cost.

vi) 'Fines and penalties are treated as administrative overheads.

9.6 SUMMARY

Administration and selling and distribution overheads are regarded as non-production costs.

Like production and sales, administration is also treated as a separate function. Hence the administration overheads are treated as a separate item of cost. Since they constitute a minor portion of the total cost, it is not considered desirable to follow a complicated method of allocation and apportionment. A blanket overhead rate is computed for the entire factory either as a percentage of works cost or as a percentage of sales.

The allocation of selling and distribution overheads are collected, allocated and apportioned to different cost centres in the same manner as the production overheads. Rate per unit sold or percentage of selling price are the two methods used for their absorption.

Depreciation of plant and machinery is included in production overheads either according to original cost method or machine how rate method. Interest on capital is normally excluded from cost accounts. Research and development costs are charged to cost of the products for which they are incurred unless these are by way of a financial provision used for regular research and development activity (R&D). Cost of fringe benefits provided to labour is an item of production overheads and is apportioned on the basis of number of employees in each department. Royalties and patents are treated as a direct cost unless paid on the basis of sale (then they are charged as selling overheads). Packing cost is a distribution overhead whereas packaging cost is a direct cost included in materials. Cash discount, being an item of purely financial nature, is excluded from costs. The overhead cost of normal idle capacity is absorbed by the cost unit, but that of abnormal capacity is charged to Costing Profit and Loss Account.

Certain items of costs which are purely of a financial nature are excluded from cost accounts. Similarly, the items which are in the form of appropriation of profits are also exclutled.

9.7 KEY WORDS

Appropriation of Profit : Utilisation or distribution of profit.

Defective work : Defective finished goods produced in the factory which requires correction or have to be sold at a loss.

Development Cost : Cost incurred in implementing the decision to produce new/improved product

Idle Capacity : Unused production potential of the plant.

Research Cost : Cost incurred for experimentation on new/improved product, idea or method.

Royalties : Rent/fees paid for the use of a patent or-copyright.

Spoilage : Rejected units of output having little or no value,

9.8 ANSWERS TO CHECK YOUR PROGRESS

A 4 i) non-production ii) standing order numbers iii) selling iv) floor space v) selling

B 3 i) True ii) False iii) False iv) True v) True vi) False

9.9 TERMINAL QUESTIONS

1 Explain the different methods of absorption of administrative overheads. Which method would you prefer and why ?

2 How do you classify and apportion selling and disaibution overheads. How are the selling overheads absorbed by cost units ?

3 Explain the treatment of the following items of overheads in cost accounts :

a) Interest on Capital
b) Depreciation
c) Fringe benefits
d) Repairs and maintenance, and
e) Defective and spoiled work

4 List the items excluded from cost accounts.

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

SOME USEFUL BOOKS

Arora, M.N. 1'988, *A Text Book of Cost Accountancy*, Vikas Publishing House Pvt. Ltd., New Delhi. (Chapter 9-12).

Bhar, B.K. 1990. ***Cost Accounting : Methods and Problems,*** Academic Publishers. Calcutta. (Chapter 1-2).

Maheshwari, S.N. and S.N. Mittal, 1990. ***Cost Accounting : Theory and Problems,*** Shree Mahavir Book Depot, Delhi. (Chapter 4, 5).

Nigam B.M.L. and G. L. Sharma, 1990. ***Theory and Techniques of Cost Accounting,*** Himalaya Publishing House, Bombay. (Chapter 8-10).

Owler, L.W.J. and J.L. Brown, 1984. ***Wheldon's Cost Accounting,*** ELBS, London. (Chapter 7-9).

UNIT 10 UNIT COSTING

Structure

10.0 OBJECTIVES

After studying this unit, you should be able to:

- prepare cost sheet and ascertain the prime cost, the factory/works cost, the cost of production, the cost of goods sold, the cost of sales and profit
- prepare production account
- prepare a statement of quotation and ascertain the selling price/price of the tender.

1 . INTRODUCTION

. Unit costing is one of the most 'commonly used method of costing by firms which are engaged in manufacturing products with identical units such as coal, bricks, shoes, sugar, cement, etc. Under this method, cost and profit per unit of output is ascertained by preparing monthly or quarterly cost sheets showing details of the various components of total cost. In this unit, you will learn how cost sheet is prepared and how cost and profit per unit of output is determined.

10.2 MEANING AND APPLICABILITY

Unit costing refers to a method of costing used by industries engaged in mass production of homogeneous/identical products. The basic feature of unit costing is that the cost units are identical. Unit costing is also known as "Single Output Costing". Single or Output Costing is the torm of unit costing used when the enterprise produces basically one homogeneous product or one homogeneous product in two or more grades. Under this method, the cost per unit is arrived at by dividing the total cost by the total number of units produced. Thus, the cost ascertainment involves the following two stages:

i) collection and functional analysis of all costs,

ii) division of total cost by the total number of units produced in order to determine the cost per unit.

This procedure is applicable only when the organisation produces only one product. If, however, the organisation produces several grades of the same product, it becomes imperative to apportion the various costs between the various grades so that the cost of each grade can be determined separately.

Unit costing method can be successfully applied in those industries engaged in assembling, such as automobiles, electronics, typewriters, etc., and also in those industries engaged in production of homogeneous products, such as collieries, quarries, brick making, brewaries, dairies, sugar, cement works etc.

10.3 PREPARATION OF STATEMENT OF COST/ COST SHEET

Under this method of costing, it is customary to prepare a statement of cost which is popularly known as 'Cost Sheet' at periodical intervals. It shows detailed break-up of the total cost and the cost per unit at each stage. It should contain as much information regarding costs as may be necessary for the purposes of cost analysis and cost control. In actual practice, the corresponding figures of the preceding period are also shown in the Cost Sheet for purposes of comparison. This facilitates cost control.

You learnt about the preparation of Cost Sheet in Unit 3 Block 1. We shall now study about it in more detail. The proforma of Cost Sheet is given here again in Figure 10.1.

Figure 10.1 : Proforma of Cost Sheet

COST SHEET OF .....
for the month ending .....

Output : ..... Units

		Total	Per Unit
		Rs.	Rs.
Raw Materials Consumed			
Opening Stock of Raw Materials	.....		
Add : Purchases of Raw Materials	.....		
	.....		
Less : Closing Stocks of Finished Goods	.....		
		.....	.....
Direct Labour		.....	.....
Other Direct Expenses		.....	.....
PRIME COST		.....	.....
Fnctory Overheads			
.....	.....		
.....	.....		
.....	.....		
		.....	.....
WORKS COST		.....	.....
Office & Administrative Overheads			
.....	.....		
.....	.....		
.....	.....		
		.....	.....

COST OF PRODUC'PION		.....	.....
(..... units)			
Add : Opening **Stock** of Finished Goods		.....	.....
(..... units)			
Less : Closing Stock of Finished **Goods**		.....	.....
(..... units)			
COST OF GOODS SOLD		.....	.....
(..... units)			
Selling & Distribution Overheads			
.....	.....		
.....	.....		
.....	.....		
	.....	.....	.....
COST OF SALES		.....	.....
(..... units)			
PROFIT (LOSS)		.....	.....
SALES/SELLING PRICE		.....	.....

Look at Illustration I and see how Cost Sheet is prepared from the given data.

Illustration 1

In a factory 20,000 units of Product X were manufactured in the month of September, 1990. From the following figures obtained from the costing records, prepare a Cost Sheet showing the total cost and cost per unit :

	Rs.
Direct Material Consumed	2,00000
Direct **Wages**	1,60000
Other Direct Expenses	40000
Factory **Overheads**	80000
Office & Administrative **Overheads**	60000
Selling & Distribution **Overheads**	60000

Solution

Cost Sheet of Product 'X' for the Month of September, 1990

Output : 20,000 Units

	Total Cost	Cost Per Unit
	Rs.	Rs.
Cost of Direct Materials	2,00,000	10.00
Cost of Direct Labour	1,60,000	8.00
Cost of Other Direct Expenses	40,000	2.00
PRIME COST	4,00,000	20.00
Add : Factory **Overheads**	80,000	4.00
FACTORY/**WORKS** COST	4,80,000	24.00
Add : Office & Administrative Overheads	60,000	3.00

COST OF PRODUCTION	5,40,000	27.00
Add : Selling & Distribution Overheads	60,000	3.00
TOTAL COST/COST OF SALES	6,00,000	30.00

Note : Cost per *unit* for each component of total cost has been arrived at by dividing the amount by the total output.

10.3.1 Ascertainment of Cost of Direct Materials

While considering the cost of direct materials, only the cost of direct materials actually used or consumed should be taken into account. Normally, all the raw materials purchased in a particular period are not consumed during the same period. Certain amount of raw materials is always kept in stock so that production may not be interrupted for want of materials. In most cases, the cost of direct materials actually used in production is not given. It should be determined in the following manner :

Cost of Direct Materials Used in Production			Rs.
Cost of Opening Stock of Raw Materials		.....	
Add : Cost of Raw Materials purchased	.....		
Add : Carriage/Freight on purchases, if any	.....	.....	
Cost of Raw Materials available for use		.....	
Less : Cost of Closing Stock of Raw Materials		.....	.....

Look at Illustration 2 and see how cost of direct materials consumed is worked out.

Illustration 2

From the particulars given below, determine the cost of direct materials consumed.

	Rs.
Opening Stock of Raw Materials	40,000
Purchase of Raw Materials	2,40,000
Carriage Inwards	20,000
Closing Stock of Raw Materials	50,000
Carriage Outwards	20,000
Production Wages	1,80,000

Solution

Cost of Direct Materials Used in Production		Rs.	Rs.
Cast of Opening Stock of Raw Materials		40,000	
Add : Cost of Raw Materials purchased	2,40,000		
Add Carriage Inward	20,000	2,60,000	
Cost of Raw Materials available for use		3,00,000	
Less : Cost of Closing Stock of Raw Materials		50,000	2,50,000

Value of stock of raw materials may be determined in any one of the methods discussed in Unit 5 on materials. However, in the absence of any indication in the given problem, it would be better to value the stock of raw materials on FIFO basis and to give a note to that effect.

10.3.2 Ascertainment of Cost of Direct Labour

While considering the cost of direct labour, only the cost of direct labour actually used in production should be taken into account. If there are outstanding or prepaid direct wages, the same should be adjusted in the following manner :

Cost of Direct Labour Used in Production	Rs.	
Direct Wages paid	.....	
Add : Outstanding Direct Wages, if any	.....	
Less : Pre-paid Direct Wages, if any	.....	.....
	.....	

10.3.3 Ascertainment of Cost of Other Direct Expenses/ Chargeable Expenses

Similarly, if there are outstanding or pre-paid direct/chargeable expenses, the same should be adjusted in the same manner as direct labour in order to ascertain the actual cost of direct/chargeable expenses. These expenses include hire-charges paid for special machinery or plant taken on hire, cost of special moulds, designs, and patterns, cost of patents and royalties, etc.

10.3.4 Ascertainment of Prime Cost

Prime cost refers to the direct cost. It is the sum total of three direct elements of cost i.e., direct materials, direct labour and other direct expenses.

While determining the prime cost, we should always take the summation of the cost of direct materials, direct labour and expenses actually used in production. However, it is important to note here that direct materials will not form part of prime cost in those industries where the product is extracted from natural resources like collieries, quarries.

10.3.5 Ascertainment of Factory/ Works Cost

Factory/Works Cost refers to the summation of prime cost and factory overheads. Factory overheads include cost of indirect materials, indirect labour and other indirect expenses incurred in the factory which are related to production. It is determined as follows :

	Rs.
Cost of Direct Materials	.....
Cost of Direct Lubour	.....
Cost of other Direct Expenses	.....
PRIME COST	.....
Add Rctory Overheads	.....
FACTORY/WORKS COST	.....

Illustration 3

From the following particulars, prepare a statement showing (a) Cost of Direct Materials consumed, (b) Prime cost, (c) Factory overheads and (d) Factory Cost.

	Rs.
Stock of Raw Materials on 1.4.90	24,000
Stock of Raw Materia.. on 30.4.90	31,000
Purchase of Raw Materials	1,10,000
Productive Wages	75,000
Drawing Office Salaries	7,800
Counting House Salaries	8,500
Freight on Purchase of Materials	6,000
Rent, Ratcs, Tnxcs & Insurance (Factory)	9,000
Rent, Ratcs, Taxes & Insurance (Office)	6,000
Carriage Outwards	9,500
Repairs of Plant & Machinery	4,500
Travelling Expenses	12,000

Gas and Water Charges (Factory)	3,500
Gas and Water Charges (Office)	1,200
General Charges	7,500
Manager's Salary (¾ time devoted to Factory and ¼ time devoted to Office)	24,000
Depreciation on Plant & Machinery	6,500
Depreciation on Furniture	1,000
Directors' Fees	9,000
Advertisement	15,000

Solution

Statement of Cost for the month of April, 1990

	Rs.	Rs.	Rs.
Cost of Direct Materials Consumed			
Cost of Opening Stock of Raw Materials		24,000	
Add : Cost of Raw Materials purchased	1,10,000		
Add : Freight on purchases	6,000	1,16,000	
Cost of Raw Materials available for use		1,40,000	
Less : Cost of Closing Stock of Raw Materials		31,000	1,09,000
Cost of Direct Labour			75,000
PRIME COST			1,84,000
Factory Overheads			
Drawing Office Salaries		7,800	
Rent, Rates, Taxes & Insurance (Factory)		9,000	
Repairs to Plant & Machinery		4,500	
Gas & Water Charges		3,500	
Managers Salary (¼ × 24,000)		18,000	
Depreciation of Plant & Machinery		6,500	49,300
FACTORY/WORKS COST			2,33,300

10.3.6 Ascertainment of Cost of Production

Cost of production refers to the summation of factory/works cost and office & administrative overheads. Office and administrative overheads include the cost of indirect materials, indirect labour and other indirect expenses incurred in office which are related to administration. Based on data given in Illustration 3, the 'Cost of Production' will be determined as follows :

		Rs.
FACTORY/WORKS COST		2,33,300
Add : Office & Administrative Overheads		
	Rs.	
Counting House Salaries	8,500	
Rent. Rates, Taxes & Insurance (Office)	6,000	
Gas & Water Charges (Office)	1,200	
General Charges	7,500	
Managers Salary (¼ × 24,000)	6,000	
Depreciation on Furniture	1,000	
Directors' Fees	9,000	39,200
COST OF PRODUCTION		2,72,500

administrative expenses do not form part of the cost of production. But, Cost Accounting literature in India still makes a distinction between the terms 'cost of production' and "works cost'.

Accordingly, in the Indian context, the cost of production includes office and administration expenses for cost accounting purposes.

10.3.7 Ascertainment of Total Cost/Cost of Sales

Total Cost/Cost of Sales refers to the summation of cost of production of goods produced and selling & distribution overheads. Selling and distribution overheads include cost of indirect materials, indirect labour and other indirect expenses which are incurred for the purpose of sale and distribution. Based on data given in Illustration 3, the Total Cost/Cost of Sales will be determined as follows :

		Rs.
COST OF PRODUCTION OF GOODS PRODUCED		2,72,500
Add : Selling & Distribution Overheads		
Carriage Outwards	9,500	
Travelling Expenses	12,000	
Advertisement	15,000	36,500
TOTAL COST/COST OF SALES		3,09,000

10.3.8 Treatment of Items of Expenses and Losses of Purely Financial Nature

It is important to note that there are certain items of expenses and losses which are of purely financial nature and are to be excluded from cost. These items are: cash discount allowed, interest paid, fines and penalties paid, income tax paid, dividend paid, obsolescence loss, loss on sale of fixed assets, loss on sale of investments, etc.

Illustration 4

The following particulars have been obtained from the cost records of P Manufacturing Company Limited for the month of August, 1990 :

Output and Sales for the month	.....	10,000 Units
		Rs.
Stock of Raw Materials as on 1.8.90	.....	15,000
Stock of Raw Materials as on 31.8.90	.....	20,000
Drawing Office Salaries	.....	9,000
Counting House Salaries	.....	6,000
Direct Wages paid	.....	58,000
Direct Expenses	.....	20,000
Purchase of Raw Materials	.....	92,000
Cnrriage Inwards	.....	3,000
Carriage Outwards	.....	4,500
Cash Discount allowed	.....	1,500
Power and Consumable Stores	.....	12,000
Indirect Wages	.....	15,000
Ligbting of Factory	.....	5,500
Repairs to Plant & Machinery	.....	6,500
Depreciation on Plant & Machinery	.....	5,000
Debenture Interest	.....	10,000
Office Rent	.....	12,000
Directors' Fees	.....	6,000
Travelling Expenses	.....	7,500

Salesmen's Salaries and Commission	.....	18,000
Office Salaries	.....	9,000
Genera1 Charges	.....	7,000
Advertisement	.....	10,000
Outstanding Direct Wages	.....	2,000
Sale Proceeds of Factory Scrap	.....	3,000

You are required to prepare the Cost Sheet for the month of August, 1990 showing the various elements of cost per unit.

Solution

Cost Sheet of P. Manufacturing Co. Ltd. for the Month of August, 1990

			Output: 10,000 Units	
			Total Cost	Cost per unit
			Rs.	Rs.
Cost of Direct Materials Used	Rs.			
Cost of Opening Stock of Raw Materials		15,000		
Add : Cost of Raw Materials purchased	92,000			
Add : Carriage Inwards	3,000	95,000		
Cost of Raw Materials available for use		1,10,000		
Less : Cost of Closing Stock of Raw Materials		20,000	90,000	9.00
Cost of Direct labour				
Direct Wages paid		58,000		
Add : Outstanding Direct Wages		2,000	60,000	6.00
Cost of Direct Expenses			20,000	
PRIME COST			1,70,000	17.00
Add : Factory Overheads				
Drawing Office Salaries		9.000		
Power and Consumable Stores		12,000		
Indirect Wages		15,000		
Lighting of Factory		5,500		
Repairs to Plant & Machinery		6,500		
Depreciation on Plant & Machinery		5,000		
		53,000		
Less : Sale proceeds of Factory Scrap		3,000	50,000	5.00
FACTORY/WORKS COST			2,20,000	22.00
Add : Office & Administrative Overheads				
Counting House Salaries		6,000		
Office Rent		12,000		
Directors' Fees		6,000		
Office Salaries		9,000		
General Charges		7,000	40,000	4.00
COST OF PRODUCTION			2,60,000	26.00
Add : Soiling & Distribution Overheads				
Carriage outwards		4,500		

Travelling Expenses	7,500		
Salesmen's Salaries & Commission	18,000		
Advertisement	10,000	40,000	4.00
COST OF SALES		3,00,000	30.00

Note : Cash Discount allowed and Debenture Interest are items of purely financial nature and, as such, are excluded from cost.

10.4 PREPARATION OF PRODUCTION ACCOUNT

Production Account is another way of presentation of cost information. It is prepared in the form of a ledger account. No separate column is shown for cost per unit. All the possible break up of cost should be shown in stages in the manner shown below.

illustration 5

Based on data given in Illustration 4, prepare Production Account.

Solution

Production Account of P, Manufacturing Co. Ltd. for the Month of August, 1990

Dr.				Cr.
	Rs.			Rs.
To Opening Stock of Raw Materials	15,000	By Closing Stock of		20,000
To Raw Materials purchased	92,000	By Cost of Direct Materials used c/d		90,000
To Carriage Inwards	3,000			
	1,10,000			1,10,000
To Cost of Direct Materials used b/d		90,000	By Prime Cost c/d	1,70,000
To Direct Wages	58,000			
Add : Outstanding Direct Wages	2,000	60,000		
To Cost of Direct Expenses		20,000		
		1,70,000		1,70,000
To Prime Cost b/d		1,70,000	By Factory/Works Cost c/d	2,20,000
To Factory Overheads				
Drawing Office Salaries	9,000			
Power & Consumable Stores	12,000			
Lighting of Factory	5,500			
Indirect Wages	15,000			
Repairs to Plant & Machinery	6,500			
Depreciation on Plant & Machinery	5,000			
	53,000			
Less : Sale proceeds of Fact. Scrap	3,000	50,000		
		2,20,000		2,20,000
To Factory/Works Cost b/d		2,20,000	By Cost of production c/d	2,60,000
To Office & Administration Overheads				
Counting House Salaries	6,000			
Office Rent	12,000			

Directors' fees	6,000			
Office Salaries	9,000			
General charges	7,000	40,000		
		2,60.000		2,60,000
To Cost of Production b/d		2,60,000	By Cost of Sales c/d	3,00,000
To Selling & Distribution Overheads				
Carriage Outward	4,500			
Travelling Expenses	7,500			
Salesmen's Salaries	18,000			
Advertisement	10,000	40,000		
		3,00,000		3,00,000
To Cost Sales b/d		3,00,000		

Note : If sales are given in the problem, the same should be shown on the credit side and the differencebetween Sales and Cost of Sales should be treated as profit/loss on sale.

Check Your Progress A

1 Fill up the blanks:

a) Cost of Direct Materials Consumed = ...

b) Prime Cost = ...

c) Cost of Sales = ...

d) Cost of Production = Factory Cost + ...

e) Selling Price = Cost of Sales + ...

2 State whether each of the following equations are True or False.

a) Factory Cost = Prime Cast + Office overheads

b) Prime Cost = Direct Cost

c) Total Cost = Prime Cost + All Indirect Costs

d) Cost of Production = Factory Cost + Selling & Distribution Overheads

e) Cost of Sales = Factory Cost + Selling & Distribution Overheads

3 Name the industries to which unit costing can be successfully applied.

.....

.....

.....

10.5 SPECIAL POINTS TO BE NOTED

10.5.1 Value of Scrap/Wastage

Scrap iefers to the incidental residue of certain types of manufacture or defective products beyond any rectification. If there is any realisable value of such scrap, the same should reduce the cost of goods produced and, as such, it should be deducted from cost of materials consumed or factory overheads or factory cost/works cost.

10.5.2 Opening and Closing Work-in-Progress

Work-in-progress refers to partly finished or semi-finished goods: Work on such goods has already started but not completed till the end of a particular period. The cost incurred in

respect of closing work-in-progress must be deducted from factory/works cost in order to ascertain the works cost of the completed units (finished goods). It should be noted that the work-in-progress of the previous period is the opening work-in-progress in the current period which has been converted into finished goods in the current period. Hence, the cost of opening stock of work-in-progress should be added to the works cost of the current period. The reason why the cost of opening and closing work-in-progress is adjusted in the works cost is that it (cost of uncompleted units) includes only the cost of raw materials, direct labour and factory overheads.

If the cost of opening and closing stock of work-in-progress is given; the same should be adjusted after the factory overheads have been added to the Prime Cost in the following manner:

		Rs.
Cost of Direct Materials		.....
Cost of Direct Labour		.....
Cost of Direct Expenses		.....
PRIME COST		.....
Add : Factory Overheads	.....	
Less : Value of Scrap, if any	.....	.....
GROSS FACTORY/WORKS COST		.....
Add : Cost of Opening Stock of Work-in-progress,if any		.....
		.....
Less : Cost of Closing Stock of Work-in-progress,if any		.....
FACTORY/WORKS COST OF GOODS COMPLETED		.....

It is important to note that, in such a situation, the calculation of cost pe: unit should be started after the stage of factory cost.

10.5.3 Opening and Closing Stocks of Finished Goods

It is unlikely that all the units of finished goods produced during a particular period will be sold in the same period. In fact, it is the management policy to keep some closing stock of finished goods so that sales for the next period remain uninterrupted. The cost of closing stock of finished goods should be deducted from the cost of production of goods produced in order to ascertain the cost of production of goods sold during the current period. Since the closing stock of finished goods of the preceding period i.e., the opening stock for the current period is likely to be sold during the current period (on FIFO basis), the same should be added to the cost of production. Thus, the adjustments for opening and closing stocks of finished goods are made in the following manner:

	Rs.
Cost of Opening Stock of Finished Goods, if any	.....
Add : Cost of Production of Goods produced	.....
Cost of Production of Goods available for sale	.....
Less : Cost of Closing Stock of Finished Goods, if any	.....
Cost of Production of Goods Sold	.....

Illustration 6

The following information has been obtained from the costing records of a manufacturing company for the month of October, 1990:

Cost of Raw Materials on 1-10-90	.:..	75,000
Cost of Rnw Materials purchased	....	9,60,000

Carriage on Purchases	....	15,000
Chargeable Expenses	....	80,000
Direct Wages paid	....	4,20,000
Factory Overheads	....	2,30,000
Cost of Work-in-progtesson 1-10-90	....	60,000
Cost of Raw Materials on 31-10-90	....	90,000
Cost of Work-in-progress on 31-10-90	....	75,000
Cost of Stock of Finished Goods on 1-10-90	....	1,50,000
Cost of Stock of Finished Goods on 31-10-90	....	1.80.000
Office & Administrative Overheads	....	1,25,000
Selling & Distribution Overheads	....	1,30,000
Sales	....	22,50,000

You are required *to* prepare

i) **Cost Sheet showing the cost of production of goods produced,** and

ii) **Statement** showing **cost of** sales and **profit** for **the month** of **October, 1990.**

Solution

1) **Cost Sheet** for **the Month** of October, 1990

			Rs.
Cost of **Direct** Materials used			
Opening Stock of Raw **Materials**		75,000	
Add : Raw Materials **purchased**	9,60,000		
Add Carriage on Purchases	15,000	9,75,000	
		10,50,000	
Less : Closing Stock of **Raw** Materials		90,000	9,60,000
Cost of Direct **Labour**			4,20,000
Cost of Chargeable Expenses			80,000
PRIME COST			14,60,000
Add : Factory **Overheads**			2,30,000
GROSS **FACTORY/WORKS** COST			16,90,000
Add:Cost **of** Opening **Stock** of Work-in-progress			60,000
			17,50,000
Less : Cost of closing **stock** of Work-in-progress			75,000
FACTORY/WORKS COST			16,75,000
Add : **Office &** Administrative Overheads			1,25,000
COST O F PRODUCTION **OF** GOODS PRODUCED			18,00,000

2) **Statement showing** the **cost of Sales and Profit** for **the Month** of October, 1990

	Rs.
Cost of Opening Stock of **Finished Goods**	1,50,000
Add : Cost of **Production** of **Goods** produced	18,00,000
Cost of Production of Goods available for sale	19,50,000
Less : **Cost** of Closing Stock of Finished Goods	1,80,000
COST OF PRODUCTION O F GOODS SOLD	17,70,000
Add : Selling & Distribution Overheads	1,30,000

COST OF SALES	19,00,000
Profit (Balancing figure)	3,50,000
SALES	22,50,000

Sometimes, the cost of closing stock of finished goods is not given. In that case, the same can be worked out by multiplying the number of units in stock by cost of production per unit as ascertained in the cost sheet. The cost of opening stock of finished goods is usually given. But, if the same is not given, it can also be worked out with the help of the cost of production per unit for the current period based on the assumption that cost of production per unit for the current period and that of the preceding period are the same.

It is considered desirable to include an additional column for the quantity of goods in the Statement of Cost of Sales and Profit. This facilitates the ascertainment of the quantity of goods sold or the quantity of goods in stock, as the case may be.

10.5.4 Selling and Distribution Overheads

Quite often, instead of giving the selling and distribution overheads in the cost data the rate of 'selling and distribution overheads per unit' is given. In such a situation, the amount of selling and distribution overheads should be worked out by multiplying the number of units sold by the selling and distribution expenses per unit. It should be noted that ***this rare is lo be applied ro rhe units sold and nor ro rhe units produced.***

10.5.5 Computation of Recovery Rates for Overheads

Sometimes, you are required to calculate overheads recovery rates based on the cost sheet prepared by you. Such rates are usually in respect of factory overheads and administration overheads. Factory overhead rate is usually calculated as a percentage of direct wages as follows:

$$\frac{\text{Factory Overheads}}{\text{Direct Wages}} \times 100$$

Administration Overhead rate is usually calculated as a percentage of works cost as follows:

$$\frac{\text{Office Administration Overheads}}{\text{Factory/Works Cost}} \times 100$$

Selling and distribution overheads rate may be computed either as a percentage of works cost or as a percentage of sales.

Illustration 7

The following is the cost data relating to product D for the year ending December 31, 1990.

	Rs.
Purchase of Raw Materials	1,20,000
Factory Rent & Insurance	8,000
Carriage Inwards	1,440
Other Factory Overheads	40,000
Direct wages	60,000
Stock on 1-1-1990	
Raw Materials	20,000
Finished Goods (1,000 tons)	15,000
Administrative Overheads	28,400
Sales	2,99,000
Stock on 31-12-1990	
Raw Materials	22,240
Finished Goods (2,000 tons)	?

There was no stock of work-in-progress either at the beginning or at the end. Advertising nd other selling costs were Re. 1 per ton. During the year 16,000 tonnes of product D was roduced.

As certain (a) total the cost of production (b) the cost of goods sold (c) the cost of sales, and, (d) the net profit for the year; and work out (i) the percentage of factory overheads on direct wages (ii) the percentage of administration overheads on works cost, and (iii) the net profit per ton.

Solution

Cost sheet of Product D for the Year ending December 31.1991

Output: 16,000 Tons.

Cost of Direct Materials used		
Opening Stock of Raw Materials	20,000	
Raw Materials purchased	1.440	
Add : Carriage inwards	1,20,000	
	1,41,440	
Less : Closing Stock of Raw Materials	22,240	
Direct Wages		1,19,200
PRIME COST		60,000
		1,79,200
Factory Overheads		
Rent & Insurance	8,000	
Other Factory Overheads	40,000	48,000
Works Cost		2,27,200
Administrative Overheads		28,400
COST OF PRODUCTION		2,55,600

Cost of Production per Unit = 2,55,600 / 16,000 = Rs. 15,975

Statement of Cost of Sales and Profit

	Quantity (Tons)	Amount (Rs.)
Opening Stock of Finished Goods	1,000	15,000
Add : Cost of Production	16,000	2,55,600
	17,000	2,70,600
Less : Closing Stock of Finished Goods	2,000	31.950
COST OF GOODS SOLD		2,38,650
Add : Selling & Distribution Overheads		15,000
(15,000 × Re. 1)		2,53,650
COST OF SALES		45,350
Net Profit		2,99,000
SALES		

i) Percentage of Factory Overheads to Direct Wages

$$= \frac{\text{Factory Overheads}}{\text{Direct Wages}} \times 100$$

$$= \frac{48,000}{60,000} \times 100$$

$$= 80\%$$

ii) **Percentage of Administration Overheads to Works Cost**

$$= \frac{\text{Administration Overheads}}{\text{Works Cost}} \times 100$$

$$= \frac{28,400}{2,27,200}$$

$$= 12.5\%$$

iii) **Net Profit per Unit**

$$= \frac{\text{Net Profit}}{\text{Number of Units sold}}$$

$$= \frac{45,350}{15,000}$$

$$= \text{Rs. } 3.02$$

Check Your Progress B

1 Fill up the blanks :

a) Realisable value of factory scrap should be deducted from .....

b) Percentage of factory overheads to cost of direct labour = ...

c) Opening and closing stock of work-in-progress should be adjusted after the factory overheads are added to the ..... but before the stage of .....

d) Selling and distribution overheads are incurred only on ..... and not on .....

2 State whether each of the, following statements is True or False.

a) Closing stock of work-in-progress should be valued on the basis of prime cost.

b) Closing stock of finished goods should be valued on the basis of cost of sales.

c) Selling and distribution overheads are incurred on the cost of production of goods produced.

d) Office & Administrative overheads are recovered usually on the basis of percentage to factory cost.

e) Selling and distribution overheads are recovered on the basis of percentage of works cost or percentage of sales.

10.6 PREPARATION OP STATEMENT OP QUOTATION/TENDERING PRICE

Sometimes, the prospective buyer invites quotations from a number of suppliers for some goods with certain specifications. The term 'Quotation' refers to quoting the minimum price for obtaining a specific order. Such a price is quoted before the commencement of actual production in anticipation of obtaining the particular order. In such a situation, first the cost of such specific order should be estimated and then a reasonable amount of profit should be added thcroto in order to determine the price to be quoted.

While quoting the price for such specific order, one has to be cautious about the fact that the price is neither too high nor too low. In case the price is too high, offer will be rejected outright. On the other hand, if the price is too low, it will result in either lower profit or loss. .Therefore. it is important to estimate the cost as accurately as possible, Although, estimation of cost is primarily based on past performance, all future trends must also be taken into account.

Statement of quotation is prepared in the same manner as Cost Sheet as shown in Illustration 8.

Illustration 8

X Manufacturing Co. Ltd. receives an enquiry for the supply of 20,000 units of its products. The costs are estimated as follows :

Raw Materials 1,00,000 Kgs @ Rs. 2 per Kg.

Direct Wages 10,000 Hours @ Rs. 8 per hour.

Variable Overheads :

Factory @ Rs. 4.80 per labour hour

Selling & Distribution Rs. 32,000

Fixed Overheads :

Factory Rs. 12,000

Office & Administration Rs. 1,00,000

Selling & Distribution Rs. 28,000

The company adds 20% to its cost as its margin of profit. Prepare a Statement of quotation showing the price to be quoted.

Solution

Statement of Quotation Showing the Price to be Quoted per unit and for 20,000 Units

		Total	Per Unit
		Rs.	Rs.
Estimated Cost of Direct Materials		2,00,000	10.00
Estimated Cost of Direct Labour		80,000	4.00
Estimated Prime Cost		2,80,000	14.00
Add : Estimated Factory Overheads			
Variable	48,000		
Fixed	12,000	60,000	3.00
Estimated Factory Cost		3,40,000	17.00
Add : Estimated Office & Administrative Overheads		1,00,000	5.00
Estimated Cost of Production		4,40,000	22.00
Add : Estimated Selling & Distribution Overheads			
Variable	22,000		
Fixed	28,000	60,000	3.00
Estimated Cost of Sale		5,00,000	25.00
Add : Desired Profit @ 20% on Cost Price		1,00,000	5.00
Estimated Selling Price		6,00,000	30.00

Sometimes; cost records for a particular period are given and the estimated cost of materials' and labour of a work order are provided for the purpose of ascertaining its selling price to be quoted. In-such a situation, you should prepare the cost sheet first and ascertain the recovery rates for factory overheads as a percentage to direct wages, for administrative overhead6 as a percentage of works costs, and for selling and distribution overheads as a percentage of cost of goods sold (or as suggested). These rates must be duly adjusted with the anticipated changes, if any, before preparing the statement of quotation. Look at Illustration 9 and study how the statement of auotation for a work order is prepared with the help of a given cost data.

Illustration 9

The following figures have been obtained from the cost records of a manufacturing company for the year 1989:

	Rs.
Cost of Materials	2,40,000
Wages for Direct Labour	2,00,000
Factory Overheads	1,20,000
Distribution Expenses	56,000

Administration Expenses	1,34,400
Selling Expenses	89,600
Profit	1,68,000

A work order was executed in 1990 and the following expenses were incurred :

	Rs.
Cost of Materials	32,000
Wages for Labour	20.000

Assuming that in 1990 the rate for factory overheads went up by 20%.distribution charges went down by 10% and selling and administration charges wept up by 12½%, at what price should the product be quoted so as to earn the same rate of profit on the selling price as in 1989. Show the full workings.

Factory overheads are based on direct wages while administration, selling and distribution expenses are based on factory cost.

Solution

Statement of Cost for the Year 1989

	Rs.
Cost of Direct Materials	2,40,000
Direct Wagcs	2,00,000
PRIME COST	4,40,000
Factory Overhcnds	1,20,000
WORK COST	5.60.000
Administration Overheads	1,34,400
COST OF PRODUCTION	6,94,400
Selling Overheads	89,600
Distribution Overheads	56,000
COST OF SALES	8,40,000
Profit	1,68,000
SALES	10,08,000

Factory Overheads Rate $= \frac{\text{Factory Overheads}}{\text{Direct Wages}} \times 100$

$= \frac{1,20,000}{2,00,000} \times 100$

$= 60\%$

Administration Overheads Rate $= \frac{\text{Admin. Overheads}}{\text{Works Cost}} \times 100$

$= \frac{1,34,400}{5,60,000} \times 100$

$= 24\%$

Selling Overheads Rate $= \frac{\text{Selling Overheads}}{\text{Works Cost}}$

$= \frac{89,600}{5,60,000} \times 100$

$= 16\%$

Distribution Overheads Rate $= \frac{\text{Dist. Overheads}}{\text{Work Cost}} \times 100$

$= \frac{56,000}{5,60,000} \times 100$

$= 10\%$

Rate of Profit $= \frac{\text{Profit}}{\text{Cost of Sales}} \times 100$

$= \frac{1,68,000}{8,40,000} \times 100$

= 20% of cost of sales

Statement of Quotation for a Work Order

	Rs.
Cost of Direct Materials	32,000
Direct Wages	20,000
PRIME COST	52,000
Factory Overheads (60% of wages plus 20% thereof i.e., 72% of wages)	14,400
WORK COST	664000
Administration Overheads (24% of works cost plus 12½% thereof i.e., 27% of works cost)	17,928
COST OF PRODUCTION	84,328
Selling Overheads (16% of works cost plus 12½% thereof i.e., 18% of works cost)	11,952
Distribution Overheads (10% of works cost minus 10% thereof i.e., 9% of works cost)	5,976
COST OF SALES	1,02,256
Profit (12% of cost of sales)	20,451
ESTIMATED SELLING PRICE	1,22,707

10.7 COMPREHENSIVE ILLUSTRATIONS

Illustration 10

The following particulars relating to the year 1989 have been taken from the books of a Chemical Works manufacturing and selling a chemical mixture :

	Kg.	Rs.
Stock on 1st January. 1989		
Raw Materials	2,000	2,000
Finished Mixture.	500	1,750
Factory Stores		7,250
Purchases		
Raw Materials	1,60,000	1,80,000
Factory Stores		24,250
Sales		
Finished Mixture	1,53,050	9,18,000
Factory Scrap		8,170
Factory Wages		1,78,650
Power		30,400
Depreciation on Machinery		18,000
Salaries		
Factory		72,220
Office		37,220
Selling		41,500

Expenses		
Direct		18,500
Ofiice		18,200
Selling		18,000
Stock on 31st December. 1989		
Raw Materials	1,200	?
Finished Mixture	450	?
Factory Stores		5,500

The Stock of finished mixture at the end of 1989 is to be valued at the factory cost of the mixture for that year. The purchase price of raw materials remained unchanged throughout the year.

Prepare a statement giving the maximum possible information about cost and its break up for the year 1989.

Solution

Cost Sheet of a Chemical Works for the Year 1989

Output : 1,53,000 Kg.

			Total Cost	Cost per Unit
			Rs.	Rs.
Cost of Direct Materials used				
Cost of Opening Stock of Raw Materials		2,000		
Add : Cost of Rnw Materials purchased		1,80,000		
		1,82,000		
Less : Cost of Closing Stock of Raw Materials		1.350	1,80,650	1.181
Cost of Direct Labour			1,78,650	1.168
Cost of Direct Expenses			18.500	0.121
PRIME COST			3,77,800	2.470
Factory Overheads				
Cost of Factory Stores consumed :				
Opening Stock	7,250			
Add : Purchases	24,250			
	31,500			
Less : Closing Stock	5.550	25.950		
Power		30.400		
Depreciation of Machinery		18.000		
Factory Salaries		72,220		
		1,46,570		
Less : Sale of Factory Scrap		8,170	1,38,400	0.904
WORKS COST			5,16,200	3.374
Office & Adm. Overheads				
Office Salaries		37,220		
Office Expenses		18.200	55,420	0 = 362
COST OF PRODUCTION			5,71,620	3.736

Statement showing Cost of Sales and Profit for the Year 1989

		Rs.
Cost of Opening Stock of Finished Mixture (500 Kg.)		1,750
Add : Cost of Production of Finished Mixture (1,53,000 Kg.)		5,71,620
		5,73,370
Less : Cost of Closing Stock Finished Mixture (450 Kg.)		1,518
COST OF GOODS SOLD (1,53,050 Kg.)		5,71,852
Selling & Distribution Overheads		
Salaries	41,500	
Selling Expenses	18,000	59,500
COST-OF SALES (1,53,050 Kg.)		6,31,352
Profit (balancing figure)		2,86,648
Sales (1,53,050 Kg. finished mixture)		9,18,000

Working Notes

I) Production during the year = Goods Sold + Closing Stock − Opening Stock = (1,53,050 + 450 − 500)
= 1,53,050 Kg.

2) Value of Closing Stock of Raw Materials = $\frac{1,80,000}{1,60,000} \times 1200$
= Rs. 1,350

3) Value of Closing Stock of Finished Mixture = Rs. $\frac{5,16,200}{1,53,000} \times 450$ = Rs. 1,518

Illustration 11

Work out in Cost Sheet form the unit cost of production per ton of Special Paper manufactured by a paper mill in March, 1990 from the following data ;

Direct Materials

Paper Pulp 500 tons @ Rs. 50 per ton

Other Materials 100 tons @ Rs. 30 per ton

Direct Labour

80 Skilled men @ Rs. 3 per day for 25 days

40 Unskilled men @ Rs. 2 per day for 25 days

Direct Expenses

Special Equipment Rs. 3,000

Special Dyes Rs. 1,000

Works Overheads

Variable @ 100% and Fixed @ 60% on Direct Wages

Administrative Overheads @ 10%

Selling and Distribution Overheads @ 15% on Works Cost

Forty tons of special paper was manufactured and Rs. 800 was realised by the sale of waste material during the course of manufacture. The scrap value of the special equipment after utilisation in manufacture is nil.

Solution

Cost Sheet of a Paper Mill for the Month of March, 1990

Output : 400 Ton

		Total Cost	Cost per Ton
		Rs.	Rs.
Cast of Direct Materials used			
Paper Pulp = 500 x Rs. 50 =	25,000		

Other Materials = 100 × Rs. 30 =	3,000		
	28,000		
Less : Sale of Waste Materials	800	27,200	68.00
Cost of Direct Labour			
Skilled Men = 80 × Rs. 3x25	6,000		
Unskilled Men = 40 × Rs. 2 × 25	2,000	8,000	20.00
Cost of Direct Expenses			
Special Equipment	3,000		
Special Dyes	1,000	4,000	10.00
PRIME COST		39,200	98.00
Works Overheads			
Variable (100%on direct wages)	8,000		
Fixed (60%on direct wages)	4,800	12,800	32 = 00
WORKS COST		52,000	130.00
Administrative or Overheads (10%on Works Cost)		5,200	13.00
COST OF PRODUCTION		57,200	143.00
Selling & Distribution Overheads (15% on Works Cost)		7,800	19.50
COST OF SALES		65,000	162.50

Illustration 12

Cooling Ltd. manufactured and sold 1,000 refrigerators in the year ending 31st March, 1990. The summarised Trading and Profit & Loss Account is set out below :

	Rs.		Rs.
To Cost of Materials	8,00,000	By Sales	40,00,000
To Direct Wages	12,00,000		
To Other Manufacturing Cost	5,00,000		
To Gross Profit c/d	15,00,000		
	40,00,000		40,00,000
To Management and Staff Salaries	6,00,000	By Gross Profit b/d	15,00,000
To Rent, Rates and Insurance	1,00,000		
To Selling Expenses	3,00,000		
To General Expenses	2,00,000		
To Net Profit	3,00,000		
	15,00,000		15,00,000

For the year ending 31st March 1991, it is estimated that–

a) Output and Sales will be 1,200 refrigerators.

b) Prices of Material will go up by 20% on the level of previous year.

c) Wages will rise by 5%.

d) Manufacturing costs will rise in proportion to the combined cost of Material and wages.

e) Selling cost per unit will remain unaffected.

f) Other expenses will also remain constant.

You are required to submit a statement to the Board of Directors showing the price at which the refrigerators should be marketed so as to show profit of 10% on selling price.

Solution :

Statement Showing Estimated Selling Price of Refrigerators for the Year ending 31.3.1991

Output : 1,200

	Total	Per Unit
	Rs.	Rs.
Cost of Direct Materials	11,52,000	960
Cost of Direct labour	15,12,000	1,260
PRIME COST	26,64,000	2,220
Add : Factory Overheads	6,66,000	555
FACTORY COST	33,30,000	2,775
Add : Office & Administrative Overheads	9,00,000	750
COST OF PRODUCTION	42,30,000	3,525
Add : Selling & Distribution Overheads	3,60,000	300
COST OF SALES	45,90,000	3,825
Add : Profit @ 10% on Selling Price i.e., 1/9 on Cost of Sales	5,10,000	425
Estimated Selling Price	51,00,000	4,250

Working Notes

1) For the sake of convenience, it is desirable that the cost sheet for the last year is prepared as follows :

Cost Sheet of Cooling Ltd. for the Year ended 31.3.1990

		Total Cost	Cost per Unit
		Rs.	Rs.
Cost of Direct Materials		8,00,000	800
Cost of Direct Labour		12,00,000	1,200
PRIME COST		20,00,000	2,000
Add : Factory Overheads (Other Manufacturing Costs)		5,00,000	500
FACTORY COST		25,00,000	2,500
Add : Office & Administrative Overheads			
Management & Staff Salaries	6,00,000		
Rent, Rates & Insurance	1,00,000		
General Expenses	2,00,000	9,00,000	900
COST OF PRODUCTION		34,00,000	3,400
Add : Selling & Distribution Overheads		3,00,000	300
COST OF SALES		37,00,000	3,700

2) It is important to note here that the cost of all variable items should be determined per unit and the same should be multiplied by the output for the next year, Thus, increase in the volume of output will be automatically taken care of.

3) Cost of direct material per unit for the next year

$$= 800 + \left(\frac{20}{100} \times 800\right) = 800 + 160 = \text{Rs. } 960$$

4) Cost of direct labour per unit tor the next year

$$= 1{,}200 + \left(\frac{5}{100} \times 1{,}200\right) = 1{,}200 + 60 = \text{a }_{,}1{,}260$$

5) Increase in combined cost of material and labour i.e., Prime Cost

$$\left(\frac{2{,}220 - 2{,}000}{2{,}000}\right) \times 100 = \frac{220}{2{,}000} \times 100 = 11\%$$

∴ Manufacturing cost per unit for the next year

$$= 500 + \left(\frac{11}{100} \times 500\right) = 500 + 55 = \text{Rs. } 555$$

10.8 LET US SUM UP

Unit costing is a method of costing used in those industries which are engaged in mass production of homogeneous/identical products. This method of costing is applied in a large number of industries like automobiles, electronics, collieries, quarries, brick making, etc.

A Statement of Cost/Cost Sheet is prepared at periodical intervals showing the total cost and cost per unit of each element of cost side by side. The cost per unit is arrived at by dividing the total cost incurred by the total number of units produced. An alternative way of presentation of this cost information is in the form of a ledger account called 'Production Account'.

Sometimes, a statement of quotations is required to be prepared in order to find out the price to be quoted to the prospective buyer for obtaining a specific order. While preparing this statement, cost for the specific order should be estimated first and, thereafter, a reasonable amount of profit should be added to the estimated cost. The resultant figure shall represent the selling price to be quoted.

10.9 KEY WORDS

Chargeable Expenses : Other direct expenses.

Cost of Production of Goods Sold : Cost of opening stock of finished goods plus cost of production of goods produced minus cost of closing stock of finished goods.

Cost of Production of Goods Produced : Total of factory/works cost and office and administrative overheads.

Cost of Sales : Tctal of cost of production of goods sold and selling & distribution overheads.

Factory/Works Cost : Total of prime cost and factory overheads.

Production Account : Statement of cost prepared in the form a ledger account. It is similar to Manufacturing Account prepared in financial accounts.

Prime Cost : Direct cost i.e., total of cost incurred on direct materials, direct labour and direct expenses.

Selling Price/Price of Tender : Total of cost of sales and desired amount of profit.

Work-in-Progress : Semi-finished goods.

10.10 ANSWERS TO CHECK YOUR PROGRESS

A 1 a) Cost of opening stock of raw materials + Cost of raw materials purchased − Cost of closing stock of raw materials.

b) Cost of direct materials + Cost of direct labour + Cost of direct expenses.

c) Cost of production of goods sold + Selling & Distribution overheads.

d) Office & Administrative overheads.

e) Profit.

2 a) False, b) True, c) True, d) False, e) False.

3 Automobiles, Electronics, Collieries, Quarries, Brick making etc.

B 1 a) factory overheads.

b) $\frac{\text{Factory overheads}}{\text{Cost of direct labour}} \times 100$

c) prime Cost, factory Cost

d) goods sold, goods produced

2) a) False, b) False, c) False, d) True, e) True.

10.11 TERMINAL QUESTIONS/EXERCISES

Questions

1) Define Unit Costing. Mention the industries to which this method of costing is applicable.

2) What is a cost sheet? In what respect does it differ from a Production Account?

3) Describe in brief the various components of Total Cost.

Exercises

1) Prepare a Cost Sheet from the following data to find out profit and cost per unit :

Raw Materials consumed	Rs. 1,60,000
Dirccr Wages	Rs. 80,000
Factory Overheads	20% of Direct Wage,
Administrative Overheads	10% of Factory Cost
Selling Overheads	Rs. 12,000
Units produced	4,000
'Units sold	3.600
Selling Price	Rs. 100 per unit

(Answer : Prime Cost : Rs. 2,40,000; Factory Cost : Rs. 2,56,000; Cost of production of goods produced : Rs. 2,81,600; Cost of Sales : Rs. 2,65,440; and Profit : Rs. 94,560)

2) You are the chief of the Cost Accounting Department of Leather Products India Ltd. Your organisation manufactures shoes. The following figures have been extracted from the account books relating to the production of shoes for the year 1989.

	Rs.
Raw Materials consumed (including abnormal wastage of Rs. 10,000)	5,10,000
Direct Wages paid	4,00,000
Factory Overheads	1,00,000
Tools consumed	10,000
Depreciation of Machines (Factory)	5,000
.Machines imported	1,00,000
Work Expenses (Misc.)	50,000
Office Expenses	25,000
Overheads for Office	40,000
Managing Director's Salary	50,000
Stationery & Printing (Office)	5,000
Depreciation of Machines (Office)	1,000
Selling and Distribution Expenses	25,000
Entertainment of customers	20,000
Advertising	30,000
Dividend paid	1,00,000

"Prepare a cost analysis statement after considering the following :

i) The profit rate is 20% on sales

i) Wages outstanding Rs. 25,000.

Hint : Abnormal wastage of raw materials should be treated separately and as such, it should not form part of cost.

(Answer : Cost of raw materials consumed : Rs. 5,00,000; Cost of direct labour : Rs. 4,25,000; Prime Cost : Rs. 9,25,000; Factory Overheads : Rs. 1,65,000; Factory Cost : Rs. 10,90,000; Administrative Overheads : Rs. 1,21,000; Cost of production of goods produced : Rs. 12,11,000; Selling & Distribution Overheads : Rs. 75,000; Cost of Sales : Rs. 12,86,000; Profit : Rs. 3,21,500 & Sales : Rs. 16,07,500)

3) The following details have been obtained from the cost records of Comet Paints Limited:

	Rs.
Stock of Raw Materials on 1st September, 1990	75,000
Stock of Raw Materials on 31st September, 1990	91,500
Direct Wages	52,500
Indirect Wages	2,750
Sales	2,11,000
Work-in-progress on 1st September. 1990	28,000
Work-in-progress on 30th September, 1990	35,000
Purchase of Raw Materials	66,000
Factory Rent, Rates and Power	15,000
Depreciation of Plant and Machinery	3.500
Expenses on Purchases	1,500
Carriage Outwards	2,500
Advertising	3,500
Office pent & Taxes	2,500
Travellers' Wages and Commission	6,500
Stock of Finished Goods on 1st September, 1990	54,000
Stock of Finished Goods on 30th September, 1990	31,000

Prepare a Production Account giving the maximum possible break up of costs and profit.

(Answer : Copt of Raw Materials consumed : Rs. 51,000; Prime Cost : Rs. 1,03,500; Factory Overheads : Rs. 21,250; Factory Cost : Rs. 1,17,750; Cost of Production of goods produced : Rs. 1,20,250; Cost of Production of Goods Sold : Rs. 1,43,250; Selling & Distribution overheads : Rs. 12,500; Cost of Sales : Rs. 1,55,750; and Profit : Rs. 55,250)

4) A company makes two distinct types of vehicles A and B. The total expenses during a period as shown by the books for assembly of 600 of A and 800 of B are as under :

	Rs.
Material	1,98,000
Wages	12,000
Stores overheads	19,800
Running Expenses of Machine	4,400
Depreciation	2,200
Labour Amenities	1,500
Works General Expenses	30,000'
Administration and Selling Expenses	26,790
Other Data available to you are–	A: B
Material Cost Ratio per Unit	1:2
Direct Labour Ratio per Unit	2:3
Machine Utilization Ratio per Unit	1:2

Calculate the cost of each vehicle per unit giving reasons for the basis of apportionment adopted by you.

Hint : a) Calculate the effective ratio by taking into account the total output of two vehicles as follows:

Effective Material Ratio = $1 \times 600 : 2 \times 800$
$= 600 : 1600 = 3 : 8$

Effective Labour Ratio = $2 \times 600 : 3 \times 800$
$= 1200 : 2400 = 1 : 2$

Effective Machine Utilisation Ratio = $1 \times 600 : 2 \times 800$
$= 600 : 1600 = 3 : 8$

b) Apportion Material and Stores overhead in Material ratio, Direct wages, Labour amenities and Works general expenses in Labour ratio, Running expenses of Machine and Depreciation in Machine utilization ratio and Administrative & selling expenses in the ratio of works cost.

(Answer: Prime Cost : A – Rs. 58,000/Rs. 96.67, B – Rs. 1,52,000/Rs. 190.00; Factory Overheads : A – Rs. 17,700/Rs. 29.50; B – Rs. 40,200/Rs. 50.25; Works Cost : A – Rs. 75,700/Rs. 126.17; B – Rs. 1,92,200/Rs. 240 = 25; Total Cost/Cost of Sales; A – Rs. 83,270/Rs. 138.79, B – Rs. 2,11,420/ Rs. 264.28)

5) From the following information prepare the Cost Sheet of Pig Iron showing cost of Pig Iron produced and Cost per tonne of each item of expenditure:

	Stock on 1st August, 1990	Purchases during the month of August, 1990	Stock on 31st August, 1990
	Rs.	Rs.	Rs.
Iron Ore	10,800	56,000	10,200
Lime Stone	4,500	15,000	4,800
Coal	94,000	70,000	47,000
Coke	10,500	59,000	7,200
Sundries	6,500	24,000	7,500
Wages Paid	Rs. 66,000		
Works Charges	Rs. 44,500		
Sale of Slag during the month was	Rs. 8,500		
Production of Pig Iron during the month was	1,000 Tonnes		

(Answer: Cost of Direct Materials used : Rs. 2,73,600; Factory Cost/Cost of Production : Rs. 3,75,600; Cost per tonne : Rs. 375.60)

6) The following particulars have been made available from the Cost Ledger of a company :

	Rs.
Stock of Raw Materials on 31.12.1990	25,600
Stock of Finished Goods on 31.12.1990	56,000
Purchases of Raw Materials	5,84,000
Direct Wages	3,97,000
Sales	11,84,000
Stock of Raw Materials on 31.12 1991	27,200
Stock of Finished Goods on 31.12.1991	60,000
Works Overheads	88.072
Office and General Charges	71,048

The company is required to submit a tender for a large machine. The Cost Department estimates that the materials will cost Rs. 40,000 and wages to fabricate the machine Rs. 24,000. The tender is to be made at a net profit of 20% on selling price

Prepare a statement showing a) Cost of materials used, b) total cost, c) percentage of factory overheads to direct wages, and d) percentage of office overheads to works cost.

Also prepare a statiment of quotation showing the price at which the tender of the machine can be submitted.

(Answer: Cost of materials used : Rs. 5,82,400; Total cost Rs. 11,38,520; Percentage of Factory Overheads to Direct Wages 22%; Percentage of Office Overheads to Works Cost 6.65%; Price to be quoted in tender : Rs. 92,360.)

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 11 RECONCILIATION OF COST AND FINANCIAL ACCOUNTS

Structure

11.0 OBJECTIVES

After studying this unit, you should be able to:

- explain briefly the two methods of cost accounting
- explain the need for reconciliation of cost and financial accounts
- list the factors responsible for causing difference in profit or loss shown by cost and financial accounts
- prepare reconciliation statement
- prepare memorandum reconciliation account.

1 INTRODUCTION

You have learnt that cost accounts act as a check on financial accounts. It is achieved by comparing the profit/loss ascertained under cost accounts with profit/loss ascertained under financial accounts. Their amounts usually differ. But, these can be reconciled by preparing a reconciliation statement which explains the causes of difference. In this unit you learn about the various causes of difference between the profit/loss shown by cost accounts and the profit/loss shown by financial accounts, and the preparation of Reconciliation Statement.

11.2 METHODS OF COST ACCOUNTING

Large manufacturing firms often maintain their cost accounts on double entry system. For this purpose, they adopt one of the following two methods:

1) Integral or Integrated Accounting

2) Non-integral or Independent Accounting

It is important to decide whether cost and financial transactions are to be unified or kept separate, for an appropriate method of cost accounting. Where cost and financial transactions are to be unified, the method to be adopted is called 'Integral/Integrated Accounting'. On the other hand, if cost and financial transactions are to be kept separate, the method followed is called 'Non-integral' or 'Independent Accounting.' The problem of reconciliation of cost and financial accounts arises only when non-integral accounting method is followed. Let us, therefore, discuss these two methods briefly before we take up the problem of reconciliation.

11.2.1 Integral Accounting

The term 'Integral/Integrated Accounting' means the merger of financial and cost accounts and maintenance of a single set of bodks to record both financial and cost transactions. In other words, **it refers to the unified method which serves the purpose of both financial and cost accounts.** Under this method, book-keeping procedure followed is very much similar to the procedure involved in financial accounting. In addition to the General Ledger, Sales Ledger and Bought Ledger in financial accounting, a Cost Ledger and three subsidiary ledgers viz., Stores Ledger, Work-in-progress Ledger and Finished Stock Ledger are also maintained.

Cost Ledger : It refers to the principal ledger in cost accounting which contains all the nominal accounts. It also contains a control account for each subsidiary ledger i.e., Stores Ledger Control Account, Work-in-progress Ledger Cbntrol Account and Finished Stock 'Ledger Control Account if non-integral accounting is followed. In case of integral accounting, however, these control accounts appear in the General ledger.

Stores ledger : It refers to a subsidiary ledger which contains an account for each item of stores and its movement. This account is debited with purchases of materials and credited with issues of materials to jobs.

Work-in-progress ledger : It refers to a subsidiary ledger which contains an account for each job, process or operation which is pending on the shop floor. This account is debited with the cost of materials, labour and overheads, and is credited with the cost of goods transferred to Finished Stock Ledger as and when they are completed.

Finished Stock Ledger : It refers to a subsidiary ledger which contains an account for each item of finished product manufactured or job completed. Each such completed product or job account is debited with the cost of production and credited with the cost of goods transferred to Cost of Sales Account.

Since only one set of accounts is maintained **under this method, no Costing Profit and Loss Account is prepared. Thus there is only one figure of profit or loss and, as such, there is no need for reconciliation of costing and financial profit or loss.**

11.2.2 Non-integral Accounting

When independent cost accounts are maintained, the subsidiary ledgers and the cost ledger are inter-locked through control accounts maintained in each ledger. These control accounts cross-check the accuracy of ledgws and also make each ledger seif-balanced so that a separate trial balance may be prepared for each ledger without reference to the other ledgers. Besides these control accounts, a General Ledger Adjustment Account is opened in the cost ledger for all items of incomeand expenditure. The account is also known as 'Cost Ledger Control Account'. The cost ledger also contains control accounts such as Wages Control Account. Production Overheads Control Account. Administrative Overheads Control Account, Selling and Distribution Overheads Control Account, etc. Thus, **under non-integral accounting, the double entry is completed through control accounts.** Hence, this system has also been termed as 'Control Accounts System'.

Costing Profit and Loss Account : When cost accounts are maintained independent of financial accounts, a separate Costing Profit and Loss Account is prepared for determining the profit or loss of a particular period. This account is debited with the cost of sales and credited with the sales value. It is also debited with items like abnormal losses, under-absorption of overheads, loss or sale of special jobs etc., and credited with items like abnormal gains, overabsorption of overheads, profit on sale of special jobs, etc. The balance of this account will indicate the profit or loss as per cost records which should be reconciled with the profit or loss as per financial records.

11.3 NEED FOR RECONCILIATION OF COST AND FINANCIAL ACCOUNTS

When cost accounts and financial accounts are maintained independent of each other, the profit or loss as disclosed by the two sets of books is bound to differ from each other. This non-agreement of profit or loss shown by the two sets of books necessitates the preparation

of a reconciliation statement which shows the causes leading to the difference between the two figures. The preparation of this statement is a must in order to establish the accuracy of cost accounts. Not only that, it also helps in cross-checking the arithmetical accuracy of operating results shown by the financial accounts.

11.4 CAUSES OF DIFFERENCE

The factors responsible for the difference between the profit or loss shown by the two sets of books can be broadly summarised as follows :

Items shown only in the financial accounts and not in **the** cost accounts : There are quite a few items which appear in the financial accounts and not in the cost accounts. **All** such items of expenses and losses reduce the financial profit while all such items of incomes and gains increase the financial profit.

This items can be classified as under :

a) Financial Charges
   i) Cash discount allowed
   ii) Interest paid on debentures, bank loans, mortgages, etc.
   iii) Penalties and fines paid
   iv) Income-tax paid
   v) Loss on sale of fixed assets
   vi) Loss on sate of investments
   vii) Obsolescence loss
   viii) Expenses on issue of shares/debentures
   ix) Discount on issue of shares/debentures
   x) Goodwill, Preliminary Expenses, etc. written off.

b) Financial Incomes
   i) Interest received on investments, bank deposits, etc.
   ii) Dividend received on investments
   iii) Share transfer fees received
   iv) Rent received
   v) Profit on sale of fixed assets
   vi) Profit on sale of investments
   vii) Cash discount received

c) **Items** of Appropriation of Profits
   i) Transfer of profits to reserves
   ii) Dividend paid
   iii) Proposed dividend

Items shown only in **the** cost accounts and not in'the financial **accounts** : There are very a few **items** which appear in the cost accounts and not in **the** financial accounts. Such items are as follows :

a) **Interest** on capital employed : Sometimes, it is the policy of the management to charge interest on capital employed for costing purposes. But, in reality, no such interest is paid. As such, it is excluded from the financial accounts.

b) Charges in lieu of rent : It is also the policy of the management to charge notional rent for the premises owned so as to enable comparison between the cost of production in a factory owned by a company and the cost of production in a leasehold or rented factory. However. in reality, no such rent is actually paid and, as such, it is exlcuded from financial accounts.

Under/Over absorption of overheads : The recovery of overheads in cost accounts is always based on estimates while the financial accounts are based on **actuals. Hence,** the amount of overheads recovered in cost accounts and the amount of expenditure actually incurred and recorded in financial accounts will invariably disagree.

The overheads charged in cost accounts may either fall short of or exceed the actual amount of expenses incurred and recorded in the financial accounts. If overheads are not fully recovered in cost accounts the shortfall is known as 'underabsorbed overheads. On the

other hand, if overheads recovered in cost accounts are in excess of the actual expenditure, the excess amount is known as 'overabsorbed overheads'.

Different basis of stock valuation : Quite often, the stock figures shown in cost accounts differ from the figures shown in financial accounts. This may be due to the different bases followed for stock valuation in the two sets of books. The conventional method of stock valuation in financial accounts is based on the principle of 'cost price or market price whichever is lower'. However, in cost accounts, the basis of stock valuation is invariably the actual cost of production and this may even include the administration overheads.

11.5 PREPARATION OF RECONCILIATION STATEMENT

The preparation of a statement to reconcile the profits shown by the cost accounts with the profits shown by the financial accounts is similar to the preparation of bank reconciliation statement. It may provide for two amount columns, the first (plus column) for showing the amounts of items to be added and the second (minus column) for showing the amounts of items to be subtracted. You can take profits as per cost accounts as the starting point and arrive at profits as per financial accounts by making the necessary adjustments, or vice versa. In case you start with profits as per cost accounts as the base, take the following steps to arrive at the profit as per financial accounts.

1) Show the profit as per cost accounts in the plus column. In case of loss, the amount may be shown in minus column.

2) Look at the debit side of the Profit and Loss Account and as certain the items such as interest, income tax, discount, etc. which are not shown in cost accounts. Had these items of expenses or appropriations been shown in cost accounts, the amount of profit would have been lower. Hence, these amounts should be deducted.

3) Look at the credit side of the Profit and Loss Account and ascertain the items such as income received on investments, rent received, etc. which are not shown in cost accounts. Had these items of income been shown in cost accounts, amount of profit would have been higher. Hence, these amounts should be added.

4) Look at the cost accounts and ascertain whether any amount of notional rent, proprietor's salary, interest on capital, etc. has been shown as expense. If so, add these amounts because they have resulted in lower profits in cost accounts.

5) Compare the amounts of all indirect costs (factory overheads, administration overheads, and selling and distribution overheads) charged in cost accounts with their actual amounts as recorded in the financial accounts. Add overabsorption and deduct underabsorption of various overheads.

6) Compare the values of stock shown in cost accounts with those shown in financial accounts. in all probability, the stock values shown in cost accounts will be higher. Hence, the difference in closing stock shall be deducted and the difference in opening stock will be added.

7) Take the totals of both plus and minus columns and work out the difference between the two totals. If the total of plus column is higher than the total of the minus column, the excess represents the profit as per the financial accounts. If, however, the total of the minus column is higher than the total of the plus column, the excess shall represent the loss as per the financial accounts.

Based on the above analysis, we can draw the lists of items to be added to the profits shown by cost accounts and the items to be deducted there from.

Items to be Added

1) Incomes not shown in cost accounts
2) Notional costs shown in cost accounts
3) Overabsorption (overcharge) of any indirect cost in cost accounts
4) Overvaluation of opening stock

Items to be Deducted

1) Charges not shown in cost accounts

2) Underabsorption (undercharge) of any indirect cost in cost accounts

3) Overvaluation of closing stock

In case the figure of profit or loss as per cost accounts, is not given, you have to start with the profit or loss as per financial accounts. In that case, the items listed above for addition shall be deducted and shown in minus column, and the items listed above for deduction shall be added and shown in plus column. In other words, the whole treatment will be reversed.

Look at Illustration 1 and study how Reconciliation Statement is prepared a) when you take profits as per cost accounts as the base, and b) when you take profits as per financial accounts as the base.

Illustration 1

The net profit of a manufacturing company appeared at Rs. 60,500 as per financial records for the year ended 31st March, 1990. The cost accounts, however, showed a net profit of Rs. 1,19,400 for the same period. A detailed cgmparison of the figures contained in both sets of books revealed the following factors responsible for their disagreement :

Directors Fees not charged in cost accounts	7.500
Works Overheads under-recovered in costs	1,500
Loss due to Obsolescence charged in financial accounts	3,500
Administrative overheads over-recovered in costs	1,800
Depreciation charged in financial accounts	10,000
Depreciation recovered in costs	12,000
Income Tax provided in financial accounts	54,500
Interest on Investments not included in costs	5,000
Transfer Fees credited in financial accounts	2,500
Fines paid not included in costs	1,200
Discount on issue of debentures written off in financial accounts	2,000

Prepare a Reconciliation Statement showing reconciliation of profit between the two sets of books.

Solution

Reconciliation Statement

	Plus Column	Minus Column
	Rs.	Rs.
Net Profit as per Cost Accounts	1,19,400	
Directors' Fees not charged in costs		7,500
Works Overheads under-recovered in costs		1,500
Loss due to Obsolescence not charged in costs		3,500
Administrative Overheads over-recovered in costs	1,800	
Depreciation overcharged in costs (12,000 – 10,000)	2,000	
Income Tax provided in financial accounts		54,500
Interest on Investments not included in costs	5,000	
Transfer Fees credited in financial accounts	2,500	
Fines paid not included in casts		1,200
Discount on Issue of Debentures not shown in costs		2,000
	1,30,700	70,200
Net Profit as per Financial Accounts	60,500	

Alternatively

Reconciliation Statement

	Plus Column	Minus Column
	Rs.	Rs.
Net Profit as per Financial Accounts	60,500	
Director's Fees not charged in costs	7,500	
Works Overheads under-recoveredin costs	1,500	
Loss due to Obsolescence not considered in costs	3,500	
Administrative Overheads over-recovered in costs		1,800
Excess depreciationcharged in costs (12,000– 10,000)		2,000
Income Tax provided in financial accounts	54,500	
Interest on Investments credited in financial accounts		5,000
Transfer Fees credited in financial accounts		*2,500*
Fines paid charged in financial accounts	1,200	
Discount on Issue of Debentures written off in financial accounts	2,000	
	1,30,700	11,300
Net Profit as per Cost Accounts	1,19,400	

Check Your Progress A

1 Fill in the blanks:

a) If cost and financial transactions are maintained in a single set of books, the method is called .....

b) If cost and financial records are kept separate, the method is called .....

c) Cost ledger is the ..... ledger in cost accounting which contains all the nominal accounts.

d) Stores ledger is a ..... ledger which records separate account for each item of stores.

e) Object of preparing Costing Profit or Loss Account is to determine .....

f) Preparation of reconciliation statement is necessitated because of .....

2 Tick the correct answer:

a) Under-recovery of works overheads should be added to the net profit as per financial records in order to arrive at the net profit as per costing records.

b) Obsolescence loss should be deducted from the net profit as per financial records in order to arrive at the net profit as per costing records.

c) Dividend on investments should be added to the net profit as per financial records in order to arrive at the net profit as per costing records.

d) Overabsorption of selling and distribution overheads in costs should be deducted from the net profit as per costing records in order to arrive at the net profit as per financial records.

3) What is the purpose of preparing reconciliation statement?

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11.6 MEMORANDUM RECONCILIATION ACCOUNT

The reconciliation of profits shown by the two sets of books can also be presented in the form of a ledger account called 'Memorandum Reconciliation Account'. This method is simple. The amounts which are to be added to profits shall be shown on its credit side while the amounts to be deducted from profits shall be shown on its debit side. In this case also, you can take either profit/loss as per cost accounts as the base or profit/loss as per financial accounts as the base. Based on data given in Lllustration 1, the Memorandum Reconciliation Account shall be prepared as follows:

Memorandum Reconciliation Account

Dr.			Cr.
	Rs.		Rs.
To Directors Fees not charged in costs	7,500	By Net Profit as per Cost Accounts	1,19,400
To Works Overheads under-recovered in costs	1,500	By Administrative Overheads over-recovered in costs	1,800
To Loss due to Obsolescence not charged in costs	3,500	By Depreciation over-recovered in costs	2,000
To Income Tax charged in financial accounts	54,500	By Interest on Investments not included in costs	5,000
To Fines paid not included in costs	1,200		
To Discount on Issue of Debentures not shown in costs	2,000	By Transfer Fees credited in financial accounts	2,500
To Net Profit as per Financial Accounts	60,500		
	1,30,700		1,30,700

Alternatively

Memorandum Reconciliation Account

Dr.			Cr.
	Rs.		Rs.
To Administration Overheads over-recovered in costs	1,800	By Net Profit as per Financial Accounts	60,500
To Excess Depreciation charged in costs	2,000	By Directors Fees not charged in cost accounts	7,500
To Interest on Investments credited in financial accounts	5,000	By Works Overheads under-recovered in costs	1,500
To Transfer Fees credited in financial accounts	2,500	By Loss due to Obsolescence charged in financial accounts	3,500
To Net Profit as per Cost Accounts	119,400	By Income Tax provided in financial accounts	54,500
		By Fines paid charged in financial accounts	1,200
		By Discount on Issue of Debentures written off in financial accounts	2,000
	1,30,700		1,30,700

11.7 COMPREHENSIVE ILLUSTRATIONS

Illustration 2
From the following figures prepare a Reconciliation Statement.

	Rs.
Net Profit as per Financial Records	25,751
Net Profit as per Costing Records	34,480
Works Overheads under-recovered in costs	624
Administration Overheads recovered in excess in costs	340
Depreciation charged in financial records	2,240
Depreciation recovered in costing	2,500
Interest on Investments received but not included in costs	1,600
Obsolescence loss charged in financial records	1,140
Income Tax provided in financial accounts	8,060
Bank Interest credited in financial accounts	150
Store Adjustments credited in financial accounts	95
Loss of Stock due to Spoilage charged in financial accounts	1,350

Solution

Reconciliation Statement

	(+) Rs.	(–) Rs.
Net Profit as per Financial Accounts	25,751	
Works Overheads under-recovered in excess in costs	624	
Administration Overheads recovered in excess in costs		340
Excess Depreciation recovered in costs		260
Interest on Investment not included in cost		1,600
Obsolescence loss charged in financial records but not in cost	1,140	
Income Tax provided in financial but not in cost	8,060	
Bank interest credited in financial books, but not in cost		150
Stores Adjustments credited in financial books, but not in cost		95
Loss of Stock due to Spoilage charged in financial books but not in cost	1,350	
	36,925	2,445
Net Profit as per Cost Accounts	34,480	

Illustration 3
The Net Loss shown by financial accounts of a company amounted to Rs. 57,320 while the Net Loss disclosed by company's cost accounts for that period amounted to Rs. 37,100. Scrutiny of figures from both the sets of books revealed the following facts:

i) Directors Fees not charged in cost Rs. 1,300

ii) A Provision for Bad and Doubtful Debts made in financial accounts Rs. 1,140

iii) Bank Interest credited in financial accounts Rs. 60

iv) Obsolescence Loss charged in financial accounts Rs. 16,600

v) Overheads in the cost accounts were estimated at Rs. 17,000. The charge shown by the financial accounts was Rs. 16,640

vi) Depreciation charged in financial accounts was Rs. 9,600 while depreciation recovered in costs amounted to Rs. 8,000.

Prepare a statement reconciling the figures shown by the financial and cost accounts.

Solution

Reconciliation Statement

	(+) Rs.	(-) Rs.
Net Loss as per Financial ~~counts		57,320
Directors Fees not charged in costs	1,300	
Provision for Bad and Doubtful Debts made in financial accounts but not in costs	1,140	
Bank Interest credited in financial accounts, but not credited in costs		60
Obsolescence loss charged in financial accounts, but not in costs	16,600	
Overabsorption of overheads in costs (17,000—16,640)		360
Excess depreciation chnrged in financial accounts (9,600—8,000)	1,600	
	20,640	57,740
Net Loss as per Cost Accounts		37,100

Illustration 4

From the following Profit and Loss Account draw up a Memorandum Reconciliation Account showing the profit as per Cost accounts.

Profit & Loss Account for the Year ended 31st December, 1989

Dr. Cr.

	Rs.		Rs.
To Office Salaries	22,564	By Gross Profit b/d	1,09,236
To Office Expenses	16,540	By Dividend received on investments	2,400
To Sales Expenses	28,452		
To Distribution Expenses	5,980	By Interest on Bank Deposits	360
To Loss of Sale of Machinery	3,900		
To Fines & Penalties	500		
To Discount on Debentures	1,000		
To Goodwill written off	10,000		
To Provision for Income Tax	10,000		
To Net Profit	13,060		
	1,11,996		1,11,996

Solution

Memorandum **Reconciliation Accounts**

Dr. Cr.

	Rs.		Rs.
To Dividend received on Investments	2,400	By Net Profit as per Financial Accounts	13,060
To Interest on Bank De osits	360	By Lou on sale of machinery	3,900
To Net Profit as per Cost Accounts	35,700	By Fines & Penalties	500
		By Discount on Debentures	1,000
		By Goodwill written off	10,000
		By Provision for Income Tax	10,000
	38,460		38,640

Illustration 5

The following figures are extracted from the financial accounts of Selwel Ltd. for the year ending 31-12-1989.

		Rs.
Sales (20,000 units)		50,00,000
Materials		20,00,000
Wages		10,00,000
Factory Overheads		9,00,000
Administration Overheads		5,20,000
Selling and Distribution Overhends		3,60,000
Finished Goods (1,230 units)		3,00,000
Work-in-process		
Materials	Rs. 60,000	
Labour	Rs. 40,000	
Factory Overheads	Rs.40,000	1,40,000
Interest paid on capital		40,000
Goodwill written off		4,00,000

In the costing records, factory overheads are charged at 100% of wages, administration overheads at 10%of factory cost, and Selling and Distribution'overheads at the rate of Rs. 20 per unit sold.

Prepare a statement reconciling the profit as per financial records with the profit as per cost records.

Solution

Trading and Profit & Loss Account of Selwel Ltd. for the Year ending 31st December, 1989

Dr.				Cr.	
	Rs.				Rs.
To Materials	20,00,000	By Sales			50,00,000
To Wages	10,00,000	By Closing Stock			3,00,000
		Finished Goods			
		Work-in-process			
To Factory Overheads	9,00,000	Materials	60,000		
To Gross Profit c/d	15,40,000	Labour	40,000		
		Factory Overhead	40,000		1,40,000
	54,40,000				54,40,000
To Administration Overheads	5,20,000	By Gross Profit b/d			15,40,000
To Selling and Distribution Overheads	3,60,000				
To Goodwill Written off	4,00,000				
To Interest paid on Capital	40,000				
To Net Profit	2,20,000				
	15,40,000				15,40,000

Cost Sheet of Selwel Etd. for the Year ending 31st December, 1989

Outpur: 21,230 units

	Rs.	Rs.
Cost of Direct Materials used	20,00,000	
Less : Cost of Materials in Work-in-process	60,000	19,40,000
Cost of Direct Labour used	10,00,000	
Less : Cost of Direct Labour in Work-in-process	40,000	9,60,000
PRIME COST		29,00,000
Factory Overheads @ 100% of wages		9,60,000
FACTORY COST		38,60,000
Administration Overheads @ 10% of Factory Cost		3,86,000
COST OF PRODUCTION (21,230 units)		42,46,000
Less : Cost of closing stock of finished goods (1,230 units)		2,46,000
COST OF GOODS SOLD (20,000 units)		40,00,000
Selling and Distribution Overheads (20,000 × Rs. 20)		4,00,000
COST OF SALES		44,00,000
Profit (balancing figure)		6,00,000
SALES		50,00,000

Reconciliation Statement

	(+) Rs.	( ) Rs.
Profit as per Cost Accounts	6,00,000	
Overabsorption of Factory Overheads in costs (9,60,000—8,60,000)	1,00,000	
Overvaluation of closing stock of Finished Goods in financial accounts (3,00,000—2,46,000)	54,000	
Underabsorption of Administration Overheads in costs (5,20,000 - 3,86,000)		1,34,000
Overabsorption of Selling and Distribution Overheads in costs (4,00,000—3,60,000)	40,000	
Goodwill written off in financial accounts, but not considered in cost accounts		4,00,000
Interest aid on Capital charged in financial accounts, but not considered in cost accounts		40,000
	7,94,000	5.74.000
Net Profit as per Financial Accounts	2,20,000	

Working Notes

i) *Total no. of units produced during the year*
= No, of units sold + No, of units remaining unsold
= 20,000 + 1230 = 21,230 units

ii) *Value of Closing Stock of Finished Goods*

$$= \frac{\text{Cost of Production}}{\text{Total No. of units produced}} \times \text{No. of Units remaining unsold}$$

$$= \frac{42,46,000}{21,230} \times 1230 = \text{Rs. } 2,46,000$$

iii) *Actual expenditure incurred on factory overheads in financial accounts*
Total amount – Amount spent on work-in-process
= Rs. (9,00,000 –40,000) = Rs. 8,60,000.

11.8 LET US SUM UP

Broadly speaking, there are two methods of maintaining cost accounts on double entry system : 1) Integral Accounting, and 2) Non-Integral Accounting. Under the second method of cost accounting (also known as control accounts system) cost records are maintained as an independent set of accounts. A separate Costing Profit and Loss Account is prepared to ascertain the profit or loss. The amount of profit or loss so ascertained is invariably different from the profit or loss as per financial accounts. This necessitates the preparation of a statement reconciling the amounts of profit or loss shown by the two sets of accounts.

The profit or loss shown by the two sets of books differs on account of four major factors. They are :

i) Items shown only in the financial accounts and not in the cost accounts

ii) Items shown only in the cost accounts and not in the financial accounts

iii) Under/Overabsorption of Overheads

iv) Different basis of Stock valuation

The reconciliation statement can be prepared either with profit/loss as per cost accounts as the starting point or with profit/loss as per financial amounts as the starting point. In both cases, the amount of profit/loss as per the other set of books is arrived at by making adjustments in respect of all items responsible for the difference. The reconciliation of two figures of profit can also be done by preparing a Memorandum Reconciliation Account. The preparation of Reconciliation Statement or Memorandum Reconciliation Account helps in cross-checking the arithmetical accuracy of both sets of accounting records and thus makes them more reliable.

11.9 KEY WORDS

Cost Control Accounts System : A method of maintaining accounts where the cost transactions are recorded in a completely separate set of books.

Cost Ledger : The principle ledger in cost accounting which contains all nominal accounts and all control accounts for the subsidiary ledgers.

Costing Profit and Loss Account : An amount prepared for determining the profit/loss as per costing books maintained under non-integral accounting.

Finished Stock Ledger : A subsidiary ledger which contains accounts of all items of finished products manufactured or the jobs completed.

Integrated Accounting : A method of maintaining accounts where both the cost and financial transactions are recqrded in a single set of books.

Memorandum Reconciliation Account : The formal way of reconciling the profit/loss shown by the two sets of books in the form of a ledger account.

Overabsorption of Overheads : The recovery of overheads in excess of the actual expenditure.

Reconciliation Statement : The formal way of reconciling the profit/loss shown by the two sets of books in the form of a statement.

Stores Ledger : A subsidiary ledger which contains accounts for items of stores and shows the movement of stores.

Underabsorption of Overheads : The short-fall in recovery of overheads.

Work-in-progress Ledger : A subsidiary ledger which contains accounts for all jobs, processes or operations pending on the shop floor.

10.10 ANSWERS TO CHECK YOUR PROGRESS

A 1 a) Integral Accounting, b) Non-integral Accounting, c) principal, d) subsidiary, c) Profit/loss as per costing records, f) Non-agreement of profit/loss as per two sets of books

2 a) True, b) False, c) False, d) False

11.11 TERMINAL QUESTIONS/EXERCISES

Questions

1) What are control accounts? Describe their advantages.

2) What do you understand by 'Integrated Accounting''?

3) Explain the need for reconciliation of cost and financial accounts.

4) It has been stated that the results worked out from the costing records and those worked out from the financial accounts may not necessarily agree. Why?

5) Give reasons as to why it is necessary to reconcile cost accounts and financial accounts. What is the accounting procedure to be adopted for their reconciliation?

6) State briefly the causes of difference between profits shown by Financial Accounts and the profits shown by Cost Accounts.

Exercises

1) From the following figures prepare a Reconciliation Statement.

	Rs.
Net Profit as per financial records	1,28,755
Net profit as per costing records	1,72,400
Works Overheads under-recovered in costing	3,120
Administrative Overheads recovered in excess in costing	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 records	40,300
Bank Interest credited in financial books	750
Stores Adjustments credited in financial books	6,750

2) From the following particulars prepare

i) Statement of Cost of Manufacture for the year 1988.

ii) Statement of Profit as per cost accounts, and

iii) Profit & Loss account in the financial books and show how you would attribute the difference in the profit as shown by (ii) and (iii).

	Rs.
Opening stock of raw materials	30,000
Opening stock of finished goods	60,000
Purchase of raw materials	1,80,000
Stock of raw materials at the end	45,000
Stock of finished goods at the end	15,000
Wages	75,000

Calculate the factory overheads at 25% on prime cost and office overheads at 75% on factory overheads.

Actual works expenses amounted to Rs. 58,125 and actual office expenses amounted to Rs. 45,750. The selling price was fixed at a profit of 25% on cost.

(Answer: Profit as per Statement of Cost Rs. 97,500; Profit as per Financial Amounts Rs. 98,625)

3) The following information has been obtained from the records of Freezer Ltd., a manufacturer of one tonne air-conditioners.:

	Rs.
a) Materials per machine	1,500
Wages	900
Number of machines manufactured and sold	80
Selling price per machine	4,250

b) Works overheads to be charged @ 60% of the wages

c) Office overheads to be charged 20% of works cost

d) There were no stock of machines or work-in-progress at the beginning or at the end of the period.

Prepare a statement showing the profit per machine sold. Also prepare a slatement showing the actual profit if work expenses were Rs. 43,000 and office expenses were Rs. 48,000 as per the financial records; and shown how you will reconcile the profits shown by two statements.

(Answer: Profit as per cost statement Rs. 57,760; Profit as per financial records **Rs. 57,000)**

4) The following is the summarised version of Trading and Profit & Loss Account of Continental Enterprises Limited for the year ended 31st March, 1990.

	Rs.			Rs.
To Materials	48,000	By Sales		96,000
To Wages	36,000	By Closing Stock Finished Goods		20,400
To Works Expenses	24,000	By Work-in-progress		
To Gross Profit c/d	14,400	Materials	3,000	
		Wages	1,800	
		Work Expenses	1,200	6,000
	1,22,400			1,22,400
To Administration Expenses	6,000	By Gross Profit b/d		14,400
To Net Profit	8,400			
	14,400			14,400

During the year 6,000 units were manufactured and 4,800 of them were sold.

The costing records show that works overheads have been estimated at Rs. 3 per unit produced and administration overheads at Rs. 1.50 per unit produced. The costing books show a profit of Rs. 11,040.

You are required to prepare a Reconciliation Statement.

(Answer: Valuation of Closing Stock of Finished Goods in Cost Rs. 21,240 **(Overvaluation** by Rs. **840).** Under-recovery of Works Overheads Rs. 4,800 and Over-recovery of Administration Overheads Rs. **3;000)**

5) Modern Company Limited furnishes the summary of Trading and Profit & Loss Account for the year ended 31st March, **1990.**

	Rs.		Rs.
To Raw Materials	1,39,600	By Sales(1,200 units)	4,80,000
To Direct Wages	76,200	By Finished Stock(200 units)	8,000

To Production Overheads	42,600	By Work-in-progress		
To Administration Overheads	39,100	Materials	28,200	
To Selling & Distribution		Wages	11,976	
Overheads	42,700	Production Overheads	7,999	47,995
To Preliminary Expenses written off	2,200	By Interest on Securities		6,000
To Goodwill written off	2,501			
To Dividends	3,000			
To Income Tax	4,100			
To Net Profit	1,89,944			
	5,41,995			5,41,995

The company manufactures a standard unit, scrutiny of cost records for the same period shows that

i) Factory overheads have been allotted to the production at 20% on prime cost.

ii) Administration overheads have been charged at Rs. 3 per unit on units produced,

iii) Selling and Distribution expenses have been charged at Rs. 4 per unit on units sold.

You are required to prepare a Statement of Cost to work out profit as per cost accounts and to reconcile the same with that shown in the financial accounts.

(Answer : Profit as per costing records : Rs. 1,88,493; 'Valuation of Closting Stock of Finished Goods in Cost Rs. 4,058 (under-valuation by Rs. 3,942); Overabsorption of production overheads Rs. 560; Underabsorption of administrative overheads Rs. 2,500 and overabsorption of selling & distribution overheads Rs. 5,300)

6) The financial profit and loss account of a manufacturing company for the year ended 31st March, 1990.

	Rs.		Rs.
To Opening Stock of Finished Goods	38,500	By Sales	2,50,000
To Purchases of Materials	60,000	By Closing Stock of Finished Goods	35,000
To Wages	48,000		
To Works Overheads	38,000		
To Gross Profit c/d	1,00,500		
	2,85,000		2,85,000
To Administrative Expenses	20,000	By Sales	2,50,000
To Selling & Distribution Expenses	24,000	By Closing Stock Finished Goods	35,000
To Bad Debts	7,200		
To' Provision for Bad Debts	5,000		
To Net Profit	65,300		
	1,21,500		1,21,500

It is found that the Costing Profit and Loss Account has been prepared on the basis of figures furnished below :

Opening Stock of Finished Goods	Rs. 45,000
Closing Stock of Finished Goods	Rs. 31,500
Works Overheads recovered in costs	Rs. 36,000
Administrative Overheads recovered in Costs	Rs. 22,000
Selling & Distribution Overheads recovered in Costs	Rs. 20,000

You are required to prepare a Memorandum Reconciliation Account and determine the profit as per cost accounts.

(Answer : Profit as per cost accounts : Rs. 50,500;
Overvaluation of Opening Stock in cost Rs. 6,500;
Undervaluation of Closing Stock in cost Rs. 3,500;
Under-resovery of Works overheads in cost Rs. 2,000

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 12 JOB AND CONTRACT COSTING

Structure

12.0 OBJECTIVES

After studying this unit. you should be able to:

- define job costing and describe its special features
- explain the procedure adopted for costing purposes in case of job costing
- evaluate job costing as a method of cost ascertainment
- prepare a job cost sheet
- define contract costing and describe its special features
- prepare contract account and ascertain the notional profit on uncompleted contracts
- explain how profit taken to profit and loss account is determined
- explain how work in progress is shown in balance sheet.

12.1 INTRODUCTION

If a firm is engaged in producing homogeneous product, it uses unit costing method about which you studied in Unit 2. But, where a firm is engaged in undertaking small jobs involving different amount of material, labopr and overhead costs such as automobile repair shop, interior decorators, furniture makers, etc., unit costing method cannot be applied. The method of costing used by them is known as 'job costing' which treats each job as a separate unit of cost. Under this method, costs are accumulated and analysed job-wise. When, however, a firm undertakes big jobs like constructing a building, road, bridge, etc., which involve huge sums and long duration, it stops contract costing method of ascertaining cost and profit. The special feature of such jobs is that they may remain incomplete by the end of the accounting year. Hence, ascertainment of profit or loss has many complexities.

In this unit, you will learn about both the methods in detail and study how cost and profit of small jobs and big projects (contracts) are ascertained. To be more specific, you will learn about the preparation of Job Cost Sheet and Contract Account.

12.2 JOB COSTING

Job Costing refers to the method of ascertaining costs where product is manufactured or

service is provided against specific order, as distinct from continuous production for stock and sale. Under this method, costs are collected and recorded for each job. or a batch of similar jobs, under a separate production order number. Each job has its own characteristics and needs special treatment. Take the example of a machine tool manufacturer or an automobile repair shop. Each order of machine or each repair job involves dtfferent amount of materials, labour and overheads. Hence, it is necessary to accumulate the costs for each order or job so that its total cost can be determined and proper matching of costs and revenues can be made.

12.2.1 Definition and Characteristics

The ICMA Terminology provides an excellent description of job costing which defines it as "that form of specific order costing which applies where work is undertaken to customers' special requirements and each order is of comparatively short duration. The work is usually carried out within a factory or work shop and moves through processes and operations as a continuously identifiable unit".

Thus, the special features relating to production and cost ascertainment in industries where job costing can be applied are :

i) Each job is unique, specific and dissimilar.

ii) Each job is undertaken to customer's special requirements and not for stock.

iii) Each job is comparatively of a short duration.

iv) Each job is capable of identification at all stages of production.

v) Each job order is separately identified by a job order number.

vi) There is no uniformity in the flow of production from department to department.

vii) Direct costs of labour, materials and expenses are booked directly against the job order.

viii) Overheads are charged on the basis of predetermined rates.

12.2.2 Applicability

Keeping in view the above features, job costing may be usefully employed in the following organisations :

Printing Press : Each item to be printed, whether it is a handout, a book or an advertising flyer, is a separate job.

Garage : Each car to be repaired or tuned up becomes a separate job.

Furniture Manufacturer : Each order for furniture is treated as an individual job. For example, several units of one style of chairs will be produced in one batch.

Service Organisation stations : A firm of Chartered Accountants is an example of a service Organisation. Each work-order assigned by the client is treated as a separate job and fees charged accordingly.

Construction Companies : Each building is a separate job because each building has different covered area and a different design.

12.2.3 Procedure

Job Costing involves considerable amount of recording and analysis. It requires reliable production control records which must show material issued to various jobs, labour time spent on different jobs and the appropriate allocation of overheads as work on each job passes through production cost centres. A concern using job costing usually adopts the following procedure for costing purposes.

1) Estimating the job costs : Estimating is an essential requirement of a job costing procedure. It is useful for submission of tenders and price quotations. The Costing Department has to prepare an estimate of the total cost for each job before it is undertaken. This forms the basis for quoting the price to the customer.

2) Allocating job order number : As soon as an order is received and accepted, it must be assigned a separate job order number. This facilitates reference for production as well as for costing purposes.

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  prepare a job cost sheet

  define contract costing and describe its special features
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2) Allocating job order number : As soon as an order is received and accepted, it must be assigned a separate job order number. This facilitates reference for production as well as for costing purposes.

3) **Preparing production order :** If the job is accepted, a production order is made out by the Planning Department in the form as shown in Figure 12.1. A production order refers to the work order or job order that constitutes a written authority to factory foremen to proceed with a job. It stipulates all essential details of the order to be executed. In fact, it serves as the authority for accounting costs assigned to a job.

Figure 12.1 : Form of Production Order

Production Order

Name of Customer ..... Job No. .....

Date of Commencement ..... Date .....

Date of Completion ..... Bill of Material No. .....

Special instructions ..... Drawing attached Yes/No.

Quantity	Description	Machines to be used	Tools required

4) **Collecting and recording costs :** The costs are collected and recorded for each job separately. A job cost sheet as shown in Figure 12.2 is used for recording and summarising the cost of materials, labour and overheads applicable to each job. A job cost sheet is often referred to as the basic document of job costing. It is used to credit the Work-in-progress Control Account when a job is completed and also to ascertain the profit or loss on each job.

Figure 12.2 : Form of Job Cost Sheet

Job Cost **Sheet**

Customer ..... Job No. .....

Date of Commencement ..... Date of completion .....

Material Cost			Labour Cost				Factory Overhead (Absorbed)			
Date	Material Req. No.	Amount Rs.	Date	Hours	Rate Rs.	Amt. Rs.	Dept.	Hours	Rate Rs.	Amt. Rs.
	Total				Total			Total		

Profit/ Loss		Cost Summary	
	Rs.		Rs.
Price Quoted		Material	
Less : Cost		Labour	
		Factory Ovcrhcad	
		Administration Overhead	
Profit or Loss		Selling Overhead	
		Total Cost	

The sources for collection of job costs are:

a) Materials : Material Requisition Slip, Materials Abstract or Materials Issue Analysis Sheet.

b) Wages : Job Card or Labour Abstract (Wages Analysis Sheet)

c) Direct Expenses : Vouchers pertaining to direct expenses

d) Overheads : Charged on the basis of pre-determined rates based on the rnethod of absorption used.

5) Comparing actual costs with estimated costs : On completion of a job, a completion report is sent by the Production Shop to the Costing Department. The Costing Department, then, prepares the job cost sheet and ascertains the actual cost and profit on the job. Thereafter, a comparison is made with estimates to find out any variance and suggest future course of action.

12.2.4 Evaluation

The main purpose of job costing is to determine the profit or loss on each job. This serves as a check on the accuracy of the estimates on the basis of which the prices are quoted. Comparison of actual costs with the estimated costs, or with the cost of similar jobs completed in the past, helps to bring to light any inefficiencies that might have occurred in the course of production. Thus, job costing separates profitable jobs from unprofitable ones, provides a check on past estimates, and serves as a basis for estimating costs for similar work in future. This method is also used when contracts are accepted on a 'cost plus' basis i.e., actual costs plus an agreed percentage of profit.

The main drawback of job costing relates to the expenditure involved in the paper work in estimating costs, and designing and scheduling of production. It should, therefore, be used when absolutely necessary.

Check Your Progress A

List four features of job costing.

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Name four industries in which job costing is considered a suitable rnethod of ascertaining costs.

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3 Fill in the blanks.

i) Job costing is applied where ..... can be measured in terms of completed jobs.

ii) Under job costing, each job is assigned a ..... number.

iii) Each job order is capable of ..... at all stages.

iv) A job order is the ..... of costing under job costing.

v) A job cost sheet is used to ..... job costs.

4 State whether the following statements are True or False.

i) Job Costing routine involves little clerical work.

ii) A production order constitutes the authority for work.

iii) The main purpose of job costing is to determine the profit made on each job.

iv) The overhead rate should be used for accumulating costs for accounting purposes and not for estimating the cost of job.

v) Each job is comparatively of a short duration.

12.2.5 Practical Problems

You have learnt that a job cost sheet is prepared for recording and summarising the cost of materials, labour and overheads pertaining to each job and ascertains the profit or loss made on each job. On going through its format as given in Figure 12.2, you might have observed that it is very much similar to the cost sheet prepared under unit costing for ascertaining the total cost and profit of a product.

Under job costing, the practical problems mostly involve the preparation of cost estimates and the ascertainment of price to be quoted. You learnt about this aspect also under unit costing (refer to Unit 10, Section 10.5) wherein you were required to prepare a statement of quotation based on cost estimates where overheads were included on the basis of recovery rates. More or less, the same practice is followed under job costing as shown by various illustrations worked out as follows.

Illustration 1

The estimated material cost of job D-2 is Rs. 5,000 and direct labour cost is likely to be Rs. 1.000. In the machine shop it will require machining by Machine No. 8 for 20 hours and by Machine No. 11 for 6 hours. Machine hour rates for Machine No. 8 and Machine No. 11 are Rs. 10 and Rs. 15 respectively. Last year, the direct wages amounted to Rs. 80,000 and factory overheads (excluding those related to Machine No. 8 and 11) amounted to Rs. 48,000. Similarly, the factory cost of all jobs last year amounted to Rs. 2,50,000 and office expenses Rs. 37,500. Prepare a statement of quotation which provides for 20% profit on selling price.

Solution

Statement of Quotation for job Number D-2

Direct Materials		5,000
Direct Wages		1,000
	PRIME COST	6,000
Machines Expenses		
Machine 8 : 20 × 10 = Rs. 200		
Machine 11 : 6 × 15 = Rs. 90		290
Other Factory Overheads		
(60% of wages)		600
	FACTORY COST	6,890
Office Overheads		
(15% of factory cost)		1,034
	TOTAL COST	7,924
	PROFIT (20% on selling price)	1,981
	SELLING PRICE	9,905

Working Notes

1) Factory overheads rate has beer: worked out as 60% of wages as under :

$$= \frac{\text{Factory Overheads}}{\text{Direct Wages}} \times 100$$

$$= \frac{48,000}{80,000} \times 100$$

$$= 60\%$$

2) Office overhead rate has been worked out as 15% of factory cost as under:

$$= \frac{\text{Office Overheads}}{\text{Factory Cost}} \times 100$$

$$= \frac{37,500}{2,50,000} \times 100$$

$$= 15\%$$

Illustration 2

A shop floor supervisor of a small factory presented the following cost data for job No. 42.

	Per Unit Rs.
Materials	70
Direct Wages (18 hours @ Rs. 2.50)	45
(Deptt. X-8 hrs., Deptt. **Y-6,** hrs., Deptt. 2-4 hrs.)	
Chargeable Expenses (special stores items)	**5**
PRIME COST	120
Add : 33.$\frac{1}{3}$% of prime cost for expenses	40
TOTAL COST	160

Analysis of the Profit and Loss Account of 1989 **shows the** following:

Dr.			Cr
	Rs.		Rs.
Materials used	**1,50,000**	Sales	**2,50,000**
Direct Wages:			
Deptt. X 10,000			
Deptt. Y 12,000			
Deptt. Z **8,000**	**30,000**		
Special Stores Items	**4,000**		
Overheads:			
Deptt. X **5,000**			
Deptt. Y 9,000			
Deptt. Z 2,000	**16,000**		
Gross Profit c/d	50,000		
	2,50,000		2,50,000
Selling expenses	20,000	**Gross** Profit b/d	**50,000**
Net profit	30,000		
	50,000		50,000

It **is also noted that the hourly wage rate for the three departments X, Y** and Z is same.

You are required to :

1) **Draw up a job *cost* sheet.**
2) **Calculate revised cost using 1989 figures as the** base.
3) Add 20% **total cost to determine the selling price.**

Solution

Job Cost Sheet

Job No. 42 — Date of **Commencement** .....

Description ..... — Date of Completion .....

Particulars	Rate	Quantity	Amount
			Rs.
Materials			70.00
Direct Wages:			
Deptt. X	**Rs. 2.50**	8 **hrs.** -	20.00
Deptt. Y	**Rs.** 2.50	6 hrs.	**15.00**
Deptt. Z	**Rs.** 2.50	**4** hrs.	10.00
Chargeable Expenses			**5.00**
		PRIME COST	120.00

Overheads:			
Deptt. X	Rs. 1.250	8 hrs.	10.00
Deptt. Y	Rs. 1.875	6 hrs.	10.00
Deptt. Z	Rs. 0.625	4 hrs.	2.50
		TOTAL COST	143.75
Add: Profit (20% of total cost)			28.75
		SELLING PRICE	172.50

Working Notes

1) The number of working hours has been ascertained by dividing the direct wages in each department by the labour hour rate.

$$\text{Overhead Rate} = \frac{\text{Overhead}}{\text{No. of hours}}$$

Deptt. X $\frac{\text{Rs. 5,000}}{\text{4,000 hrs.}}$ = Rs. 1.250 per hour

Deptt. Y $\frac{\text{Rs. 9,000}}{\text{4,800 hrs.}}$ = Rs. 1.875 per hour

Deptt. Z : $\frac{\text{Rs. 2,000}}{\text{3.200 hrs.}}$ = Rs. 0.625 per hour.

Illustration 3

A factory uses job costing. The following data is obtained from its books for the year ended 31st December, 1989:

	Rs.		Rs.
Direct Materials	90,000	Selling and Distribution Overheads	52,500
Direct Wages	75,000	Administration Overheads	42,000
Profit	60,900	Factory Ovsrheads	45,000

a) Prepare a Job Cost Sheet indicating the Prime Cost, Works Cost, Cost of Production, Cost of Sales and Sales Value.

b) In 1990, the factory received an order for a number of jobs. It was estimated that direct materials required would be for Rs. 1,20,000 and direct labour would cost Rs. 75,000. What should be the price for these jobs if factory intends to earn the same rate of profit on sales as in 1989, assuming that she selling and distribution overheads had gone up by 15%? The factory recovers factory overheads as a percentage of direct wages and administration and selling and distribution overheads as a percentage of works cost.

Solution

Job Cost Sheet for the Year ended 31-12-1989

		Rs.
Direct Materials		90,000
Direct Wages		75,000
	PRIME COST	1,65,000
Factory Overheads		45,000
	WORKS COST	2,10,000
Administration Overheads		42,000
	COST OF PRODUCTION	2,52,000
Selling and Distribution Overheads		52,500
	COST OF SALES	3,04,500
Profit		60,900
	SALES VALUE	3,65,400

1) Percentage of Factory Overheads to Direct Wages = $\frac{45,000}{75,000} \times 100$

= 60%

2) percentage of Admin. Overheads to Works Cost = $\frac{42,000}{2,10,000} \times 100$

= 20%

3) Percentage of Selling & Distribution Overheads to Works Cost = $\frac{52,500}{2,10,000} \times 100$

= 25%

4) Percentage of Profit to Sales = $\frac{60,900}{3,65,400}$

= 16.67%

Estimate Job Cost Sheet for 1990

		Rs.
Direct Materials		1,20,000
Direct Wages		75,000
	PRIME COST	1,95,000
Add : Factory Overheads (60% of direct wages)		45,000
	WORKS COST	2,40,000
Add : Administration Overheads (20% of works cost)		48,000
	COST OF PRODUCTION	2,88,000
Add : Selling & Distribution Overheads (25% of works cost + 15% thereof)		69,000
	COST OF SALES	3,57,000
Add : Profit (16.67% of sales or 20% of cost of sales)		71,400
	SALES	4,28,400

Illustration 4

The following information for the year ended December 31, 1989 is obtained from the books and records of a job order factory :

	Completed jobs	Work-in-progress
	Rs.	Rs.
Raw Materials supplied from stores	90,000	30,000
Wages	1,00,000	40,000
Chargeable Expenses	10,000	4,000
Materials transferred to work-in-progress	2,000	2,000
Materials returned to stores	1,000	—

Factory Overheads are 80% of wages and office overheads are 25% of Factory Cost. The price of the executed contracts during 1989 was Rs. 4,10,000. Prepare (i) Consolidated Completed Jobs Account showing the profit made or loss incurred, and also (ii) Consolidated Work-in-progress Account.

Solution

Consolidated Completed **Jobs Account** for **the Year** ending 31-1.2-1.989

Dr. Cr.

		Rs.		Rs.
To Materials	90,000		By Sales	4,10,000
Less : **Transfer** to W.I.P. 2,000				
Returned to stores 1,000	**3,000**	87,000		
To Wages		1,00,000		
To Chargeable Expenses		10,000		
PRIME COST		1,97,000		
To Factory overheads (80%of wages)		80,000		
FACTORY COST		2,77,000		
To **Office** Overheads (25%of factory cost)		69,250		
COST OF PRODUCTION		3,46,250		
To Net Profit		63,750		
		4,10,000		4,10,000

Consolidated Work-in-progress Account for the **Year ending** 31-12-1989

Dr. Cr.

		Rs.		Rs.
To **Materials**	30,000		By Balance **c/d**	1,35,000
Add : Transfer to W.I.P.	**2,000**			
		32,000		
To Wages		40,000		
To Chargeable Expenses		4,000		
PRIME COST-		76,000		
To Factory **overheads** (80%of wages)		32,000		
FACTORY COST		1,08,000		
To **Office** Overheads **(25%** of factory cost)		27,000		
COST OF PRODUCTION		1,35,000		1,35,000
To Balance b/d		1,35,000		

12.3 CONTRACT COSTING

Contract costing is a special form of job costing used for ascertaining cost and profit on contracts undertaken for big jobs like constructing a building, a road, a bridge or a ship. Such jobs mainly comprise **activities** outside the **contractor's** premises and involve huge amount. They take long time to complete so much so that the work may extend over more than one accounting year. This means that the cost and profit may have to be worked out even on incomplete work as at-the end of an accounting year. Hence, a special method of accounting known as 'contract costing' or 'terminal costing' has been developed for ascertaining cost and profit on such jobs.

12.3.1 Definition and Characteristics

Contract costing has been defined as "that form of specific order costing **which** applies,

where work is undertaken to customer's special requirements and each order is of long duration (compared with those to which job costing is applied). The work is usually of constructional nature. In general, the method is'similar to job costing, although it has certain distinctive features".

The distinguishing features of contract are as follows:

Features regarding Production

i) The work is undertaken to customer's specific requirements.

ii) The work will be of a relatively long duration and involves large amount.

iii) The work is usually site based.

iv) The work is frequently of a constructional nature.

v) Plant and equipment may be purchased or hired for the duration of the contract.

vi) The completion date is fixed In advance, and penalties follow delays.

vii) Certain aspects of the work are assigned to sub-contractors.

Features regarding Cost

i) The cost unit in contract costing is a contract.

ii) A'separate account is prepared for each contract to ascertain the profit or loss on each contract.

iii) Most of the items of cost can be classified as direct since they can be easily identified with a specific contract.

iv) Indirect costs are normally restricted to Head Office expenses and storage costs. These are allocated to various contracts on which work is carried out during the year.

v) The contract price is often fixed in advance and payment is received at various stages of completion based on architect's certificate.

vi) A separate contract ledger is maintained for recording costs when the number of contracts is large.

12.3.2 Difference between Job and Contract Costing

There is a great deal of similarity between job and contract costing because a contract is nothing but a job, though large in size. In both cases, the unit of cost collection, cost determination and cost control is the job itself. Contract costing, more or less, follows the same principles as job costing. However, there are certain points of difference between the two. These can be summarised as follows:

1) Jobs are generally performed within the factory premises while contracts are usually location-bound, making site-operation an important element in contract costing.

2) Many expenses which are treated as indirect costs in job costing, are often treated as direct costs in contract costing. Thus, the cost of supervision and indirect labour regarded as overheads in case of job costing is charged as a direct cost to the contract.

3) Overheads constitute a substantial portion of the total cost of a job. This creates problems of over or under absorption of expenses. Under contract costing, overheads form only a small part of the total cost and so over or under absorption of overhead costs is negligible.

4) In Job Costing, no profit is computed on work-in-progress. But, as contracts may run for long periods, profit or loss may have to be ascertained even on contracts that are incomplete at the end of the accounting year.

5) Job Costing is applicable to repair shops, printing presses. machine tools manufacturing units and foundries. But contract costing is used by ship-builders, civil engineering contractors, constructional and mechanical engineering firms, etc.

Check Your Progress B

1 What is meant by contract costing?

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2 Give four examples of industries for which contract costing is considered appropriate.

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3 State whether the following statements are True or False?

i) Contract costing follows the same principles as jobs costing.

ii) Contract costing applies to small job whereas job costing is used for big jobs.

iii) The price for which the contractor agrees to carry out the work is called contract price or the tender price.

iv) Many contracts require several years for completion.

v) General overheads form a substantial proportion of the total cost of a contract.

vi) The costs of sub-contracting are charged as direct expenses of the contract.

12.3.3 The Procedure

There are two parties to a contract : i) The contractor, and ii) the contractee. Contractor is a person (or an organisation) who undertakes to do the job. Contractee is the person (or an organisation/a government agency) who assigns the job to the contractor. The contractor usually engages an architect who prepares the plans, structural designs, detailed drawings and the tender documents, and also undertakes to supervise the complete contract. The contractor submits the tender to the contractee and, when it is approved, an agreement is signed by both the parties including the contract price and the terms of payment. It may also provide for an 'escalation clause' to compensate the contractor for an unwarranted increase in prices and for other contingencies.

Since, the contract involves a large amount and a long period, payment is made at various stages of completion based on the architect's certificate. The contractee usually retains a certain percentage of the amount recommended for payment by the architect. This is called 'retention money'. It is in the form of security against defective work and penalties chargeable for delay in completion of the work. It is retained for a short period (called warranty period) even after the completion of the contract. Thus, it is released to the contractor only after the warranty period is over.

12.3.4 Treatment of Important Items

The contractor usually maintains a Contract Ledger in which a separate account is opened for each contract. It is a common practice to allot a distinguishing number to each contract, and all costs and revenues relating to a particular contract must be shown against the appropriate contract number.

Let us take some important items of contract costing and study their treatment in detail.

Materials

i) **Direct materials :** Most of the materials like bricks, cement, steel, etc. are delivered direct to the site. Their costs will be debited to the contract account.

ii) **Stores materials :** Some materials are received through material requisitions from the store. The cost of the same should also be debited to the respective contract account.

iii) **Materials on site :** At the end of an accouning year, the cost of materials on site is carried forward to the next year.

iv) **Materials returned to the stores :** The materials found surplus on site are returned to the stores. Their cost should either be deducted from materials issued (shown on the debit side) or credited to the contract account,

v) **Materials stolen or destroyed :** The cost of materials stolen or destroyed is treated as an abnormal loss. Hence the same should be transferred to the Profit and Loss Account and credited to the contract account.

Labour

i) All labour employed at the contract site should be regarded as direct labour and charged direct to the contract account.

ii) As far as possible a separate wage sheet should be prepared for each contract.

iii) Wages accrued or outstanding at the end of the year should appear on the debit side of the contract account.

iv) Wages of labour employed at Head Office and Central Stores are considered as overhead cost. Hence, these should be allocated to all contracts on some equitable basis.

Direct Expenses

All expenses other than material and wages are charged to individual contracts as and when they are incurred. Direct expenses may include i) cost of special tools, jigs etc., ii) cost of designs, and iii) cost of hiring plant and machinery for the contract.

Overheads

i) Direct allocation : Most of the expenses incurred in connection with a contract can be directly identified with each contract, e.g., supervisory salaries, staff amenities, repairs and maintenance of machinery, etc. These are directly allocated to the contract concerned.

ii) Apportionment : It is only the Head Office expenses which will require an apportionment to various contracts on some equitable basis. Labour hour rate is the most common method used for this purpose. However, the overhead costs can also be apportioned in the ratio of wages or total expenses incurred on the respective contracts. The amount thus allocated to a contract must be debited to contract account.

Plant and Machinery

This includes cranes, trucks, excavators, bulldozers, mixers and lorries, etc. The plant and equipment may be taken on lease or purchased specifically for a contract. When it is taken on lease or hire, the leasing charges or the hire will be charged to the contract account. If the plant or equipment has been specially purchased for a particular contract, there are two ways of showing it in the contract account:

i) Contract account may be debited with the cost of plant sent to the site and then credited with its depreciated value when it is moved to another site. The difference between the cost and the depreciated value represents the depreciation charge. Similarly, at the end of the accounting period, an uncompleted contract is credited with the depreciated value which is later debited to the contract account at the beginning of the next year.

ii) Alternatively, depreciation may be calculated based on the period for which the plant. has been used for the contract during the accounting year and debited to the contract account. Other plant costs such as maintenance, insurance, fuel, oil, etc. should also be debited to the contract account.

Sub-contracting

Sometimes, a sub-contractor is engaged for a special work connected with the main contract. For instance, in constructing a house, the jobs like painting, plumbing. special flooring, carpentry, etc. may be given lo different sub-contractors. The cost of such jobs must be charged to the main cpntract.

Value of Work Certified

As stated earlier, part payment is made to the contractor at each stage of completion based on architect's certificate. These stages usually are: plinth level, walls, roofing, plastering, flooring, etc. On complelion of each stage, the contractor submits his bills to the architect for certification, who, after verification of the quantities and rates, certifies the value of work done. It is called 'work certified' or 'value of work certified', This amount is credited to the contract account.

Progress Payments

The payments due to the contractor at each stage of completion, is termed as 'progress payments'. The amount of progress payment due at each stage is calculated as follows:

Value of Work Certified	.....
Less : Retention Money	.....
Total Payment Due	.....
Less : Payments made to date	.....
Progress Payment Due	.....

The total amount of progress payment made up to the end of the accounting year is termed as 'cash received'; This stands debited to the contractee's personal account. **It is not shown anywhere in the contract account.**

Cost of Work Uncertified

It is quite possible that at the end of an accounting year, certain amount of work remains uncertified. For example, the accounting year of a contract ends on 31st March, 1991. The work done up to 15th February, 1991 having reached a stipulated stage, had been duly certified. Apparently, the work done from 16th February to 31st March, 1991 remains uncertified. The costs incurred in relation to the contract during this period of six weeks shall be ascertained and shown as 'cost of work uncertified'. It is like closing stock of finished goods. Hence, it is credited to contract account at the end of the accounting year and then debited to the contract account at the beginning of the next accounting year.

Extras

Sometimes, the contractor may be asked to do some work which is not included in the original contract. This becomes necessary on account of some additions/alterations which are suggested later on. The contractor is usually entitled to charge extra amount for such work. This amount is called 'extras'. These charges are treated as income for the contractor and is credited to the contract account in his books.

12.3.5 Profit on Uncompleted Contracts

If the work on a contract is started and finished during the same accounting year, its profit or loss can be easily calculated and transferred to Profit and Loss Account. But, in case of contracts which extend to more than one accounting year, the question arises whether any profit or loss should be accounted for during the accounting year or years when they are still in progress and, if so, how? It is agreed that if profit is computed only on the completion of the contract, there will be heavy fluctuation in the amount of profit from year to year. This will result not only in distorted profit pattern but also higher tax liability during the year of completion of the contract because the tax will have to be paid at higher rates. At the same time, if profit is computed on the uncompleted contracts and taken to Profit and Loss Account, there is a possibility of other unforeseen contingencies. Hence, it is an **accepted principle that profit on uncompleted contracts must be taken into account in respect of the work certified only after providing adequate reserve for future contingencies.** This is usually based on the formula

$$2/3 \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

However, after ascertaining the profit in respect of the work certified (called notional profit), the amount to be taken to Profit and Loss Account is determined on the basis of the following rules :

1) In case the **work on the contract has not reasonably advanced,** say, the value of work certified is less than one-fourth of the contract price, the whole amount of the notional profit should be kept in reserve. In other words, in such a situation, no *profit* should be taken to Profit and Loss Account.

2) In case the **work on the contract ha,. reasonably advanced,** say, up to one-fourth of the contract, then :

   a) If the value of work certified is one-fourth or more but less than half of the contract price, the amount of profit to be taken to Profit and Loss Account is determined as follows :

$$1/3 \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

b) If the value of work certified is half or more than half of the contract price, the amount of profit to be taken to Profit and Loss Account is determined as follows :

$$2/3 \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

Look at Illustration 1 and see how profit taken to Profit and Loss Account has been worked out.

Illustration 5

The total contract price in respect of a contract was Rs. 5,00,000. On 31st March, 1991, the value of work certified was Rs. 3,00,000, and the cost of work certified (total cost incurred to date minus cost of work uncertified) was Rs. 2,55,000. The cash received was Rs. 2,40,000.

You are required to determine the amount of profit to be taken to the Profit and Loss Account for the year ending 31st March, 1991.

Solution

Value of Work Certified	3,00,000
Less : Cost of Work Certified	2,55,000
Notional Profit	45,000

Profit taken to Profit and Loss Account

$$= \mathbf{2/3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= 2/3 \times 45{,}000 \times \frac{2{,}40{,}000}{3{,}00{,}000}$$

= Rs. 24,000

3) In case the **work on the contract is nearing completion,** the basis of taking profit to Profit and Loss Account is the total estimated profit on complete contract, and not the notional profit. Hence, you will have to work out first the total profit expected on the complete contract. For this purpose, further expenditure to be incurred on the remaining part of the contract is estimated and added to the costs incurred to date so as to arrive at the total cost, on the contract, By deducting this amount from the contract price, you will arrive at the total estimated profit. Thus

- Total Estimated Profit = Contract Price – (Expenditure incurred to date + Additional Expenditure)

Having arrived at the total estimated profit as per the above equation, the profit to be taken to the Profit and Loss Account is determined as follows :

$$\text{Total estimated profit} \times \frac{\text{Work Certified}}{\text{Contract Price}} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

Alternatively

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

The alternative formula may be used if the amount of cash received cannot be ascertained,

Look at Illustration 2 and see how profit taken to Profit and Loss Account has been worked out where the work on contract is nearing completion.

Illustration 6

The contract price in respect of a project was Rs. 5,00,000. On 31st March, 1991, 90% of the work had been completed and certified by the architects. The costs incurred up to 31st March, 1991 on this project amounted to Rs. 4,00,000. It was estimated that another Rs. 20,000 would have to be spent further to complete the project. The contractee paid 80% of the value of work certified.

Complete the profit to be taken to Profit and Loss Account for the year ending 31st March, 1991.

Solution

		Rs.
Contract Price		5,00,000
Less : Total Estimated cost :		
Costs to date	4,00,000	
Costs to be incurred	20,000	4,20,000
Total Estimated Profit		80,000

Profit to be taken to Profit & Loss Account

$$= \text{Total estimated profit} \times \frac{\text{Work Certified}}{\text{Contract Price}} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= 80{,}000 \times \frac{4{,}50{,}000}{5{,}00{,}000} \times \frac{3{,}60{,}000}{4{,}50{,}000}$$

= Rs. 57,600

Working Note

Cash received being 80%of the work certified is

$$= \frac{80}{100} \times 4{,}50{,}000$$

= Rs, 3,60,000

Let us now take a few illustrations and study how notional profit on uncompleted contracts is computed when detailed cost data is given and also how profit taken to Profit and Loss Account is to be determined.

Illustration 7

On 3rd January, 1990 Beas construction Ltd. started work on the construction of an office black at a contracted price of Rs. 7,50,000. The construction company's financial year ended on 31st October, 1990 and on that date the accounts pertaining to the contracl contained the following balances :

	Rs.
Materials issued to site	1,61,000
Materials returned from site	14,000
Wages paid	68,000
Own Plant in use on site (at cost)	96,000
Hire of Plant and Scaffolding	72,000
Supervisory Staff Direct	11,000
Indirect	12,000
Head office Charges allocated to the contract	63,000
Value of Work Certified to 31.10.1990	4,00,000
Cost of Work Completed but not yet Certified	40,000
Cash Received on Work Certified	3,30,000

Depreciation on own plant is lo be provided at the rate of 12½% per annum on cost; Rs. 2,000 is owning for wages; Estimated value of materials on site Rs. 24,000.

You are required to prepare the Contract Account for the period ended 31st October, 1990 showing the amount to be included in the construction company's Profit and Loss Account.

Solution

Beas Construction Ltd.
Contract Account for the Year ending 31-10-1990

Dr.			Cr.	
		Rs.		Rs.
To Materials issued		1,61,000	By Materials returned	14,900
To Wages paid		68,000	By Plant on hand (Depreciated value)	86,000
To Plant at cost		96,000	By Materials on site	24,000
To Plant Hire		72,000	By Cost of Work-in-progress c/d	3,61,000
To supervision : Direct		11,000		
Indirect		12,000		
To Head Office Charges		63,000		
To Wages		2.000		
		4,85,000		4,85,000
To Cost of Work-in-progress b/d		3,61,000	By Value of Work Certified	4,00,000
To Notional Profit				
P & L A/c	43,450			
Reserve	35,550	79,000	By Cost of Work Uncertified c/d	40,000
		4,40,000		4,40,000

Working Notes

1) *Depreciated Value of Plant on hand*

	Rs.
Plant at cost	96,000
Less : Dep. at 12 for 10 months	10,000
Depreciated value	86,000

2) *Profit to be credited to Profit & Loss Account*

$$= \frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= 79,000 \times \frac{2}{3} \times \frac{3,30,000}{4,00,000} = \text{Rs. } 43,450$$

Illustration 8

A firm of building contractors started its business on 1-4-1990. Following was the expenditure on the contract for Rs. 3,00,000.

	Rs.
Materials issued to contract	51,000
Plant issued for contract	15,000
Wages incurred	81,000
Other Expenses incurred	5.000

Cash received on account up to 31-3-1991 amounted to Rs. 1,28,000 being 80% of the work certified. Of the plant and materials charged to the contract, plant which cost Rs. 3,000 and malerials which cost Rs. 2,500 were lost, On 31.3.1991 plant which cost Rs. 2,000 was returned to stores. The cost of work done but uncertified was Rs. 1,000 and materials costing Rs. 2,300 were in hand on site.

Charge 15% depreciation on plant and take to the Profit & Loss Account 2/3rd of the profit received. Prepare the necessary Contract Account from the above particulars.

Solution

Contract Account for the Year ending **31-3-1991**

Dr.			Cr.
	Rs.		
To Materials issued	51,000	By Profit & Loss A/c	
To Wages	81,000	Plant Lost 3,000	
To Plant issued	15,000	Materials Lost 2,500	
To Other Expenses	5,000		
		By Plant returned to store (2,000 - 300)	1,700
		By Materials on hand	2,300
		By Plant on site (10,000 - 1,500)	8,500
		By Cost of Work-in-progress c/d	1,34,000
	1,52,000		1,52,000
To Cost of Work-in-progress b/d	1,34,000	By Value of Work Certified	1,60,000
To Notional Profit		By Cost of Work Uncertified	1,000
P & L A/c 14,400			
Reserve 12,600	27,000		
	1,61,000		1,61,000

Working Notes

1) *Value of Work Certified :* Cash received is Rs. 1,28,000 representing 80% of the work certified, hence the value of the work certified would be $\left(1,28,000 \times \frac{100}{80}\right)$ = Rs. 1,60,000

2) *Profit to be taken to Profit and Loss Account :* It has been worked out as follows :

$$= \frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$= \frac{2}{3} \times 27,000 \times \frac{1,28,000}{1,60,000}$$

= Rs. 14,400.

Illustration 9

The following is a summary of entries in a contract ledger as on 31st December, 1989 in respect of Contract No. 27.

	Rs.
Direct Materials	30,000
Materials from stores	6,500
Wages	17,210
Direct Expenses	6,710
Establishment Charges	8,000
Plant	34,200
Sale of Scrap	1,820
Sub-contract Cost	7,210

The following further information is made available to you :

a) Accrued as on 31st December, 1989 were :
Wages Rs. 800 and Direct Expenses Rs. 1,120

b) Depreciation of plant up to 31st December, 1989 was Rs. 8,550

c) Included in the above summary of entries were : Wages Rs. 1,000, Other Expenses Rs. 1,500 and Materials Rs. 2,080. These expenses were incurred after certification.

d) Materials on site on 31st December, 1989 cost Rs. 10,000

e) Rs. 62,500 worth of work had been certified up to 31st December, 1989 when three eighth of the contract remained uncompleted.

f) The total contract price was Rs. 1,00,000.

You are required to show what profit or loss would be taken into the accounts for the year ended 31st December, 1989 in respect of this contract.

Solution

,Contract Account for 1989

Dr. Cr.

		Rs.		Rs.
To Materials			By Sale of Scrap	1.820
Direct	30,000		By Materials on hand	10.000
From stores	6,500	36,500	By Plant on hand (34,200-8,550)	25,650
To Wages	17,210		By Cost of Work Uncertified	4,580
Add : Outstanding	800	18,010	By Value of Work Certified	62,500
To Establishment Charges		8,000	By Loss (transferred to P & L A/c)	7,200
To Plant at Cost		34,200		
To Direct Expenses	6,710			
Add : Outstanding	1,120	7,830		
To Sub-contracting cost		7,210		
		1,11,750		1,11,750

Notes

1) Cost of work certified has been given indirectly by stating the cost of materials, labour and other expenses incurred after certification. Hence, it has been worked out by adding these amounts.

2) The cost of work-in-progress has not been worked out, as the value of work certified has been shown in the first part of the Contract Account itself and so also the loss. This is an alternative method ofpreparing Contract Account.

3) The contract has shown loss. As per rules, the whole amount of loss has to be transferred to Profit nnd Loss Account.

12.3.6 Contractee's Account

Contractee's Account is a personal account of the contractee. This account is credited as and when the cash is received from the contractee. No amount is debited to this account till the contract is completed, Thus, it will continue to show a credit balance so long as the work on the contract is in progress. Since the amount is received from the contractee against the value of work certified, the balance in his account is not treated as a liability and, therefore, it should not be shown on the liabilities side of the Balance Sheet. The common practice is to ***deduct it from the work-in-progress*** shown on the assets side of the Balance Sheet.

12.3.7 Work-in-Progress

In Contract Account you must have noted that all costs incurred on the uncompleted contract are shown as the cost of work-in-progress, The cost of work-in-progress consists of the cast of work certified as well as the cost of work uncertified. Hence, if you have to work out the cost of work certified, deduct the cost of work uncertified from the total cost of work-in-progress. While showing it in the Balance Sheet, however, the profit transferred to Profit and Loss Account is also added thereto. Thus, it will include: a) the cost of work certified, b) the cost of work uncertified, and c) the profit taken to Profit and Loss Account.

You have also learnt that the credit balance in the Contractee's Account (being cash received) is deducted from the work-in-progress shown in the Balance Sheet. Thus, the work-in-progress is shown on the assets side of the Balance Sheet in one of the following two ways:

Work-in-progress	Rs.
Cost of Work Certified	
Cost of Work Uncertified	

Cost to date	.....
Add : Profit taken to P & L A/c	.....
	.....
Less : Cash received	.....
	.....

Alternatively

Work-in-progress	
Value of Work Certified	.....
Cost of Work Uncertified	.....
	.....
Less : Reserve	.....
	.....
Less : Cash Received	.....
	.....

If we were to show work-in-progress in the Balance Sheet of Beas Construction Ltd. as per data given in Illustration 3, it will appear as follows:

Work-in-progress	Rs.
Cost to date	3,61,000
Add : Profit taken to P & L A/c	43,450
	4,04,450
Less : Cash received	3,30,000
	74,450

Alternatively

Work-in-progress	Rs.
Value of work certified	4,40,000
Cost of work uncertified	40,000
	4,40,000
Less : Reserve	35,550
	4,04,450
Less : Cash received	3,30,000
	74,450

The second alternative is most commonly used by the accountants. It should be noted that while showing work-in-progress, there is no need to make any adjustment for loss taken to Profit and Loss Account when second alternative is used.

12.3.8 Comprehensive Illustrations

Illustration 10

Alcon Construction Co. Ltd., commenced its business,on 1st January, 1990. The following data has been extracted from its books in relation to a contract,

	Rs.
Cash received from Contractee	1,20,000
Materials	40,000
Direct labour	55,000
Expenses at site	2,000
Plant & Equipments (at cost)	30,000
Fuel and Power	2,500

The contract price was Rs. 3,00,000 and the work certified Rs. 1,50,000. The work completed, since certification had been estimated at Rs. 1,000 (at cost). Machinery costing Rs. 2,000 was returned to stores at the end of the year. Stock of materials at site on 31-12-1990 was worth Rs. 5,000 and wages outstanding were Rs. 200. Depreciation on Machinery was to be charged at 10%. You are required to calculate the profit on the contract and show how the work-in-progress will appear in the Balance Sheet as on 31.12.1990. Also prepare the Contractee's Account.

Solution

Alcon Construction Company Ltd.
Contract Account 1990

Dr. Cr.

	Rs.			Rs.
To Materials	40,000	By Materials at site		5,000
To Direct Labour	55,000	By Machinery		
		at site	25,200	
To Expenses at site	2,000	at stores	1,800	27,000
To Fuel & Power	2,500			
To Machinery at site	30,000	By Value of work certified		1,50,000
To Notional Profit c/d	53,300	By Cost of work uncertified		1,000
	1,83,000			1,83,000
To Profit & Loss A/c	28,427	By Notional Profit b/d		53,300
To Balance c/d (Reserve)	24,873			
	53,300			53,300

Workings: ***Profit token to Profit & Loss Account***

$$\text{Notional profit} \times \frac{2}{3} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

$$53{,}300 \times \frac{2}{3} \times \frac{120000}{1{,}50{,}000} = \text{Rs. } 28{,}427$$

Balance Sheet as on 31.12.1990 (Extracts)

Assets		
Work-in-progress		
Work certified	1,50,000	
Work Uncertified	1,000	
	1,51,000	
Less: Reserve	24,873	
	1,26,127	
Less: Cash received from Contractee	1,20,000	
		6,127

Contractee's Account

Cr.

	Rs.		Rs
To Balance c/d	1,20,000	By Bank	1,20,000
		By Balance b/d	1,20,000

Illustration 7

The following particulars relate to a contract for Rs. 40 lakhs :

	1988 Rs.	1989 Rs.	1990 Rs.
Materials	4,50,000	7,00,000	6,00,000
Wages	4,30,000	6,00,000	5,00,000
Expenses	20,000	50,000	16,000
Carriage	20,000	60,000	50,000
Work Certified	9,00,000	30,00,000	40,00,000
Work Uncertified	10,000	50,000	—

Plant costing Rs. 1,00,000 was bought in the beginning of 1988, and depreciation was charged at 25% to per annum. The contractee was to pay 80% of the work certified every year and settle the account in 1990. Draw Contract Account for three years and also write Contractee's Account and Work-in-progress Account in the books of the contractor.

Solution

Contract Account for 1988

Dr. Cr.

	Rs.		Rs.
To Materials	4,50,000	By Plant on hand (1,00,000–25,000)	75,000
To Wages	4,30,000	By Work certified	9,00,000
To Expenses	20,000		
		By Work uncertified	10,000
To Carriage	20,000		
To Plant at cost	1,00,000	By P & L A/c (Loss transferred)	35,000
	10,20,000		10,20,000

Contract Account for 1989

To work-in-Progress			
Work Certified	9,00,000	By Work Certified	30,00,000
Work Uncertified	10,000		
	9,10,000	By Work Uncertified	50,000
To Plant on site	75,000		
To Materials	7,00,000	By Plant on hand (75,000-18750)	56,250
To Wages	6,00,000		
To Expenses	50,000		
To Carriage	60,000		
To P & L A/c	3,79,333		
To Balance c/d	3,31,917		
	31,06,250		31,06,250

Contract Account for 1990

	Rs.		Rs.
To Work-in-progress :		By Plant on hand (56,250–14,062)	42,188
Work certified	30,00,000	By Contractee's A/c (contract price)	40,00,000
Work Uncertified	50,000		
	30,50,000		

Less : Reserve	3,31,917		
	27,18,083		
To Plant on site	56,250		
To Materials	6,00,000		
To Wages	5,00,000		
To Expenses	16,000		
To Carriage	50,000		
To P & L A/c	1,01,855		
	40,42,188		40,42,188

Contractee's Account

	Rs.		Rs.
19[illegible] To Balance c/d	7,20,000	1988 By Bank	7,20,000
	7,20,000		7,20,000
1989 To Balance c/d	31,20,000	1989 By Balance b/d	7,20,000
		By Bank	24,00,000
	31,20,000		31,20,000
1990 To Contract A/c	40,00,000	1990 By Balance b/d	31,20,000
		By Bank	8,.80,000
	40,00,000		40,00,000

Work-in-Progress Account

	Rs.		Rs.
1988 To Contract A/c	9,10,000	1988 By Balance c/d	9,10,000
	9,10,000		9,10,000
1989 To Balance b/d	9,10,000	1989 By Contract A/c (transfer)	9,10,000
To Contract A/c	30,50,000	By Contract A/c (reserve)	3,31,917
		By Balance c/d	27,18,083
	39,60,000		39,60,000
1990 To Balance b/d	27,18,083	1990 By Contract A/c (transfer)	27,18,083
	27,18,083		27,18,083

Working Notes

1) *Profit taken to P & L A/c in 1989*

$$= \frac{2}{3} \times 7,11,250 \times \frac{80}{100}$$

= Rs. 3,79,333

2) Depreciation has been charged on the basis of diminishing balance method.

Check Your Progress C

1 Why does contractee retain certain percentage of the amount due to the contractor?

.....

.....

.....

.....

2 What do you mean by 'extras'?

.....

.....

.....

3 Fill in the blanks.

i) If, value of work certified is not given, the same can be worked out with the help of ..... clause.

ii) While determining profit on uncompleted contract taken to P & L A/c, a provision must be made for ..... contingencies.

iii) Cost of work certified can be ascertained by deducting cost of ..... from the cost to date.

iv) An abnormal loss of materials or equipment should be ..... to Contract Account.

v) While showing work in progress in Balance Sheet, cash received from the contractee must be ..... therefrom.

vi) No profit on uncompleted contract shall be taken to Profit and Loss Account if the value of work-in-progress is less than ..... of the contract price.

vii) If plant issued to contract has been debited at cost to the Contract Account, the plant on hand at the end of the accounting year should be credited to Contract Account at .....

viii) The terms of a contract may include an ..... under which the contract price can be enhanced.

12.4 LET US SUM UP

Job costing is the method of ascertaining costs where work is undertaken to customers' special requirement and which is in the form of small jobs. Thus, this method is used for jobs like car repairs, painting and decorating, printing, furniture making, etc. Under this method, each job is treated as a separate cost unit and a Job Cost Sheet is prepared to ascertain the cost and profit on each job. The Job Cost Sheet can also be used for estimating the cost of a job to be undertaken and for submitting the quotation therefor.

Contract costing is a special form of job costing used for ascertaining the cost and profit on big projects called contracts. The contract work usually involves huge cost, require long time to complete, and comprises activities outside the factory premises. This applies to most civil engineering jobs like construction of buildings, roads, bridges, etc.

The pecularity of contract costing lies in ascertaining year-wise cost and profit on projects extending to more than one accounting year. In this regard, the basic principle follows that no profit should be taken on an uncompleted contract unless the work on the project has reasonably advanced. Even then, only a conservative sum may be taken into account. This is usually based on the formula:

$$= \frac{2}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

of course, if the Contract Account shows some loss it should be fully accounted for.

The work-in-progress is shown in the Balance Sheet as follows :

Value of Work Certified	×××
Cost of Work Uncertified	×××
	×××
Less : Reserve	×××
Less : Cash Received	×××
	×××

12.5 KEY WORDS

Bill of Materials : The document contains a complete list of materials required for a given job.

Contractor : The person or the organisation that agrees to undertake the contract.

Contractee : The person or the organisation for whom the job is done.

Contract Costing : A special form of job costing applicable to big projects like construction of a building, construction of a bridge, etc. which involve huge cost to complete, and is usually site-based.

Contract Price : The price at which the contractor has agreed to undertake the job.

Escalation Clause : A provision made in the agreement to compensate the contractor for an unwarranted increase in prices and for other contingencies.

Extras : Extra amount charged by the contractor for additions/alterations suggested later on.

Job Costing : Specific order costing involving accumulation of costs relating to a single cost unit—the 'job' — when each order is of comparatively short duration. It is also called job order costing.

Job Cost Sheet : A statement showing cost and profit relating to a specific job a batch or a contract.

Notional (or Attributable) Profit : Value of work certified minus cost of work certified.

Production Order : A document prepared by the Planning Department authorising and stipulating the details of the work to be done on the job undertaken.

Progress Payments : Payments made to the contractor at various stages of the work or at agreed intervals.

Retention Money : Amount of payment withheld as a security against defective work and penalties chargeable for delay in completion of work.

Sub-contracting : Assigning special work relating to the main contract to a sub-contractor.

Work Certified : Work approved by the contractee's architect or surveyor.

Work Uncertified : Work done from the date of certification to the last date of the accounting year and which still remains to be approved.

12.6 ANSWERS TO CHECK YOUR PROGRESS

A 3 i) output, ii) job order, iii) identification, iv) unit, v) summarise

4 i) False, ii) True, iii) True, iv) False, v) True

B 3 i) True, ii) False, iii) True, iv) True, v) False, vi) True

C 3 i) retention, ii) future, iii) uncertified work, iv) credited, v) deducted, vi) one-fourth, vii) depreciated value, viii) escalation clause

12.7 TERMINAL QUESTION/EXERCISES

1) How does contract costing differ from job costing?

2) Indicate how you would deal with the following items in Contract Account.

   a) Plant and machinery specially purchased for a contract

   b) Loss of materials stolen or destroyed

   c) Sub-contracting

3) State how you would ascertain the actual profit on an incomplete contract. How far such profit is taken to Profit and Loss Account?

4) a) How is progress payment due at a specific stage computed?

b) Explain the use of a production order and give its specimen.

Exercises

1) The following direct costs were incurred on Job No. 415 of standard Radio Company :

	Rs.
Materials	4,010
Wages :	
Deptt. A-60 hours @ Rs. 3 per hour	
Deptt. B-40 hours @ Rs. 2 per hour	
Deptt. C-20 hours @ Rs. 5 per hour	

Overheads expenses for these three departments were estimated as follows :

Variable Overheads :

Deptt. A Rs. 5,000 for 5,000 labour hours

Deptt. B Rs. 3,000 for 1,500 labour hours

Deptt. C Rs. 2,000 for 500 labour hours

Fixed overheads : Estimated at Rs. 20,000 for 10,000 normal working hours.

You are required to calculate the cost of job No. 415 and calculate the price to earn profit of 25% on selling price.

(**Answer :** Total Cost : Rs. 4,830; Sales Price : Rs. 6,440)

2) A company is engaged in job work. It has completed all jobs in hand except Job No. 44 on December 30, 1990. The cost sheet on December 30 showed direct material and direct labour costs of Rs. 40,000 and Rs. 30,000 respectively as having been incurred on Job No. 44.

The costs incurred by the business on 31st December, 1990, the last day of the accounting year, were as follows :

	Rs.
Direct Materials (Job 44)	2,000
Direct Labour (Job 44)	8,000
Indirect Labour	2,000
Miscellaneous Factory Overheads	3,000

It is the practice of business to charge factory overheads to the jobs on the basis of 120 per cent of direct labour cost. Calculate the cost of work-in-progress of Job No. 44 on 31st December, 1990.

(**Answer :** Rs. 1,25,600)

Hints : The cost of indirect labour and miscellaneous factory overheads is not to be included, as the factory overheads have been included on the basis of recovery rate.

3) A company of civil engineers proposes to make tenders for the construction of an auditorium and estimate their direct cost at Rs. 1,12,500 as follows.

Material	45,000
Wages	47,250
Cost of transport of men and materials to site	12,750
Other Direct Expenses	7,500

Existing commitments of the company are involving a total overheads of Rs. 6,37,875 for various projects and direct labour cost of Rs. 4,25,250.

Assuming all the overheads as variable, calculate the estimated value of tender keeping in view the following :

1) Necessary overheads,

2) 5% interest on total capital outlay, and
3) 10% margin on total cost.

(**Answer :** Estimated value of tender : Rs. 2,11,798)

Hints : Overheads = $\frac{47,250}{4,25,250} \times 6,37,875$ or 150% wages; 5% interest on capital outlay to be computed on total cost of Rs. 1,83,875)

4) The following figures are available at the end of a financial year relating to a contract.

Total cost of work done to date	1,10,350
Cost of Work Uncertified	8,300
Contract Price	5,80,000
Value of Work Certified	1,40,280

Determine the amount of profit to be taken to Profit and Loss Account.

(**Answer :** Notional Profit : Rs. 38,230; Profit taken to P & L A/c;
NIL (Value of work certified is less than one-fourth of the contract price.)

5) A construction company took a contract in 1989 for road construction. The contract price was Rs. 5,00,000 and its estimated cost of completion would be Rs. 4,60,000. At the end of 1989, the company had received Rs. 1,80,000 representing 90 per cent of work certified. Work not yet certified had cost Rs. 5,000.

Expenditure incurred on the contract during 1989 was as follows :

	Rs.
Materials	25,000
Labour	1,50,000
Plant	10,000

Materials costing Rs. 2,500 were damaged and had to be disposed off for Rs. 500. Plant was considered as having depreciated by 25 per cent. Prepare Contract Account for 1989 in the books of the construction company. Also show the amount of profit that can be reasonably credited to Profit and Loss Account in respect of the contract.

(**Answer :** Notional Profit : Rs. 30,000; Profit taken to P & L A/c : Rs. 9,000. Since the value of work certified is more than one-fourth of the contract price but less than half, the formula used is :

$$\frac{1}{3} \times \text{Notional Profit} \times \frac{\text{Cash Received}}{\text{Work Certified}}$$

6) A contractor has obtained a contract for construction of a bridge. The value of a contract is Rs. 12 lakh, and the work commenced on Ist October, 1988. The following details are shown in their books for the year ended 31st Sept., 1989 :

	Rs.
Plant purchased	60,000
Wages paid	3,40,000
Materials issued to site	3,36,000
Direct Expenses	8,000
General Overheads allocated	32,000
Wages accrued as on 30.9.1989	2,800
Materials at site as on 30.9.1989	4,000
Direct Expenses accrued as on 30.9.1989	1,200
Work not yet Certified at cost	14,000
Cash Received being 80% of Work Certified	6,00,000

Life on plant purchased is 5 years and scrap value is nil.

1) Prepare the contract account for the year ended 30th Sept., 1989.

2) Show the amount of profit which you consider might be fairly taken on the contract and how you have calculated it.

(**Answer** : Profit taken P & L A/c : Rs. 19,200)

Hints : 2/3 of Notional profit as reduced on cash basis should be taken to P & L A/c.

7) From the following particulars relating to a contract, prepare a) Contract Account, b) Contractee's Account and also show how work-in-progress will appear in the Balance Sheet as on 31.12.1989.

	Rs.
Materials sent to site	85,349
Labour engaged on site	74,375
Plant installed at cost	15,000
Direct Expenditure	4,126
Establishment Charges	3,167
Materials returned to store	549
Work Certified	1,95,000
Cost of Work not yet Certified	4,500
Materials on hand as at 31.12.1989	1,883
Wages accrued on 31.12.1989	2,400
Direct Expenditure accrued on 31.12.1989	240
Value of Plant as on 31.12.89	11,000

The contract price had been agreed at Rs. 2,50,000. Cash had been received from the contractee amounting to Rs. 1,80,000.

(**Answer** : Notional Profit : Rs. 28,275; Profit credited to P & L A/c : Rs. 17,400; W.I.P. to be shown in B/s : Rs. 8,625)

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

UNIT 13 PROCESS COSTING

Structure

13.0 OBJECTIVES

After studying this unit you should be able to :

- explain the meaning and the main characteristics of process costing
- list the industries for which process costing is suitable
- distinguish between job costing and process costing
- describe the costing procedure followed in process costing and prepare the process account
- distinguish between the normal and abnormal process losses and explain their accounting treatment
- prepare abnormal loss and abnormal gain accounts.

13.1 INTRODUCTION

Job and contract costing methods about which you learnt in Unit 12, are used for ascertaining the costs of specific job orders involving special orders and individual specifications. These are not considered suitable for industries involving mass production such as chemical plant, paper manufacturing, flour mill, cement works, textile mill, etc. Depending upon the nature of their product and the production processes involved, the organisations engaged in such industries generally use unit costing method or process costing method. You have learnt about unit costing method in Unit 10. In this unit you will learn about the process costing method under which the cost of a product can be ascertained at each stage of production.

13.2 MEANING AND APPLICATION

Process costing refers to a method of ascertaining the cost of product at each stage or process of manufacture where a product passes through different consecutive processes of production, each distinct and well defined. As a matter of fact, almost every product passes through a series of manufacturing operations before it takes the shape of a final product. But, in most cases, the operations involved are small and the costs incurred on each operation form an insignificant portion of the total cost. Hence, it is not considered worthwhile to compute the cost of each operation separately and so the process costing is not considered useful. **Process costing is suitable only where the final product is the result of a series of such process that the output of one process passes on as a raw material to the next process and may otherwise be saleable as a finished product in the market.** Take the case of a cotton textile mill, for example, where production of cloth

2) Show the amount of profit which you consider might be fairly taken on the contract and how you have calculated it.

(Answer : Profit taken P & L A/c : Rs. 19,200)

Wits : 2/3 of Notional profit as reduced on cash basis should be taken to P & L A/c.

7) From the following particulars relating to a contract, prepare a) Contract Account, b) Contractee's Account and also show how work-in-progress will appear in the Balance Sheet as on **31.12.1989.**

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W.I.P. to be shown in B/s : Rs. 8,625)

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

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- describe the costing procedure followed in process costing and prepare the process account
- distinguish between the normal and abnormal process losses and explain their accounting treatment
- prepare abnormal loss and abnormal gain accounts.

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Job and contract costing methods about which you learnt in Unit 12, are used for ascertaining the costs of specific job orders involving special orders and individual specifications. These are not considered suitable for industries involving mass production such as chemical plant, paper manufacturing, flour mill, cement works, textile mill, etc. Depending upon the nature of their product and the production processes involved, the organisations engaged in such industries generally use unit costing method or process costing method. You have learnt about unit costing method in Unit 10. In this unit you will learn about the process costing method under which the cost of a product can be ascertained at each stage of production.

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involves three distinct sequential processes viz., tbe spinning process, the weaving process and the finishing process. The output of spinning process (yarn) is passed on as a raw material to the weaving process. It can also be sold in the market, if the mill has somk surplus. Similarly, the output of weaving process (coarse cloth) is passed on to the finishing process as a raw material and, if there is surplus, it can be sold to other textile mills. For a textile mill, therefore, it will be useful to compute the costs of spinning, weaving and finishing processes separately and ascertain the cost of yarn, coarse cloth and finished cloth. This will also enable them to compare their costs with the market prices thereof.

Thus, the industries to which process costing can be usefully applied, may normally have the following features :

1) The production is continuous and passes through a number of consecutive operations or processes.
2) The output of one process becomes the input for the next process till final product is obtained.
3) The products are standardised and homogenous.
4) The output of each process may be saleable in the market.
5) The processing of raw material may give rise to the production of joint and/or by-products.

Hence, process costing is usually employed by the following industries :

Chemical works	Distillaries	Textile mills	Sugar works
Soapmaking	Paper mills	Food processing	Paint manufacturing
Breweries	Oil refineries	Canning factories	Milk dairy

13.3 DIFFERENCE BETWEEN JOB COSTING AND PROCESS COSTING

The distinction between job and process costing arises mainly from tbe distinctive nature of the manufacturing systems to which they are applicable. The main points of difference can be summarised as follows :

JOB COSTING	PROCESS *COSTING*
1) Job costing measures product costs in industries where production is intermittant and against specific orders from customers.	1) Process costing is used in industries where production is continuous and is meant for stock and sale.
2) Costs arc collected and analysed by individual jobs or work orders regardless of the time taken to complete them.	2) Costs are accumulated and analysed by departments or processes on a time basis.
3) The job cost is a terminal cost. The accumulation of costs in respect of a job is stopped when the job is completed and disposed off.	3) Process cost is a period cost. Under process costing system, costs a n computed at the end of each specified period.
4) The cost of each job order or unit of production can be separately identified without averaging the total cost of production.	4) The unit cost of a process represents on average cost for the period, obtained after adjustment of work-in-progress.
5) Them are usually no transfers from one job to mother except in case of surplus material.	5) Costs are transferred from one process to mother process till completion.
6) There may or may not be any work-in-progress at the end of an accounting period. However, the value of uncompleted job is easy to obtain.	6) There is always some work-in-progress at the beginning as well as at the end of the period. This presents the knotty problem of valuation of work-in-progress.
7) Proner control requires greater supervision due to discrete nature of the Job.	7) Control of process activities is comparatively easy because production is more stable and standardised.
8) Job costing is applied in any situation where "one-off" orders are being executed. For example, machine-tools, general-engineering, printing, motor-car repairs, etc.	8) Process costing is applied under conditions of continuous production, sequential processing and uniform outputs. For example : cement, chemical products, bottling and canning, oil refining, soap-making, etc.

13.4 MAIN CHARACTERISTICS

1) Process costing applies to industries where production is continuous and passes through a series of processes, each distinct and well-defined.

2) All costs (material, labour and overheads) are accumulated and classified by processes.

3) An account is maintained for each process to which all direct and indirect costs are allocated or apportioned.

4) Production in terms of physical quantities is also recorded in respective process accounts.

5) Average cost per unit is worked out for each process.

6) Since the output of each but last process becomes the input of the next process, and that of the last process is transferred to Finished Stock Account. The total cost of finished product comprises of the cumulative costs of all processes.

7) Average cost per unit provides the basis for transfer of costs to subsequent process.

Check Your Progress A

1 What do you mean by process costing?

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2 Mention any three features relating to industries which adopt process costing.

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3 State whether the following statements are True or False:

i) Process costing is a multi-step method or procedure to measure product costs in mass production industries.

ii) Process costing is used by industries where each unit of output is different from another.

iii) In process costing average cost per unit provides the basis for transfer to subsequent process.

iv) Process costing is applied to industries where standardised goods are produced usually for stock.

v) Process costing can be usefully employed by a company manufacturing custom-made machinery.

13.5 COSTING PROCEDURE

You have learnt that, under process costing method, a separate account is opened for each process in respect of which the costs are to be ascertained.. It should be noted that each Process account will have an additional column on both debit and credit sides for recording the physical quantities. Look at Figure 13.1 which shows the proforma of a process account.

Figure 13.1 Proforma of Process Account

Process I Account

Month ended : .....

Dr. **Cr.**

Particulars	Qty. (units)	Amount Rs.	Particulars	Qty. (units)	Amount Rs.

The main steps involved in costing procedure are as follows :

1) Debit the cost of basic raw material to the first process account showing both quantity and amount involved.

2) Show costs of other materials, direct labour and direct expenses pertaining to each process in their respective process accounts.

3) Debit each process account with production overheads as given or on some equitable basis.

4) Credit the process account with realisable value of scrap and containers of materials returned or sold, if given. Alternatively, their amounts can be deducted from cost of raw materials.

5) Ascertain the total cost of the process and calculate average cost per unit of output.

6) If the whole output of a process has been transferred to the next process, the total cost may be shown on the credit side as transfer to next process. The same shall be shown on the debit side of the next process account.

7) If a portion of output has been earmarked for sale or has been sold, show its cost as transfer to store and the balance as transfer to the next process. It should be noted that when a portion of output has been sold, the process account should be credited only with its cost, and not the sale value.

8) The cost of containers used for packaging the finished goods should be debited to the last process account.

9) The total cost of the last process shall be transferred to Finished Stock Account.

10) The Finished Stock Account is like the Trading Account. Hence, sales will be credited to this account and gross profit ascertained.

Look at Illustrations 1 and 2 and study how process accounts are prepared.

Illustration 1

In the course of manufacture, a product passes through three distinct processes, A, B and C. During a four week period, 1,000 units are produced and the following information is made available :

	Process A Rs.	Process B Rs.	Process C Rs.
Direct Materials	2,000	1,000	—
Direct Wages	1,500	700	800
Direct Expenses	300	100	—

Indirect production costs were Rs. 4,500 and these are to be apportioned to the processes on the basis of direct wage cost. Prepare the necessary process accounts.

Solution

Process A Account

Output : 1,000 units

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Direct Materials		2,000	By Transfer to		6,050
To Direct Wages		1,500	Process B at Rs. 6.05		
To Direct Expenses		300	per unit		
To Overheads (7/30)		2,250			
		6,050			6,050

Cost Per Unit of output = $\frac{6,050}{1,000}$ = Rs. 6.05

Process B Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process A		6,050	By Transfer to		8,900
			Process C at Rs. 8.90		
To Direct Materials		1,000	per unit		
To Direct Wages		700			
To Direct Expenses		100			
To overhead (7/30)		1,050			
		8,900			8,900

Cost Per Unit of output = $\frac{8,900}{1,000}$ = Rs. 8.90

Process C Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process B		8,900	By Transfer to Finished Stock A/c		
To Direct Wages		800	at Rs. 10.90 per unit		10,900
To Overheads (8/30)		1,200			
		10,900			10,900

Cost Per Unit of output = $\frac{10,900}{1,000}$ = Rs. 10.90

Finished Stock Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process C	1,000	10,900			

Illustration 2

The following details are extracted from the costing records of an oil mill for the year ended 31st March, 1989 :

Purchase of 500 tonnes Copra Rs. 2,00,000

	Crushing Rs.	Refining Rs.	Finishing Rs.
Cost of labour	2,500	1,000	1,500
Electric power	600	360	240
Sundry materials	100	2,000	—
Steam	600	450	450
Repairs of machinery	280	330	140
Factory expenses	1,320	600	220
Cost of Casks	—	—	7,500

300 tonnes of crude oil were produced. 250 tonnes of oil were produced by the refining process. 248 tonnes of refined oil were finished for delivery. Copra sacks were sold for Rs. 400. 175 tonnes of copra residue were sold for Rs. 11,000. Loss in weight in crushing 25 tonnes, 45 tonnes of by-products obtained from refining process valued at Rs. 6,750.

You are required to show the accounts in respect of each of the following stages of manufacture for the purpose of arriving at the cost per tonne of each process and the total cost per tonne of the finished oil.

(a) Copra Crushing Process (b) Refining Process (c) Finishing Process including casking.

Solution

Crushing Process Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Copra used	500	2,00,000	*By* Loss in Weight	25	—
To Labour		2,500	By Sale of Copra Resrdue	175	11,000
To Electric Power		600	By Sale of Copra Sacks	—	400
To Sundry Materials		100			
To Repairs to Machinery		280	*By* Transfer to Refining Process A/c	300	1,94,000
To Steam		600			
To Factory Expenses		1,320			
	500	2,05,400		500	2,05,400

Cost Per Unit of Crude Oil = $\frac{1,94,000}{300}$ or Rs. 646.67

Refining Process Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Crushing Process A/c	300	1,94,000	By Loss in Weight	5	—
To Labour		1,000	By Sale of By-product	45	6,750
To Electric Power		360	By Transfer to Finishing Process A/c	250	1,92,050
To Sundry Materials		2,000			
To Steam		450			
To Repairs to Machinery		330			
To Factory Expenses		660			
	300	1,98,800		300	1,98,800

Cost Per tonne of Refined Oil = $\frac{1,92,050}{250}$ or Rs. 768.20

Finishing Process Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Refining Process A/c	250	1,92,050	By Loss in Weight	2	—
To Labour		1,500	By Finished 'stock A/c	248	2,02,100
To Electric Power		240			
To Steam		450			
To Repairs to Machinery		140			
To Factory Expenses		220			
To Cost of Casks		7,500			
	250	2,02,100		250	2,02,100

Cost Per tonne of Finished Oil = $\frac{2,02,100}{248}$ or Rs. 814.92

13.6 PROCESS LOSSES

In most manufacturing industries, some loss or wastage of materials always occurs while they pass through different stages of production. Consequently, the output from a process is usually less than the input. This difference is termed as a process loss.

Process losses can be classified into two categories : (1) normal process loss, and (2) abnormal process loss. Let us understand the nature of each type of loss and study its treatment in process costing.

13.6.1 Normal Process Loss

Certain losses are inherent in the production process. They cannot be avoided because of the very nature of materials or the production process. These include losses due to evaporation, chemical reaction, scrap, or unavoidable spoilage. The loss of output resulting from such factors is termed as 'normal process loss' or 'normal wastage'. Since such a loss is quite expected under normal conditions, it can always be worked out in advance on the basis of past experience.

Accounting treatment : It is a fundamental accounting principle that the cost of any normal loss should be absorbed by the cost of production of good units. Hence, for ascertaining the cost per unit of output, the total cost should be divided by the number of good units (normal output). However, if the wastage has some realisable value, the same should be credited to the process account and duly adjusted in the cost of output. For example, 500 tonnes of raw material costing Rs. 5,000 have been placed in a process I, The other process costs are : labour—Rs. 2,500 and overheads—Rs. 1,100. If 10% of material is normally lost in the process and the wastage realises Re, 1 per unit, the cost per unit of output wiil be ascertained as follows :

Process I Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Materials	500	5,000	By Normal Wastage	50	50
To Labour	—	2,500	By Transfer to next Process	450	8,550
To Overheads	—	1,100			
	500	8,600		500	8,600

Cost Per Unit of Output = $\frac{8,500}{450}$ = Rs. 19 per tonne

The same thing you had observed in Illustration 2 where 500 tonnes of copra was put in crushing process and only 300 tonnes of crude oil was produced. The cost per tonne of oil was worked out by dividing the total cost (after adjusting the sale value of copra residue) by 300. Obviously, it had been assumed that 40%loss of weight was normal at crushing stage in case of coconut oil production.

13.6.2 Abnormal Process Loss

Any loss of material which is in excess of normal loss, is termed as 'abnormal process loss' or 'abnormal wastage'. For example, the normal loss in crushing process is 40%.If the input is 500 tonnes the normal output shall be 300 tonnes. If the actual output is 280 tonnes, the loss of 20 tonnes is treated as abnormal loss. This loss may occur due to some unexpected or abnormal operating conditions, such as accidents, carelessness, inefficiency or use of sub-standard materials. Such losses must be thoroughly investigated and, where necessary, remedial steps should be taken to prevent any recurrence.

Accounting treatment : Abnormal loss does not form part of the cost of good units otherwise it will unnecessarily inflate the cost of production. Hence, the cost of abnormal loss is excluded from process costs by transferring it to the costing Profit and Loss Account. In such a situation, the real problem arises in ascertaining the cost of abnormal process loss. The guiding principle in this regard is to treat the abnormal loss as the loss of good units of output. Hence, ***the cost of abnormal loss units is ascertained in the same manner, and on identical basis, as the good units ofproduction.*** This implies that the total process cost should be spread proportionately over both good units and the abnormal loss units.

You should adopt the following procedure to deal with the problem of abnormal loss in process costing :

1) Work out the quantum of normal loss and show it on the credit side of the respective process account alongwith its realisable value.

2) Assuming there is no abnormal loss, work out the cost per unit of output as follows :

$$\frac{\text{Cost of Production}}{\text{Normal Output}}$$

3) Ascertain the cost of abnormal loss units on the basis of the cost per unit as calculated above.

4) Debit Abnormal Loss Account and credit the respective process account with quantity and amount of the abnormal wastage.

5) The balance in the Process Account shall now show the cost of the actual output which shall be transferred to the next process account.

6) Prepare Abnormal Loss Account and show the cost of abnormal loss units on its debit side and their scrap value on its credit side. The balance in Abnormal Loss Account is transferred to the Costing Profit and Loss Account.

Look at Illustration **3** and study how abnormal loss is treated in process costing.

Illustration 3

1200 Units were introduced into a process at a cost of Rs. 12,000. The additional expenditure incurred for the process was Rs. 3,000. From past experience and technical estimates, a normal loss equal to one-sixth of the input is expected which has scrap value of Re. 1 per unit. The actual output for the period was 900 units. Complete the Process Account and show how abnormal loss will be treated in accounts.

Solution

Process Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
	Rs.	Rs.		Rs.	Rs.
To Materials	1,200	12,000	By Normal Loss	200	200
To Expenses	—	3,000	By Abnormal Loss	100	1,480
			By Cost of Production tr. to next Process	900	13,320
	1,200	15,000		1,200	15,000

$$\text{Cost of Production Per Unit} = \frac{\text{Cost of Production}}{\text{Normal Output}}$$

$$= \frac{14,800}{1,000}$$

= Rs. 14.80 per unit

Abnormal Loss Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Process A/c	100	1,480	By P&L A/c (scrap value)	100	100
			By Cash A/c		1,380
	100	1,480		100	1,480

Working Notes

1) Normal Output = Total Input–Normal Loss Units
= 1,200-(1/6 of 1,200)
= 1,200–200
= 1,000 Units

2) Cost of Production :
= Total Expenditure–Scrap Value of Normal Loss Units
= 15,000–200
= Rs. 14,800.

3) Abnormal Loss Units = Normal Output–Actual Output
= 1,000–900
= 100 Units

4) Cost of Abnormal Loss
= Abnormal Loss Units × Cost of Production Per unit
= 100 × 14.80 = Rs. 1,480

13.7 ABNORMAL EFFECTIVENESS

It is quite possible that the actual output of a process is more than the expected (normal) output. This will happen when the actual loss is less than the normal loss which may be the result of efficiency or overestimation of normal loss. In such a situation, the excess of actual output over normal output is regarded as 'abnormal gain'. The presence of abnormal effectivenessshould not affect the cost per unit of output because it will be calculated in the same manner as in case of abnormal loss.

Accounting treatment : The value of abnormal gain units is calculated with the help of the cost per unit of output. It will be shown on the debit side of the respective process account and on the credit side of a newly opened Abnormal Gain Account. Abnormal Gain Account is closed by transfer to Costing Profit and Loss Account.

It must be noted that whether there is abnormal loss or abnormal gain, the normal loss is shown in the process account on the basis of pre-determined rate, and not on the basis of actual loss. Hence, in case of abnormal effectiveness, the realisable value of normal loss units as shown in the process account will be more than the actual amount realised on the sale of scrap. This unrealised amount of scrap should be adjusted by showing it on the credit side of Normal Loss Account and on the debit side of the Abnormal Gain Account before its balance is transferred to the Costing Profit and Loss Account.

Look at Illustration 4 and study how abnormal effectiveness is treated in process costing.

Illustration 4

Based on data given in Illustration 3 and assuming the actual output was 1,050 units, prepare the Process Account and show how abnormal loss effectiveness will be treated in accounts.

Solution

Process Account

Dr.					Cr.
Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Material	1,200	12,000	By Normal Loss	200	200
To Expenses	—	3,000	By Cost of Production tr. to next Process	1,050	15,540
To Abnormal Gain	50	740			
	1,250	15,740		1,250	15,740

Cost of Production per Unit of Output

$$= \frac{\text{Cost of Production}}{\text{Normal Output}}$$

$$= \frac{14,800}{1,000}$$

= Rs. 14.80 per unit.

Abnormal Gain **Account**

Dr.					Cr.
Particulars	Units	Amount	Particulars	**Units**	Amount
		Rs.			Rs.
To Normal Loss A/c. (unrealised scrap value)	50	50	By Process A/c	50	740
To P&L A/c		690			
	50	740		50	740

Working Notes

1) Normal Output = Total Input–Normal Loss
= 1,200–(1/6 of 1,200)
= 1,200–200
= 1,000 Units

2) Cost of Production
= Total Expenditure-Scrap Value of Normal Loss
= 15,000–200
= Rs. 14,800

3) Abnormal Effectiveness
= Actual output–Normal Output
= 1,050–1,000
= 50 Units

4) Value of Abnormal Effectiveness
= Abnormal Effectiveness × Cost of Production per unit = 50 × 14.80
= Rs. 740

Check Your Progress B

1 What do you mean by process loss?

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2 List three causes of abnormal process loss.

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3 What is abnormal effectiveness?

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4 Fill in the blanks.

i) The type of loss which does affect the cost of good units is called ..... process loss.

ii) Process loss usually has some ..... value.

iii) Excess of actual loss over the normal loss is called .....

iv) In case of abnormal loss as well as abnormal effectiveness, the average cost'of production is calculated by dividing the total cost of production by .....

v) In case of abnormal effectiveness,the unrealised scrap value is debited to Abnormal Gain Account and credited to ..... Account.

vi) In case of abnormal loss, its scrap value is credited to Abnormal Loss Account and debited to ..... Account.

13.8 COMPREHENSIVE ILLUSTRATIONS

Illustration 5

In a factory the product passes through two processes A and B. A loss of 5%is allowed in Process A and 2% in Process B, nothing being realised by disposal of the wastage.

During April 1990, 10,000 units of material costing Rs. 6 per unit were introduced in Process A. The other costs were as follows :

	Process A	Process B
	Rs.	Rs.
Materials	—	6,140
Labour	10,000	6,000
Overheads	6,000	4,600

The output was 9,300 units from Process A. 9,200 units were produced in Process B which were transferred to the warehouse, 8,000 units of the finished product were sold at Rs. 15/- per unit, the selling and distribution expenses were Rs. 2 per unit. Prepare (1) Process Accounts, and (ii) a statement of Profit and Loss of the firm for April, 1990, assuming there were no opening stocks of any type.

Solution

Process A Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Materials	10,000	60,000	By Normal Loss (5%of 10,000)	500	—
To Labour		10,000	By Abnormal Loss	200	1,600
To Overheads		6,000	By Transfer to Process B at Rs. 8 per unit	9,300	74,400
	10,000	76,000		10,000	76,000

Process B Account

Dr.					Cr
Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process A	9,300	74,400	By Normal Loss (2% of 9,300)	186	—
To Material		6,140	By Finished Stock		
To Labour		6,000	A/c at Rs. 10 per unit	9,200	92,000
To Overhead		4,600			
To Abnormal Gain	86	860			
	9,386	92,000		9,386	92,000

Statement of Profit and Loss lor April, 1990

	Rs.
Profit on sale of 8,000 units	40,000
Less : Abnormal Loss in Process A	1,600
	38,400
Add : Abnormal Gain in Process B	860
	39,260
Less : Setting and Distribution Expenses	16,000
	23,260

Note : The valuation of unsold stock has been ignored.

Working Notes

I) Normal Output = Total Input − Normal Loss

In Process A = 10,000–500 = 9,500 units

In Process B = 9,300–186 = 9,114 units

2) Cost of Production = Total Expenditure − Scrap value of Normal Loss

In Process A = 76,000–NIL = Rs. 76,000

In Process B = 91,140–NIL = 91,140

3) Cost of Production per Unit = $\frac{\text{Cost of Production}}{\text{Normal Output}}$

In Process A = $\frac{76,000}{9,500}$ = Rs. 8 per unit

In Process B = $\frac{91,140}{9,114}$ = Rs. 10 per unit

4) Normal Loss Unit = Normal Output − Actual Output

In Process A = 9,500 − 9,300 = 200 units

5) Cost of Abnormal Loss = Ab. Loss Units × Cost per Unit

In Process A = 200 × 8 = Rs. 1,600

6) Abnormal Gain Units = Actual Output − Normal Output

In Process B = 9,200 − 914 = 86 units

7) Value of Abnormal Gain = Abnormal Gain Units × Cost Per Unit

In Process B = 86 × 10 = Rs. 860

Illustration 6

Product 'Z' is obtained after it passes through three distinct processes. The following information is obtained from the accounts for the month-ending December, 31, 1989 :

Items	Total	Processes		
		I	II	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 Overhead	9,000	—	—	—

1,000 Units at Rs. 3 each were introduced in process I. There was no stock of materials or work-in-progress at the beginning or at the end of the period. The output of each process passes direct to the next process and finally to finished stock. Production overheads are recovered at 100 per cent of direct wages. The following additional data are obtained :

Process	Output during the month	Percentage of Normal loss to Input	Value of Scrap per unit
I	950	5%	Rs. 2
II	840	10%	Rs. 4
III	750	15%	Rs. 5

Prepare process accounts; and normal loss, abnormal gain and abnormal loss accounts.

Solution

Process I Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Units introduced	1,000	3,000	By Normal Loss (5% of 1,000)	50	100
To Direct Materials		2,600	To Transfer to Process II	950	9,500
To Direct Wages		2,000			
To Production Overheads		2,000			
	1,000	9,600		1,000	9,600

Process II Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process I	950	9,500	By Normal Loss (10% of 950)	95	380
To Direct Materials		1,980	By Abnormal Loss	15	300
To Direct Wages		3,000	By Transfer to Process III	840	16,800
To Production Overheads		3,000			
	950	17,480		950	17,480

Process III Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Transfer from Process II	840	16,800	By Normal Loss (15% of 840)	126	630
To Direct Materials		2,962	By Transfer to Finished Stock A/c	750	28,500
To Direct Wages		4,000			
To Production Overheads		4,000			
To Abnormal Gain	36	1,368			
	876	29,130		876	29,130

Normal Loss Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Process I	50	100	By Cash A/c:		
To Process II	95	380	Process I	50	100
To Process III	126	630	Process II	95	380
			Process III	90	450
			By Abnormal Gain A/c	36	180
	271	1,110		271	1,110

Abnormal Loss Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Process II A/c	15	300	By Cash A/c	15	60
			By Profit & Loss A/c (loss)		240
	15	300		15	300

Abnormal Gain Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
		Rs.			Rs.
To Normal Loss A/c (unrealised scrap)	36	180	By Process III A/c	36	1,368
To Profit & Loss A/c (gain)		1,188			
	36	1,368		36	1,368

Working Notes:

1) Cost of Population = Total cost - Scrap value of Normal Loss

In Process I = 9,600 - 100 = Rs. 9,500

In Prows II = 17,480 - 380 = Rs. 17,100

In Process III = 27,762 - 630 = Rs. 27,132

2) Cost of Production per Unit = $\frac{\text{Cost of Production}}{\text{Normal Output}}$

In Process I = $\frac{9,500}{950}$ = Rs. 10 per unit

In Process II $\frac{17,100}{855}$ = Rs. 20 per unit

In Process III = $\frac{27,132}{714}$ = Rs. 38 per unit

3) Abnormal Loss Units = Normal Output - Actual Output
In Process I = 950 - 950 = NIL
In Process II = 855 - 840 = 15 units

4) Cost of Abnormal Loss = Abnormal Loss Units × cost per unit
In Process I = NIL
In Process 11 = 15x20 = 300

5) Abnormal Gain Units = Actual Output - Normal Output
In Process III = 750 - 714 = 36 units

6) Value of Abnormal Gain = Ab. Gain Units × Cost per unit
In Process III = 36 × 38 = Rs. 1,368

Illustration 7

A product passes through two processes P & Q and then to Finished Stock Account. It is ascertained that in each process normally 5% of the weight of output is lost and 10% is scrap which from process P realises Rs. 80 per tonne and from process Q Rs. 200 per tonne.

The following data is available for both the processes for the month of February, 1991.

	P	Q
Materials in tonnes	1,000	70
Cost of materials per tonne in rupees	125	200
Wages in rupees	28,000	10,000
Mfg. expenses in rupees	8,000	5,250
Output in tonnes	830	780

prepare process accounts, showing cost per tonne of each process. There was no stock or work-in-progress in any process.

Solution

Process P Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
	Ton.	Rs.		Ton.	Rs.
To Materials	1,000	1,25,000	By Loss in Weight (5% of 1,000)	50	—
To Wages		28,000	By Normal Loss (10% of 1,000)	100	8,000
To Mfg. Exp.		8,000	By Abnormal Loss	20	3,600
			By Transfer to Process Q at Rs. 180 per tonne	830	1,49,400
	1,000	1,61,000		1,000	1,61,000

Cost of Output per tonne = $\frac{\text{Cost of Production}}{\text{Normal Output}}$

= $\frac{1.53.000}{850}$

= 180 per tonne

Process Q Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
	Ton.	Rs.		Ton.	Rs.
To Transfer from Process P	830	1,49,400	By Loss in Weight (5% of 900)	45	—
To Materials	70	14,000	By Normal Loss (10% of 900)	90	18,000
To Wages		10,000	By Transfer to Finished stock		
To Mfg. Exp.		5,250	at Rs. 210 per tonne.	780	1,63,800
To Abnormal Gain	15	3,150			
	915	1,81,800		915	1,81,800

Cost of Output per tonne = $\frac{\text{Cost of Production}}{\text{Normal Output}}$

= $\frac{1.53.000}{850}$

= 210 per tonne

working Notes

1) Normal Loss Unit In Process P = Normal Output - Actual Output
= 850 - 830 = 20 tonne

2) Cost of Abnormal Loss In Process P = Ab. Loss Units × Cost Per Unit
= 20 × 180 = Rs. 3,600

3) Abnormal Gain Units In Process Q = Actual Output - Normal Output
= 780 - 7.65 = 15 tonne

4) Value of Abnormal Gain = Abnormal Gain Units × Cost per unit
= 15 × 210 = Rs. 3,150

5) Loss in weight has no scrap value

Illustration 8

A company manufactures and sells three chemicals produced by three consecutive processes known as A, B and C. In each process, 2% of the weight put in is lost and 10% is scrap. The scrap realises in Process A and B - Rs. 100 per tonne and in C - Rs. 200 per tonne. The other details are as follows :

	A	B	C
Materials (in tonnes)	100	140	1,348
Cost of Materials per tonne (in rupees)	120	200	80
Mfg. Expenses (in rupees)	30,800	24,810	1,832
Output retained for sale	25%	50%	100%
Output sent to next process	75%	50%	

Solution

Process A Account

Dr. Cr.

Particulars.	Units	Amount	Particulars	Units	Amount
	Ton.	Rs.		Ton.	Rs.
To Materials	100	12,000	By Loss in Weight	2	—
To Mfg. Exp.		30,000	By Scrap	10	1,000
			By Transfer to stores for sale	22	10,450
			By Transfer to Process B	66	31,350
	100	42,800		100	42,800

Cost of Production per tonne = $\frac{41,800}{88}$

= Rs. 475 per tonne

Process B Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
	Ton.	Rs.		Ton.	Rs.
To Transfer from Process C	66	31,350	By Loss in Weight	4	—
To Materials	134	26,800	By Scrap	20	2,000
To Mfg. Exp.		24,810	By Transfer to stores for sale	88	41,480
			By Transfer to Process C	88	41,480
	200	82,960		200	82,960

Cost of Production per tonne = $\frac{80,960}{176}$

= Rs. 460 per tonne

Process C Account

Dr. Cr.

Particulars	Units	Amount	Particulars	Units	Amount
	Ton.	Rs.		Ton.	Rs.
To Transfer from Process B	88	41,480	By Loss in weight	28	—
To Materials	1,312	1,04,960	By Scrap	140	28,800
To Mfg. Exp.	—	1,864	By Transfer to finished stock	1,232	1,19,504
	1,400	1,48,304		1,400	1,48,304

Cost of Production per tonne $= \frac{1,19,504}{1,232}$

= Rs. 96 per tonne

13.9 LET US SUM UP

Process costing refers to a method of ascertaining the cost of a product at each stage or process of manufacture. This method is applied where (i) the production is continuous and passes through a number of processes, (ii) the product of one process becomes the material of the next process, and (iii) the products are standardised and homogeneous. Process costing, therefore, is considered suitable for industries like textile, oil refining, paper, breweries, etc.

Under process costing, a separate account is opened for each process of manufacture and all costs relevant to a process arc debited thereto. If the whole output of a process is transferred to the next process, the total cost is shown on the credit side as a transfer to the next process. If a part of the output is retained for sale in the market, the proportionate cost of such output is shown as a transfer to store. As for the last process, its total cost is transferred to the finished Stock Account.

Process losses can he normal or abnormal. Normal losses are inherent in any process, They cannot be avoided. Hence, such losses should be absorbed by good production. Abnormal losses are caused usually by factors like use of sub-standard material, inefficiency or accidents. Their cost is determined on the basis of the cost per unit of output and transferred to the Costing Profit and Loss Account through the Abnormal Loss Account.

In some cases, the actual output may be more than the normal output. In such a situation, the excess is regarded as abnormal effectiveness (also called abnormal gain). The cost of such gain is also determined on the basis of the cost per unit of output and transferred to the Costing Profit and Loss Account.

13.10 KEY WORDS

Abnormal Process Loss : Excess of actual loss over normal loss which is caused hy factors like accidents, inefficiency, etc.

Abnormal Gain : Excess of actual output over normally expected output. It is also called 'abnormal effectives'.

By-Product : A product of relatively small value produced incidently from processing the raw material for the main product.

Joint Product : Two or more products resulting from processing a particular raw material. Both have equally high value and merit recognition.

Mass **Production Industries :** Industries engaged in a standardised and homogeneous product on large scale.

Normal Output : The normally expected output from processing certain quantity of raw material.

Normal Process Loss : Loss of materials expected under normal operation conditions and inherent in the process of manufacture,

Process *Costing* : A method of ascertaining the cost of a product at each stage or process of manufacture.

13.11 ANSWERS *TO* CHECK YOUR PROGRESS

A 3 i) True, ii) False, iii) True, iv) True, v) False

B 4 i) Normal, ii) Realisable, iii) Abnormal Loss, iv) Normal Output, v) Normal Loss vi) Cash

13.12 TERMINAL QUESTIONS/EXERCISES

1) Distinguish between job costing and process costing.

2) State the main characteristics of process costing and outline the costing procedure thereof.

3) Explain the meaning of normal and abnormal process losses and state how, they are treated in cost accounts.

4) Explain the following terms :
   a) Abnormal Effectiveness
   b) By-Products
   c) Joint Products

Exercises

1) Chemical X passes through three consecutive processes P, Q and R. From the following cost data relating to the three processes, prepare the process cost accounts and find out the cost of production of each process. The production per month was 270 bottles.

Items	Process P	Process Q	Process R
Materials	8,750	4,250	2,900
Labour	3,600	9,000	2,700
Direct Expenses :			
Fuel	1,500	1,500	1,500
Carriage Inwards	1,500	1,500	1,500
Factory Expenses	1,170	3,240	1,125

Indirect expenses Rs. 3,825 should be apportioned on the basis of labour.

(Answer : Total Cost : P-Rs. 17,420, Q-Rs. 39,160, R-Rs. 49,560
Unit Cost : P-Rs. 64.52, Q-Rs. 145.04, R-Rs. 183.55)

2) In the month of May, 1991, 6,000 tonnes of raw material A costing Rs. 150 per tonne were produced through process No. 3 for the manufacture of solvant X.

The total operating cost of the process for the month was Rs. 12,50,000. 10%of the input was wasted and was disposed off at Rs. 25 per tonne.

Prepare the Process 3 Account for the month of May, 1991 assuming that the wastage was
i) the normal process loss

ii) an abnormal loss due to poor quality material.

(Answer : i) Finished stock Rs. 21,35,000 @ Rs. 395.37 per tonne.
ii) Finished stock Rs. 19,35,000 @ Rs. 358.33 per tonne.)

3) 600 Kgs. of a material was charged to Process I at the rate of Rs. 4 per kg. The direct labour accounted for Rs. 200 and the other departmental expenses amounted to Rs. 760. The normal loss is 10%of input and the net production was 500 kgs. Assuming that the scrap is sold at Rs. 2 per kg., prepare the Process I Account clearly showing the values of normal and abnormal loss.

(Answer : Normal loss Rs. **120;** Abnormal loss Rs. **240;** Transfer to Process II Rs. **3,000)**

4) The particulars for the last process are as follows :

	Units	Rs.
Transfer to last process from the first process	4,000	9,000
Transfer to Finished Stock from the last process	3,240	—
Direct Wages		2,000
Direct Materials used		3,000

The factory overhead in process was absorbed at **400%** of direct materials. Allowance for normal loss is **20%** of units worked. The scrap value of the wastage was Rs. 5 per unit. You are required to prepare

a) Last Process Account

b) Normal Wastage Account

c) Abnormal Effectiveness Account.

(Answer : Transfer to Finished stock Rs. **22,275;** Abnormal Effectiveness Transfer to P & L A/c Rs. **75 (275-200)**

5) The product of a manufacturing company passes through two processes A and B. It is ascertained that in each process **10%** of the total weight is lost and **20%** is scrap. The realisation from scrap amounts to Rs. **160** per tonne and Rs. 400 per tonne from processes A and B respectively.

The process figures are as follows :

	Process A	Process B
Materials consumed in tons	2,000	140
Cost per tonne	Rs. 250	400
Wages	Rs. 36,000	Rs. 24,000
Manufacturing Expenses	Rs. 12,000	Rs. 10,000

Prepare process accounts showing the cost per tonne of output in each process.

(Answer : Transfer to Finished stock **1,078** units at Rs. **4,50,800**
Process A Cost per unit : Rs. **345.71,** Process B-Rs. **418.18)**

6) X Manufacturing Company's product passes through two distinct processes A and B then to Finished Stock. It is known from past experience that wastage occurs in the process as follows : in Process A, **5%** of the units entering the process and in Process B, **10%** of the units entering the process. The scrap value of wastage in process A is Rs. **16** per **100** units and in Process B is Rs. **20** per **100** units. The process figures are :

	Process A	Process B
	Rs.	Rs.
Materials consumed	6,000	3,000
Wages	7,000	4,000
Manufacturing Expenses	2,000	2,000

5,000 units were brought into Process A, costing Rs. **5,000.** The outputs were : Process A = **4,700** units, Process B = **4,150** units. Prepare Process Accounts showing the cost of the output.

(Answer : Process A : cost per unit–Rs. **4.20;** Abnormal Loss–Rs. **202 (210–)**
Process B : cost per unit–Rs. **6.77;** Abnormal Loss–Rs. **434 (542-108)**

7) The product of a company passes through three distinct processes to completion. From the past experience it is ascertained that wastage is incurred in each process as under : Process A **2%,** Process B **5%,** Proms C **10%**

The wastage of Processes A and B is sold at Rs. **10** per **100** units and that of Process C at Rs. **80** per 100 units.

Following is the information regarding the production of March, 1979 :

	Process A	Process B	Process C
Materials	12,000	8,000	4,000
Direct Labour	16,000	12,000	6,000
Machine Expenses	2,000	2,000	3,000
Other Factory Expenses	3,500	3,800	4,200

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

Process	A	19,500	Units
Process	B	18,800	Units
Process	C	16,000	Units

There was no stock or work-in-progress in any process in the beginning and in the end of March.

Prepare Process Accounts.

(Answer : Transfer to Finished stock 16,000 units at Rs. 90,549.50)

Note : These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.

SOME USEFUL BOOKS

Arora, M.N. 1988. *A Text Book of Cost Accountancy,* Vikas Publishing House Pvt. Ltd. : New Delhi. (Chapters 14, 15, 16, 17, 19)

Bhar, B.K. 1990. *Cost Accounting : Methods and Problems,* Academic Publishers : Calcutta.

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Owler, L.W.J. and J.L. Brown, 1984. *Wheldon's Cost Accounting,* ELBS : London. (Chapters 17, 18)