Directorate of Distance Education

UNIVERSITY OF JAMMU

JAMMU

SELF LEARNING MATERIAL

B.COM-V SEM.

COST ACCOUNTING **UNIT : I-IV**

COURSE BCG-501 **LESSON NO. : 1-12**

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COST ACCOUNTING

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B.COM FIFTH SEMESTER
COST ACCOUNTING

Course:BCG 501 **Title : Cost Accounting**

Duration of Exam: 3 hrs. **Total Marks :100**

Internal Assessment : 20

External Examination: 80

(Syllabus for examination to be held in Dec 2016, 2017, 2018)

UNIT-I

INTRODUCTION:

Cost Accounting, Meaning , Scope , Objectives and Limitations,Difference betweeen Cost and Financial accounting , Items excluded from Cost accounts, Costing as an aid to Management.

Numerical : Prepration of Cost sheet and Tender (Quotation)

UNIT -II

ACCOUNTING FOR MATERIALS

Meaning and classification of Materials Meaning and Objectives of Store Keeping.

Numerical : Requisitioning for stores- calculation of re-ordering level and economics ordering quantity (Formula method only)

Methods of evaluating material issues -FIFO, LIFO, Simple Average Cost and Weighted Average Cost Methods.

UNIT -III

ACCOUNTING FOR LABOUR AND OVERHEADS COST:

Idle time -Meaning and causes, Methods of Wage Payment , Overheads -Meaning and difference between overhead Allocation and Apportionment Meaning and Cause of under and over Absorption of Overheads

Numerical: Methods of Absortion of overheads - Direct labour hour R

ate and Machine Hour Rate.

UNIT-IV

METHODS OF COSTING

Contract costing - Meaning and Types of Contracts Concept of Retention money and Work in Progress, Process costing -Meaning and Features Concept of normal & Abnormal wastage and Abnormal Gains.

Numerical: Prepation of contract accounts , Preparation of process account with normal process loss, abnormal process loss and abnormal gain.

SKILL DEVELOPMENT (GUIDELINES FOR CLASS ROOM TEACHING AND INTERNAL ASSESSMENT)

Enable student to clearly identify elements of cost.

Make students able to prepare cost sheet and tender.

Create clear understanding in the minds of students about the calculation of labour and machine hour rate.

Teach the preparation of contract and process accounts as per specifications mentioned in the syllabus.

Create deep understanding of all concepts specified in the syllabus.

MODEL QUESTION PAPER

COST ACCOUNTING

Max marks :-80

Time allowed:3hrs

Section A (20 marks)

Attempt all the questions .Each question carries five marks

1. Differentiate between Cost and Financial Accounting

2. What is store keeping ? What are the objectives of Store keeping ?

3. Differentiate between Allocation and apportionment of overheads.

4. Write short note on Retention money and work in progress under contract costing.

Section B (60 Marks)

Attempt any four questions, selecting one question from each unit. Each question carries 15 marks

1. The following data relate to the manufacture of product during the month of May

Raw materials consumed	= Rs. 80000.
Direct wages	= Rs. 48000.
Machine hour worked	= 8000
Machine hour rate	= Rs. 4
Office overheads	= 10% of work cost.
Selling overheads	= Rs. 1.50 per unit sold.
Units produced	= 4000
Units sold	= 3600 at Rs 50 each.

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

OR

The accounts of a machine manufacturing comapny disclose the following information for the six months ending 31st December 2006

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

Prepare the cost sheet of the machines and calculate the price which the company should quote for the manufacture of a machine requiring material valued Rs. 1,250 and expenditure in productive wages Rs 750 so that the price might yield a profit of 20% on the selling price. Absorb factory overheads on the basis of Direct Wages and Administration Expenses on works cost basis.

2. Given the annual consumption of a material is 1,800 units ordering costs are Rs. 2 per order per unit of material is 32 paisa and storage costs are 25% per annum of stock value , find the Economic order quantity.

OR

The stock in hand of a material as on 1st September , 2006 was 500 units at Re 1 per unit. The following purchase and issues were subsequently made. Prepare the store Ledger account showing how the value of the issues would be recorded under (a) FIFO and (b) LIFO methods

Purchased	Issues
Sept 6 800 units@ Rs 2.20	Sept 9 450 units
Sept 8 400 units@ Rs1.40	Oct 27 700 units
Oct 16 1000 units@Rs 2.00	Nov 30 800 units
Nov 20 700 units@ Rs1.00	

3 . Meaning and causes of under and over absorption of overheads.

OR

Machine X cost Rs 1,10,000 and has a life of 15 years and its expected to

yields a scrap value of Rs 5000. The normal working hour p.a are 2,400 inclusive of 10% for preventive maintenance . The following information is avaliable for the machine; Rent Rs 2400 p,a ,: Light Rs 50 p.m : Power @ 10 p.per unit rs 700 p.m : Supplies rs 1,800 p.a repairs rs 3600 p.a Wages of the operators Rs 2.00 per hour and supervision Rs 600 p.m ascertain the comprehensive machine hour rate. If the machine is idle for want of material for 10 hours how much is the loss?

4. M/s Promising Company undertook a contract for erecting sewerage treatment plant for Prosperous Municipality for a total value of Rs 24 lakhs . It was estimated that the job would be complected by 31st january 2007

You are asked to prepare the contract Account for the year ending 31st January 2007 from the following particulars;

(i) Material Rs 3,00,000

(ii) Wages Rs 6,00,000

(iii) Overhead charges Rs 1,20,000

(iv) Special Plant Rs 2,00,000

(v) Work certified was for Rs 16,00,000 and 80% of the same was recieved in cash.

(vi) Material lying at site as on 31-1-2007 Rs 40,000.

(vii) Depreciate Plant by 10%

(viii) 5% of the value of material issued and 6% of wages may be taken to have been incurred for the portion of the work completed but not yet certified . Overheads are charged as a Percentage of Direct Wages.

(ix) Ignore depreciation of plant for use on uncertified portion of work

(x) Ascertain the amount to be ransferred to profit and loss A/c on the basis of realized profit.

OR

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 realized by disposal of wastage.

During April 2012 , 10,000 units of material costing Rs 6 per unit were introduced in process A the other costs are

	ProcessA	Process B
	Rs.	Rs.
Materials	-	6,140
Labour	10,000	6,000
Overheads	6,000	4,600

The output was 9,300 units from processsA 9,200 units were produced by Process B, which were transferred to the warehouse.

8,000 units of the finished product was sold @ Rs 15 per unit, The selling and distribution expenses were Rs 2 per unit.

Prepare (i) Process Accounts ; and (ii) A statement of profit or loss of the firm for April 2012 assumng there were no opening stocks of any type

Course Code: BCG-501 **UNIT -I**

Course Title : Cost Accounting **LESSON NO. 1-3**

1.1 Introduction

1.2 Objectives

1.3 Introduction of Cost Accounting

1.4 Meaning of Costing

- 1.4.1 Meaning of Cost Accounting
- 1.4.2 Difference between Costing and Cost Accounting
- 1.4.3 Meaning of Cost Management
- 1.4.4 Meaning of Cost Accountancy

1.5 Scope of Cost Accounting

1.6 Objectives of Cost Accounting

1.7 Advantages of Cost Accounting

1.8 Costing -an aid to Management

1.9 Distinguish between Financial Accounting and Cost Accounting.

1.10 Limitations of Cost Accounting

- 1.10.1 Objection against Cost Accounting
- 1.10.2 Limitations of Financial Accounting

1.11 General Principles of Cost Accounting

- 1.11.1 Characteristics of Ideal Costing System
- 1.11.2 Installation of a Costing System
- 1.11.3 Steps of Installation of a Costing System

1.11.4 Difficulties in Installing of a Costing System

1.11.5 Steps to overcome practical difficulties in Installing a Costing System

1.12 Meaning of Cost Ascertainment

1.12.1 Types and Techniques of Costing

1.12.2 Methods of Costing

1.12.3 Evolution and Development of Cost Accounting

1.12.4 Status of Cost Accountant

1.12.5 Role of Cost Accountant

1.12.6 Cost Accounting Department and its relations with other Departments

1.12.7 Meaning of Cost Accounting Standards

1.13 Meaning of Tender or Quotation

1.13.1 Cost Estimation

1.13.2 Use of estimated Costs for Quotation or Tenders

1.14 Meaning and Format of Production Account

1.15 Difference of Production Account and Cost sheet

1.16 Numerical solved Portion- Cost sheet

1.17 Numerical Unsolved Portion - Cost sheet

1.18 Numerical Practice Questions - Cost sheet

1.19 Summary

1.20 Glossary

1.21 References

1.1 Introduction

All types of business, whether Service Manufacturing or trading require cost accounting to trace their activities .It has long been used to help managers understand the costs of running a business modern cost accounting originated during the Industrial revolution when the comlexities of running a large scale Industries led to the development of system for recording and training costs to help business owners and managers make decision.

Some costs tend to remain the same even during busy periods, unlike variable costs which rise and fall with volume of work , overtime , these “fixed costs” have became these important to managers. However, with the growth of rail roads , steal and large Scale manufacturing by the late 19th century, these costs were often more important than the variable cost of a product and allowing them to a broad range of products led to bad decision making. Managers must understand fixed costs in order to make decision about products and pricing.

Cost accounting is the process of determining and accumilating the cost of product or activity . It is a process of accounting for the incurrence and the control of cost. It also covers classification , analysis and interpretation of cost. It is a system of accounting which provide the information about the uncertainment and control of costs of a product or service. It measures the operating efficiency of the enterprise. It is an internal aspect of the organisation . It is accounting for cost aimed at providing cost data statement and report for the purpose of Mangerial decision making.

1.2 Objectives

After reading unit you would be able

- to understand the Concept of cost account and cost accounting.
- to understand about the general principles of cost accounting , cost accounting Standards and cost systems.
- to know about the elements of cost, cost sheet , tender and quotations

1.3 Introduction to Cost Accounting

Today, the world has become a global village. There is a sea change in the business environment' Business is required to face competition world wide. In order to survive global in this economy, business must have a competitive edge over others. This

objective can be achieved if the business is inclined towards : (i) Cost Effectiveness and (ii) Quality Consciousness. Cost effectiveness and Quality consciousness are important elements

in determining the success of a business enterprise. Management can achieve these goals provided it has perfect and detailed knowledge about costs. Management has to ensure that quality is not compromised for saving in costs. Accounting in its traditional sense fails to provide meaningful information to the management to achieve modern objectives of business.

Cost accounting is a branch of accounting and has been developed due to limitations of financial accounting. Financial accounting is primarily concerned with record keeping directed towards the preparation of Statement of Profit an-d Loss and Balance Sheet. It provides information regarding the profit and loss that the business enterprise is making and also its financial position on a particular date. The information concerning the business enterprise is helpful to management to control in a general way the major functions of a business viz., finance, administration, production and distribution but details regarding operating efficiency of these divisions are lacking. In fact, the development in the field of cost accounting is so quick and fields covered by it are expanding so much in magnitude that it becomes difficult for management to lay down management policies, to guide management decisions or evaluate operating management performance with the information provided by financial accounting.

1.4 Meaning of Costing

Costing is a technique and process of ascertaining principles costs. This technique consists of and rules which govern the procedure of ascertaining the cost of products/ services. The process of costing includes routines of ascertaining costs by following techniques like historical or conventional costing, standard costing and marginal costing.

1.4.1 Meaning of Cost Accounting

Cost Accounting is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services, and tor the presentation of suitably arranged data for purposes of control and guidance of

management. It includes the ascertainment of the cost of every order, job, contract, process, service or unit as may be appropriate. It deals with the cost of production, selling and distribution. It is thus the provision of such analysis and classification of expenditure as will enable the total cost of any particular unit of production or service to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted (i.e. the value of material used, the amount of labour and other expenses incurred) so as to control and reduce its cost. According to wheldon, "Cost accounting is the application of accounting and costing principles, methods and techniques in the ascertainment of costs and the analysis of saving/or excess cost incurred as compared with previous experience or with standards. Thus, cost accounting relates to the collection, classification, ascertainment of cost and its accounting and control relating to the various elements of cost. It establishes budgets and standard costs and actual cost of operation, processes, departments or products and the analysis of variances, profitability and social use of funds. Thus, cost accounting has the following features :

(i) It is a process of accounting for costs.

(ii) It records income and expenditure relating to production of goods and services.

(iii) it-provides information on cost of every product, job, work order, process or operation of the organisation.

(iv) It provides statistical data on the basis of which future estimates are prepared and quotations are submitted.

(v) It is concerned with cost ascertainment, cost presentation, cost control and cost reduction.

(vi) It establishes budgets and standards so that actual cost may be compared to find out deviations or variances.

(vii) It involves the presentation of right information to the right person at the right time so that it may be helpful to management for planning, evaluation of performance, control and decision making.

1.4.2 Difference Between Costing and Cost Accounting

Main difference between costing and cost accounting are given as under:

Basis Distinction	Costing	Cost accounting
(1) Nature	It is a technique and process of ascertaining costs.	It is regarded as a specialised branch of accounting.
(2) Scope	Costing techniques include principles and rules which govern the procedure of ascertaining the cost of products/services.	It involves classification, accumulation, assignment and control of costs.
(3) Process	The process of costing consists of routines of .ascertaining costs by historical or conventional .costing, standard costing	It involves establishment of budgets, standard costs or actual costs of operations, classification, recording and Appropriate allocation of expenditure.

1.4.3 Meaning of Cost Management

Cost management is used to describe the approaches and activities of managers in the short-term and long-term planning and control decisions that increase value for customers and lower costs of products and service. It identities, collect, measures, classifies and reports information that is useful to managers in costing, planning, controlling and decision-making. Thus, it is oriented towards innovative and better management of costs of men,materials and machines including Methods (Techniques) and Minutes (Time). Costmanagement is the widest term and includes cost accounting, cost control, cost reduction and management accounting.

1.4.4 Meaning of Cost Accountancy

Cost Accountancy is the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived there from tor purposes of managerial decision making .Thus, cost accountancy is the science, art and practice of a cost accountant. It is science because it is a body of systematic knowledge having certain principles which a cost accountant should possess for proper discharge of his responsibilities.

It is an art as it requires the ability and skill with which a cost accountant is able to apply the principles of cost accountancy to ,various managerial problems. Practice includes the continuous efforts of a cost accountant in the field of cost accountancy. Such efforts also include the presentation of information for the purpose of managerial decision-making and keeping statistical records.

1.5 Scope of Cost Accountancy

Scope of cost accountancy is very wide and includes the following:

(i) cost Ascertainment. It deals with the collection and analysis of expenses, the measurement of production of the different products at the different stages of manufacture and the linking up of production with the expenses. In fact, the varying procedures for the collection of expenses give rise to the different systems of costing as Historical or Actual Costs, Estimated Costs Standard Costs etc. Again the varying procedures for the measurement or production have resulted in different methods of costing such as Specific order Costing, operation Costing. etc. For linking up of production with the expenses the different techniques of costing such as Marginal Cost technique, the Total Cost Technique.

Direct Cost Technique etc. have been evolved. All the three i.e. systems, methods and techniques can be used in one concern simultaneously.

(ii) Cost Accounting. It is the process of accounting for cost which begins with recording of expenditure and ends with the preparation of statistical data. It is normal mechanism by means of which costs of products or services are ascertained and controlled. Cost can be ascertained either by following the historical or

predetermined system of costing. Cost can bepredetermined either by standard costing or estimated. Costing. If the cost and financial accounts are kept separately then their reconciliation is also to be done in order to verify the accuracy of both sets of accounts.

(iii) Cost Control. Cost Control is the guidance and regulation by executive action of the costs of operating an undertaking. It aims it guiding the actual performance towards the line of targets regulates the actual if they deviate or vary from the targets ; this guidance and regulation is done by an executive action. The cost can be controlled by standard costing, budgetary, control, proper presentation and reporting of cost data and cost audit.

(iv) Cost Reduction. It is a planned positive approach to reduce expenditure. It is a corrective function by continuous process of analysis of costs, functions etc' for further economy in application of factors of production.

(v) Cost Audit. Cost Audit is the verification of the correctness check of cost accounts and a check on the adherence to the cost accounting plan. Its-purpose is not only to ensure that cost accounts and other records that are arithmetically correct correct but also to see that the principles and rules have been applied correctly.

1.6 Objectives of Cost Accounting

Objectives of cost accounting are ascertainment of cost, fixation of selling price, proper recording and presentation of cost data to management for measuring efficiency and for cost control and cost reduction, ascertaining the profit of each activity, assisting management in decision making and determination of break-even point. The aim is to know the methods by which expenditure on materials, wages and overheads is recorded, classified and allocated so that the cost of products and services may be accurately ascertained ; these costs may be related to sales and profitability may be determined. Yet with the development of business and industry, its objectives are changing day by day. Following are the main objectives of cost accounting :

(i) To ascertain the cost per unit of the different products manufactured by a business concern;

(ii) To provide a correct analysis of cost both by process or operations and by different elements of cost;

(iii) To disclose sources of wastage whether of material, time or expense or in the use of machinery, equipment and tools and to prepare such reports which may be necessary to control such wastage;

(iv) To provide requisite data and serve as a guide for fixing prices of products manufactured or services rendered;

(v) To ascertain the profitability of each of the products and advise management as to how these profits can be maximised;

(vi) To exercise effective control of stocks of raw materials, work-in-progress, consumable stores and finished goods in order to minimise the capital locked up in these stocks;

(vii) To reveal sources of economy by installing and implementing a system of cost control for materials, labour and overheads; -

(viii) To advise management on future expansion policies and proposed capital projects;

(ix) To present and interpret data for management planning, evaluation of performance and control;

(x) To help in the preparation of budgets and implementation of budgetary control;

(xi) To organise an effective information system so that different levels of management may get the required information at the right time in right form for carrying out their individual responsibilities their in an efficient manner;

(xii) To guide management in the formulation and implementation of incentive bonus plans based on productivity and cost savings

(xiii) To supply useful data to management for taking various financial decisions such as introduction of new products, replacement of labour by machine etc;

(xiv)) To help in supervising the working of data processing through computers;

(xv) To organise the internal audit system to ensure effective working of different departments;

(xvi) To organise cost reduction programmes with the help of different departmental managers;

(xvii) To provide specialised services of cost audit in order to prevent the errors and frauds and to facilitate prompt and reliable information to management; and

(xviii) To find out costing profit or loss by identifying with revenues the costs of those products or services by selling which the revenues have-resulted.

Broadly speaking, the above objectives can be re-grouped under the following three heads :

(1) Ascertainment and analysis of cost and income by product, function and responsibility

(2) Accumulation and utilisation of cost data for control purpose to have the minimum possible cost consistent with maintenance of quality. This objective is achieved through fixation of targets, ascertainment of actual, comparison of actual withtargets, ,analysis of reasons of deviations between actual and targets and reporting deviations to management for taking corrective action.

(3) Providing useful data to management for taking decisions.

1.7 Advantages of Cost Accounting

Main advantages of cost accounting are given below :

(i) **Profitable and unprofitable activities are disclosed** and steps can be taken to eliminate or reduce those activities from which little or no benefit is obtained or tochange method of production in order to make such activities more profitable.

(ii) **It enables a concern to measure the efficiency and then to maintain and improve it**. This is done with the help of valuable data made available

for the purpose of comparison. For example, if material spent upon a pair of shoes in 2014 comes to Rs 160 and for a similar pair of shoes the amount is Rs 180 in 2016, the increase may be due to increase in prices of material or more wastage in the use of materials or inefficiency at the time of buying or unnecessarily high prices paid.

(iii) **It provides information upon which estimates and tenders are based.** In case of big contracts or jobs, quotations cannot be given unless the cost of completing the contracts can be found out.

(iv) **It guides future production policies**. It explains the cost incurred and profit made in various lines of business and processes and thereby provides data on the basis of which production can be appropriately planned.

(v) **It helps in increasing profits** by disclosing the sources of loss or waste and by suggesting such controls so that wastages, leakages and inefficiencies of all department may be detected and prevented.

(vi) **It enables a periodical determination of profits or losses** without resort to Stocktaking

(vii) It furnishes **reliable data for comparing costs** in different periods for different volumes of output, in different departments and processes and in different establishments. This helps in maintaining costs at the lowest point consistent with the most efficient operating conditions.

(viii) The **exact cause of a decrease or increase in profit or loss** can be detected.A concern may suffer not because the cost production is high or prices are low but also because the output is much below the capacity of the concern. This fact is revealed by cost accounts only.

(ix) Cost Accounting discloses **the relative efficiencies of different workers** and there by facilitates the introduction of suitable plans of wage payment to reward efficiency and to provide adequate incentive to the less efficient workers. A goodsystem of costing promotes prosperity of the business and thus ensures greater security of service and adequate reward to workers.

(x) It enables the **creditors and investors** to judge the financial strength and creditworthiness of the business . **A sound business concern with a good system of costing can attract more investors** than a similar concern without an adequate system of costing.

(xi) **Helpful to the Government**. It facilitates the assessment of Excise Duty andincome Tax and the formulation of policies regarding industry, export, import,taxation etc. It also facilitates the preparation of national plans for economic development. It provides ready figures for use by the Government for application to problems like price fixation, price control, tariff protection, wage level fixation, payment of dividends or settlement of disputes.

(xii) **Helpful to Consumers.** The ultimate aim of costing is to reduce cost of productionto the minimum and maximise the profits of the business. A part of the benefitresulting from the reduction of the cost is usually passed on to consumers in theform of lower prices. Besides, the installation of a costing system will infuseconfidence in the minds of the public about the fairness of the prices charged.

(xiii) **Efficiency of Public Enterprises**. The efficiency of a public sector can be best judged by comparing its cost of production with the cost of production of its counterpart in the private sector. Public enterprises lack the personal initiative and interest of private enterprises. A good system of costing ensures efficient and effective control through a proper analysis of their working. It provides for gradedfinancial control over expenditure and avoids conflict of authority. It measures efficiency and profitability of the undertaking to justify its running in the public sector. It helps management in fixing reasonable selling prices for the products manufactured or services rendered by public enterprises.

(xiii) **Helpful to the Economy.** The aim of costing is to eliminate wasteful expenditurethereby reducing and controlling cost. It ensures optimum utilisation of limited resources. It also helps increase the productivity. These factors go a long way to boost the economy and mark its place at the global level.

1.8 Costing-An Aid to Management

Planning, decision-making and control are three important functions of management. It is desirable to have a brief discussion of these functions.

Planning. Planning is thinking in advance i.e. looking ahead and deciding in advancewhat to do, how to do it, when to do it and who is to do it. In planning, management is concerned with laying down objectives and determining the courses of actions to be followed out of several alternatives available to achieve those objectives. Thus, planning is concerned with future activity and formulates budgets to meet the objectives of the organisation.

Decision Making. Since management has to make a choice of one course of action out of several alternative courses of action available, it involves decision-making. All rational decisions are based on accounting information. Decisions may relate to various problems like:

(i) **Fixation of price ;** (ii) Whether or not price should be reduced for increased level of sales ; (iii) Whether a change in production should be followed ; (iv) Whether or not factory should operate at full capacity;(v) Determination of the most profitable levels of production;(v) Whether to make or buy a spare part ; (vii) Whether a new product should be introduced in the market (viii) Whether the product should be exported or not ; (ix) Whether a particular market should be tapped or not ; (x) Whether a product should be discontinued to avoid the present loss ; and (xi) Whether or not an investment in a particular asset will be worthwhile.

Controlling. Controlling is that part of management activity whereby managers compare actual performance against the planned performance, find out the deviations and take remedial steps to remove the deviations. Immediate action should be taken to remove the deviations to make an improvement in the performance because promptness is the essence of an effective control. Thus, control helps correction. Planning and controlling are interlinked with each other because a manager cannot control unless he has planned a c6urse of action.

The above functions of management cannot be satisfactorily carried out by financial accounting because of its limitations. Cost accounting helps management in carrying out efficiently its functions (i.e. planning, budgeting, decision-making, organising, control, pricing and evaluation of operating efficiency) by developing practical cost procedures that provide information useful in controlling the operations of the business enterprise. cost accounting does this by analysing, recording, standardising, forecasting, comparing, reporting and recommending. Cost accounting methods supply the basis of factual information on which management can build up its presentation of planning and control. In fact, cost accounting is so closely allied to management that it is difficult to indicate where work of cost accountant ends and managerial control begins. To quote Blocker and Weltmer, in general, it may be said that cost accounting is to serve management in the execution of policies and in then comparison or actual and estimated results in order that the value of each policy be appraised and changed to meet future conditions.

A good system of cost accounting serves management

(a) **Classification and Sub-divisions of Costs.** Costs are collected and classified by various ways in order to provide. information to management for control purposes and to ascertain the profitability of each area of activity. It enables a concern to measure the efficiency, and then to maintain and improve it. Unprofitable activities are disclosed and steps can be taken to make an improvement in those activities.

(b) **Control of Materials, Labour and overhead costs**. An efficient check is provided on stores and materials. Stores Ledger and material Abstracts are maintained which provide an effective check on the stores and materials used in a business. By adopting the maximum limit for stores the total capital outlay is controlled and total financial loss due to over stocking is obviated. Information of stock of various materials and stores is constantly available. This helps in planning the production according to availability of materials and fresh stocks can be arranged in time. Loss due to carelessness or pilferage or any other mischief is detected and steps may, therefore, be taken to minimise

such loss in future. An efficient check on labour and machines is provided by giving detailed information about the availability of machine and labour capacity. The work is so planned that no section is over worked and no section remains idle. The maintenance of time and job cards for workers discloses the loss incurred by idle time and indicates the direction in which losses may be minimised. The relative advantages of remunerating labour, on the time or piece work or premium plans may be ascertained. It also measures the efficiency of the wages system in use. Cost Accounting thus provides a detailed control of materials and stores and labour costs. Various techniques of materials control are applied in order to avoid the excessive locking up of capital in stock of materials and stores. Idle time should be kept as low as possible. By having proper classification of overheads into controllable and uncontrollable or fixed and variable, it helps to control the overhead costs.

(c) **Business Policies.** Business Policy may require the consideration of alternativeMethods and procedures and this is facilitated by cost information correctly presented. For example, by the aid of cost reports management can decide whether the manufacture of certain products increases overhead expenditure disproportionately or whether to treat by products even at a loss to make possible a more important trade in another product. Thus it helps management 'to take vital decisions such as introduction of a new product, selection of a most profitable product mix, utilisation-of space capacity, exploration of additional market, whether to make or buy, problem of limiting factors, replacement of existing assets, appraisal of proposed investment to meet etc. with the help of marginal costing techniques and differential cost analysis.

(d) **Budgeting.** It provides the use of budgets and performance reports and enables management to correct inefficiencies before they enter into business. It is a co-ordinated plan of action for every responsible person for comparing the actual results with the budgets. Two important cost accounting tools for helping managers are budgets and performance reports.Budgets are financial and/or quantitative statements prepared and approved prior to a defined period of time, of the policies to be pursued during that period for the purpose

of attaining objectives of management. Thus, budgets are the formal quantifications management. Performance reports of the plans of measure actual performance and give accounts of comparisons of budgets with actual results which facilitate action against those persons whose performance is less than the performance specified in the budgets. The technique of control through performance reports is known as management by exception, which is the practice of concentrating on areas whose performance is not up to the mark as it was planned and ignoring areas that are running smoothly as these were planned.

(e) **Standards for Measuring Efficiency.** It provides the use of standards to assist management in making estimates and plans for future and to provide the basis of management of efficiency. Actuals are compared with predetermined standards to determine the operating efficiency.

(f) **Best use of Limited Resources.** In all varied fields we are concerned to make the best use of limited resources that are available to us. Thus the intention is to obtain the maximum output from a given input. Cost Accounting provides the reliable data of costs with regard to materials, wages and other expenses. These help management to get maximum output at the minimum cost by indicating where economies may be affected, waste eliminated and efficiency increased ; some of the loss occasioned by reduced turnover and falling prices may be avoided.

(g) **Instrument of Management Control**. It provides management with valuable data for Planning, budgeting and control of costs. The organisation and management of undertaking must be planned and controlled in such a way that the desired volume of production is achieved at the least possible cost in relation to the scheduled quantity of the product. The measurement of the degree to which this objective is attained, is provided by cost accounting. An efficient system of cost accounting is, thus, regarded as an important part in the efforts of any management to secure business stability.

(h) **Cost Audit**. The operation of a system of cost audit in the will assist in prevention of errors and frauds. It will help to improve cost accounting methods

and techniques to facilitate prompt and reliable information to management.

(i) **Special Factors.** It informs management about the special factors such as optimum profitability, seasonal variations in volume and costs, idle time of labour and capacity of the machine etc. It also helps to curtail the losses during the off season.

(j) **Price Determination.** It helps management to fix the remunerative selling prices of various items of goods in different circumstances. During the period of depression a businessman has to become very watchful and vigilant in tracking down the concealed inefficiencies and sources of wastage, so that he may reduce the cost of production to the minimum. He has to resort to price cutting to such an extent so as to recover variable costs. Cost accounting makes a distinction between fixed and variable costs and helps the businessman in the determination of prices in the depression period. The fixation of prices cannot be properly done unless proper figure of cost are available. If prices are fixed without costing information, it is possible, that prices quoted be too high or too low. In periods of depression, It may become necessary to reduce the prices even below total cost. It is only costing which will guide the businessman in this matter.

(k) **Expansion**. Management is able to formulate expansion policy on the basis of estimates of cost of production at various levels provide by cost accountant.

1.9 Distinguish between Financial Accounting and Cost Accounting

Both financial and cost accounting are the branches of accounting whose main object is to provide information by recording the business transaction systematically and scientifically so that it may serve the purpose of the management for policy formulation and controlling and to provide necessary protection to the outsiders. Both are based on double entry system and their roles are supplementary. The ordinary trading account is a locked storehouse of

Most valuable information to which cost system is the key. In case of financial accounting stress is on the ascertainment and presentation of profits earned or losses incurred in the business. Due to this reason, in financial accounting the transactions are recorded, classified and analysed in a subjective manner, i.e.,

according to the nature of expenditure. They do not provide the information on the relative effectiveness of products,processes, human resources, equipments and other factors of production. The provision of accounting and financial data at macro level does not provide tools for indepth analysis for performance in terms of cost efficiency. Thus, Financial accounting treats costs very broadly, while cost accounting does this in much greater detail. In order to illustrate this fact, let us examine the following statement :

Particulars	**Under Financial Accounting**	**Under Cost Accounting**		
(1)	**Total** **(2)**	**Product A** **(3)**	**Product B** **(4)**	**Product C** **(5)**
	Rs	Rs	Rs	Rs
Materials	1,50,000	48,000	37,000	65,000
Wages	70,000	15,000	25,000	30,000
Other Expenses	50,000	15,000	18,000	17,000
Total Cost	2,70.000	78,000	80,000	1,12,000
Sales	3,00,000	1,02,400	1,08,000	89,600
Profit	30,000	24,400	28,000	(-)22,400
Profit (%)	10	23.8	25.9	

Financial accounting reveals (see column 2) an apparently satisfactory profit of Rs.30,000 which represents 10% of sales. However the information is too general to be of great use to management, who needs to know the profit or loss of each product so that policy decision can be made. With this end in view and assuming that three products A, B and C were manufactured, cost accounting records (see Column 3 to 5) could reveal a position something like the above.

The information (under cost accounting) clearly reveals to management that products A and B are obtaining approximately 24% and 26% profit but product C is pulling down the total profit to 10%. Thus management may : (a) investigate thoroughly

product C to find out possible economies, (b) Stop production of C, (c) increase selling price of C, (d) produce C as a loss leader, i.e., produce and sell in the hope of encouraging consumers also to buy A and B g provided there are no changes in plant capacity, plant utilisation, volume of sales etc. The cost accountant point out the facts and where possible, suggests remedies; management must make the final decision on policy.

For example, it course (b) were followed, the overhead which had been absorbed by product C, may have to absorbed by Products A and B or if course (c) were followed, market research may have to be conduct6ed to determine consumer reactions.

Distinction Between Financial Accounting and Cost Accounting

Main differences between financial accounting and cost accounting are given as

Point of Distinction		Financial Accounting	Cost Accounting
(1)	**Purpose**	It provides information about the It provides information to business in a general way. It tellsabout the profit and loss and financial position of the business to owners and other outside Parties.	It provides information to management for Proper planning, operation, control and decision making.
(2)	**Form of Accounts**	These accounts are kept in such a way as to meet the requirements of Companies Act and Income Tax Act.	These accounts are generally kept voluntarily to meet the requirements of management. But now Companies Act has made it obligatory to keep cost records in some manufacturing industries.
3)	**Recording**	It classifies, records and analyses the transactions in a subjective manner i.e. according to the nature of expenses.	It records the expenditure in an objective manner i.e. according tothe purposes for which the costs-are incurred.

(4) Control	It lays emphasis on the recording aspect without attaching any importance to control.	It provides a detailed system of control for materials, labour and overhead costs with the help of standard costing and budgetary control.
5 Periodicity ofReporting	It reports operating results and financial position usually at the end of the year.	It gives information, through costreports to management as and when desired.
6 Analysis of Profit	Financial accounts are the accounts of the whole business. They are independent in nature and disclose the net profit or loss of the business as a whole.	Cost accounting is only a part of the financial accounts and' discloses profit or loss of each product, job or service.
7 Reporting of cost	The costs are reported in aggregate in financial accounts.	The costs are broken down on a unit basis in cost accounts.
8 Nature of Transaction	Financial accounts relate to commercial transactions of the business and include all expenses viz., manufacturing, office, selling and distribution etc. Financial accounts are concerned with external transactions i.e. transactions between the business concern on one side and third parties on the other. These transactions form the basis for payment or receipt of cash.	Cost accounts relate to transactionsconnected with the manufacture ofgoods and services and include only those expenses which enter into th6 production. Cost accounts are concerned with internal transactions which do not form the basis of payment or receipt of cash.
9 Information	Monetary information is only used (i.e. only monetary transactions are recorded).	Non-monetary information like units is also used (i.e. it deals withmonetary as well as non-monetary information).
10 Fixation of Selling price	Financial accounts are not maintained with the object of fixing selling prices.	Cost accounting provides sufficient data for fixation of selling prices.

10 Figures	Financial accounts deal mainly with actual facts and figures.	Cost accounts deal partly with factsand figures and partly with estimates.
(13) Reference	In devising or operating a system of financial accounting reference can be made in case of difficulty to the company law, case decisions and to the canons of sound professional practice.	No such reference is possible. Guidance can be had only from a body of conventions followed cost accountants.
(14) Relative Efficiency	Financial accounts do not provide information on the relative efficiencies of various workers, plants and machinery.	Cost accounts provide valuable information on the relative efficiencies of various workers, plants and machinery.
(15) Stock Valuation	Stocks are valued at cost or market price whichever is less.	Stocks are valued at cost.
(15) Type of Science	Financial accounting is a positive Science because it is subject to legal rigidity with regard to the preparation of the financial statements. Financial accounting is a positive Science because it is subject to legal rigidity with regard to the preparation of the financial statements.	Cost accounting is not only a positive science but also a normative science because it includes techniques of budgetary control and standard costing. Costing is an empirical science, that is to say, the rules which govern it are largely conditioned by the operations, personnel and Policy of the undertaking with respect to which its techniques are to be applied.

1.10 Limitations of Cost Accounting

Cost accounting like other branches of accountancy is not an exact science but is an art which has developed through theories and accounting practice based on reasoning and common sense. Many theories can be proved or disproved in the light of conventions and basic principles of cost accounting. These principle are not static but changing with the change of time and circumstances. Following are the main limitations of cost accounting :

(i) Cost accounting lacks a uniform procedure. It is possible that two equally competent cost accountants may arrive at different results from the same information. keeping in view this limitation, all cost accounting results can be taken as mere estimates.

(ii) There are a large number of conventions, estimates and flexible factors such as classification of costs into its element., of materials on average or standard price, apportionment of overhead expenses, arbitrary allocation of joint costs, division of overheads into fixed and variable costs, division of cost into normal and abnormal and controllable and non-controllable and adoption of marginal costs and standard costs due to which it becomes difficult to have exact costs. Moreover, no one cost is suitable for a, purposes and under all circumstances. virtually its calculation depends on the use to which the data are required to be put to because of inclusion of some items of cost on estimated basis it is difficult to have actual true cost. On this basis when the valuation of stock is done, that will not be based on true facts and naturally the profit Calculated from the cost records will not be true.

(iii) For getting the benefits of cost accounting **many formalities are to be observed** by a small and medium ,size concern due to which the establishment and running costs are so much that it becomes difficult for these concerns to afford its cost. Thus, cost accounting can be used only by big concerns.

(iv) Contribution of cost accounting for handling futuristic situations has not beenmuch. For example, it has not evolved so far any tool for handling inflationary situation.

1.10.1 Objections Against Cost Accounting

A number of objections are generally raised against the introduction of costing on Various grounds. Following are some of the important objections usually raised.

(1) **Want of necessity.** It has been argued that costing is of recent origin and that industries prospered in the past and are still prospering without the aid of costing and, therefore, expenditure-incurred in installing a costing System would be an unnecessary expenditure. This argument overlooks the fact that modern industries are running under highly competitive conditions and that every manufacture should know the actual cost of production to decide how far he can reduce the selling price. Many industrial failures in the past may be attributed to the lack of knowledge on the part of manufacturer of actual cost of production and therefore, selling products below cost.

(2) **Inapplicability.** It is argued that modern methods of costing are inapplicable to many types of industries. It is true costing cannot be applied with advantage to trading concerns and concerns of small size. But in many cases some methods of costing can devised always be to suit the requirements of the business. It should be clearly understood that there is no stereotyped system of costing which can be applied to all types or industries. The system of costing should be so devised as to suit the business but not the business to suit the system.

(3) **Failure in many cases**. It is argued that the adoption of costing system failed to produce the desired results in many cases and, therefore, the system is defective. The failure of a system may be due to several causes such as apathy or indifference of management, lack of adequate facilities, non-co-operation or opposition from the employees. So it is hasty to find fault with the system, if it fails to produce the desired results.

(4) **Mere matter of forms and rulings**. It is argued that after some time, a costing system degenerates into a matter of forms and rulings. This is not the fault of the system. It is thefault. of the way in which the system is maintained. Forms and rulings are essential for a costing system but they must be revised and brought up-to-date ii the light of altered conditions' lf this is not done,

the system is bound to d6generate into a mere matter of forms and rulings.

(5) **Expensive**. It is said that the cost involved in installing and working a cost system isout of all proportions to the benefits derived there from. It may be stated in this connection that a costing system must be a profitable investment and should produce benefits commensurate with the expenditure incurred on the system. If care is taken to devise a costing system to suit the requirements of the industry and avoid unnecessary elaboration, expenditure incurred in installing and operating the system will be a profitable investment and will bring adequate return.

1.10.2 Limitations of Financial Accounting

Following limitations of financial accounting have led to the development of cost accounting :

1. No clear idea of operating efficiency. Financial accounting does not give a clear picture of operating efficiency when prices are rising or decreasing on account of inflation or trade depression. It is possible that profits may be more or less not because of efficiency or inefficiency but because of inflation or trade depression.

2. **Weakness not spotted out by collective results**. Financial accounting discloses only the net result of the collective activities of a business as a whole. It does not indicate Profit or loss of each department, job, process or contract. It does not disclose the exact cause of inefficiency i.e., it does not tell where the weakness is because it discloses the net profit of all the activities of a business as a whole. It can be compared with a reading on a thermometer. A reading of more than 98.4 or less than 98.4 discloses that something is wrong with human body but the exact disease is not disclosed. Similarly, loss or less profit disclosed by the statement of profit and loss is signal of bad performance of the business but the exact cause of such performance is not known.

3. **Not helpful in the price fixation.** In financial accounting costs are not available as an aid in determining prices of the products, services, production

order and lines of products.

4. **No classification of expenses and accounts**. In financial accounting there is no such System by which accounts are classified so as to give data regarding costs by departments, processes, products in the manufacturing divisions ; by units of product lines and sales territories ; by departments, services and functions in the administrative division. Further expenses are not classified as to direct and indirect items and are not assigned to the products at each stage of production to show the controllable and uncontrollable items of overhead costs.

5. **No data for comparison and decision-making.** It does not supply useful data to management for comparison with previous period and for taking various financial decisions as introduction of new products, replacement of labour by machines, price in normal or special circumstances, producing a part in the factory or buying it from outside market,production of a product to be continued or given up, priority accorded to different products, investment to be made in new products or not etc.

6. **No control on cost**. It does not provide for a proper control of materials and supplies, wages, labour and overheads and as a result effective cost control is not possible.

7. **No standards to assess the performance.** In financial accounting there is no well developed system of standards to appraise the efficiency of the organisation in the use of materials, labour and overhead costs by comparing the work of labourers, clerks, salesmen and executives which should have been accomplished in producing and selling a given number of products in an allotted period of time. It does not provide information to assess the performance of various persons and departments and to see that the costs do not exceed a reasonable limit for a given quantum of work of the requisite quality.

8. **Provides only historical information**. Financial accounting is mainly historical and tells about the cost already incurred. It does not provide day-to-day cost information to management for making effective plans for the coming

year and the period after that as financial data are summarised at the end of the accounting period

9. **No analysis of losses**. It does not provide complete analysis of losses due to defective material, idle time, idle plant and equipment. In other words, no distinction is made between avoidable and unavoidable wastage.

10. **Inadequate information for reports.** It does not provide adequate information for reports to outside agencies such as banks, government, insurance companies and trade associations.

11. **No answer for certain questions**. Financial accounting will not help to answer such questions as :(a) Should an attempt be made to sell more products or is the factory operating to capacity ? (b) lf an order or contract is accepted, is the price obtainable sufficient to show I profit ? (c) lf the manufacture or sale of product A were discontinued and efforts made to increase the sale of product B, what would be the effect on the net profit ? (d) Why the profit of last year is of such a small amount despite the fact that output was increased substantially ? (e) If a machine is purchased to carry out a job, at present done by hand, what effect will this have on profits ? (f) Wage rates having been increased by Rs.10 per hour, should selling price be increased, and if so, by how much?

1.11 General Principles of Cost Accounting

Following are the main principles of Cost Accounting :

(1) Cause-effect relationship. Cause-effect relationship should be established for each item of cost. Each item of cost should be related to its cause as minutely as possible and the effect of the same on the various departments should be ascertained. A cost should be shared only by those units which pass through the departments for which such cost has been incurred.

(2) Charge of cost only after its incurrence. Unit cost should include only those costs which have been actually incurred. For example unit cost should not be charged with setting

cost while it is still in factory.

(3) Past costs sho.uld not form part of future costs. Past costs (which could not be recovered- in past) should not be recovered from future costs as it will not only affect the true results of future period but will also distort other statements.

(4) Exclusion of abnormal costs from cost accounts. All costs incurred because of abnorm.al reasons (like theft, negligence) should not be taken into consideration while computing the unit cost. lf done so, it will distort the cost figures and mislead management resulting in wrong decisions.

(5) entry should be followed preferably. To lessen the chances of any mistake or error, cost ledgers and cost control accounts, as far as possible, should be maintained on double entry principles. This will ensure the correctness of cost sheets and cost statements which are prepared for cost ascertainment and cost control.

1.11.1 Characteristics of an Ideal Costing System

The main objective of introduction of a Cost Accounting System in a manufacturing organisation are ascertainment of cost, determination of selling price, cost control and cost reduction, ascertainment of profit of each activity and assisting in managerial decision making.

An ideal system of costing is that which achieves the objectives of a costing system and brings all advantages of costing to the business. Following are the main characteristics which an ideal system of costing should possess or the points which should be taken into Consideration before installing a costing system.

(i) **Suitability to the business**. A costing system should be tailor-made, practical and must be devised according to the nature, conditions, requirements and size of the business. Any system which serves the purposes of the business and supplies necessary information for running the business efficiently is an ideal system.

(ii) **Simple and Informative.** The system of costing should be simple and plain so that it may be easily understood even by a person of average intelligence. The facts, figures and other information's provided by cost accounting must be presented in the right form at the right time to the right person in order to

make it more meaningful.

(iii) **Flexibility and Accuracy.** The system of costing must be flexible so that it may be Changed according to changed conditions and circumstances. The system without such flexibility will be outmoded because of fast changes in business and industry. Thus, the system must have the capacity of expansion or contraction without much changes. The data to be used by cost accounting system should be accurate otherwise it may distort the output of the system.

(iv) **Economical.** A costing system is like other economic goods. It costs money just like Economic goods. If the system is too expensive, management may be unwilling to pay as Buyers are not willing to pay for the goods if these are expensive as compared to their utility. A costing system should not to expensive and must be adapted according to the financialCapacity of the business. The benefits to be derived from the system must be more than itscosts as .management will be willing to install the system when its perceived expectedbenefits exceed its perceived expected costs. In short, the system must be economical taking into consideration the requirements of the business. The cost of installing and operating the system should justify the results in order to have cost benefit analysis.

(v) **Comparability**. The costing system must be such so that it may provide facts and figures necessary to management for evaluating the performance by comparing it with the past figures , or figures of other concerns or against the industry as a whole or other department of the same concern.

(vi) **Capability of presenting information at the desired time.** The system must provide accurate and timely information so that it may be helpful to management for taking decisions and suitable action for the purpose of cost control.

(vii) **Support from Management.** Necessary cooperation and participation of executives From various departments of the concern is essential for development of a good system of cost accounting. Moreover, management should have faith in the costing system and should also provide a helping hand

for its development and success.

(viii) **Precise information**. The system of costing should not sacrifice the utility by introducing meticulous and unnecessary details.

(ix) **Procedure.** A carefully phased programme should be prepared by using network analysis for the introduction of the system.

(x) **Minimum changes in the existing set up.** The existing system of delegation and division of authority and responsibility must not be disturbed with the costing system. As far as possible the system must be such so that it may least disturb the existing organisational set up.

(xi) **Uniformity of forms.** All forms and performs etc. necessary to the system should be uniform in size and quality of paper. Higher efficiency can be obtained by using colour of the paper to distinguish different forms. Printed forms should contain instructions as to their use and disposal. Forms should be suitably designed for collection and dissemination of cost data.

(xii) **Minimum clerical work.** The filling of the forms by foremen and workers should little clerical work as possible as most of workers are not well educated. To ensure reliable statistics, every original entry should by supported by an examiner's signatures.

(xii) **Efficient system of material control.** There should be an efficient system of stores stock control as mate.ria.ls. usually account for a greater proportion of the total cost. A good method of pricing material issued to production should be followed.

(xiv) **Adequate wage procedure**. There should be a well defined wage procedure for recording the time spent by workers on different jobs, for preparing the wage sheets and for The payment of wages' Thus the introduction of well defined wage system will help to control of labour.

(xv) **Departmentalisation of expenses.** A sound plan should be devised for the collection, allocation, apportionment and absorption of overheads in order to ascertain the cost accurately.

(xvi) Reconciliation of cost accounts and financial accounts. If possible the

cost accounts and financial accounts should be interlocked into one integral accounting scheme. If this is not possible the systems should be so devised that the two sets of accounts are capable of easy reconciliation.

(xvii) External factors. The installation of a costing system mainly depends on internal may factors of a firm, but external factors may also affect the structure of the system. For example, cost accounting rules applicable to certain industries as notified by the Central government require certain cost information to be developed and included in the books of accounts. Therefore, an ideal system of costing should take care of internal as well as external factors.

(xviii) Duties and. responsibilities of the cost accountant. Under a good system of cost accounting the duties and responsibilities of the cost accountant should be clearly defined. The cost accountant should have access to all works and departments.

(xix) Trust. Management should have faith in the costing system and should also provide a helping hand for its development and success.

To conclude, primary criterion for an. ideal costing system is : How well it helps in achieving management goals in relation to its cost ?

1.11.2 Installation of a Costing System

The fundamental factors that a Cost Accountant should consider while introducing a system of costing are:

(i) The existing organisation should be disturbed as little as possible.

(ii) There should be a gradual and smooth introduction of the system.

(iii) While over elaboration of records should be avoided, it would be false economy to prune out essentials and impair efficiency.

1.11.3 Steps for Installation of a costing system

The steps to be taken in installing a costing system are given below:

(1) Objective to be achieved through the costing system. The costing system will be simple if the objective is only to determine cost but it will have to be

elaborate objective is to have information which will help management in exercising control and taking decisions.

(2) Studying the existing organisation and routine. In this connection the points to be noted are-the nature of the business and of the operations or process carried on, extent of responsibility and authority attached to the various functionaries, the with particular reference to the manufacturing departments, the methods of dealing with wastage of materials, the system of time recording and the methods of computing and paying wages the system of issuing orders for production to the factory and the amount of fixed, semi-variable and variable overheads.

(3) Deciding the structure of cost accounts. What system of cost accounting is suitable and the extent of details required can be decided after a thorough study of the manufacturing process and their ancillary services. The structure of cost accounts should follow the natural production line, the sequence can be simple, analytical or synthetic. The designing of the system should be such that there is a gradual build up of the cost at each significant stage of production as the product proceeds to completion.

(4) Determining the cost rates. This entails a thorough study of factory conditions and decisions are to be made about classification of cost into direct and indirect, grouping of indirect costs into production, selling, administration etc., treatment of wastes of all kinds, methods of pricing issues, methods of recovering overheads and calculation of overhead rates. A complete cost accounting code should be drawn up so that expenditure may be quickly classified in the office as to both source and cause.

(5) Introducing the system. No costing system can be expected to function effectively unless co-operation of all the officials could be obtained. Before the system is put into effect, the implications of the system should be explained to all indicating to them the benefits that will accrue to each and to the business as a whole. However, complete the system is, it should be introduced only by stages and the existing routines and practices should be utilised unless there are good grounds to supersede them. For example, a start could be made

with the stores by introducing proper accounts of receipts and issues, opening of bin cards, stores ledgers etc.

(6) **Organising the cost office.** It is always better that the cost office is situated adjacent to the factory so [hat delay in routing out documents or in clearing up discrepancies and doubts, is avoided. The costing staff must be allowed to have access to the works if they are to perform their duties property. The size of staff would depend on the volume of work involved. A costing organisation is not worth its existence if it cannot present figures with speed and accuracy and observe simplicity in the presentation of results. The duties of cost office fall into the following spheres:

(i) **Stores Accounts**. Posting of materials receipts and stores issues in stores ledgers, preparing material abstracts.

(ii) **Labour Accounting**. Evaluation of time sheets, job cards etc., preparing labourabstracts. In some cases preparation of actual pay rolls.

(iii) **Cost Accounts**. Posting of all cost accounts whether job or process or service accounts.

(iv) **Cost Control**. Posting cost control accounts from data supplied from sections (i) to (ii) above. Preparation of special statistical and other information for management for carrying out special investigation and preparation of periodical trading statements.

(7) **Relationship of cost office to other departments.** The cost department should function independently, the cost accountant being made directly responsible to the General Manager or Managing Director. The costing system should be designed to serve management at all levels. The cost accountant, therefore, should design his whole system of records and reports etc., with this end in view. He must know and understand the problems faced in the process of production, and try to translate them into financial implications so that correct decision may be taken.

(8) **Authority and responsibility should be clearly defined.** If the costing system is to be successful. There should be no ambiguity, everything should

be clear. To sum up, a cost system should be perfect in a manner that will enable cost of sales to be computed ; provide means tor valuing inventories ; aid in the control and management of a company, measure the efficiency of men, materials and machines, identify wastes collected by cost codes so as to pave the way for cost reduction, make possible inter-firm comparison, provide data for pricing and policy decision and form a basis for the preparation of various reports.

1.11.4 Difficulties in Installing a Costing System

Practical difficulties, apart from technical costing problems which a cost accountant has to face in installing a costing system, are :

(1) **Lack of support from top management.** In most of the cases, the cost accounting system is introduced without the support of the top management in all the functional areas. Even managing director or chairman often introduces such system without consulting the departmental heads. The departmental managers treat it as interference in their work by persons involved in a costing system. Thus it creates fear in the mind of the departmental managers as they treat the system as a device to check their activities.

(2) **Resistance from the existing accounting staff.** Whenever a new system is introduced resistance is natural, as the existing staff may feel that they would lose their importance and may be unsure of their position in the organisation.

(3) **Non-cooperation at other levels of organisation**. The foremen, supervisors and other staff may also resent the additional paper work which may arise because of introduction of costing system and may not co-operate with other departments in providing the information which is absolutely necessary for the smooth and efficient working of any accounting system.

(4) **Shortage of trained staff.** There may be shortage of cost accountants to handle the work of cost analysis, cost control and cost reduction. The work of costing department cannot be handled without the availability of trained staff.

(5) **Heavy cost of operating the system**. The cost of operating a system may be heavy unless the costing system is properly designed according to the require-

ments of each case specially. The system may be able to provide information which is required by all levels of management. It may involve additional paper work. Thus, the operation cost of the system will be heavy.

1.11.5 Steps to Overcome Practical Difficulties in installing a costing system

To overcome the above difficulties, following steps are suggested:

(1) **Support from the top management**. Before the installation or operation of a costing system, there must be firm commitment to the system on the part of the top management. This will create cost consciousness and interest in cost improvement among technical, production and top management.

(2) **Utility of system to existing staff.** The existing accounting staff should be impressed about the need to supplement the existing financial accounting system. It will broaden the job of an accountant and will create new opportunities for the accounting staff .

(3) **Workers' confidence -for cooperation.** The various employees must be properly educated regarding the benefits which can be obtained from such a system. Workers' confidence should be gained in the system to get their co-operation before steps are taken to put the system in practice.

(4) **Training of existing accounting staff.** The existing staff working in the accounts department must be properly trained in costing methods and techniques with the help of the Institute of Cost Accountants of India, Calcutta.

(5) **Cost system according to specific requirements of the concern.** The system should be installed and operated according to the requirements of a specific case, so that itmay not entail heavy cost on the concern. It should avoid additional unnecessary work as far as possible. The system, when installed and operated, will provide many benefits to the concern as compared to the cost and prove beneficial to the concern.

(6) **Proper supervision.** There should be proper supervision after installation and continuous efforts on the part of the cost accountant to make the system successful and to achieve the desired goal of cost ascertainment, cost presentation and cost control.

One of the main objects of cost accounting is cost ascertainment Cost ascertainment deals with :

(i) collection and analysis of expenses,

(ii) measurement of production and

(iii) linking up of production with the expenses.

The varying procedures for collection of expenses give rise to different systems of costing as Historical or Actual costs, Estimated costs, standard costs, etc.

The varying procedures for the measurement of production have resulted in different methods of costing such as Specific Order Costing. Operation Costing, etc, For linking up of production with the expenses, the different techniques of costing such as Marginal cost Technique and total Cost Technique have been evolved. All these three, i.e., systems, Methods and technique can be used in one concern simultaneously.

The system of costing adopted refers to the type of cost used for cost ascertainment. In other words whether historical/actual, standard, marginal or full cost has been charged to products and servicer. The system of costing has direct impact on the technique used for linking up of production with expenses. So to avoid confusion, systems have been discussed along with the techniques of costing.

1.12 Cost Ascertainment

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The system of costing adopted refers to the type of cost used for cost ascertainment. In other words it refers to whether historical/actual, standard, marginal or full cost has been charged to products-and services. The system of costing has a direct impact on the technique used for linking up of production with expenses. So to avoid confusion, systems have been discussed along with the techniques of costing.

1.12.1 Types and Techniques of Costing

Following are the main types (or techniques) of costing for ascertaining costs :

1. **Uniform costing**. It is the use of same costing principles and/or practices by several undertakings for costing control or comparison of costs.

2. **Marginal Costing.** It is the ascertainment of marginal cost by differentiating between fixed and variable cost. It is used to ascertain the effect of changes in volume or type of output on Profit.

3. **Standard costing**. A comparison is made of the actual cost with a pre-determined standard cost and the cost of any deviation (called variances) is analysed by causes. This permits the management to investigate the reasons for these variances and to take suitable corrective action.

4. **Historical Costing.** It is ascertainment of costs after they have been incurred. It aims at ascertaining costs actually incurred on work done in the past. It has a limited utility, though comparisons of costs over different periods may yield good results.

5. **Direct Costing**. It is the practice of charging all direct costs, variable and some fixed costs relating to operations, processes or products leaving all other costs to be written off against profits in which they arise.

6. **Absorption Costing.** It is the practice of charging all costs, both variable and fixed to operations, processes or products This differs from marginal costing where fixed costs are excluded.

Any of the methods of costing like unit costing, service costing, process costing etc. can be used under any techniques of costing.

1.12.2 Methods of Costing

Methods to be used for the ascertainment of cost of production differ from industry to industry. It primarily depends on the manufacturing process and also on the methods of measuring the departmental output and finished products. Basically, there are two methods of costing viz : (i) Specific Order Costing (or Job/Terminal Costing) and (n) Operation Costing (or Process or Period Costing.)

Specific Order Costing is the category of basic costing methods applicable where the work consists of separate jobs, batches or contracts each of which is authorised by a specific order or contract. Job costing, batch costing and contract costing are included in this category.

Operation Costing is the category of basic costing methods applicable where standardized goods or services result from a sequence of repetitive and more or less continuous operations or process to which costs are charged before being averaged over units produced during the period.

All these methods are discussed briefly as under :

(1) Job Costing. Under this method, costs are collected and accumulated for each job, work order or project separately. Each job can be separately identified ; so it becomes essential to analyse the cost according to each job. A job card is prepared for each job for cost accumulation. This method is applicable to printers, machine tool manufacturers, foundries and general engineering workshops.

(2) Contract Costing. When the job is big and spread over long periods of time, the method of contract costing is used. A separate account is kept for each individual contract. This method is used by builders, civil engineering

contractors, constructional and mechanical engineering firms etc.

(3) Batch Costing. This is an extension of job costing. A batch may represent a number of small orders passed through the factory in batch. Each batch is treated as a unit of cost and separately costed. The cost per unit is determined by dividing the cost of the batch by the number of units produced in a batch. This method is mainly applied in biscuits manufacture, garments manufacture and spare parts and components manufacture.

(4) Process Costing. This is suitable for industries where production is continuous,manufacturing is carried on by distinct and well defined processes, the finished product of one process becomes the raw material of the subsequent process, different products with or without by-products are produced simultaneously at the same process and products produced during a particular process are exactly identical. As finished products are obtained at the end of each process, it will be necessary to ascertain not only the cost of each process but also cost per unit at each process. A separate account is opened for each process to which alt expenditure incurred thereon is charged. The cost per unit is obtained by averaging the expenditur incurred on the process during a certain period. Hence, this is known as averagecosting. As the products are manufactured in a continuous process, this is also known ascontinuous costing. Process costing is generally followed in Textile Industries, Chemical Industries, Tanneries, Paper Manufacture etc.

(5) Unit or Output Costing. This is suitable for industries where manufacture is continuous and units are identical. This method is applied in industries like mines, quarries, oil drilling,breweries, cement works, brick works etc. In all these industries there is natural or standard unit of co5t. For example, a barrel of beer in breweries, a tonne of coal in collieries, one thousand of bricks in brickworks etc. The object of this method is to ascertain the cost per unit of output and the cost of each item of such cost. Here cost accounts take the form of cost sheets prepared for a definite period. The cost per unit is determined by dividing the total expenditure incurred during a given period by the number of units produced during that period.

(6) Service (or Operating) Costing. This is suitable for industries which render services as distinct from those which manufacture goods. This is applied in transport undertakings, power supply companies, municipal services, hospitals, hotels etc. This method is used to ascertain the cost of services rendered. There is usually a compound unit in such undertakings, e.g., tonne-kilometre (transport undertaking), kilowatt-hour (power supply) and patient day (hospitals).

(7) Farm Costing. It helps in calculation of total cost and per unit cost of various activities covered under farming. Farming activities cover agriculture, horticulture, animal husbandry (i.e., rearing of livestock), poultry farming, pisciculture (i.e., rearing of fish), dairy, sericulture (i.e, silkworm breeding), nurseries for growing and selling of seedlings and plants and rearing of fruits and flowers. Firm costing helps to improve the farming practices to reduce cost of production, to ascertain the profit on each line of farming activity which ensureses better control by management and to obtain loans from banks and other financial institutions as they give loans on the basis of proper cost accounting records.

(8) Operation Costing. Multiple operation method of manufacture consists of a number of distinct operations. It ref6rs to conversion cost i.e., cost of converting the raw materials into finished goods. This method takes into consideration the rejections in each operation for calculating input units and cost. The different operations in machine screw are-stamps, knurl, thread and trim. The cost per unit is determined with reference to final output.

(9) Multiple Costing. It represents the application of more than one method of costing in respect of the same product . This is suitable for industries where a number of component parts are separately produced and subsequently assembled into a final product. In such industries each comp6nent differs from the others as to price, material used and process of manufacture undergone. So it will be necessary to ascertain the cost of each component. For this purpose, process costing may be applied. To ascertain the cost of the final product batch costing may be applied. This method is used in factories

manufacturing cycles, automobiles, engines, radios, typewriters, aeroplanes and other complex products. This method has been dropped from the latest CIMA Terminology.

1.12.3 Evolution and Development of Cost Accounting

Widespread growth of industrialisation in the western world during the last half of the 19th century gave rise to the development of cost accounting. With the advent of the factory system, necessity for accurate cost information was felt to bring efficiency in production. Inspite of this, there was slow development of cost accounting during the 19th century. Toquote Eldon S. Hendriksen, "Not until the last 20 years of the 19th century was there much literature on the subject of cost accounting in England and even then very little was to befound in the United States. Most of the literature until this time emphasized the procedures for the calculation of prime costs only."

Several reasons for the late development of cost accounting can be attributed as given below:

(1) Overheads (i.e. indirect costs) constituted a small part of total cost in the early period of the factory system as costly machinery was uncommon during those days.Necessity of cost accounting is felt more if overheads form a significant portion of total cost as we will see in the course of our discussion in the book.

(2) A tendency among the cost accountants to keep their costing methods strictly secret was also responsible for slow development of cost accounting.

(3) Until the late 19th and early 20th centuries, manufacturing processes were simpleand firms were producing a small variety of products. Because of these facts also, development in cost accounting was slow.

The most rapid development in cost accounting took place after 1914 with the growth of heavy industry and mass production methods when costs (i.e., overheads) other than materials and labour constituted a significant portion of the total cost of production. The scientific management movement led by Taylor gave impetus to the development of cost accounting because it

contributed to the use of standard costs in planning manufacturing operations and in evaluating performance.

The development of cost accounting in India is of recent origin and it started gainingimportance after the independence of the country when the Indian Government started laying emphasis on the industrial development of the country. Further, provision of cost audit under the Companies Act has given impetus to the development of cost accounting in India. The **vivian Bose Enquiry Commission** brought to light the various malpractices prevalent in themanufacturing establishments and it was thought that the financial audit for the audit of financial accounts at the end of the year was insufficient to judge the real efficiency of working manufacturing organisations. As a result, the concept of cost audit emerged to get the best utilisation of the resources of the country which are used in the manufacturing organisations and the Government was given the power for ordering cost audit under of the Companies Act. The Government may appoint a cost auditor to conduct cost audit where it is necessary-

(a) so to do in the opinion of the Government under of the Companies Act ;

(b) to ascertain correct cost of certain units when Government is approached for protection or financial help ;

(c) to ascertain correct cost of contract given to private firms under cost plus basis;

(d) to fix reasonable prices of certain items of production so as to prevent undue profiteering.

1.12.4 Status of Cost Accountant

In a small concern, the cost accounting department may be set up as a section of financial accounting system. The cost accountant who is in charge of the cost accounting section works under the chief accountant and reports to him. But in a large concern, a separate cost accounting department is set up under the supervision of a full fledged cost accountant. In such a case the cost accounting department is equipped with sufficient staff to look after different functions of cost accounting.

The status of the cost accountant heading the cost accounting department is equal to other functional managers. He is to supervise the duties of various persons working in the cost accounting department and reports directly to the chief executive of the organisation or finance controller as the case may be. He works independently and is given full cooperation by the top management in performing his functions.

1.12.5 Role of Cost Accountants

cost accountants collect, assimilate, collate and analyse all financial information related to an organisation. Management makes decisions based on information provided by these professionals. Their chief role is to ensure that managerial decisions are within cost prescriptions. They need to give a prognosis for proposed projects based on past and current financial performances. to do this, a cost accountant has to consider factors such as the cost of raw materials, labour, transport and overheads, among others. His/her responsibilities include designing and implementing effective management information and control systems, planning costing system methods, inventory control, incorporating mathematical models, investment analysis, project management, internal audit cost audit' diagnosis of sick industries, fund management, pricing planning, interpreting information and data related tobusiness activities and translating them. This guides the management in taking the right decisions. Cost Accountants must possess strong quantitative aptitude and interest in finance, sharp analytical skills and should have good communication skills (both written and oral).

1.12.6 Cost Accounting Department and its Relation with Other Departments

Costaccountingdepartmentrecords,classifiesan.dpresentcostinformationfor manufacturing and other activities of the organisation. It makes an analysis of cost of manufacturing, marketing and administration aid provides control reports and other decision making data to all levels of management for the purpose of controlling and reducing costs. It is, therefore, necessary that cost accounting department should have a proper coordination with other departments of the organisation. All department should help each other so that the objective of minimum possible be achieved without too many bottle necks.

1. Cost Accounting Department and Production Department

Cost accounting department and production department are closely related to each other production department is concerned with the conversion of raw materials in to finished products. Cost accounting department helps in estimating the various costs involved in the manufacturing process like material cost, labour cost and other expenses involved for manufacturing a product. As per cost estimates , production department makes timely arrangement of material, labour and other services required for the manufacturing process so that production may go on smoothly without any interruption. Cost accounting department is concerned with ascertaining, controlling and reducing cost of the manufacturing process. The required information regarding costs relating to the manufacturing process both budgeted and actual is collected by cost accounting department form the production department and sent to the management for exercising cost control. In a competitive world for facing competition effectively, reducing cost of production is a very important function. Both production department and cost accounting department can help each other in reducing cost of production which is the crying need of the competitive economy.

2. cost accounting department and purchase department: Purchase department is to ensure that right type of material is purchased at a reasonably low price at a right time from a right supplier and there is no excessive investment in materials. Continuous availability of material is to be ensured so that production may not be held up for want of materials. In these respects cost accounting department can help purchase department by setting various levels of materials like minimum level, maximum level, reordering level, economic order quantity, etc. various types of material control suggested by the cost accounting department will be helpful in ensuring minimum possible cost of materials.

3. Cost Accounting Department and Personnel Department

Personnel Department concerned with proper recruitment, selection, training labourturnover, time keeping, time booking, fixing of wage rate, preparation of payroll, idle time and over time works with close co-ordination of cost accounting department to get effective results of the personnel policies. Cost accounting department suggest ways and means for reducing costs relating to employees working in the organisation. Cost accountant can recommend incentive plans for remunerating

employees which will be attractive to the employees for earning more wages and salaries and at the same time reducing labour cost per unit. ln this way both departments personnel and cost accounting can be helpful in developing a contented labour force which will be willing to work for the organisation,

4. Cost Accounting Department and Finance & Accounts Department

A close coordination is required between cost accounting department and finance and accounts department for reducing and controlling costs. Finance department is dependent upon the cost accounting department for making an estimate of funds required for production and marketing purposes. Similarly, materials and other supplies cannot be purchased at the minimum possible prices if the finance department does not provide the required finance at the time it is required. cost accounting department helps financial accounting department in preparing budgets. lt also helps financial accounting department to make the payment of the bills by duly approving them. Past figures are provided to the cost accountant by financial accounting for making estimates for the future. Cost accounting department and financial accounting department depend on each other for reconciling profit as per cost accounts and profit as per financial accounts.

5. Cost Accounting Department and Marketing Department

Marketing department is mainly concerned with marketing of products at competitiveprices. Marketing department gets cost information from cost accounting department for fixing reasonable selling prices which may be acceptable to consumers. For considering alternative methods of marketing, information of various types of costs involved in various methods is provided by the cost accountant to the marketing manager. Similarly, on the basis of information provided by the marketing department, cost accounting department will suggest the cheapest and effective method of marketing a particular product.

1.12.7 Meaning- Cost accounting standards

Cost Accounting Standards are principles based, deal with the principles of costing, and provide guidance on the preparation of General Purpose Cost Statements which require attestation by the cost accounting profession, wherever applicable. Cost Accounting Standards (CAS) are, thus, a set of standards that provide a structured

approach to achieve 'uniformity and consistency in cost accounting principles and practices. These provide guidance on the preparation of General Purpose Cost Statements. To promote uniformity, there was an urgent need to integrate, harmonise, and standardise the cost accounting principles and practices. Therefore, the Generally Accepted Cost Accounting principles have been clearly defined and well documented in the form of the Cost Accounting Standards. Cost Accounting Standard Board (CASB) has been set up by the Council of the institute of Cost Accountants of lndia (lCAl). The Cost Accounting Standards Board (CASB) also keep in focus the Generally Accepted Cost Accounting Principles and formalise them so that with the passage of time, an accepted framework can be evolved and remain capable of adoption by all users of the standards, including industries, professionals, and other stakeholders. While formulating the Cost Accounting Standards, the CASB takes into consideration the applicable laws, usage and business environment prevailing in lndia. CASB also gives due consideration to the Cost Accounting Standards, principles and practices being followed by the other countries.

- **Constitution of CASB**

The CASB will have a Chairman as appointed and nominated by the Council of theinstitute and other members will also be appointed and nominated by the Council. The terms and period of appointment will also be decided by the council of the institute. The Director(Technical) will be the Secretary of the CASB. The CASB will prepare a report of its work each year and send it to the Council.

- **Objectives of CASB**

The work of CASB is to develop Cost Accounting Standards on important issues/ topics relating to Cost and Management Accounting with the following objectives :

1. To equip the profession with better guidelines on standard cost accounting practices
2. To assist the Cost Accountants in preparation of uniform cost statements
3. To provide guidelines to Cost Accountants to make standard approach

towards maintenance of Cost Accounting Record Rules and Undertaking Cost Audit under the Companies Act and various other Acts like lncome Tax Act, Central Excise Act, Customs Act, Sales Tax Act, etc.

4. To assist the management to follow the standard cost accounting practices in the matter of compliance of statutory obligations.

5. To help lndian industry and the Government towards better cost management.

? Operating Procedure and policies of CASB

1. Organising and initiating discussion and deliberation at national level to identifythe areas/topics in respect of which needs tor standards are felt.

2. Generating information on all alternative cost accounting practices in respect of selected practices.

3. Preparation of draft on the standard cost accounting practices in respect of chosen areas/topic in cost accounting and circulate it to the members of the institute, national accounting institute and others and user bodies like industry association, Chambers of Commerce and industry, Government bodies etc.

4. Allowing sufficient time for consideration and comments on the exposure draft.Pronouncement of the exposure draft as 'standard' after giving due consideration to The suggestions and modification generated on the circulated exposure drafts from such individuals and agencies

5. To fix a date for the standard to be effective.

6. To propagate and generate acceptance and commitment to follow the ,standards, prescribed by CASB.

7. To revise the 'standards' once issued, if dictated by environment, government, legal authority and other situation,

- **Scope and Applicability**

The 'standards' issued by. CASB will be recommendatory in nature and every member of the institute is expected to honour the same. A standard will always make sure that it complies with the legal regulations in respect of the matter covered by it. However, a standard by its nature will have to be more definite and specific than its'legal requirements. AnyImitations, in application of a 'standard' in specific circumstance must be spelt out in the standard' itself. Every standard will broadly have two parts- (a) explanatory part and (b) the operative part. The explanatory section will set out topic covered, the premises, the need for standardisation and methodology and rationale for practice recommended. The second part,the operative portion will be definite direction on the matter. Every standard will indicate the date from which it will be operative. The standards will be applicable to preparation of cost statements and other documents where the concepts embedded in the standard will be Applicable. As far as maintenance of cost accounting record rules is concerned, relevant Matter covered under the standards,wherever applicabIe,will be followed.Cost Auditors will adopt and encourage the adoption of the standards whereverapplicable, in maintenance of Cost Accounting rules and report the deviations, if any,in the cost audit reports. The institute will take up the standards with national accounting standard Board to enforce them and to include in the companies Act.

Framework of Accounting Standards

The Cost Accounting Standards framework has been adopted by the CASB with the borruing structure :

1. lntroduction : brief details depict the topic and its role in the cost ...
2. objectives : basic objective that necessitated the standard.
3. Scope : scope of applicability.
4. Definitions : terminology used in the standard.
5. principles of Measurement : principles behind the ascertainment, measurement,

determination, and categorisation of elements of cost

6. Assignment of dosts : basis of assignment of costs_to the product or service and the Generally accepted cost accounting principles behind such assignment.

7. presentation : essence of the standard and the prescriptive nature to be followed for any certification requirement.

B. Disclosure : specific disclosures required in the presentation to provide clarity.

The CASB has identified 39 areas for developing the CASs, which include the 22

standards released so tar. of these, 21 areas relate to components of cost and the remaining

18 areas are on cost accounting methodologies. The ICAI has issued 22 cost accounting standards over the period of time as given in the following table:

CAS l\to.	Title	Objective
CAS 1	Classification of Cost	For preparation of Cost Statements
CAS 2	Capacity Determination	For determination of capacity.
CAS 2 (Revised 2012)	Capacity Determination	fo Uring uniformity and consistency in the principles and m6thods of determination of capacity with

		reasonable accuracy
CAS 3	Overheads	For Collection, Allocation, Apportionment and Absorption of overheads
CAS 3 (Revised 2011)	Overheads	To bring uniformity and consistency in the principles and m6thods of determining the Overheads with reasonable accuracy.
CAS 4	Cost of Production for Caotive Consumption	To determine the assessable value of excisable ooods used lor captive consumption
CAS 5	Average (equalised) Cost of Transportation	To.delermine averaged/equalised transportation cost
CAS 6	Material Cost	To bring uniformity and consistency in the. principles and melhods of determining the material cost with reasonable accuracy in an economically feasible manner.

CAS 10	Direct Expenses	To bring uniformity and consistency-in the principles and methods of determining the Direct Expenses with reasonable accuracY'
CAS 11	Administrative Overheads	To bring uniformity and consistency in the principles and methods ol determining the Administrative Overheads with reasonable accuracy'
CAS 12	Repairs and Maintenance Cost	To bring uniformity and consistency in the principles and mEthods of determining the Repairs and Maintenance Cost with reasonable accuracy.
CAS 13	Cost of Service Cost Centre	To bring uniformity and consistency in the principles and melhods of d6termining the Cost of Service Cost Centre with reasonable accuracY
CAS 14	Pollution Conrtrol Cost*	To bring uniformity and consistency in the principles and methods of determining the pollution Control Costs with reasonable accuracy.

CAS 15 CAS 16	Selling and Distribution Overheads Depreciation and Amortisatlon	To bring uniformity and consistency in the principles and methods of determining the Selling and Distribution Overheads with reasonable accuracy.
CAS 17	lnterest andl Financing Charges.	To bring uniformity and consistency in the principles and methods of determining the Depreciation and Amortisation with reasonable accuracy.
CAS 18	Research and Development Oosts	To bring uniformity and consistency in thd principles and methods of determining the Research, and Development Costs with reasonable accuracy and presentation of the same.
CAS 19	Joint Costs	To bring uniformity and consistency in the principles and methods of determining the Joint Costs.
CAS 20	Royaity and Technical Know-how Fee	To bring uniformity and consistency in the principles and methods of determining the amount of Royalty and Technical Know-how Fee with reasonable accuracy.

CAS 21	Quality Control	To bring uniformity, consistency in the principles, methods of determining and assigning Quality Control cost with reasonable accuracy.
CAS 22	Manufacturing Cost	To bring uniformity and consistency in the principles and methods of determining the Manufacturing Cost of excisable goods.

1.13 Tenders or quotations

Very often a producer in response to an advertisement in the press is required to submit a tender or to quote prices for the supply of the commodities he produces or for completing a job. A tender has to be prepared very carefully as the receipts of orders depend upon the acceptance of quotations or tenders supplied by the manufacturer. The preparation of tenders requires information regarding prime cost, works, administration and selling overheads and profit of the preceding period. The manufacturer has to ascertain and find out the possible changes in prices of materials, rates of wages and other costs. He has to ascertain the amount of variable, semi-variable and fixed overheads on the basis of past experience. he must also have a reasonable amount of profit by taking into consideration the market condition. In preparation of estimates or tenders, overheads are generally not given. They are estimated as percentage i.e., works overheads on wages and administration , selling and distribution overheads on works cost basis.

1.13.1 Cost estimation

Costs are ascertained on the basis of estimated costs, so it will be appropriate to have a discussion on estimated costs.

Product pricing is dependent on estimated costs. Estimated costs are very useful for preparation of budgets, measurement and evaluation of performance, preparation of financial statements, for valuation of stock and for making decisions whether to make or buy or lease or buy and fixation of selling price.

1.11.2 Use of estimated costs for quotations and tenders

When a job is to be undertaken for a prospective customer, it becomes necessary to offer a quotation. For preparing a quotation, use of estimated costs in necessary. The products or jobs for which such quotations are to be submitted may be specialised products i.e., manufactured according to the specification of the customers and no established market prices are available or products available which are manufactured in anticipation of demand for stock purposes. While submitting quotations, utmost care is to be observed as too high a quotation may lead to loosing of a contract or job and too low may result in reduced profits or even losses.

Those concerns which are mainly manufacturing goods against customers specification, have generally a separate department for dealing the cost estimating. This department specialises in the function of cost estimating and works in close co- operation with other related departments as sales, planning and production departments. Whenever, an enquiry for quotation is received, the following aspects may be seen carefully by the planning or the related departments.

1. Whether the required technical know how and machine facilities exist for the quantum of work to be done.

2. Whether the machine capacity to manufacture the quantum of goods is available .

3. Whether there exists any limiting factor such as shortage of material or labour etc. if so, is there any possibility of improving the position of such factors in future.

4. The profitability of this job is to be compared with the profitability of the other products taking into consideration all constraints. If the manufacture of the

job under consideration is not profitable, then, it is better not to proceed with the submission of such quotation.

It is decided to entertain the enquiry, then it becomes necessary that the enquiry is processed through planning, design and production department and necessary drawings, blue prints and design ,etc. of the products to be manufactured are prepared. While doing this a coordinated decision is taken relating to any modification necessary in order to reduce the cost, preparation of details of parts or components necessary for manufacture or purchase, preparation of bills of materials to assess the details of various materials required, requirements of tools, jigs and fixtures and preparation of operation schedule in order to assess the requirements of various grades of skilled workers for the job.

Estimates of cost are prepared in the cost estimate sheet, a proforma of which is given below

Cost estimates sheet
Proposed product particulars and specifications: **No. Of estimate:**
Quantity of the proposed produced to be made **Date of estimate:**
Production and cost details:

Description	**quantity**	**Unit rate**	**Total cost**	**Cost per unit**
Material cost Material A B C Less scrap & waste Net material cost				

Labour and factory overhead costs	**labour**	**Wage rate** Overhead rate	**Total cost**	**Cost per unit**
Operation /process/deptt. **I** **II** **III** **IV** **Total labour and factory Overhead costs**				
Direct expenses Dies Special tools Jigs Other expenses		**Total cost**	**Proportionate cost for the order**	**Cost per unit**
	Summary		**Total cost for the order**	**Cost per unit**
Special remarks	**Material** **Labour and factory overheads** **Direct expenses** **Total factory cost** **Administration expenses** **Selling and distribution expenses**			
	Total cost			

This shows that the cost of materials, labour, direct expenses and overheads. Past data may also be helpful, if such goods are manufactured in the past but suitable adjustments are to be made for anticipated future changes. But where past data is not available , then the following points may be considered in respect of various aspects of costs.

1. Materials: The different materials and their quantities are incorporated in the bills of materials which are valued at any of the methods of issuing materials as LIFO, FIFO , average, replacement cost ,etc. if there is any possibility of rise or fall in price of material, that must be suitably adjusted. Forward contracts may be entered or escalation clause may be included in the contract to obviate the effect

of fluctuations of prices.

2. Labour: operation schedule may be prepared in order to calculate the labour requirements ant to convert them in term of labour costs. Such costs may include - fringe benefits, overtime premiums and training costs. It easy to estimate the labour cost if piece rate or other incentives are in use. Like material, escalation clause regarding wages may be included in the contract to avoid the effect of rise or fall in wage rates.

3. Direct charges: Such costs include costs of designs, jigs, tools and fixtures, payment of royalties, patents rights, packing , transportation, insurance , commission and discount, hire charges of plant and machinery specially acquired for such jobs and after sale services. If there is possibility of repeat orders, then a proportionate charge of design, tools and jigs,etc. may be included in the cost. If the total expenses related to these items are charged in costs, the cost will increase and there is every possibility of loosing the job.

4. Overhead costs: Production overheads may be charged on the basis of the method of recovery of such overheads in use. Inclusion of administration , selling and distribution overheads virtually depends on the policy of the management and market conditions of the product under consideration. Overhead rate may be calculated taking into consideration the future level of activity and normal capacity as this will influence the costs and may result in understanding the estimated cost with the risk of incurring the loss on undertaking the order. If the cost of idle capacity is included in the overhead rate, it will lead to high cost which may result in loss of order. The distinction between fixed and variable overhead is to be maintained if the prices are based on marginal costs.

The management will decide the price to be quoted on the basis of materials , labour, direct expenses and overhead costs. Besides these there are other factors also which are taken into consideration for fixation of price of a product. Pricing involves judgement rather than mere computation. After taking into consideration all the factors the price fixed should be neither too high nor very low in order to get the order besides getting a reasonable margin of profit.

1.14 Production account

Where the statement of cost is extended to include sales, stock of finished goods and profit , the statement usually assumes the form of manufacturing or a production account or output account. A manufacturing account, therefore, may be described as the statement prepared under the unit costing which shows the output during the given period , the total cost and per unit cost incurred during the same period , their components as also the profit or loss.

Like cost sheet there is no fixed form for production or manufacturing account which is prepared according to the needs of management. Where only the cost information is required production account is very much similar to the cost sheet with the only difference that instead of being prepared in a statement form it is prepared as a traditional ledger account.

However, the real production account is one which combines in itself the ingredients of cost sheet and a trading and profit and loss account with result that it consists of four distinct parts, first part gives prime cost, the second part gives the cost of goods manufactured, third part shows the gross profit and last part shows the net profit .

The format of production account

Particulars	amount	particulars	amount
To direct materials		By prime cost c/d	
To direct labour			
To direct expenses			
To prime cost b/d		By cost of goods manufactured c/d	
To works overheads			
To work in progress (op.)			
Less: work in progress (cl.)			
Less: sale of by products or scrap			
To cost of goods manufactured b/d		By sales	
To opening stock of finished goods		By closing stock of finished goods	
To gross profit c/d			
To administration overheads		By gross profit b/d	
To selling & distribution overheads			
To net profit			

1.15 Distinguish between production account and a cost sheet

Production account	cost sheet
It is based on double entry system	It is not based on double entry system
It consists of four parts namely prime cost, cost of goods manufactured, gross profit and net profit	It presents the elements of cost in a classified manner and the cost at ascertained at different stages such as prime cost, works cost, cost of production, cost of goods sold, cost of sale and total cost
It shows the cost in aggregate and thus facilitates comparison with other financial accounts	It shows the cost in detail and analytical manner which facilitates comparison of cost for the purpose of cost control
It is not useful for preparing tenders and quotations	Estimate cost sheets can be prepared on the basis of actual cost sheets and these are useful for preparing tenders and quotations
It is prepared in the form of an account	It is prepared in the form of a statement
Expenses are not classified in this account	Expenses are classified to ascertain different divisions of cost as prime cost, works cost , total cost,etc.
No comparison in possible due to non availability of previous year's figures.	Figures of previous year are provided to enable comparison
It is based on actual figures of expenses.	It is based on actual and estimated figures of expenses
It is prepared for each production department.	It is prepared for each job and sometimes for the whole factory also

1.16 Numerical Solved portion - Cost sheet

Problem 1: Prepare cost sheet of a company

Direct expenses 100,000 direct wages 20,000; direct expenses 10,000; wages of foreman 2,500; electric power 500; factory lighting 1,500; office lighting 500; storekeeper's wages 1,000; oil and water 500 ; factory rent 5,000; office rent 2,500; repairs and renewals of factory plant 3,500 ; repairs and renewals of office premises 500; Transfer to reserves 1,000; discount on shares written off 500 ; dividend 2,000; depreciation of factory plant 500; depreciation of office premises 1,250; consumable stores 2,500; manager's salary 5,000; director;s fees

1,250 ; office stationery 500 ; telephone charges 125; postage and telegrams 250; Salesmen's salaries 1,250; travelling expenses 500; advertising 1,250; warehouse charges 500; sales 189,500; carriage outward 375; income tax 10,000.

Solution1: Statement of cost and profit

Direct materials		100,000
Direct wages		20,000
Direct expenses		10,000
Prime cost		130,000
Add: factory overheads		
Wages	2,500	
Electric power	500	
Storekeeper's wages	1,000	
Oil and water	500	
Factory rent	5,000	
Repairs and renewals – factory plant	3,500	
Factory lighting	1,500	
Depreciation – factory plant	500	
Consumable stores	2,500	17,500
Factory cost		147,500
Add: administration overheads:		
Office rent	2,500	
Repairs and renewals – office premises	500	
Office lighting	500	
Depreciation – office premises	1,250	
Manager's salary	5,000	
Director's fees	1,250	
Office stationery	500	
Telephone charges	125	
Postage and telegrams	250	11,875
Cost of production		159,375
Add: selling and distribution overheads :		
Carriage outward	375	
Salesman's salaries	1,250	
Travelling expenses	500	
Advertising	1,250	
Warehouse charges	500	3,875
Cost of sales		163,250
Add:- profit		26,250
Sales		189,500

Transfer to reserves, discount on shares, income tax and dividend are excluded from cost accounts being items of appropriation of profit. So , these items have not been included in the cost.

Treatment of stock

Stock requires special treatment while preparing a cost sheet. Stock may be of raw materials, work in progress and finished goods.

Stock of raw materials

If opening stock of raw materials , purchases of raw materials and closing stock of raw materials are given, then, with the hekp of the following, raw materials consumed can be calculated.

Opening stock of raw materials	xxxx	
Add: purchases of raw materials	xxxx	
		xxx
Less: closing stock of raw materials	xxxx	
Cost of raw materials consumed	xxxx	

Stock of work in progress

Work in progress means units on which some work has been done but which are not yet complete. Work in progress is valued at prime cost or works cost basis, but the latter is preferred. Instruction in this respect should be carefully noted from the language of the question . if it is valued at works or factory cost, then opening and closing stock will be adjusted as follows:

Prime cost		xxxx
Add: factory overheads incurred	xxxx	
Add: work in progress - opening	xxxx	

		Xxxx
Less: work in progress- closing		xxxx
Factory or manufacturing or works cost	xxxx	

Stock of finished goods

If opening and closing stocks of finished goods are also given, then these must be adjusted before calculating cost of goods as under:-

Cost of production	xxxx	
Add: finished goods - opening		xxxx
		Xxxx
Less: finished goods- closing		xxxx
Cost of goods sold		xxxx

Problem 2 : following information has been obtained from the records of ankush corporation ltd. for the period from January, 1 to june 30, 2016

	2016 on January 1	2016 on June 30
Cost of raw materials	30,000	25,000
Cost of work in progress	12,000	15,000
Cost of stock of finished goods	60,000	55,000

Transaction during six months are:-

Purchases of raw materials 450,000; administration overheads 30,000; wages paid 230,000; selling and distribution expenses 20,000; factory overheads 92,000; sales 900,000 . prepare statement of cost and profit showing various divisions of cost.

Opening stock of raw materials	30,000
Add: purchases of raw materials	450,000
	480,000
Less: closing stock of raw materials	25,000
Cost of materials consumed	455,000
Direct wages	230,000
Prime cost	685,000
Add: factory overheads	92,000
Factory cost incurred	777,000
Add: opening work in process	12,000
	789,000
Less: closing work in process	15,000
Factory or manufacturing or works cost	774,000
Add: administration overheads	30,000
Cost of production	804,000
Add: opening stock of finished goods	60,000
	864,000
Less: closing stock of finished goods	55,000
Cost of goods sold	809,000
Add: selling and distribution overheads	20,000
Cost of sales	829,000
Add: profit	71,000
sales	900,000

Sometimes the entire output is not sold, cost of production of the goods sold is to be calculated in order to calculate the profit or loss after adding the selling and distribution overheads. Sometimes, selling price is to be determined on the basis of cost of production but profit percentage is generally given on sales. For calculation of profit the following formula should be used:-

Profit = rate percentage on sales x total cost

100 - rate percentage on sales

Suppose if the profit of 25 % on sales is to be realised and total cost is Rs 33,000. , then profit to be added to the total cost will be calculated as under:-

Profit = $\frac{25 \times \text{Rs } 33{,}000}{100 - 25}$ = Rs 11,000.

Problem 3 : The cost of sale of product A is made up as follows:-

Materials used in manufacturing	5,500	indirect expenses - factory	100
Materials used in packing	1,000	office expenses	125
Materials used in selling and product	150	depreciation office building and equipment	75
Mateials used in the factory	75	depreciation - factory	175
Materials used in the office	125	selling expenses	350
Labour required in production	1,000	freight on materials	500
Labour required in factory	200	advertising	125
Direct expenses- factory	500		

Assuming that all products manufactured are sold, what should be the selling price to obtain a profit of 25 % on selling price.

Direct material: materials used in manufacturing	5,500	
Materials used in packing material	1,000	
Freight on materials	500	
		7,000
Direct labour: labour required on production		1,000
Direct expenses: direct factory expenses		500
Prime cost		8,500
Add: factory overheads		
Indirect material: material used in factory	75	
Indirect labour: labour required for supervision of the management- factory	200	
Indirect expenses:indirect factory expenses 100		
Depreciation- factory 175	275	550

Factory cost or work cost			9,050
Add: office and administrative overheads:			
Indirect material: material used in office		125	
Indirect expenses: office expenses	125		
Depreciation	75	200	325
Total cost of production			9,375
Add: selling and distribution overheads:			
Indirect material: material used in selling the product		150	
Indirect expenses: selling	350		
Advertising	125	475	625
Cost of sales			10,000
Profit (25 % of sales)			3,333
sales			13,333

Value of closing stock = $\frac{\text{cost of production}}{\text{Units produced}} \times \text{units of closing stock} =$

$\frac{60,000}{10,000} \times 2,000 = \text{Rs } 12,000.$

Problem 4 : Following extract of costing information relates to commodity A for the half year ending 31st December, 2015.

Purchases of raw materials 120,000 stock - closing of raw materials 22,240

Works overheads 48,000 direct wages 100,000

Carriage on purchases 1,440 stock -closing of finished products (2,000 tons)

Stock of raw materials on 1st july, 2015 20,000 stock - work in progress on 1st july, 2015 4,800

Stock of finished products (1,000 tons) 16,000 work in progress on 31st dec, 2015 16,000

Sales - finished products 300,000

Selling and distribution overheads are Rs 1 per ton sold. 16,000 tons of commodity

were produced during the period.

You are to ascertain net profit for the period if profit of 15 % on sales is desired.

Solution 4 :

Statement of cost and profit

For the half year ending 31st December, 2015

Opening stock of raw materials		20,000
Add: purchases of raw materials		120,000
Add: carriage on purchases		1,440
		141,440
Less: closing stock of raw materials		22,240
Value of raw materials used		119,200
Add: direct wages		100,000
Prime cost		219,200
Add: works overheads		48,000
Add: opening stock of work in process		4,800
		272,000
Less: closing stock of work in process		16,000
Cost of output for the period (Rs 16 per unit)	16,000	256,000
Add: opening stock of finished products	1,000	16,000
	17,000	272,000
Less: closing stock of finished products (256,000 x 2,000)	2,000	32,000
16,000		
Cost of goods sold	15,000	240,000
Selling and distribution overheads on 15,000 tons @ Re 1 per ton		15,000
		255,000
Cost of sales		45,000
Profit		300,000
sales		

Problem 5 : Following figures are extracted from the trial balance of gogetter co. on 30th sept, 2015

Debit balances:

Opening inventories: finished goods 80,000; raw materials 140,000; work in process 200,000; office appliances 17,400 Plant and machinery 460,500; building 200,000; sales return and rebates 14,000; materials purchased 320,000; freight incurred on materials 16,000; direct labour 160,000; indirect labour 18,000 ; factory supervision 10,000; repairs and upkeep factory 14,000 ; heat , light and power 65,000; rates and taxes 6,300; miscellaneous factory expenses 18,700; sales commission 33,600; sales travelling 11,000; sales promotion 22,500; distribution dept. - salaries and expenses 18,000; office salaries and expenses 8,600; interest on borrowed funds 2,000; sales (credit balances) 768,000; purchase returns (credit balances) 4,800.

Further details are available as follows:-

1. Closing inventories: finished goods Rs 115,000 ; raw materials Rs 180,000 work in process Rs 192,000

2. Accrued expenses on: direct labour Rs 8,000; indirect labour Rs 1,200; interest on borrowed funds Rs 2,000;.

3. Depreciation to be provided on : office appliances 5 % ; Plant and machinery 10 % , building 4 %.

4. Distribution of the following costs: heat , light and power to factory, office and distribution in the ratio of 8 :1:1; rates and taxes two- thirds to factory and one- third to office , depreciation on buildings to factory, office and selling in the ration of 8 :1:1.

   With the help of the above information, you are required to prepare a statement of cost showing various elements of cost and a statement of profit.

Opening stock of raw materials	140,000	
Add: materials purchased	320,000	
Freight on material	16,000	
	476,000	
Less: purchase returns 4,800		
Closing stock of raw materials 180,000	184,800	
Material consumed		291,200
Direct labour (Rs 160,000 + Rs 8,000)		168,000
Prime cost		459,200
Add: factory overheads		
Indirect labour (Rs 18,000 + Rs 1,200)	19,200	
Factory supervision	10,000	
Repairs and upkeep – factory	14,000	
Heat, light and power (65,000 x 4/5)	52,000	
Rates and taxes	4,200	
Miscellaneous factory expenses	18,700	
Depreciation on plant (10 % of Rs 460,500)	46,050	
Depreciation on building (Rs 200,000 x 4/100 x 4 /5)	6,400	170,550
Gross works cost		629,750
Add: opening work in process		200,000
		829,750
Less: closing work in process		192,000
Works cost		637,750
Add: administrative expenses:		
Office salaries and expenses	8,600	
Depreciation on office appliances (5 % of 17,400)	870	
Depreciation on building	800	
Heat , light and power (1/10 of 65,000)	6,500	
Rates and taxes	2,100	18,870
Cost of production		656,620
Add: opening stock of finished goods		80,000
		736,620
Less: closing stock of finished goods		115,000
Cost of goods sold		621,620
Add: selling and distribution expenses:		
Sales commission	33,600	
Sales travelling	11,000	
Sales promotion	22,500	
Distribution department – salaries and expenses	18,000	
Heat ,light and power (65,000 x 1/10)	6,500	
Depreciation on building	800	92,400
Cost of sales		714,020

Statement of profits

Sales	768,000	
Less: returns	14,000	
		754,000
Less: cost of sales		714,020
Net operating profit		39,980
Less: interest on borrowed funds		4,000
Net profit		35,980

Problem 6: Following information has been obtained from the cost records of aditya chemicals ltd. for 2016:

Finished goods on 1/1/2016	50,000	heat, light and power	20,000
Raw materials on 1/1/2016	10,000	factory insurance and taxes	5,000
Work in progress 1/1/2016	14,000	repairs to plant	3,000
Direct labour	160,000	factory supplies	5,000
Purchase of raw material	98,000	depreciation - factory building	6,000
Indirect labour	40,000	depreciation - plant	10,000

Other information made available is -

Factory cost of goods produced in 2016 Rs 280,000; raw materials consumed in 2016 Rs 95,000; cost of goods sold in 2016 Rs 160,000. No office and administrative expenses were incurred during the year 2016. Prepare cost sheet for obtaining a profit of 20 % on selling price.

Solution 6 :

Aditya Chemicals Ltd.

Statement of cost and profit

For the year 2016

Opening stock of raw materials	10,000		
Add: purchases	98,000		
Materials available for use of raw materials	108,000		
Less: closing stock of raw materials (108,000 – 95,000)	13,000		
Cost of raw materials consumed			95,000
Direct labour			160,000
Prime cost			255,000
Factory overheads:			
Indirect labour	40,000		
Heat, light and power	20,000		
Insurance and taxes	5,000		
Repairs to plant	3,000		
Factory supplies	5,000		
Depreciation on plant	10,000		
Depreciation on building	6,000		89,000
Total factory cost			344,000
Add: opening work in progress			14,000
Total factory cost to account			358,000
Less: closing work in progress			78,000
Factory cost			280,000
Add: opening finished goods of stock			50,000
			330,000
Less: closing stock of finished goods			170,000
Cost of goods sold			160,000
Profit			40,000
sales			200,000

Problem 7 : Rahul ltd. is metal and wood cutting manufacturer, selling products to the home construction market. Consider the following data for the month of nov, 2016

Particulars	1/1/2015	31/11/2016
Direct materials	100,000	125,000
Finished goods	250,000	375,000
Work in progress	25,000	35,000

Transactions during the month:

Sand paper 5,000 materials handling costs 175,000 lubricants and coolants 12,500 Miscellaneous indirect manufacturing labour 100,000 direct manufacturing labour 750,000 plant leasing costs 135,000 Depreciation on plant and equipment 90,000 customer service costs 250,000 property taxes on plant 10,000 Fire insurance on plant 7,500 direct materials purchased 11,50,000 sales revenue 34,00,000 marketing promotions 150,000 Marketing salaries 250,000 distribution costs 175,000

Prepare cost of goods manufactured and operating income

Solution 7:

Opening stock of raw materials	100,000	
Add: purchase of direct materials	11,50,000	
	12,50,000	
Less: closing stock of raw materials	125,000	11,25,000
Direct manufacturing labour		750,000
Indirect manufacturing costs:		
Sand paper	5,000	
Material handling cost	175,000	
Lubricants and coolants	12,500	
Misc. Indirect mfg. Labour	100,000	
Plant leasing cost	135,000	
Depreciation on plant	90,000	
Property tax on plant	10,000	
Fire insurance on plant	75,000	535,000
Manufacturing cost incurred		24,10,000
Add: opening work in progress		25,000
		24,35,000
Less: closing work in progress		35,000
Cost of goods manufactured		24,00,000

Income statement

For the month ending November, 2016

Sales revenue		34,00,000
Cost of goods sold		
Beginning finished goods	250,000	
Add: cost of goods manufactured	24,00,000	
	26,50,000	
Less: ending finished goods	375,000	22,75,000
Gross margin		11,25,000
Less: marketing promotions	150,000	
Marketing salaries	250,000	
Distribution costs	175,000	
Customer service costs	250,000	825,000
Operating income		300,000

Problem 8: A fire occurred in the factory premises on October 31, 2015. The accounting records have been destroyed. Certain accounting records werer kept in another building. They reveals the following for the period September, 1, 2015 to October 31, 2015.

Direct materials purchased 250,000

Work in progress on 1-09-2015 40,000

Direct materials inventory 1-09-2015 20,000

Finished goods inventory 1-09-2015 37,750

Indirect manufacturing costs 40 % of conversion cost

Sales revenue 750,000

Direct manufacturing labour 222,250

Prime cost 397,750

Gross margin percentage based on revenues 30 %

Cost of goods available for sale 555,775

The loss is fully covered by insurance. The insurance company wants to know the historical cost of the inventories as a basis for negotiating a settlement although the settlement is actually to be based on replacement cost, not historical cost. Prepare cost sheet.

Solution 8 : Schedule of computation

Direct materials 1-09-2015	20,000
Direct materials purchased	250,000
Direct materials available for use	270,000
Direct materials (bal. Fig)	94,500
Direct materials used	175,500
Direct manufacturing labour cost	222,250
Prime cost	397,750
Indirect manufacturing cost	148166.67
Manufacturing cost incurred during current period	545,916.67
Add:- work in progress	40,000
Manufacturing cost to account	585,916.67
Less:- work in progress	67,891.67
Cost of goods manufactured	518,025
Add: finished goods	37,750
Cost of goods available for sale	555,775
Less: finished goods	30775
Cost of goods sold (70 % of Rs 750,000)	525,000

Prime cost (given) = Rs 397,750

Direct materials used = Rs 397,750 - Rs 222,250 = Rs 175,500

Conversion cost = Rs 222,250 / 0.6 = Rs 370,416.67

Indirect manufacturing cost = Rs 370,416.67 - Rs 222,250 = Rs 148,166.67

Problem 9 : The books and records of the anand manufacturing company present the following data for the month of august, 2015.

Direct labour cost = Rs 16,000 (160 % of factory overhead)

Cost of goods sold = Rs 56,000

Inventory accounts showed these opening and closing balances

	August 1	August 31
Raw materials	8,000	8,600
Work in progress	8,000	12,000
Finished goods	14,000	18,000

Other data:

Selling expenses: Rs 3,400 ; general and administration expenses Rs 2,600; sales for the month Rs 75,000

You are required to prepare the statement showing the cost of goods manufactured and sold and profit earned.

Solution 9:

Opening stock of raw materials	8,000
Add: purchase of raw materials	36,000
	44,000
Less: closing stock of raw materials	8,600
Materials consumed	35,400
Direct labour cost	16,000
Prime cost	51,400
Factory overhead (100 / 160 x 16,000)	10,000
Manufacturing cost incurred	61,400
Add : work in progress- opening	8,000
	69,400
Less work in progress- closing	12,000
Works cost	57,400
Add : general and administration expenses	2,600
Cost of goods manufactured	60,000
Add: opening stock of finished goods	14,000
	74,000
Less: closing stock of finished goods	18,000
Cost of goods sold	56,000
Add: selling expenses	3,400
Cost of sales	59,400
Profit	15,600
sales	75,000

Cost of goods sold	56,000
Add: closing stock of finished goods	18,000
	74,000
Less: opening stock of finished goods	14,000
Cost of production	60,000
Less: general and administration expenses	2,600
Works cost	57,400
Add: work in progress – closing	12,000
	69,400
Less: work in progress- opening	8,000
Manufacturing cost	61,400
Less: factory overheads	10,000
Prime cost	51,400
Less: direct labour	16,000
Materials consumed	35,400
Add: closing stock of raw materials	8,600
	44,000
Less: opening stock of raw materials	8,000
Purchase of materials	36,000

Problem 10 . The accounts of pleasant company ltd. show for 2016: materials Rs 350,000; labour Rs 270,000; factory overheads Rs 81,000 and administration overheads Rs 56,080. What price should the company quote for a refrigerator ? absorb factory overheads on the basis of labour and administration overheads on the basis of works cost. A profit of 12.5 % on selling price is required.

Solution 10:

Statement of cost

Materials	350,000
Labour	270,000
Prime cost	620,000
Factory overheads	81,000
Works cost	701,000
Administration overheads	56,080
Total cost of production	757,000
Percentage of factory overheads to labour = factory overheads / labour x 100 = 81,000/ 270,000 x 100 = 30 % Percentage of administration overheads to works cost = administration overheads / works cost x 100 = 56080 / 701,000 x 100 = 8 %	

Statement of the selling price of a refrigerator

Materials	1000
Labour	700
Prime cost	1700
Add: factory overheads	210
Works cost	1910
Add: administration overheads (8 % of labour)	152.80
Total cost of production	2062.80
Add: profit (1/ 8 on sale of 1/ 7 of cost)	294.69
Selling price	2,357.49

Problem 11:

From the following data prepare a cost and profit statement of popular stoves manufacturing co. for the year 2015

Stock of raw materials on 1-1-2016 35,000

Stock of raw materials on 31-12-2016 4,900

Purchase of raw materials	52,500
Direct expenses	95,000
Factory expenses	17,500
Establishment expenses	10,000
Finished stock - opening	nil
Finished stock - closing	35,000
Sales	189,000

The number of stoves manufactured during the year 2016 was 4,000

The company wants to quote for a contract for the supply of Rs 1,000 electric stoves during the year 2017.

The stoves to be quoted are of uniform quality and make and similar to those manufactured in the previous year but the cost of materials has increased by 15 % and cost of factory labour by 10 % . Prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realised during the year 2016, assuming that the cost per unit of overheads will be the same as in the previous year.

Soluton 11:

Raw material – opening	35,000	
Purchase of materials	52,500	
	87,500	
Less: closing stock of raw materials	4,900	
Value of materials consumed	82,600	20.65
Add: direct wages	95,000	23.75
Prime cost	177,600	44.40
Add: factory expenses	17,500	4.37
Works cost	195,100	48.77
Add: establishment expenses	10,000	2.50
Cost of production	205,100	51.27
Add: finished stock – opening	Nil	
Cost of production	205,100	
	205,100	
Less: finished stock – closing stock	35,000	
Cost of sales	170,100	
Profit (10 % on sales)	18,900	
Selling price	189,000	

Statement showing quotation price for 1,000 stoves

Materials consumed @ Rs 20.65 per stove	20,650	
Add: 15 % increase	3,098	
		23,748
Add: factory wages @ Rs 23.75 per stove	23,750	
Add: 10 % increase	2,375	26,125
Prime cost		49,873
Add: factory expenses @ Rs 4.375 per stove		4,375
Works cost		54,248
Add: office expenses @ Rs 2.50 per stove		2,500
Total cost		56,748
Profit (10 % on selling price)		6,305
Selling price		63,053

Problem 12 : Following are the particulars for the production of 2,000 machines of N co. ltd for the year 2016:

Cost of materials Rs 160,000; wages Rs 240,000; manufacturing expenses Rs 100,000; salaries Rs 120,000; Rent and taxes Rs 20,000; selling expenses Rs 60,000; general expenses Rs 40,000 and sales Rs 800,000.

The company plans to manufacture 3,000 machines during 2017. You are required to submit a statement showing the price at which machines would be sold so as to show a profit of 10 % on selling price. Following additional information is supplied to you:

1. Price of material is expected to rise by 20 %.
2. Wages rates are expected to show an increase of 5 %.
3. Manufacturing expenses will rise in proportion to the combined cost of materials and wages .
4. Selling expenses per unit will remain the same.
5. Other expenses will remain unaffected by the rise in output.

Estimate for the manufacture of 3000 machines during 2017

particulars		Cost per machine	Total cost
Materials	80		
Add : 20 % increase	16	96	288,000
Add: direct wages		120	360,000
Add: 5 % increase	6	6	18,000
Prime cost		222	666,000
Add : manufacturing expenses (25 % of prime cost)		55.50	166,500
Works cost		277.50	832,500
Add: administration expnses			
Salaries		40	120,000
Rent and taxes		6.67	20,000
General expense (unchanged)		13.33	40,000
Cost of production		337.50	10,12,500
Add: selling expenses		30	90,000
Cost of sales		367.50	11,02,500
Profit (10 % on sales)		40.83	122,500
Selling price		408.33	12,25,000

1.15 Numerical unsolved practical - cost sheet

1. On 1st july, the hero ltd was required to quote for a contract for the supply of 400 spare parts. From the following details prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realised during the six months to 30th june. Stock of raw materials on 1st January, 2017 40,000 ; stock of raw materials on 30th june, 2017 30,000, raw materials purchased 120,000 ; direct labour 30,000 , factory overheads 20,000, other works charges 10,000; administrative charges 5,000; show room rent 12,000, stock of work in progress : opening 4,000 and closing 1,000; stock of finished goods : opening 6,000 and closing 3,000; sales of scrap 3,000 ;sales 200,000 . the number of spare parts manufactured during the six months was 1,000 including those sold and those in stock at the end of the period. The spare parts to be quoted and cost of materials

increased by 20 % and labour by 10 %.

The data is given relating to the manufacture of a standard product during the month of November 2017. Raw materials consumed 24,000; direct labour charges 6,000; machine hours worked 1,000 ; machine hour rate 7 ; administrative overheads 30 % on factory cost ; selling overheads 0.90 paisa per unit ; units produced 4,810 ; units sold 4,500 @ 15 per unit. Show cost sheet by showing the cost of production per unit, profit per unit and profit for the period. **[ans profit 18,450 , cost of sales 49,050, cost of production 48,100 and 45,000]**

2. Following are the particulars for the production of 700 books of G publishers ltd. for the year ending 31 dec, 2016. Cost of materials 42,000; direct wages 35,000; factory rent 12,000, salesmen salaries 20,000, bad debt 8,000; indirect wages 18,000; manufacturing expenses 12,000; opening work in progress 2,000; closing work in progress 5,000; office overheads 21, 000; sales 250 per book. Following estmates were made by the costing department of the company for the year ending 31st dec, 2017: The output and sales will be of 1,400 books. The price of materials and labour will rise by 10 %. Factory cost will rise in proportion to the combined cost of materials and wages. Selling cost per unit will remain unchanged. Other expenses will remain unaffected by rise in the output. Prepare future tender price cost sheet so that each book show a profit of 10 % on the selling price.

3. Prepare cost sheet: Stock of raw materials - opening Rs 50,000; closing stock of raw materials Rs 16,000; stock of finished goods Rs 13,500, closing stock of finished goods Rs 12,200; beginning work in process Rs 12,200, work in process ending Rs 9,000; direct labour Rs 118,000; raw materials purchased Rs 250,000; abnormal losses Rs 11,000; raw materials return to supplier Rs 13,000; direct chargeable expenses Rs 31,000; carriage inward Rs 14,000; fuel and gas Rs 12,000; indirect wages Rs 40,000; sales of scrap Rs 3,000; advertisement Rs 3,000; bad debts Rs 4,000; repairs of tools Rs 6,000; depreciation of furniture Rs 4,000; depreciation of plant and machinery Rs 4,000; indirect consumption of materials Rs 2,000; managerial remuneration Rs 8,400 divided equally between factory, office and selling expenses, salary

paid to office staff Rs 16,000; bank charges Rs 2,300; travelling commission Rs 2,000; carriage outward Rs 2,100; director's fees Rs 4,000; administration expenses Rs 1,500; rent of warehouse Rs 1,900; sundry expenses Rs 1,700; rent and taxes Rs 2,700; sales Rs 587,000, advance tax Rs 4,500; sinking fund Rs 2,500 [ans Cost of raw materials consumed Rs 40,000; prime cost Rs 423,000; manufacturing cost incurred Rs 489,800; gross factory cost Rs 493,000; factory cost Rs 490,000, cost of production Rs 525,000; cost of goods sold Rs 526,300; Cost of sales Rs 542,100, profit Rs 44,900] hint: advance tax and sinking fund excluded in cost sheet

4. **Prepare cost sheet: opening-** raw materials Rs 50,000; closing raw materials Rs 110,000; carriage inward Rs 60,000; factory rent Rs 40,000; indirect wages Rs 20,000; depreciation on plant Rs 4,000; opening work in progress - Rs 8,000; closing work in progress - Nil, power Rs 2,000; productive wages Rs 20,000; gas and water Rs 6,000; sales of scrap Rs 10,000; general expenses Rs 2,000; office rent Rs 4,000; rent and rates Rs 13,000; upkeep of delivery vans Rs 6,000; salesman salaries Rs 3,000; rent of warehouse Rs 1,000; sales Rs 850,000; closing finished goods Rs 10,000; opening finished goods Rs 11,000, purchase of raw materials **Rs 700,000 [ans cost of raw materials consumed Rs 700,000 ; prime cost Rs 720,000; manufacturing cost incurred Rs 792,000, gross factory cost Rs 800,000, factory cost Rs 790,000, cost of production Rs 809,000, cost of goods sold Rs 810,000; cost of sales Rs 820,000, profit Rs 30,000, % of factory overheads 310 %, % of office overheads 2.41 % and % of selling and distribution overheads 1.27 %]**

5. **Prepare cost sheet showing cost of production per unit and profit per unit sold and profit for the period.** Raw materials consumed Rs 24,000; direct labour Rs 12,000, machine hours worked 1,000 hours, machine hour rate Rs 6, office overheads is 30 % on works cost, selling overheads Rs 2 per unit, units produced 4,550 units, units sold 4,000 @ 15 per unit [ans cost of production per unit = Rs 12 per unit, profit = Rs 4,000]

6. From are the particulars for the production of 900 plywoods of AB ltd. for the year ending 31st march, 2016: cost of materials Rs 54,000, direct labour Rs 36,000, factory rent Rs 12,000, depreciation on plant Rs 24,000, rent and taxes Rs 7,000, general expenses Rs 13,000, depreciation on tools Rs 18,000, unkeep of delivery vans Rs 8,000, worksmen salary Rs 27,000, rent of warehouse Rs 19,000, bank charges Rs 6,000, legal charges Rs 1,000, sales of scrap Rs 18,000, opening WIP Rs 11,000, WIP ending Rs 2,000, opening finished goods Rs 2,000, closing finished goods Rs 11,000, sales 252,000. Following estimates were made by the costing department of the company for the year ending 31st march, 2017: a) the output and sales will be of 1,000 plywoods b) the price of the materials will rise by 30 % on the previous year level c) wages during the year will rise by 15 % d) manufacturing cost will rise in proportion to the combine cost of materials and wages e) selling cost per unit will remain unchanged f) other expenses will remain unaffected by the rise in output. Prepare cost sheet and tender sheet at which plywoods would marked to show a profit of 16.5 % on the selling price. [ans cost sheet profit = Rs 45,000, tender sheet Profit Rs 57.82 per unit, selling price per unit = Rs 350.42]

1.18 Numerical practice Questions - Cost sheet

1. In respect of a factory the following figures have been obtained for the year 2016:

   Cost of material Rs 600,000; direct wages Rs 500,000; factory overheads Rs 300,000; administrative overheads Rs 336,000; selling overheads Rs 224,000; distribution overheads Rs 140,000; and profit Rs 420,000.

   A work order has been executed in 2017 and the following expenses have been incurred materials Rs 8,000 and wages Rs 5,000.

   Assuming that in 2017 the rate of factory overheads has increased by 20 % , distribution overheads have gone down by 10 % and selling and administrative overheads have each gone up 12.5 % at which price should the product be sold so as to earn the same rate of profit on the selling price as in 2016?

Factory overhead is based on direct wages while all other overheads are based on factory cost.

2. The managing director of a small manufacturing concern consults you as to the minimum price at which he can sell the output of one of the departments of the company which is intended for mass production in future. The company records show the following particulars for this department for the past year for production and sales of 100 units.

Materials Rs 14,000; direct labour Rs 7,000; works overheads Rs 7,000; office overheads Rs 2,800; selling overheads Rs 3,200; profit 6,000

You ascertain that 40 % of the works overheads fluctuate directly with the production and 70 % of the selling overheads fluctuate with sales. It is anticipated that the department would produce 500 units per annum and that direct labour charges per unit will be reduced by 20 % while fixed works overheads will increase by Rs 3,000. Administration overheads and fixed selling overheads are expected to show an increase of 25 % but otherwise no changes are anticipated.

3. A factory's normal capacity is 120,000 units per annum. The estimated costs of production are as under:

Direct materials Rs 3 per unit; direct labour Rs 2 per unit (subject to a minimum of Rs 12,000 p .m). Overheads - Fixed Rs 160,000 per annum ; variable Rs 2 per unit; semi- variable Rs 60,000 p .a upto 50 % capacity and an additional Rs 20,000 for every 20 % increase in capacity or part thereof.

Each unit of raw material yields scrap value which is sold at the rate of 2 paise.

In 2016 the factory worked at 50 % capacity for the first time three months but it was expected that it would work @ 80 % capacity for the remaining 9 months.

During the first three months, the selling price per unit was Rs 12. What should be the price in the remaining nine months to produce a total profit of Rs 218,000.

4. A company presently sells an equipment for Rs 35,000. Increase in prices of labour and material cost are anticipated to the extent of 15 % and 10 % respectively in the coming year. Material cost represents 40 % of sales and labour cost 30 % of cost of sales. The remaining relates to the overheads. If the existing selling price is retained, despite in the increase in labour and material prices, the company would face a 20 % decrease in the existing amount of profit on the equiptment.

   You are required to arrive at a selling price so as to give the same percentage of profit on increased cost of sales, as before. Prepare a statement of profit or loss per unit , showing the new selling price and cost per unit in support of your answer.

5. mangla and co. manufacture two types of toys A and B. The cost data for the year ended 31st march, 2016 is as follows:

   Direct material Rs 400,000; direct wages Rs 224,000; production overheads Rs 96,000. It is further ascertained that:

   1. Direct materials in type A cost twice as much direct materials in type B.
   2. Direct wages for type B were 60 % of those for type A
   3. Production overhead rate was same for both types.
   4. Administration overhead for each was 200 % of direct labour.
   5. Selling costs were 50 paise per toy for both types.
   6. Production during the year:

      Type A 40,000

      Type B 120,000

7. Sales during the year

      Type A 36,000

      Type B 100,000

8. Selling prices were Rs 14 per toy for Type A and Rs 10 toy for type B.

Prepare a cost sheet for two types of toys A and B separately.

6. From the following particulars , prepare a production account showing all details of cost and their break up and also calculate gross profit and net profit.

	1-9-2016	30-9-2016
Stock of raw materials	75,000	91,500
Stock of work in progress	28,000	35,000
Stock of finished goods	54,000	31,000
Raw materials purchased	66,000	
Direct wages	54,000	
Indirect wages	2,750	
Factory expenses	25,000	
Depreciation of plant and machinery	3,500	
Sales	211,000	
Sales men salaries and commission	6,500	
Office rent, rates,etc	2,500	
Sundry office expenses		6,500
Advertising		3,500
Carriage outwards		2,500

1.19 Summary

Mere knowledge of the total cost cannot satisfy the needs of management. For proper control and managerial decisions, management is to be provided with necessary data to analyse and classify costs. For this purpose, the total cost is analysed by elements of cost i.e. , by the nature of expenses. The elements of cost are three i.e., materials, labour and other expenses. These

elements of cost are further analysed into different elements i.e, direct and indirect. Cost sheet is a statement designed to show the output of a particular accounting period along with break up of costs. The data incorporated in cost sheet are collected from various statements of accounts which have been written in cost accounts, either day to day or regular records. It is a memorandum statement and does not form a part of double entry system of cost accounting records.

1.20 Glossary:

Cost, costing, cost sheet, tender, quotation, fixed costs, work in progress, finished stock, cost of sales

1.21 References

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Course Code: BCG-501 **UNIT -II**

Course Title : Cost Accounting **LESSON NO. 4-6**

2.1 Introduction

2.2 Objective

2.3 Introduction of Material

2.4 Meaning of Materials

- 2.4.1 Purchase Procedure
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- 2.4.3 Advantages of Centralised Purchasing
- 2.4.4 Disadvantages of Centralised Purchasing
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- 2.8.1 Difference between Bin card and Stores ledger
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2.10 Meaning of FIFO

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2.11 Meaning of LIFO

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2.12 Meaning of Average cost method

2.12.1 Advantages of average cost method

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2.13 Meaning of material control

2.13.1 Aspects of material control

2.13.2 Need of material control

2.14 Essentials of material control

2.15 Techniques of Material control

2.16 Meaning of EOQ

2.16.1 Assumptions in calculation of EOQ

2.17 Meaning of perpetual inventory system

2.17.1 Advantages of perpetual inventory system

2.18 Numerical solved practical portion - FIFO, LIFO, Average cost method, EOQ

2.19 Numerical unsolved practical portion

2.20 Numerical practice questions

2.21 Summary

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2.23 References

2.1 Introduction

Material Control is the main component of the process of material management. Control over materials is of utmost importance for smooth and uninterrupted functioning of an organisation. It is a systematic control over purchasing , storing and compostion of materials , so as to maintain a regular and timely Supply of materials at the same time avoiding overstocking. It refersto the management function concerned with theacquistion , storage , handling and use of material so as to minimise wastages and losses. Material control refers to the various measures adopted to reduce the amount of loss of material at the time of recieving, storing and issuing direct and indirect materials. Proper control over material can contrbute substantially to the efficiency of a business.

FIFO and LIFO are cost layering methods used to value the cost of goods sold and ending inventory. FIFO is a contraction of the term " first in first out and means that the goods first added to Inventory are assumed t be first goods removed from Inventory for sale. LIFO is a contraction of the term "last in first out" and means that the goods last added to Inventory are assumed to be the first goods removed from inventory for sale. FIFO and LIFO accounting are methods used in managing inventory and financial matters involving the amount of money a company has to have tied up with in Inventory of produced goods , raw material , Parts components or feed stocks . They are used to manage assumptions of cost sheet related to Inventory , Stock repurchases and various other accounting process.

Stores management is to recieve materials to protect them while in storage from damage and unauthorised removal to issue the material in the right place and to provide these service Promptly and at least cost.

2.2 Objectives

After reading this unit you would be able

-to understand the concept of material control

to understand the concept of purchase department and stores control.

to know about te concept of LIFO, FIFO and average weighted and EOQ

2.3 Introduction - Materials

Material is the first and most important element of cost. In most of the manufacturing organisation, materials form the single largest component of cost. The term material simply means any commodity or substance which is processed in factory in order to be converted into finished product. Materials may be classified as follows :

Raw Materials are the basic materials supplied in crude form to be used for production,

e.g., Jute, cotton, steel, timber, rubber, coal etc

Components are not raw in nature rather are finished parts made out of raw materials which are assembled to make the finished product, e.g., tyres and tubes in cycle industry stabilisers in A.C. and fridge manufacturing, batteries in car manufacturing, monitors in computer manufacturing, etc.

Tools are the appliances used in the manufacturing operations, e.g., hammers, screw-drivers, drills, milling cutters etc.

Spare parts are used for the maintenance of plant, machinery and building and for smooth running of production schedule.

Consumable Stores are the items used for smooth running of the machines e.g., lubricants, oil, cotton waste, rags, brooms, etc.

Materials include both direct and indirect materials. Direct and indirect materials are as both treated as stores items, whereas stock of finished goods is not treated as a stores item. Direct and indirect materials purchased for stock purposes are issued to different jobs, work order or departments as and when required are know as stores. On the other hand, finished goods are for the purpose of sale and have treated as stock. We may also refer to the commonly used term 'inventory' which includes the stock not only of raw materials but also stores and spares, work-in-progress and finished goods. Thus stock of materials is only a part of the inventory held by a manufacturing unit.

2.4 Meaning - Materials

Materials which form part of a finished product are known as direct materials. In other words, direct materials can be conveniently and accurately allocated to a particular unit of cost. For example, leather used in the making of a pair of shoes

and yarn required for a metre of cloth, are direct materials. Indirect material, on the other hand cannot be treated as part of the finished product because it cannot be conveniently and accurately allocated to a particular unit of product. Examples of such materials can be nails used in the making of shoes, cotton waste and lubricating oil required for the maintenance of machines, buttons and threads used in a suit etc.

To sum up, materials include physical commodities used to manufacture the final end product. It is the starting point from which the first operations start.

Out of all the factors of production, material is the most flexible and controllable input,Material has two unique features : First, it is inventoriable and does not get waste andExhaust (unless it is deteriorated) with the passage of time as labour is wasted with the Passage of time whether in use or not. Second, material can be purchased in varying Quantities according to the requirements of the firm whereas other elements of cost like labour and other services cannot be easily varied once they are established. That is why cost and ,management experts put in lots of efforts to control material cost.

Materials account for nearly 60 per cent of the cost of production as is clear from an analysis of the financial statement of a large number of private and public sector organisations. The information on the average materials expenditure for different manufacturing industries is as follows :

AVERAGE MATERIALS EXPENDITURE

Average expenditure on materials (Per cent)	Industry group
Above 65	Cotton yarn, earthmoving equipment, sugar, wool, jute, commercial vehicles, fabrication
60 - 65	Cotton textiles, bread
55 - 60	Engineering, non-ferrous
50 - 55	Ship-building, chemicals, tyre, machine tools, cement, electricity
45 - 50	Pharmaceuticals
40 - 45	Steel, newspaper, fertilizer, aircraft

According to the Indian Association of Materials Management, 64 paise in a rupee are spent on materials by Indian industries 16 paise on labour and the rest of one rupee of cost is spent on overheads. Thus, the importance of material control ties in the fact that any saving, made in the cost of materials will go a long way in reducing the cost of production and improving the-profitability of a concern. Studies by experts in this field have highlighted the fact that if an organisation can effect 5% saving- in material cost, it would be as' good asincreasing the production or sales by about 36%.

proper control of materials is necessary from the time orders for purchase of materials are placed with suppliers until they have be6n consumed. The object of material control is to attack material cost on all fronts so that cost of material may be reduced. In other words, efforts are to be made to reduce the cost of material when it is purchased, stored and used.

2.4.1 Purchase Procedure

Purchase procedure covers control on all aspects of purchases. Purchases are made by the purchase department.

Purchase Department

The purchase department plays a very important role in an organisation because purchasing has its effect on every vital factor concerning the manufacture, quality, cost, efficiency and prompt delivery of goods to customers. Its function is to procure materials supplies, services, machines and maintaining tools.. at the most favourable terms consistent with the maintaining the desired standard of quality. Purchasing is the most important function of materials management as the moment an order is placed for the substantial part of the company's finance is committed which affects cash flow position of the company. Thus, if the size of a business concern permits, there should be a separate purchasing department and the responsibility for be for purchasing all types of materials should be entrusted to this department. The head of this department is usually known as the Purchase Manager or the Supply Manager or the Chief Buyer. Following are the basic objectives behind establishing a separate purchasing department:

- To make continuous availability of materials so that there may be

uninterrupted flow of materials for production ;

- To make purchases competitively and wisely at the most economical prices;
- To Make purchases in reasonable quantities to keep investment in materials at minimum;
- To purchase proper quality of materials to have minimum possible wastage of materials and loss in production;
- To develop good supplier relationship which will ensure the best terms of supply of materials;
- To develop alternate sources of supply so that materials may be purchased from those alternate sources if a particular supplier fails to supply the materials;
- To adopt the most advantageous method of purchase to ensure smooth delivery of materials from suppliers and-to avoid the risk of any disputes or financial loss; and
- To serve as an information centre on the materials knowledge relating to prices, sources of supply, specifications, mode of delivery etc.

To sum up, the basic objective of setting up a separate purchase department is to ensure continuous availability of requisite quality of materials to avoid held up of production and loss in production and at the same time reduce the ultimate cost of the finished product.

2.4.2 Centralised purchasing

Purchase department may be centralised or decentralised. Centralised purchase department means that all the purchase functions are routed through one department. Purchasing should be centralised i.e. all purchases should be made by the purchase department to avoid duplication, overlapping and the non-uniform procurements. All the other departments which require materials, supplies, services, machines and tools should send indents or purchase requisitions to the centralised purchasing department to make timely and suitable purchases.

2.4.3 Advantages of centralised purchasing are:

1. when materials are purchased, favourable terms, e.g., more trade discount or economies in transport can be obtained. Because the quantity involved will be large.
2. The purchasing department can be staffed with highly paid officials who are experts in the art of purchasing the materials. Specialised knowledge and skill of these persons can be utilised.
3. Better control on purchasing is possible. There are chances of reckless buying when several persons are authorised to make purchases for the requirements.
4. All records with regard to purchases are kept at one place under the supervision of the Purchase officer. This results in economy, both in compilation and consultation of records.
5. Centralised purchasing helps in following uniform purchasing policies, practices and procedures.
6. It avoids duplication of efforts and is helpful in achieving product standards.
7. The liaison with production and service departments becomes easier by centralised purchasing because all departments are to approach the. purchasing department for their requirements of materials, supplies, services and tools.
8. Centralised purchasing results in economy to a vendor because there is only one purchase officer to be dealt with instead of many persons under decentralised Purchasing.

2.4.4 Disadvantages of centralised purchasing are:

1. Centralised purchasing will cause delay because branches at different places will send their requirements to the purchasing department and the purchasing departmentwill then look into their requirements-and place the order for the purchase ofmaterials.
2. In case of centralised purchasing, branches at different places cannot take

advantage of localised Purchasing.

3. There are chances of misunderstanding between the branch which requires the materials and the purchasing department with the result that wrong purchases of materials can be made.

4. It will lead to high initial cost because a separate purchasing department for the purchase of materials is to be set up.

It may be concluded that the 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 requirement by making purchases in their local markets. It is advantageous to have centralised purchasing if the branches or factories situated at different places need the same types materials.

2.4.5 Qualifications of a Purchase Officer

An efficient purchase officer should possess the following qualifications:

1. He should be a person of undoubted integrity who could be relied upon for responsible job of purchase of materials .

2. He should have complete information about the materials which he is required purchase so that requisite quality of materials may be purchased at the reasonable price from the reliable supplier or suppliers.

3. He should maintain proper documents like price lists, catalogues and trade journals to help him in finding the best possible market.

4. He should have good knowledge of economic principles and should have up-to-date knowledge of import and export procedures and various duties and taxes on items be purchased by him.

5. He should have a good knowledge of Sale of Goods Act and the Indian Contract Act so that he may be able to enter into contracts on suitable terms.

6. He should be aware of the policy of the firm relating to purchase of materials. He should also know the firm's financial resources which can be spared for the purchase of materials.

7. He should have good organising abilities because he is to supervise the duties different members of the staff under his charge.

8. He should be prompt in taking decisions when exceptional matters relating to purchase of materials arise.

In conclusion, the purchase officer should be able to obtain maximum value for each rupee spent by him.

2.5 Functions of a Purchase Department (or Purchase Routine or purchase Cycle)

Following are the functions of a purchase department:

1. what to-purchase ? 2. when to purchase ? 3. where to purchase purchase ? 4. How much to purchase ? 5. At what price to purchase ?

To perform these functions effectively, purchase department follows the following procedure:

(a) Receiving purchase requisitions. (b) Exploring the sources of supply and choosing the supplier. (c) Preparation and execution of purchase orders. (d) Receiving and inspecting

materials. (e) Checking and passing of bills for payment

(a) Purchase Requisitions (or Indenting for Materials)

The purchase officer does not initiate any action for the purchase of materials on his own accord. With the help of the purchase requisitions, the purchase officer comes to know thetypes of materials needed in the organisation. A purchase requisition is a form used as aformal request to the purchasing as a department to purchases materials. This form is prepared by the storekeeper for regular stock materials and by the departmental head for special materials not stocked as regular items. The requisition is approved by an executive, such as the plant superintendent or works manager, in addition to the one originating the requisitions.

The purchase requisition is generally prepared in triplicate. The original-copy is sent to the purchasing department, the duplicate is kept by the storekeeper or the department which

initiates the requisition and the triplicate is sent to the authorising executive.

The purchase requisition initiated by the storekeeper for regular items of materials is called 'regular' purchase requisition and the purchase requisition prepared by the departmental head for special materials is known as 'special' or 'occasional' purchase requisition. Regular purchase requisitions are prepared when the items of materials reach at the ordering

levels i.e. the level at which the order for replenishment should be placed. This is done with a view to avoid the shortage of materials and make available uninterrupted supply of materials

to jobs or departments. The specimen form of a purchase requisition is given below.

Swadeshi company ltd.

Purchase Requisition

No..... Regular Date .....

Special date by which materials are required.....

Serial No.	Description of articles	Stores code No.	Quantity required	remarks

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

For use in the purchase department

Quotations invited on .....

From :

1.....

2.....

3.....

Other action ..... Purchase order

It is clear from the above specimen of the purchase requisition that it provides three basic in formations which assist in the work of tie purchase department. These are:

(a) What type of material is to be purchased ? Description of articles and stores code number should be given clearly in the purchase requisition so that right quality of materials may be purchased.

(b) When is to be purchased ? The materials should be purchased at right time so that there may be neither shortage of materials nor any excessive investment in stocks.

(c) How much is to be purchased at one time of placing an order ? What should be economic order quantity ?

(b) Exploring the Sources of Supply and Choosing the Supplier

A source of supply of materials must be selected after the receipt of the purchaserequisition. The purchase department usually for every group of materials a list ofthe suppliers' names and addresses. Quotations may be invited from these suppliers by issuing tenders to them. On receipt of the quotations from the suppliers, a comparative statement of various quotations received should be prepared and the desirable suppliers should be selected.

While selecting the supplier to whom order is to be given for the purchase-of materials,the purchase department should keep in mind : (i) manufacturing capacities, (ii) reliability ofthe supplier (iii) financial condition of the supplier, (iv) the management of the supplying firm,(v) price quoted (vi) quantity for which price quoted is applicable, (vii) terms of payment, (viii) terms of delivery (ix) ipecifications to which the products are manufactured.

All other factors being the same, the purchase price should be the lowest price at which a particular material is to be purchased. Thus, the supplier from whom materials is purchased Should be dependable and capable of supplying materials of uniform quality at right time at reasonable prices. The purchase officer should keep in mind all the criteria give above in making a choice of a supplier. However, he must not become penny wise and pound foolish . he must not be afraid to spend, at times more of the firm's money to meet required delivery schedules,

quality standards and terms of payment.

The purchase Manager will obtain the necessary information from schedule of quotations, past records, catalogues, buyers' guides and other books. In short, he should maintain all thenecessary records keeping in mind the most important objective of the Purchase Departmenti.e., purchasing right quantity and quality of materials at the cheapest rate at proper time tohelp smooth running of the production function.

The specimen of a tender form which is issued to the various suppliers for inviting quotations is as follows:

SWADESHI COMPANY LTD.

Tender From

Indent No. ..... Tender No. .....

Date.....

.....

To

Dear Sir,

Please let us have your best offer for the supply of the following items. The items should be delivered F.O.R. Delhi . The tender closes on march 18, 2009 at 1 P.M. and will be opened at 11 A.M on the following day. The first copy of the tender should be despatched to us duly filled in

Yours faithfully,

For Swadeshi Company Limited

Purchase Officer

Serial No	Description of the items	Quality	Quantity	Price	Term of Delivery	Other Terms

SWADESHI COMPANY LTD.

Comparative Statement of Quotations

Tender No. .....

Name of material.....

Serial No	Name of the Supplier	Quantity	Price	Term of Delivery	Other Terms	Remarks

There should be periodic evaluation of suppliers and those whose performance is found to be bad in regard to quality, delivery time, sales policies and competitive prices, such suppliers till their performance is found good.

Materials can be purchased by open tender method, limited tender method and single tender method. **Open tender method** helps in inviting quotations from many parties by giving advertisement in the press and is followed when the purchase involves considerable quantity and value. This method will increase the stock of materials because advertised tenders take longer time for settlement of tenders and placement of orders. In limited tender method quotations are invited from limited number of suppliers. In limited tenders, suppliers are usually familiar with the materials and can submit realistic quotations. Suppliers are proven suppliers in the past. Consequently, continuous supplies can be ensured according to quotedterms. In such a system of tender, Competitiveness is also possible because previous price can be compared with the quoted price and if tender price is more, the tenderer can

be called for to justify the increase. This method is more popular because of its advantages. Single tender method is resorted to where the supplier is a sole supplier.

(c) 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. 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. The supplier is bound to supply materials according to the terms and conditions of the purchase order and the purchaser is required to accept delivery of, and make payment for, materials as agreed upon. Moreover, it ii the document which gives authority to the receivingDepartment to receive the materials ordered for and to the accounts department to accept the bill from the supplier for paymentThe number of copies of the purchase order to be prepared varies from organisation to organisation. Three to five. Copies are prepared depending upon the size of the organisation. If five copies are prepared, the possible use may be as follows:

(i) The original copy is sent to the supplier. (ii) One copy is sent to the receiving department' (iii) one copy is sent to the person who initiated the purchase requisition. (iv) One copy is sent to the according department. (v) The last copy is retained by the purchase department for future reference.

SWADESHI COMPANY LTD.

Purchase Order

No. ..... Dated ..... Purchase Requisition No.....

To (Suppliers)

Your quotation number .....dated.....has been accepted. Please supply the following items of stores in accordance with the instructions mentioned therein and terms and conditions listed on the reverse of this purchase order.

Serial No	Description	Quantity	Rate	Total Cost	Delivery Date	Remarks

Terms of Delivery

Terms of Payment

Packing and Despatch Instructions

Discount Allowed Purchase Officer

the following items of stores in accordance with the instructions mentioned therein and terms and conditions listed on the reverse of this purchase order.

Serial No	Description	Quantity	Rate	Total Cost	Delivery Date	Remarks

Terms of Delivery

Terms of Payment

Packing and Despatch Instructions

Discount Allowed Purchase Officer

There should be a **regular follow up of purchase orders placed** so that materials may be received in time. Enquiries should be made at regular intervals at the delivery dates agreed upon. Suitable remedial measures may be taken or alternative sources of supply maybe tapped if they face any difficulty in supplying the materials at the promised delivery datesWhen the delivery dates have expired, the suppliers should be asked to indicate the dates by which they expect to supply the materials. Extension in deliveries should be granted only subject to penalties in the contracts. Thus, follow up of orders ensures smooth purchase of materials and also safeguards against the closure of the factory due to non-receipt of materials.

(d) Receiving and Inspecting Materials

In a large concerns, a separate Receipt and Inspection Department independent of stocking locations should be set up to receive and inspect the materials. But in small concerns, the work of receiving the goods may be entrusted to the storekeeper. The functions of the receipt and inspection department are:

1. Maintenance of purchase order files.

2. Receiving, unloading and unpacking the materials delivered by suppliers under the delivery challans. These challans are signed by a clerk in the receiving department and one copy of the challan is returned back to the supplier as a proof for the receipt of the materials delivered by the supplier under the challan.

3. Checking quantity and physical condition of materials received. This is done by comparing purchase order with delivery challan. Any shortage or breaking should be intimated to the suppliers.

4. Checking quality of materials received. 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 materials, the department will submit a report as to the quality and if some materials are rejected the reason thereof.

SWADESHI COMPANY LTD.

Material Inspection Report

No..... Goods Received Note No. .....

Date ..... Date .....

Purchase Order No. Supplier's Name .....

Date .....

Serial No.	Description	Code No.	Quantity			Remarks for Rejection
			Received	Accepted	Rejected	

Special Remarks ..... Inspector.....

5. On completion of the inspection, the goods receiving clerk should enter details of materials received in Store or Goods Received Note. Five copies of the note should be prepared. One copy will be kept by the Receiving Department and four copies along with the materials will be sent to the storekeeper. He will again check the quantity of materials and compare it with the quantity given on the note. He will sign all the four copies. One copy will be kept by the storekeeper for his record and the other three copies will be sent to the following departments (one copy to each department):

(i) The Purchase Department, (ii) The Accounts Department, (iii) The Department

which Initiated the requisition.

The form of Stores (or Goods) Received Note is given below:

Stores (or Goods Received Note)

Supplier's Name ..... No. .....

Purchase Order No. Date .....

Serial No.	Description	Code No.	Quantity	Date	Amount	Remarks

Received by ..... Inspected by.....

Storekeeper .....

Stores Ledge Posted by .....

It should be noted that the rate and amount columns will be filled by the Costing department.Goods received note is a document on the basis of which purchases are verified and payment is made to the supplier. It is also helpful in filing any claim for short-supplies. It provides a complete record of all materials received.

(e) Checking and passing of Bills for payment

When the invoice is received from the supplier, it is sent to the stores accounting section check both the authenticity as well as the arithmetical accuracy. The quantity mentioned in the invoice is checked with reference to stores Received note while the price invoice is checked from the purchase order. The price of material has to be adjusted for discounts, transport charges, custom duties, excise duties, cost of containers, etc. Before verifying the final bill, the following points need attention:

1. Trade discount, if any, is to be deducted from the purchase price of material.

2. Quantity discount given by the supplier for bulk purchases is also to be dedicated from the price of material

3. Cash discount is claimed only if payment is made in cash. However, some experts advocate that cash discount is an item of pure financial nature, therefore, it should not be brought in cost accounts.

4. Transport charges incurred in bringing the material to the organisation are part of material cost. If such expenses are met by the supplier on behalf of the buyer, invoice of material should be increased with the amount of transport charges.

5. Any insurance charges paid by the supplier are also to be added to the price of material.

6. Sales tax, excise Duty, etc. are also to be added

7. Any interest due on the balance due to supplier must be added.

8. The cost of containers is added to the purchase price of material if they are not to be returned back to supplier. Purchase price, however, will not include any cost for containers if they returnable at full value. In case of containers returnable at reduced value, the rental, i.e., the difference between the price charged out by supplier, and returnable price is added to the price of material.

After verifying the authenticity of the bill, the arithmetical accuracy should also bechecked. The stores accounting section finally approves, certifies and passes the invoice for payment and on this, basis the cashier can make the payment' Payment is made according to thee terms agreed in any particular order.

2.6 Problem and solutions of quotations

Problem 1. When tenders were invited for a store, quotations were received as under:

Supplier A

(a) Rate Rs 2 each ; (b) Trade discount 10% ; (c) Cash discount 5% if bills are paid within a fortnight after receipt ; (d)'Transport charges Rs 1 per 100 units.

Supplier B

(a) Rate Rs.1.80 each (upto 1,000 units), Rs 1.60 each (for orders above 1,000 units) ; (b) 6% interest per, annum will be added if bills are not paid within a fortnight after receipt of the materials ; (c) Transport charges Rs. 3 per 100 units.

Assuming about 5,000 units are required every month and that quality and other conditions of supply are the same, offer your comments as to whom purchase order can be issued. The factory pays 50% of its total monthly bills every fortnight.

SOLUTION 1

COMPARTIVE STATEMENT OF COST OF MATERIAL OF TWO QUOTATIONS

Ordering Quantity = 5,000 units	Supplier A	Supplier B
	Rs.	Rs.
	10,000	8,000
5,000 units @ Rs.2Perunit		
5,000 units @ Rs.1.60 Per unit	1,000	
Less: Trade discount @ 10%	9,000	
	50	
Transport charges @ Rs. 1 per 100 units	9,050	150
Transport charges @ Rs. 3 per 100 units	226.25	8,150
Less: Cash discount @ 5% on half of the amount of		
Rs. 9,050 paid within 15 days		10.20
Add: Interest @ 6% on half of the amount of Rs 8,150 not paid within		
15 days for the next 15 days of the month	8,823.75	8,160.20
(4,075 x 6 x 1)		
100 24		
Total cost of materials		

The purchase order should be issued to supplier B because of the lower cost of materials.

Problem 2. After inviting tenders, two quotations are received as follows:

(a) Rs. 4.20 per unit.

(b) Rs.4.00 per unit plus Rs.2,000 fixed charges to be added irrespective of units ordered.

Advise with your argument with whom order should be placed and quantity is to be ordered.

SOLUTION

It is evident that tender (a) is more economical for lesser quantity of purchase. Tender (b) will be economical only when sufficient quantity is ordered to justify the fixed charges of Rs.2,000.

Tender (b) is cheaper by Rs. 0.20 per unit (i.e. Rs. 4.20 - Rs.4.00).

Therefore, to justify the fixed charges of Rs. 2,000 the minimum quantity to be ordered should be 10,000 units (i.e. Rs 2,000)

Rs..20

Hence, an ordered quantity above 10,000 units becomes economical for tender (b) Tender (a) will be economical if the quantity to be ordered is less than 10,000 units.

Problem 3. A lorry load of material of mixed goods was purchased for Rs. 9,000. These were sorted out in the following grades whose materials rates are shown against each.

Order A 5,000 units Selling rate @ Rs 1.20

Order B 3,000 units Selling rate @ Rs 1.00

Order C 2,000 units Selling rate @ Rs 0.50

Find the purchase rate per unit on each grade of the materials assuming that all the grades yield same rate of profit

Solution 3:

Order A 5,000 units @ Rs 1.20 = 6,000

Order B 3,000 units @ Rs 1.00 = 3,000

Order C 2,000 units @ Rs 0.50 = 1,000

Total selling price of all grades = 10,000

Thus, cost of material (Rs 9,000) should be divided in proportion to 6,000 : 3,000: 1,000 i.e., 6:3:1

	A grade	**B grade**	**C grade**
Cost of purchase	Rs 9,000 x 6/10 = Rs 5,400	Rs 9,000 x 3/10 = Rs 2,700	Rs 9,000 x 1/10 = Rs 900
Cost per unit	Rs 5,400/ 5,400 = Rs 1.08	Rs 2,700/ 3,000 = Rs 0.90	Rs 900/ 2,000 = Rs 0.45

2.7 Stores control

To further strengthen material control, purchase control must be matched by equally effective stores control to avoid losses from misappropriation , damage, deterioration, evaporation and carelessness. The investment in materials constitutes a major portion of current assets, so there should be a separate stores department to excercise stores control. It is an amazing fact that in many industrial organisations while a most rigid control over cash exists, little or no attention is paid to materials . it is not desirable . materials to become cash on the sale of the finished products represent an equivalent amount of cash, so it is desirable to have an efficient and well equipped stores department to excercise an effective materials control.

Stores Department-Location and Layout

The location of the stores department should be carefully planned out and it should be housed in a postion which is very near to the receiving department so that

transporation charges are at a minimum. At the same time, there should be an easy access to all other departments of the factory, roads, railway siding and wharf so that the minimum of expenses is incurred in unloading. It is very important that bulky and heavy stores should be stored nearest to the department requiring them in order to minimise the labour and transportation charges. In this way, planned location of the stores department will avoid delay in the movement of the materials to the departments in which these are needed.

The layout of the stores department needs careful consideration. The store should be divided into racks which should be further sub divided in to small spaces. All these spaces are known as bins and for one item of materials, one bin is allotted. Bin is not necessary a space on a rack but it really means any place where materials , a big hall can be treated as one bin. Special attention must be paid to storage of materials which are liable to leakage or evaporation or deterioration due to atmospheric conditions. The building of the stores department should be properly constructed from the point of view of avoiding loss due to damage and pilferage. Moreover, all the materials needed in a department should be kept side by side.

Classification and Codification

Scientific classification and codification of various items of stores in essential for a good system of storekeeping . materials in stores are classified either on the basis of their nature or on the basis of their usage. The former method of classification is most commonly used. For example, materials may be classified as construction materials, consumable stores into various parts, abrasives, lubricating oils,etc. after dividing all items of stores in to various classifications, the next step is to codify alphabetically or numerically each item of stores by giving it a distinctive stores code number. Decimal system of codification is more commonly used. Under this method of codification, the whole numbers are used to indicate the main group and the decimals to indicate primary, secondary and other groups. For example, materials may be classified and codified as follows:

Selection body 1 - i.e. main code consists of first two digits.

Selection body 2- i.e. sub- code consists of the next two or three digits depending upon the requirement.

Selection body 3 - i.e. the details of the sizes, quality,etc. last one or two digits depending upon the requirement.

If in a store , there are 1,500 items classified into 20 groups , two digits before decimal will be required to indicate the master group. Further, under each group of materials , the individual items will have to be given number and a number may also be given for quality. Thus, cotton waste under the group of consumable stores may be given a code number of 12.23.1 indicating number 12 for the group of consumable stores, number 23 for cotton waste and number 1 for the quality of the group of cotton waste . following are the advantages of a system of classification and codification.

2.5.1 Advantages of stores control

1. Better control can be exercised over stores because all stores are housed in one department.
2. Better layout of stores is possible.
3. Less storage space as stores are kept to a minimum.
4. Investment in stocks is minimized.
5. Economy in cost. Examples are reduced clerical costs and economy in records and stationery.
6. Economy in staff and concentration of experts in one department will lead to development of high technical skill.
7. Less botheration in inventory checks as all the stores are located in one place.

2.5.2 Disadvantages of stores control

1. This system of stores increases transportation costs because one central

store may not be near to every department of the factory.

2. Delay and inconvenience may be caused to departments (situated at a distance from the central stores) in drawing materials from the central stores.

3. Greater risk of loss in case of fire.

4. Breakdown in transport may stop production in departments.

(2) Decentralized Stores

Under this type of stores, independent stores are situated in various departments. Handling of stores is undertaken by the storekeeper in each department. The departmentsrequiring stores can draw from their respective stores situated in their departments. Thedisadvantages of centralized stores can be eliminated if there are decentralized stores. Suchtype of stores set up to meet the requirements of materials of each production department are not very popular because of the heavy expenditure involved.

(3) Central Stores with Sub-stores

In large factories, departments are situated at a distance from the central store; so inorder to keep the transportation costs and handling charges to minimum, sub-stores (in addition to the central stores near the Receiving Department) should be situated near production departments. For each item of materials, a quantity is determined and this should be kept I stock in sub-store at the beginning-of any period. At the end of a period the storekeeper of each sub-store will requisition from the central stores the quantity of the material consumed to bring the stock upto the predetermined quantity. In short, this type ofstores operates in a similar way to a petty cash system, so this system of stores is also knownas the imp rest System of Stores Control.

To conclude, the ideal course for a large factory to overcome the disadvantages of centralized and decentralized stores is to have central stores with sub-stores.

The Storekeeper

All manufacturing concerns appoint a person known- as the Storekeeper,

ChiefStorekeeper or the Stores Superintendent who is in-charge of the stores department and isresponsible for stores control. The storekeeper should have technical knowledge and wideexperience in stores routine and ability of organizing the operations of the stores. He shouldbe a man of undoubted integrity. His duties and responsibilities include the following:

1. Receiving the stores correctly i.e. ensuring that every item of stores received by the storekeeper is duly supported by an indent, a purchase order, an inspection note and a goods received note.
2. Entering all receipts regularly in the bin cards.
3. Keeping every item of stores in its allotted bin. The principle of good storekeeping is

   -A place for everything and everything in its place.
4. Maintaining the stores in an orderly and tidy manner so as to facilitate easy handling and physical verification of stores and prevention of loss in storage.
5. Ensuring that materials are issued only to those who present a duly signed requisition note and that the quantities issued are correctly recorded in the bin cards.
6. Requisitioning from the purchasing department when the stock of a material reaches the re-order level.
7. Ensuring that the stocks do not exceed the maximum level nor go belowthe
8. Checking the balances of bin cards with the physical quantities in the bins.
9. Maintaining and supervising the duties of the different members of staff under his charge.
10. Preventing unauthorized persons from entering into the stores.
11. Carrying out a regular review of the items of stores in hand for locating slow-moving and non-moving items so that steps may be taken for their disposal before they become obsolete.

2.6 Requisitioning for Stores

One of the duties of the storekeeper is to send requisitions for materials for replenishment in time so that the production may not hamper for want of materials. The storekeeper is to see that neither production is adversely affected nor there is unnecessarily blocking of capital due to overstocking of materials. In this respect, he is guided by the re-order level, economic ordering quantity, and the maximum and minimum quantity which he is authorized to store in respect of each kind of material. These various levels are discussed in the next chapter.

Stores (or Material) Records

The bin cards and the stores ledger are the two important stores records that are generally kept for making a record of the various items of stores.

(a) Bin Card

A bin card makes a record of the receipt and issue of material and is kept for each item of stores carried. Quantity of stores received is entered in the receipt column and the quantity of stores issued is recorded in the issue column of the bin card and a balance of the quantity of stores is taken after every receipt or issue, so that the balance at any time can be readily seen. These cards are maintained by the storekeeper and the storekeeper is answerable for any difference between the physical stock and the balance shown in the bin card. These cards are used not only for recording receipts and issues of 'stores .put also assist the storekeeper to control the stock. For each item of stores, minimum quantity, maximum quantity and ordering quantity are stated on the card. By seeing the bin card, the storekeeper can send the material requisition for the purchase of material in time.

A bin card is also known as bin tag or stock card and is usually hung up or placed in shelf, rack or bin where the material has been kept. Bin cards can also be in the form of loose sheets which can be maintained in a ledger kept in the stores.

Double Bin System. Some concerns divide the bin, rack or shelf (where material has been kept) in two parts, namely, the smaller part to store the quantity equal to the minimumquantity and the other part to store the remaining quantity. The quantity in the smaller part is not issued so long as the quantity is available in the other part.

This system helps in exercising stores control in an effective way as. it facilitates physical verification and services as a signal when it becomes necessary to use the quantity kept in the smaller part.

(b) Stores Ledger

This ledger is kept in the costing department and is identical with the bin card except that receipts, issues and balances are shown along with their money values. This contains an account for every item of stores and makes a record of the receipts, issues and the balances, both in quantity and value. Thus, this ledger provides .the information for the pricing of materials issued and the money value at any time of each item of stores.

The ruling of the bin card and the store ledger are given on the next page :

The columns under 'goods on order' in the bin card are meant to show how much quantity is still on order. A copy of the purchase order is also sent to the storekeeper so that he mayrecord the number and date of the order and the quantity for which order has been placed.

The third column is filled by the storekeeper when the goods are actually received showing that the goods have been received against the order.

2.6.1 Difference between bin card and stores ledger

Bin Card Vs. Stores Ledger. The difference between a bin card and the stores ledger can be summarized as follows :

Bin Card	Stores Ledger
1. A record of quantities only.	1. A record of both quantities and values.
2. Maintained by the storekeeper,	2. Maintained by the Costing Department.
3. Normally Posted just before the transaction takes Place.	3. Always posted after the transaction takes place.
4. Each transaction is individually posted.	4. Transactions may be summarized and posted periodically.
5. Usually kept inside the stores	1. Kept outside the stores.

2.6.2 Are Bin Cards Necessary at all ?

Some persons argue that where a store ledger is maintained, the bin card is a duplicate record and as such" should not be maintained. This is wrong and is against the basic principles of stores accounting on account of the following reasons :

1. The storekeeper is responsible for the maintenance of stores and as such he should have a stock record under him.
2. The storekeeper is held responsible for the difference in the physical stock and the stock record. The responsibility for difference in stock will get divided if the stock records are not kept by the storekeeper.
3. The store ledger is not kept up-to-date because posting of transactions is done periodically and as such the maintenance of bin cards is desired to have up-to-date balance of stock. In bin cards, posting is done before the transaction takes place.
4. Bin cards and stores ledger act as a cross check on each other because balance of stock disclosed by bin cards should agree with the balance shown by the stores ledger. Thus, the accuracy of both records is established.
5. Keeping in view the above reasons it is said that storekeeper should himself keep theStores ledger. This is also wrong because a stores ledger is a record of both quantity and value and figures for calculation of the cost of production are taken from this record. The calculation of cost is the responsibility of the cost accountant ; so the store ledger should not be outside the control of the cost accountant. Further, it is not fair to burden the storekeeper with the responsibility of the valuation of the receipts, issues and balances; his recording should be restricted to quantity alone. It is,therefore, necessary that both stock records should be kept.

Problem 4. Following information regarding receipts and issues of pigmentshas been obtained from the stores record of a paint manufacturing factory :

October, 2015

1. Opening stock of pigments 25,000 kgs.

(There were no issues or receipts during the last week of September)

2. Issued on Requisition No. 1 13,000 kgs.
3. Issued on Requisition No. 2 2,000 kgs
4. Received from a supplier by Challan No. 13 of 3-'t0-2015 (as per stipulated date of delivery) 30,000 kgs
5. Issued on Requisition No. 3 10,000 kgs
6. Issued on Requisition No. 4 5,000 kgs
7. Received from supplier by Challan No. 48 10,000 kgs
8. Issued on Requisition No. 5 4,500 kgs

Examination by the stock verifier on 6th morning revealed a shortage of 500 kgs. Maximum limit was 50,000 kgs. Minimum limit was 8,000 kgs. Ordering level was 25,000 kgs.

You are required to prepare Bin Card No. 36 for the item pigment for which the Symbol allotted is X-40.

SOLUTION 4

Bin Card

No. 36 Max. stock : 50,000 kgs
Code : X – 40 Min . stock : 8,000 kgs
Unit : kgs. Ordering Level : 25,000 kgs

Reservation			On Order		
Job No.	Qty.	Date Issues	Order No & Date	Qty	Date Received

	Receipts		Issues		Balance	Stock verification		
Date	Challan	Qty kgs.	Requisition	Qty kgs		Date	Remarks	Initials
Oct 2015						Oct. 6,2015	Shortage	
1					25,000		500 kgs	
2			1	13,000	12,000			
3			2	2,000	10,000			
4	13	30,000			40,000			
5			3	10,000	30,000			
6			4	5,000	25,000			
6	48	10,000			35,000			
6			Shortage	500	34,000			
7			5	4,500	30,000			

Issue of Materials

Materials are kept in stores so that the storekeeper may issue them whenever these are required by the production departments. But a storekeeper must not issue materials unless a properly authorized materials requisition is presented to him.

Material Requisition. The storekeeper should always issue the material on proper authority to avoid the misappropriation of material. This authority is usually given by theforeman of the production department on a form known as material requisition. The ruling ofthe form is as follows:

SWADESHI COMPANY LIMITED

Material (or Stores) Requisition

Department,.. No. .....

Job No,…..…… Date .....

To

The Storekeeper

Please issue the materials stated herein.

Description	Code No	Quantity	For Cost Office		Bin Card No.	Stores Ledger Folio	Remarks
			Rate	Amt.			

Authorized by Received by .....

Issued by…..…… Checked by .....

The requisition received are serially numbered by the storekeeper so that norequisition may be left out in accounting. Besides the serial number written by thestorekeeper, department placing the requisition may put its own serial number on it.

The details relating to quantity issued and number of the stores requisitions are entered inthe issue column of the bin card so that the bin card may show the correct balance of thematerial. After this, these requisitions are sent to the cost office where rate and amount columns are filled so that credit may be given to the materials issued in the stores ledger and debit may be given to the job receiving the material in the job ledger.

A materials requisition serves the purpose of an authority to the storekeeper to issue thematerials, so it is signed only by the person authorized to do so, so that there may be nowrong drawal of materials. To avoid misuse and excess drawal of materials, a list of thenames of the persons authorized to draw the materials together with their specimensignatures is maintained by the storekeeper.

Remarks

.....

.....

Bill of Materials

A bill of materials gives a complete list of all materials required with quantities for a particular job, order or process. Thus, all materials required for a particular job, order or process are listed by the production department on a single document. This bill serves the purpose of material requisition and all materials listed on the bill are sent to the production department. A bill of materials should be prepared if the job is of non-standardized nature so that reasonable estimate of all materials required may be made by the production department before the job is started.. A specimen form of a bill of a materials is as follows:

SWADESHI COMPANY LIMITED

Bill of Materials

Job No. . . . . . No. .....

Department Authorized. . . . . Date .....

Serial No	Description of Materials	Stores Code No	Quantity Required	For Cost Office		Remarks
				Rate	Amt	

Drawing Officer . . . . . Price by . . . . . .

Received by .....

Stores ledger Folios. . . . . .

Sore Keeper .....

Advantages of Bill of Materials. (1) A bill of materials serves the purpose of anauthority for the production department to place requisitions for materials as stated in it. (2) It serves the purpose of an indent or purchase requisition upon the purchase officer for thepurchase of materials required for a particular job. (3) It serves the purpose of materialrequisition for the issue of materials by the storekeeper. (4) Costing of jobs becomeseasier because costing department can use one bill of materials for calculating the cost ofmaterials issued for each job (5) Control over use of materials in case of non-standard jobs is facilitated if materials are issued according to the bill of materials. A bill of materials is prepared keeping in view the scientific estimate of all materials required for a particular job, Thus, wastage can

be discovered if the actual quantity of materials issued is more than the quantity shown in the bill of materials. (6) Procurement of materials can be planned in advance to avoid production delays. (7) The use of a bill of materials saves time which otherwise would have been wasted for preparing separate requisitions for different materials.

2.9 Difference Between Material Requisition and Bill of Materials

Material requisition is a document authorizing the storekeeper to issue materials stated therein to the consuming department. Bill of materials on the other. hand is a document which gives a list of all materials required with specifications and quantities for a particular job, order or process.

Bill of material often serves the purpose of a material requisition because it shows a list of all materials required for a particular job, order or process but a material requisition gives a list of materials required by a particular department at a particular time. Therefore, a bill of materials can replace a material requisition but a stores requisition cannot replace a bill of materials. Bill of materials helps in keeping a quantitative control on materials drawn through stores requisition because wastage can be located if the actual quantity of materials drawn is more than the quantity shown in the bill of materials.

A bill of materials can be very helpful in case of non-standardised jobs whereas a material requisition will not serve this purpose.

A bill of materials is helpful in sending competitive quotations because a bill of materials is prepared keeping in view the scientific estimate of all materials required for a particular job,

order or process. This is not possible in case of stores requisition which is prepared only at the time of getting materials issued from stores.

We have seen that a bill of materials can serve the purpose of a stores requisition

but a store requisition cannot serve the purpose of a bill of materials. However, the co existence of both the documents is desirable under the following cases :

- When materials shown in bill of materials to be drawn over a long period are

not to be drawn at one time;

- When standard costing system is adopted; and
- Where job or batch costing is followed, stores requisition may be used for any issue of materials over and above quantities stated in bills of materials for the respective batches or jobs to be undertaken.

3 Treatment of Surplus Materials

The requisitions received are serially numbered by the storekeeper and the details relating to quantity issued and number of the stores requisitions are entered in the issue column of the bin card. Alter this, these requisitions are sent to the cost office where rate and amount columns are filled and entries are made in the store ledger and job ledger.

Sometimes materials may be issued in excess of the requirements of a particular job or work order to facilitate convenient handling. For example, sheet iron or steel bars may not be cut off in the stores to the exact size required and at the same time may be conveniently operated upon in the works when in full size. In such a case, the full quantity issued is charged to the job or work order and surplus materials of that job may either be returned to stores or transferred to other job.

Return of Surplus Materials. When excess materials is returned to stores, a materials Returned Noted or Stores Debit Note or Shop Credit Note is prepared in the department where the material is in excess. The storekeeper signs all the three copies as a token of receipt of the surplus material and keeps one copy of the same with him for making entries on the receipt side of the bin cards, The second copy is sent to the cost office for making entries in the stores ledger and for giving credit to the particular job where the materials is in excess and returned. The third copy is sent to the department which returns the surplus material. The ruling of the note is given below:

SWADESHI COMPANY LIMITED

Material Returned Note

Credit ……..

Job No……. No. .....

Department/Shop ……. Date .....

.

Serial No.	Description	Code No	For Cost Office		Amount	Remarks
			Quantity	Rate		

Approved by……... Received by .....

Returned by ..... Priced by……...

Bin No …… Stores Ledger Folio……

Transfer of Surplus Materials. Transfer of excess materials from one job to another job should be avoided as far as possible. The main objection is that record for the transfer may not be made and actual material cost for job may be inaccurate. An exception to the return of surplus materials to the stores is that when returning of materials to the stores may be costly due to the distance or excessive amount of handling charges, material may be transferred to another job which is near the transferring job. This will save the transport cost from the transferring job to the store and again from the store to the other job. A large amount of transport expenses will be saved if the materials to be transferred are heavy.

However, transfer of materials from one job to the other job is to be allowed with the preparation of Material Transfer Note. The ruling of this note is given below:

SWADESHI COMPANY LIMITED

Material Transfer Note

From:

Job No……………… No. ....

Department/Shop Date ....

To

Job No………………

Department/Shop……………...

Description	Code No	Quantity	For Cost Office		Remarks
			Rate	Amount	

Approved by ………….. Received by .... Priced by ……………..

Debited Job No……….. Checked by ....

Material Transfer Note is prepared in the department where the material is in excess and one copy of the note is sent to the cost office for making necessary records. The job receiving the material is debited and the job transferring the material is credited.

4 Material Abstract (or Material Issue Analysis Sheet)

periodically an analysis of various requisitions,. material returned notes and material transfer notes should be made and a statement should be prepared which shows at a glance the value of material consumed in each job. This statement is known as Material Abstract or Material issue Analysis Sheet. The ruling of the abstract is given as under:

Materials Requisition or Transfer Note or Returned Note No	Amount	Job No						Total for Jobs	Overheads(indirects Materials Charged	
		101	102	103	104	105	106			
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.			
Total										

The material abstract serves a very useful purpose, as it shows the amount of materials to be debited to the various jobs and overheads. The total amount of stores

debited to the various jobs and overheads should be the same as the total value of stores issued in any Period.

5 Methods of Valuing Material Issues (or Material Costing)

Materials issued from the stores are debited to the jobs or work orders which received them and credited to the materials account. These jobs are debited with the value of materials issued to them.

Let us at this stage consider, what the value of materials is. Theoretically the valueincludes all expenses up to the point of placing materials at the processing plant. Therefore,the value includes (i) the invoice price less trade discount.(ii) the freight, cartage, octrol and insurance on incoming materials, and (iii) expenses of purchase, receiving, storing and record keeping and carriage from the stores up to the process plant. Hence, in order to work out correct costs of jobs or work orders, all these types of expenses should be included in the value of materials issued. However, in practice it is a difficult task because the clerical work involved in making minute calculations for the inclusion of these expenses will be much more than the benefit derived. So, this is not done.

Then what is done ? The general practice is to include the invoice price (less trade discount;, the freight, cartage, insurance and octrol on the incoming materials. For example, if 100 units of a particular material have been purchased at the invoice price of Rs. 2,100; trade discount allowed is Rs. 100 and Rs. 200 have been spent as freight, cartage, insurance and octroi on incoming of the material to the stores ;the value per unit of material will be \f(Rs. 2,100 -Rs.100+Rs. 200,100) = Rs. 22per.unit. The issue price of the material issued to jobs will be Rs. 22.

If the same purchase price is paid for all lots of a given material, no difficulty would been countered in the valuation of that material when it is issued to jobs or work orders.

However, that is not the case and the price always changes in accordance with them market conditions. The stock of a given material will, therefore, consist of purchases made at different times at different prices, which poses a problem as to what should be the price when the material is issued. There are many methods of pricing material issues, the most important being :

A Cost Price Methods

(i) First in First out (ii) Last in First out (iii) Average cost

(iv) Inflated Price (v) Specific Price (vi) Base Stock

(vii) Highest in First out.

B. Market Price Methods

(i) Replacement Price (ii) Realizable Value

C. Standard Price Methods

(i) Current Standard Price (ii) Basic Standard Price

A very careful choice has to be made of the methods of valuing the material issues because it influences the cost of the jobs and the value of the closing balances of material in the stores. The various methods of pricing material issues given above are the cost assignment methods and do not necessarily relate to.ihe physical flow of materials on and off the shelves, Generally accepted accounting principles require that the material costing method used must be rational and systematic. A good method of valuing material issues should satisfy the following conditions :

1. The issue price should recover the cost price of the materials.
2. The issue price must be near the market price so that the effect of current market prices is revealed in the cost of issues.
3. The issue price should not lead to any significant variation in cost of similar jobs from period to period so far as materials are concerned, otherwise comparison of similar jobs will become difficult. Range of fluctuations in prices of materials should be considered.
4. The issue price should not necessitate heavy adjustments in values of stock of materials in the stores ledger at the end of the year, thus making the stores ledger complicated.
5. The issue price should take into consideration management policy relating to the valuation of closing stock.

6. A method of valuing material issues should take into consideration the nature of materials used. For example, if the materials are likely to loose weight due to evaporation etc., issue price should be higher than the purchase price to cover wastage of materials

6 Pricing of Returns

Return of surplus materials from production departments has already been discussed in the beginning of the chapter. Now we discuss the various methods of pricing such returns.

Materials returned in the original condition may be valued by any one of the following two methods :

(i) At the same price at which it was issued. The returned materials is valued at the original price at which it was issued. This price is ascertained from the original material requisition. This method of pricing of returns is most desirable because the values of the credit given on return and th6 original debit given on issue to the production order concerned are identical and no further adjustment is needed. The returned materials may be kept apart and may be issued according to the specific price method at the original price or the returned materials may be treated as-a new purchase at the original price and entry may be made in the bin card and stores ledger after the last purchase entry. After treating the returned materials as a new purchase, it will be issued according to the method of pricing of issues prevalent in the organization.

(ii) At the current price of issue : According to this method, the returned material is priced at the rate at which any materials requisition placed on that date would have been priced. In other words, pricing of returns will not be done at the original price. This method is not popular as it will need adjustment in production order on account of different rate being applied on returns.

Scraps, wastages, defectives,etc do not possess the same value as the original material. Therefore, these are valued separately and then entered in the bin card and stores ledger . thus, pricing of scraps, wastes and defectives is made according to their value and credit is given to the production order who returned such scraps, wastages and defectives.

2.10 Meaning of First in First out (FIFO)

Under this method, material is first issued from the earliest consignment on hand and priced at the cost at which that consignment was placed in the stores. In other words, materials received first are issued first. The units in the opening stock of materials are treated as if they are issued first, the units from the first purchase issued next, and so on until the units left in the closing stock of materials are valued at the latest cost of purchases, it follows that unit costs are apportioned to cost of production according to their chronological order of receipts in the store.

This method is most suitable in times of falling price because the issue price of materials to jobs or works orders will be high while the cost of replacement of materials will be low but in case of rising prices this method is not suitable because the issue price of the materials to production will be low while the cost of replacement of materials will be high.

2.10.1 Advantages of FIFO method

1. It is simple to understand and easy to operate
2. It is a logical method because it takes in to consideration the normal procedures of utilizing first those materials which are received first. Materials are issued in order of purchases, so materials received first are utilized first.
3. Under this method, materials are issued at the purchases price, so, the cost of jobs or work orders is correctly ascertainment so far as cost of materials is concerned. Thus, the method recovers the cost price of the marerials.
4. This method is useful when prices are falling .
5. This method is also useful when transactions are not too many and prices of materials are fairly steady.

2.10.2 Disadvantages of FIFO method

1. This method increases the possibility of clerical errors.
2. In case of fluctuations in prices of materials , comparison between one job and the other job becomes difficult .
3. For pricing one requisition more than one price has often to be taken

4. When prices rise, the issue price does not reflect the market price as materials are issued from the earliest consignments.

2.11 Meaning of Last in first out (LIFO)

This method is also known as replacement cost method because materials are issued at the current cost to jobs or work orders except when purchases were made long ago. This method is suitable in times of rising prices because material will be issued from the latest consignment at a price which is closely related to the current price levels. Valuing materials issues at the price of the latest available consignment will help the management in fixing the competitive selling price of the products. This method was first introduced in the USA during the second world war to get the advantages of the rising prices.

2.11.1 Advantages of LIFO method

1. It is simple to operate and is useful when transactions are not too many and the prices are fairly steady.
2. Like FIFO, this method recovers cost from production because actual cost of material is charged to production.
3. Production is charged at the current prices because materials are issued from the latest consignment. Thus, effect of current market prices of materials is reflected in the cost of sales provided the materials are recently purchased.

2.11.2 Disadvantages of LIFO

1. Like FIFO , this method may lead to the clerical errors as every time an issue is made, the store ledger clerk will have to go through the record to ascertain the price to be charged.
2. Comparison between one job and the other job will become difficult because one job started a few minutes after another of the same type many bear a different charge for materials consumed, merely because the earlier job exhausted the supply of the lower priced or higher priced materials in stock.
3. For pricing a single requisition, more than one price has often to be adopted.

2.12 Average cost method

The principle on which the average cost method is based is that all of the materials in store are so mixed up that an issue cannot be made from any particular lot of purchases and therefore, it is proper if the materials are issued at the average cost of materials in store. The weighted average price takes into account the price and quantity of the materials in store. It is better to issue the material at weighted average price method because it recovers the cost price of the materials form production.

2.12.1 Advantages of average cost method

1. This method is rational, systematic and not subject to manipulation. It is representative of the prices that prevailed during the entire period rather than of the price at the beginning , end , or at one point of issue during the period because it is based on the average of the material costs of the various lots available in the store.
2. This method recovers the cost of materials from production.
3. This method maintains the issue prices as near to the market price as possible.
4. This method eliminates the necessity for adjustments in stock valuation
5. Issue prices are not to be calculated each time issues are made.

2.12.2 Disadvantage of Average cost method.

1. Closing stock is not valued at current cost.
2. At the time of rising prices, it over states profit but not as much as FIFO because average price is lower than the most recent price.
3. Issue price of materials does not represent actual cost of materials issued butit represents average cost of materials in stores.
4. A fresh rate calculation will have to be made as soon as a new lot of materials is purchased which may involve tedious calculations.

2.13 Meaning of material control :

Material control is a system which ensures that right quality of material is available in the right quantity at the right time and right place with the right amount of

investment. It can be defined as a comprehensive framework for the accounting and control of material cost designed with the object of maintaining material supplies at a level so as to ensure uninterrupted but at the same time minimising investment of funds. In simple words, material control is a systematic control over the purchasing , storing and using of materials so as to have the minimum possible cost of materials.

Materials constitute such a significant part of product cost and since this cost is controablle, proper planning, purchasing , handling and accounting are of great importance. Material control is accompolished through functional organisation, assignment of responsibility, and documentary evidence obtained in various stages of operations fromthe approval of sales and production budgets to the completion of products which are ready for sale and shipment. Material control involves recording on printed forms all steps and movements which occure in the acquisition and utilisation of materials . effective control also requires the systematic preparation of periodic summaries and reports.

2.13.1 Aspects of material control

1. Accounting aspect: This aspect of material control is concerned with maintaining documentary evidence of movement of materials at every stage right from the time sales and production budgets are approved to the point when materials are purchased and actually used in production operations.
2. Operational aspects: This aspect of material control is concerned with the maintenance of material supplies at a level so as to ensure that material is available for use in production and production services as and when required by minimising investment in materials.

2.13.2 Need or objectives of material control

1. Availability of materials: There should be a continuous availability of all types of materials in the factory so that the production may not be held up for want of any material . minimum quantity of each material is fixed to permit production to move on schedule.
2. No excessive investment in materials: There should be no excessive investment in stocks. Investment in materials must not tie up funds that could be better

used in other activities. Overstocking should be avoided keeping in view the disadvantages it carries. For this purpose, a maximum quantity is assigned to each item of material above which stock should not be exceeded.

3. Reasonable price: While purchasing materials , it is seen that it is purchased at a reasonably low price. Quality is not to be sacrificed at the cost of the lower price. The material purchased should be of that quality alone which is needed.

4. Minimum wastage: There should be minimum possible wastage of materials while these are being stored in the godowns by storekeeper or used in the factory by the workers. Wastage should be allowed upto a certain level known as normal level of wastage and it should not exceed that level . leakage or theft of materials must be avoided to keep the cost of production under control. Storekeeper and workers should be trained to handle the materials in a scientific way to avoid the wastage. The storekeeper is to keep the stores neat and tidy to avoid the wastage due to rust, dust or dirt.

5. No risk of spoilage and obsolescence: In order to avoid spoilage and obsolescence, a maximum quantity of each material is determined and a proper method of issue of materials is followed. The materials received earlier should be issued earlier.

2.14 Essentials of material control

1. There should be proper co-operation and co-ordination among the departments involved in purchasing , receiving and inspection, storage, sales, production and accounting so that there should be no inadequate availability of materials which may disrupt production and lose sales. At the same time, purpose of co-ordination is that there should be no excessive investment in materials leading to unnecessary carrying costs and obsolescence risks.

2. There should be proper scheduling of materials.

3. A good method of classification and codification of materials should be followed.

4. A system of internal should be introduced to ensure that all transactions

involving materials are checked by properly authorised and independent persons.

5. A careful choice should be made of the method of valuing the material issues because it affects the cost of the jobs or processes and the value of the closing stock of materials in the stores.

6. Standard forms for requisitions, orders, issue, transfer of material from one job to the other and transfer of material from the job to the stores should be used.

2.15 Techniques of material control

Material control aims at eliminating and minimising all kinds of wastes and losses while the materials are being purchased, stored, handled , issued or consumed. A number of techniques are used at planning, procuring and holding stage of material which help in exercising and effecting material cost control. Such techniques have been discussed below:-

1. Level setting
2. Economic order quantity
3. Just in time inventory system
4. ABC analysis
5. VED analysis
6. Perpetual inventory system
7. Double bin system
8. Input- output ratio
9. Material or inventory turnover ratio
10. FNSD analysis
11. Material or inventory cost records.

Level settings :

In order to have proper control on materials , the following levels are set.

1. **Re - order level:** It is the point at which if stock of a particular material in store approaches, the store- keeper should initiate the purchases requisition for fresh supplies of that material. This level is fixed somewhere between the maximum and minimum levels in such a way that the difference of quantity of the material between the re- ordering level and the minimum level will be sufficient to meet the requirements of production upto the time the fresh supply of the material is received.

   Ordering level = minimum level + consumption during the time required to get the fresh delivery.

2. **Minimum level**: This represents the minimum quantity of the material which must be maintained in hand at all times. The quantity is fixed so that production may not be held up due to shortage of the material. In fixing this level, the following factors are taken into consideration.

   a) **Lead time**: it is the lag time between indenting and receiving of the material . it is the time required to replenish the supply.

   b) **Rate of consumption**: rate of consumption of the material during the lead time.

   c) **Nature of the material** : Minimum level is not required in case of a special material which is required against customer's specific order.

   Minimum stock level = re- ordering level - (normal consumption x normal re- order period)

3. **Maximum level:** It represents the maximum quantity of an item of material which can be held in stock at any time. Stock should not exceed this quantity. The quantity is fixed so that there may be no overstocking. Overstocking should be avoided as far as possible because of unnecessarily blocks working capital, fear of reduction in market value, chances of reduction in quality.

   Maximum stock level = re - ordering level + re - ordering quantity - (minimum consumption x minimum re - ordering period)

4. **Danger level**: This means a level at which normal issues of the material are

stopped and issues are made only under specific instructions. The purchase officer will make special arrangements to get the materials which reach at their danger levels so that the production may not stop due to shortage of materials.

Danger level = average consumption x maximum re - order period for emergency purchases

5. **Average stock level: Minimum stock level + ½ of Re- order quantity**

   Or ½ (minimum stock level + maximum stock level)

2.16 Meaning of Economic order quantity

The total costs of a material usually consist of :

Total acquisition cost + total ordering cost + total carrying cost

Total acquisition cost through buying is usually unaffected irrespective of the quantity of material ordered at one time unless quantity discounts are available. For example, whether total annual requirements of a material of 10,000 units are purchased at R s10 per unit in 50 orders of 200 units each or in 10 orders of 1,000 units each, total acquisition cost will be Rs 100,000 under each alternative if no quantity discounts are available. Thus, when acquisition costs of a material remain the same. They are irrelevant and are often excluded while deciding the quantity of a material to be ordered at one time. The only costs to be taken care of are carrying costs and ordering costs.

Carrying cost: it is the cost of holding the materials in the store and includes:

1. Cost of shortage space which could have been utilised for some other purposes.
2. Cost of bins and racks that have to be provided for the storage of materials.
3. Cost of maintaining the materials to avoid deterioration
4. Amount of interest payable on the money locked up in the materials
5. Cost of spoilage in stores and handling.
6. Transportation costs in relation to stock

7. Cost of obsolescence on account of some of the materials becoming obsolete after some time of storage either due to change in the process or product.

8. Insurance cost

9. Clerical cost

Ordering cost: It is the cost of placing orders for the purchase of materials and includes: (1) cost of staff posted in the purchasing department , inspection section and payment department (2) cost of stationery , postage and telephone charges.

The quantity of material to be ordered at one time is known as economic ordering quantity. This quantity is fixed in such a manner as to minimise the cost of carrying and ordering the stock.

The order for the material to be purchased should be large enough to earn more trade discount and to take advantage of bulk transport, but at the same time it should not be too large to incur too heavy a payment on account of interest, storage and insurance costs. If the price to be paid is stable, the quantity to be ordered each time can be ascertained by the following formula:

$$Q = \sqrt{2C0 / I}$$

Q= Quantity to be odered

C= Consumption of the material concerned in units during a year

O = Cost of placing an order including the cost of receiving the goods

I= Interest payment including variable cost of storing per unit per year

2.16.1 Assumptions in the calculation of EOQ

1. Thereare dynamic conditions of the supply which enable a firm to place as many orders as it needs.

2. Prices of the item remain stable which keep carrying cost constant

3. The quantity of the item to be consumed during a particular period is totally known i.e, quantity to be consumed is certain.

2.17 Meaning of Perpetual inventory system

The chartered institute of management accountants, London, defines the perpetual inventory as a system of records maintained by the controlling department, which reflects the physical movements of stocks and their current balance. 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 the materials and also reflect the balance in the stores. Thus, it is a system of ascertaining balance after every receipt and issue of materials through stock records to facilitate regulare checking and to avoid closing down the firm for stocktaking. To ensure the accuracy of the perpetual inventory records, physical verification of the stores is made by a programmes of continuous stocktaking. Perpetual inventory means the system of records whereas continuous stock taking means the physical checking of those records with actual stock. It is possible that the balance of stock shown by bin cards or stores ledger may differ from the actual balance of stock as ascertained by physical verififcation. It may be due to the following avoidable and unavoidable causes.

2.17.1 Advantages of perpetual inventory system

1. A detailed and more reliable check on the store helps to have better control in stores.
2. As the work of recording and continuous stocktaking is carried out systematically and without undue haste, the figures are more reliable.
3. Errors and shortage of stock are readily discovered and efforts are made to avoid the shortage of stock in future.
4. The capital investment in stores can be kept under control because actual stock can be compared with the maximum and minimum levels.
5. It makes available correct stock figures for claim to be lodged with the insurance company for loss on account of stock destroyed by fire.
6. A system of internal check remains in operation all the time because bin cards and the stores ledgder act as a cross check on each other.

2.18 Numerical Practical problems of FIFO, LIFO, Average cost method and EOQ

Problem 1: Following is an extract of the record of receipts and issues of sulphur in a chemical factory during November, 2016

November 1	Opening balance 500 tonnes @ Rs 200
Nov 3	Issue: 70 tonnes
Nov 4	Issue : 100 tonnes
Nov 8	Issue : 80 tonnes
Nov 13	Received from supplier 200 tonnes @ 190
Nov 14	Returned from department 15 tonnes.
Nov 16	Issue : 180 tonnes
Nov 20	Received from supplier 240 tonnes @ 190
Nov 24	Issue : 300 tonnes
Nov 25	Received from supplier 320 tonnes @ 190
Nov 26	Issue : 115 tonnes
Nov 27	Returned from department 35 tonnes.
Nov 28	Received from supplier 100 tonnes @ 190

Issues are to be priced on the principal of FIFO . The stock verifier of the factory had found shortage of 10 tonnes on the 22nd and left a note accordingly . prepare stores ledger card .

Solution 1:

Store ledger card

Date	particulars	receipts		issue		Balance	
		Qty	amt	qty	amt	Qty	amt
Nov1	Bal b/d	-	-	-	-	500	100,000
Nov 3	Req. slip no,	-	-	70	14,000	430	86,000
Nov 4	Req. slip no.	-	-	100	20,000	330	66,000
Nov 8	Req. slip no.	-	-	80	16,000	250	50,000
Nov 13	Goods received	200	38,000	-	-	250	50,000
						200	38,000
Nov 14	Material returned note	15	3,000	-	-	265	53,000
	no.					200	38,000
Nov 16	Req. slip no.	-	-	180	36,000	85	17,000
						200	38,000
Nov. 20	Goods received note no.	240	45,600	-	-	85	17,000
						440	83,600
Nov 22	Credit note no.	-	-	10	2,000	75	15,000
						440	83,600
Nov 24	Req. slip no.	-	-	75	15,000	215	40,850
				225	42,750		
Nov 25	Goods received note no.	320	60,800	-	-	535	101,650
Nov 26	Req. slip no.	-	-	115	21,850	420	79,800
Nov 27	Material returned note	35	6,650	-	-	455	86,450
	no.						
Nov. 28	Goods received note no.	100	19,000	-	-	555	105,450
N0v 30.	Bal c/d					555	105,450

Problem 2: Raja co. uses copper wire which is purchased from the market as and when necessary . following purchases and issues were made during the month of January, 2017

January 1	Opening balance 300 kgs @ Rs 25 per kg.
January 3	Purchased 500 kgs @ Rs 22.60 per kg.
January 4	Purchased 490 kgs @ 23 per kg
January 10	Issued 220 kgs
January 20	Issued 440 kgs.
January 25	Issued 300 kgs.
January 26	Surplus 20 kgs . Returned to store out of quantity issued on 4th january

Prepare store ledger account by LIFO method.

Solution 2;

Date	particulars	receipts		issue		balance	
		Qty	Amt.	qty	amt	Qty	Amt
Jan 1	Bal b/d			-		300	7,500
Jan 3	Purchase order	500	13,300	-	-	300	7,500
						500	13,300
Jan 4	Material requisition no.	-	-	220	5,852	300	7,500
						280	7,448
Jan 10	Material requisition no.	-	-	280	7,448	140	3,500
				160	4,000		
Jan 20	Purchase order	490	11,270	-	-	140	3,500
						490	11,270
Jan 25	Material requisition no.	-	-	300	6,900	140	3,500
						190	4,370
Jan 26	Material requisition no.	20	532	-	-	140	3,500
						20	532
						190	4,370

Problem 3:

Following transactions took place in respect of an item of materials

	Receipts - Qty	Rate	Issue -Qty.
2-9-2016	200	2	-
10-9-2016	300	2.40	-
15-09-2016	-	-	250
18-09-2016	250	2.60	-
20-09-2016	-	-	200

Record the above transactions in the stores ledger account by simple average rate and weighted average rate method.

date	particulars	receipts			issues			balances	
		Qty	Total cost	Cost per unit	Qty	Total cost	Cost per unit	Qty.	amount
02 sept	Goods received note no.	200	400	2	-	-	-	200	400
10 sept	Goods received note no.	300	720	2.40	-	-	-	500	1,120
15 sept	Req. slip n0.	-	-	-	250	550	2.20	250	570
18 sept	Goods received note no.	250	650	2.60	-	-	-	500	1,220
20 sept	Req. slip n0	-	-	-	200	500	250	300	720

$\frac{\text{Rs } 2 + \text{Rs } 2.40}{2} = \text{Rs } 2.20$ $\frac{\text{Rs } 2.40 + \text{Rs } 2.60}{2} = \text{Rs } 2.50$

Weighthed average rate method

Stores ledger account

date	particulars	receipts			issues			balances	
		Qty	Total cost	Cost per unit	Qty	Total cost	Cost per unit	Qty.	amount
02 sept	Goods received note no.	200	400	2	-	-	-	200	400
10 sept	Goods received note no.	300	720	2.40	-	-	-	500	1,120
15 sept	Req. slip n0.	-	-	-	250	560	2.24	250	560
18 sept	Goods received note no.	250	650	2.60	-	-	-	500	1,210
20 sept	Req. slip n0	-	-	-	200	484	2.42	300	726

$\frac{\text{Rs } 400 + \text{Rs } 720}{200 + 300} = \text{Rs } 2.24$ $\frac{\text{Rs } 560 + \text{Rs } 650}{250 + 250} = \text{Rs } 2.42$

Problem 4: if the minimum stock level and average stock level of raw materials are 20,000 and 40,000 units respectively, find out its re- order quantity.

Solution 4: average stock level = minimum stock level + ½ re order quantity

Or ½ re - order quantity = average stock level + minimum stock level

Or ½ re- order quantity = 40,000 units - 20,000 units

Re- order quantity = 20,000 units x 2 = 40,000 units.

Problem 5: In a company weekly minimum and maximum consumption of material are 25 units and 75 units respectively. The re- order quantity as fixed by the company is 300 units. The material is received within 4 to 6 weeks from issue of supply order. Calculate minimum and maximum level of material

Solution 5:

Minimum level = re - order level - (Normal consumption x normal re - order period) = 450 units - (50 units x 5 weeks) = 450 units - 250 units = 200 units.

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

= 75 units x 6 weeks = 450 units

Normal i.e., Average consumption = 25 units + 75 units / 2 = 50 units

Normal i.e., average period = 4 weeks + 6 weeks / 2 = 5 weeks

Maximum level = re - order level + Re - order quantity - (minimum consumption x minimum Re - order level period)= 450 units + 300 units - (25 units x 4 weeks) = 650 units.

Problem 6: (a)The availability of an imported machinery component is irregular and consequently , the consumption pattern also varies during the year . show how should the re - ordering level be ascertained for this component . (b) from the following data for the last 12 months , compute the average stock level for the said co component:

Consumption : (1) maximum usage in a month - 300 Nos. (2) minimum usage in a month - 200 Nos. (3) average usage in a month - 225 Nos.

Time gap for procurement of material : maximum - 6 units ; minimum - 2 months ; re - ordering quantity : 750 units.

Solution 6 :

(a) Re - ordering level = maximum usage x maximum lead time = 300 x 6 = 1,800 Nos.

(b) Calculating of average stock level :

Average stock level = minimum stock + ½ of re- ordering quantity = 900 + ½ x 750 = 1,275 Nos.

Minimum stock = Re- ordering level - average usage x average lead time = 1,800 - (225 X 4) = 900 Nos.

Average lead time = maximum lead time + minimum lead time / 2 = 6 months + 2 months / 2 = 4 months.

Problem 7: find ou the economic ordering quantity from the following particulars and also show a graph identifying economic ordering quantity.

Annual usage : 6,000 units; cost of material per unit : Rs 20 , cost of placing and receiving one order : Rs 60; annual carrying cost of one unit: 10 % of inventory value.

Solution 7:

The formula for the calculation of economic ordering quantity is :

EOQ = ? 2CO /I

Where C = Annual usage of material i.e, 6,000 units.

O = cost of placing one order i.e, Rs 60

I = Annual carrying cost of one unit i.e,(Rs 20 x 10) / 100 = Rs 2

EOQ =? 2x 6,000 x 60 / 2 = ?360,000 = 600 units

Problem 8 : Find out the economic ordering quantity from the following particulars: Annual usage Rs 120,000; cost of placing and receiving one order Rs 60; Annual carrying cost 10 % of Inventory value.

Solution 8 : EOQ = ?2C0/ I

C= Rs 120,000

O = Rs 60

I = 10 % of carrying cost i.e, 10 %

EOQ = ? 2 X 120,000 X 60 / 0.01 = Rs 12,000.

Problem 9 : About 50 items are required every day for a machine. A fixed cost of Rs 50 per order is incurred for placing an order. The inventory carrying cost per item amounts to Rs 0.02 per day. Thelead period is 32 days. Compute EOQ

Solution 9:

EOQ = ?2CO / I

C = 50 x 365 days = 18,250 items

O = Rs 5o

I = Rs 0.02 per day = Rs 0.02 x 365 = Rs 7.30

EOQ = ?2CO / I = ?2 x 18,250 x 50 / 7.30 = 500 items.

Re - order level = maximum usage per day x maximum lead period = 50 items x 32 days = 1,600 items.

Problem 10 : Following information relating to a type of material is available : Annual demand 2,400 units; unit price Rs 2.40; ordering cost per order Rs 4; storage cost 2 % p.a; interest rate 10 % p.a; lead time half month. Calculate eoq and toal annual inventory cost in respect of the particular raw material.

Solution 10 : EOQ = ?2C0 /I = ?2 X 2,400 X 4/ 2.40 X 12 % = 258 Units.

Calculation of total inventory cost

Purchase price of 2,400 units @ Rs 2.40 per unit	5,760
Add: carrying cost (½ x 258 units x 2.40 x 12 %)	37.15
Add: ordering cost of 10 orders @ Rs 4 per order [no. Of orders = annual demand / EOQ = 2,400 units /258 units = 9.3 orders or 10 orders	40
Total inventory cost	5,837.15

Problem 11: Primex limited produces product P . It uses annually 60,000 units of a material Rex costing Rs 10 per unit. Other relevant information are:

Cost of placing an order Rs 800 per order; carrying cost 15 % p.a of average inventory

Re- order period 10 days; safety stock 600 Units.

The company operates 300 days in a year. You are required to calculated EOQ , re- order level , maximum stock level and Average stock level

Solution 11: eoq = ?2 x annual requirements x ordering cost per order/ annual carrying cost per unit p.a

= ? 2 x 60,000 x 800 / 10 x 15 % = 8,000 units

Reorder level = safety stock + (Normal daily usage x re- order period)

= 600 + (60,000 x 10 days) / 300 days = 2,600 units.

Maximum stock level = EOQ + safety stock = 8,000 units + 600 units = 8,600 units

Average stock level = minimum stock level + ½ re- order quantity

= 600 + ½ x 8,000 units = 4,600 units

Average stock level = maximum stock level + minimum stock level / 2 = 8,600 units + 6,000 units / 2 = 4,600 units

Minimum stock level = re- order level - (Normal daily usage x re- order period) = 2,600 - (60,000x 10) / 300= 2,600 - 2,000 = 600 units.

2.17 Numerical Unsolved practical problems

1. prepare stores ledger account from the following data

Feb 1	Opening balance	500 qtl.	
Feb 3	Issue	70 qtl.	
Feb 4	Issue	100 "	
Feb 8	Issue	80 "	
Feb 13	Received from vendor	200 "	
Feb 14	Refund of surplus from a work order	15 "	
Feb 16	Issue	180 "	
Feb 20	Received from vendor	240 "	
Feb 24	Issue	304 "	
Feb 25	Received from vendor	320 "	
Feb 26	Issue	112 "	
Feb 27	Refund of surplus from a work order	12 "	
Feb 28	Received from vendor	100 "	

Issues are to be priced on the principle of FIFO . The stock verifier of the factory noted that on 15th he had found a shortage of 5 q uintals and on 27th another shortage of 8 Quitals.

2. Following transactions occur in the purchase and issue of material :

Jan 19	Purchased 100 @ Rs 5 .00 each
Feb 4	Purchased 25 @ Rs 5.25 each
Feb 12	Purchased 50 @ 5.50 each
Feb 14	Issued 80
Feb 16	Purchased 50 @ Rs 5.50 each
Feb 20	Issued 80
Feb 27	Purchased 50 @ Rs 5.75

Preare stock leger account by LIFO method

3. Following transactions occur in the purchase and issue of material

Jan 2	Purchased 4,000 units @ Rs 4.00 per unit
Jan 20	Purchased 500 units @Rs 5.00 per unit
Feb 5	Issued 2,000 units
Feb 10	Purchased 6,000 Units @ Rs 6.00 per unit
Feb 12	Issued 4,000 units
March 2	Issued 1,000 units
March 5	Issued 2,000 units
March 15	Purchased 4,500 units @ Rs 5.60 per unit
March 20	Issue 3,000 units

4. Two materials X and Y are used as follows: minimum usage - 50 Units per week each, maximum usage - 150 per week each; normal usage - 100 units per week each

	X	Y
Ordering quantity in units	600	1,000
Delivery period in weeks	4 to 6	2 to 4

Calculate minimum level,. Maximum level and ordering level for each material.

5. Two components A and B are used as follows:

Average consumption 40 units

Normal usage 50 units per week each

Minimum usage 25 units per week each

Maximum usage 75 units per week each

Re- order quantity A - 300 units B- 500 units

Re order period in weeks A - 4 to 6 weeks , B - 2 to 4 weeks

Maximum lead time for emergency purchases in weeks A - 1 Week , B - 2Week.

Calculate Re- Order level , minimum level, maximum level, average stock level, and danger level.

2.20 Numerical Practice Questions

1. Find out the eoq for raw materials and packaging materials with the following data :

(1) cost of ordering : raw materials Rs 1,000 per order, packaging materials Rs 5,000 per order; (2) cost of holding inventory : Raw materials Rs 1 paisa per unit p.m; packaging materials Rs 5 paisa per unit p.m; production rate : 200,000 units per month.

2. PQR Ltd. manufactures a special product , which requires ZED . The following particulars were collected for the year 2016 -17.

(i) monthly demand for ZED : 7,500 Units (ii) Cost of placing an order: Rs 500 (iii) Re- order period : 5 to 8 Weeks (iv) Cost per unit Rs 60 (v) Carrying cost % P.a : 10 % (vi) Normal usage : 500 units per week (vii) minimum usage : 250 units per week (viii) maximum usage : 750 Units per week. Calculate re- order quantity, re- order level, minimum stock level, maximum stock level, average stock level.

3. From the following data calculate EOQ. Rate of material Rs 50 per unit, consumption of material p.a 8,000 Units, cost of placing one order Rs 200; rate of interest : 10 % per annum.

4. prepare stock ledger account by FIFO, LIFO and average stock method

Dec 1	Purchases 300 units @ Rs 3 per unit
Dec 4	Purchases 600 units @ Rs 4 per unit
Dec 6	Issue 400 units
Dec 10	Purchases 600 units @ Rs 4 per unit
Dec 15	Issue 1,000 units
Dec 20	Purchases 400 units @ Rs 5 per unit
Dec 23	Issue 200 units

2.21 Summary

Material control is a system which ensures that right quality of material is available in the right quantity at the right time and right place with the right amount of investment. Material control has two dimensions i.e., quantity or unit control and rupee or financial control. Material control should meet these two conflicting objectives i.e, the maintenance of sufficient quantity of every item of material for efficient operations and maintenance of an inventory that is not detrimental financially. It aims at eliminating and minimizing all kinds of wastes and losses while the materials are being purchased, stored , handled, issued or consumed.

Material is the first and most important element of cost. It forms part of a finished product and purchase department may be centralized or decentralized. All manufacturing concerns appoint a person known as storekeeper . One of the duties of the storekeeper is to send requisitions for materials for replenishment in time so that the production may not hamper for want of materials. The storekeeper is to see that neither production is adversely affected nor there is unnecessarily blocking of capital due to overstocking of materials.

2.22 Glossary

Material control, FIFO, LIFO, Average cost method, EOQ, Requisition, store keeping, Stores control, Bin card.

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Course Code: BCG-501 **UNIT -III**

Course Title : Cost Accounting **LESSON NO.7-9**

Machine hour rate and Labour rate

3.1 Introduction

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3.3 Introduction

In business overhead or overhead expenses refers to an ongoing expense of operating a business overhead are the expenditure which cannot be conveniently traced or identified with any particular cost unit unlike operating expenses such as raw material and labour overheads cannot be immediately associated with the production services being offered thus do not directly generated profits overhead are still vital to business operations as they provide critical support for the business to carry out prof its making activities. Overheads are often related to accounting concepts such as fixed loss and indirect costs.

Overheads expenses are all costs on the income statement expect for direct labor , direct material and direct expenses overhead is an accounting term that refers to ongoing business expenditure not including or related to direct labour , direct material or third

party expenses that are billed directly to customers. A company must pay overheads on ongoing basis regardless of whether the company is doing a high or low volume business. It is important for budgeting purposes but for determining how much a company must charge for its products or services to make a profit overhead expenses can also be semi variable meaning that the company incurs some portion of the expense no matter what and some portion depends on the level of business activity overhead expenses may apply to a variety of operational categories.

Machine hour rate is a rational method for absorption of a family overhead. The factory overhead costs are allocated to a machine or a group of machines doing the same type of job and the cost per hour of the machine is ascertained dividing the total allocated overheads costs to the machine by number of hours the machine unused during the same period of time for which the costs have been considered The machine hour method is based on the principle that in plants where production process are primarily mechanical Machines constitute a more important and costly elements than labour. This method of overhead absorption can be sastifactorily be used when all the production overheads are departmentalized and the overheads of the service departments are apportioned to the production departments.

3.2 Objectives

After reading this you would be

- to understand the concept of wage overheads
- to understand the concept of machine hour rate
- to know about the absorption and marginal costing , idle time.

3.3 Introduction - Wages system

Remuneration to workers is the most complex problem in a democratic country like india because there is no single method of wage payment which is acceptable both to the employers and employee. Wages as a means of providing income for the workers become the only source of income which determines their economic

3.4 Meaning of wage payment system

The success of a concern largely depends upon the efficiency of labour and the efficiency of labour is considerably affected by the amount of wages paid to them. Some personal are of the view that the profit of a concern can be maximized only by reducing the wages rates payable to be workers. But this view is not correct. It

should be remembered that low-paid workers' are usually inefficient that leads to wastage of materials, less economic use of tools, frequency breakdown of machinery and loss of time as a result of which the cost of production goes up, reasonable and fair wage rates allowed ultimately lead to more economic use of machines, tools, materials and time. Therefore, the importance of the method of wages of wages payment should never be under-estimated.

3.5 Features of wage payment system

1. The system should be fair both to the employer and the employee. It should be based upon scientific time and motion study to ensure a standard output to the employer and a fair amount of wages to the workers.
2. The worker should be assured of a guaranteed minimum wage at satisfac tory level irrespective of the work done by him.
3. Workers should be paid according to their merits. Efficient workers should be able to earn more wages as compared to the inefficient workers.
4. Skilled workers should be paid more as compared to the unskilled workers. Skilled workers are to be compensated for the efforts put in by them to acquire the skill.
5. The system should ensure equal pay for equal work.
6. The system should be flexible to allow necessary changes which may arise.
7. The system should be such as to minimise labour turnover, absenteeism and late attendance.
8. The system should not violate any local or national trade union's agreements.
9. The system should keep in view the wage rate in the same area or industry.
10. In order to protect the real wages from erosion, the level of money wages should be adjusted to price changes. Workers should be paid dearness or dear food allowance over and above the basic pay to take account of an increase in prices. Thus, a system of wage payment should keep in view the price changes.

11. The system should be correlated to the capacity of the organisation to pay.
12. The method should be simple and capable of being understood by the workers.
13. The workers and unions of workers should be adequately informed about the procedures used to establish wage rates, so that there may be no cause of suspicion in the minds of workers.

3.6 Methods of wages payment

1. Time rate system

2. Piece rate system

3. Incentive wage system (payout plan)

Piece rate system

In this method, wages are paid to the employees after completion of work. Under it, a worker is paid on the basis of output. Not the time by him to perform the work. This is one of the simplest and most commonly used systems of wages payment. In this system, the wage rate is expressed in terms of per unit of output, per job or per work-order. This amount of wages payable to a workman under this method is to be calculated as follows:

Total wages = total output x wages rate per unit of output

=output units x unit rate

=actual yield x unit or piece rate

This system is suitable in the following cases:

- Where a work is of a repetitive natures.
- Where the measurement of work is simple.
- Where the quality and accuracy of output is not very important.
- Where strict supervision is not possible.

Advantages of piece rate system

The main advantages of piece rate systems are as follows:

a. **Simplicity:** just like time rate system, the piece rate system is also simple to operate and easy to understand. It does not involve tedious calculations.

b. **Incentive to workers:** This system provides an increase to the workers to work hard as the wages are paid on the basis of quantity of output not on the basis of time. So efforts and rewards are correlated.

c. Ascertainment of accurate labor cost: since the wages are paid on the basis of output, the exact cost of labour per unit of output or job can be considerable.

d. No payment for idle time: under piece rate system, any payment is made to the workers for the idle time as a result of which the cost of supervision is not considerable.

e**. Proper care and use of machine and tools:** the workers rake proper care of their machine and tools since breakdown of machine and tools means decrease in output resulting in less remuneration to them.

Disadvantages of piece rate system

This system has the following disadvantages:

a. Less attention to quality: as the payment of wages is made on the basis of output, the workers, in order to maximize their output, work with sense of hurry, which may affect the quality of the output adversely.

b. Inefficient use of machine and materials: since the wages are paid on the basis of quantity of output, an excursive wastage of materials and frequent breakdown of machinery may be caused by the workers due to their efforts to obtain maximum output.

c. No guarantee of minimum wages: since there is direct relationship between quality of output and wages, the workers suffer if they fail to work efficiently. There is no guarantee of minimum daily wages o workers.

d. Dissatisfaction among inefficient workers: the inefficient workers, who work slowly, become dissatisfied by reason of lower wages as compared to the wages paid to their efficient counterparts.

e. Adverse effect on worker's health: the worker may try to abnormally to earn more which has an adverse effect on their health and efficiency. So, this method is not accepted by trade union.

Time rate system

Under this system, the amount of remuneration or the total wages payable to the workers depends on the time for which he is employed. This is simple and common method of wages payment. In this method, the workman is paid an hourly, daily, monthly or yearly rate rat of wages.

Thus the worker is paid on the basis of time and not on his performance or unit of output. The amount of wages payable to a workman under this method is to be calculated as follows:

Total wages = actual time take x time rate

Or, total wages = total hours worked x wages rate per hour.

This method is suitable to be applied in the following circumstances:

- Where the quality of work is more important than production.
- Where the volume of production is not within the control of labour.
- Where it is difficult to fix the unit of output.
- When it is volume of production is not within the control of labour.
- The nature of work is such that there is no basis for incentive plan.
- Where the amount of output cannot be accurately measured, counted and standardized.

Advantages of time rate system

a. Simplicity: it is very easy to understand and simple to calculate the earnings of

worker under this method.

b. Guarantee of minimum wages: it guarantees a minimum wages to the workers.

c. Quality production: since this amount of wages is not linked with the quantity of output, this method ensures production of better quality due to the careful attention of the workers.

d. Unity among workers: under this method, all workers falling under a particular category are paid at equal rate without any consideration of their quantity of output. It encourages a feeling of equality among workers on account of which this method is also favored by trade unions.

e. Economical: it involves less clerical work and detailed records are not necessary. Since the output is not the criteria for determination of wages, tool and materials are handled carefully. Wastage are also minimized.

Disadvantages of time rate system

a. No incentive to the efficient workers: This system lacks incentive to efficient workers since all works are paid equally and no distinction is made between efficient and inefficient workers. So efforts and rewards are not correlated.

b. Go-slow policy: the workers, in order to earn higher wages for overtime work, may try to perform the worker slowly which leads to increase in labor cost per unit.

c. Dissatisfaction among the efficient workers: the efficient workers are paid wages at the rate equal to these payable ton inefficient workers, which creates dissatisfaction among the efficient workers.

d. Payment for idle time: under this method, idle time of the workers is also paid that increase the cost of production.

e. High cost of supervision: since there is no direct link between quantity of output and wages, wastage of time on the part of the workers is common, the avoidance of which requires considerable supervision leading to increase costs.

3.7 Difference between time rate and piece rate method

Based of differences	Time rate	Piece rate
1. Basis of wages	Wages is calculated on the basis of time spent by the worker on the jobs.	Wages is calculated on the basis of output or production.
2. Idle time	There is a possible of excessive idle time in this system.	There is a less chance of idle time in this system.
3. Quality of work	The quality of work is good as there is no pressure to produce more goods.	The quality of work may not be good because of pressure to produce more goods.
4. incentive	There is a lack of incentive for the efficient and honest workers.	It encourages motivated workers to produce more and earn more.
5. Control and supervision	Control and supervision are needed as the workers may not work properly.	It encourages motivate workers to produce more and earn more.
6. suitability	If the quality is more concerned than quantity, this method is suitable.	If the quantity is more concerned than quality, this method is appropriate.
7. equality	All the workers get equal wages under this method irrespective of the output.	The works with high output get higher wages and vice versa.

3.8 Meaning of Incentive wages payment plan

To remove the defects of both time rate and piece rate systems of wages payment, incentive plans have been developed. Under these plans, the advantages of time and piece-wages system are combined, and incentives are provides to workers to work hard. The characteristics of these plans are as follows:

i. Incentives by way of bonus and other are given to efficient works for time saved.

ii. A standard time is fixed and the worker is to perform the given work within the standard time.

The standard time is set after making time studies for the performance of specific job.

The incentive is compromise between the two extremities, on the one, if the workers are paid according to time, hey a nothing if time is saved and on the other hand, if they are paid on the basis of piece rate, employers get nothing, if time is saved. Under incentive plans, the employer as well as the workers shares the benefit of time saved, and both labour and overtime costs are reduced.

The incentive plans should be selected according to the nature of work and other

circumstances. It should be accepted by the management as well as labour otherwise it does not function successfully. The payment of wages may be made according to any of the following plans:

A . Individual bonus plan	B. Group bonus plan
1. Harleys premium plan	2. Priestman's plan
3. Rowan premium plan	4, Scranton plan
5. Taylor's differential piece rate system	
6. Grntt's task and bonus plan	

Individual bonus plan

According to individual bonus plan, the bonus of each worker is calculated separately. Some methods of calculating wages under individual bonus plan are discussed below:

a. Halsey premium plan

This plan was originated by F.A. Haley. Under this scheme, an hourly rate is guaranteed to all workers. A standard time is fixed unit, job or operation on the basis of time and mention studies and the worker is paid the agreed hourly rate of wages for the actual time taken plus a fixed percentages of bonus on the time saved. The amount of bonus or premium payable to the workers in one-half of the wages of the time saved.

Requirements for calculating total wages or total earning of the worker under. Halsey premium plan are:

ST = standard time or normal time allowed

TT = time taken

SR = standard time rate of wages

Time saved (TS = ST -TT

Advantages of Halsey premium plan

i. It is simple to understand and operate.

ii. Every worker is guaranteed minimum wages and even the inefficient worker

feel secured.

iii. It encourages efficiency among worker by inducing them to finish their job before the standard time.

iv. The benefit from the time saved is shared equally by have employer and the workman.

v. Generally workers do not oppose this method of wages, payment as it rewarded time saved rather than increase output.

Disadvantages of Halsey premium plan

i. Workers are paid only half of the wages on the time saved. So the worker may oppose this method.

ii. The worker may perform to work in hurry by neglecting the quality of output to save time and earn higher bonus.

iii. The standard time fixed for finished a job may not be scientific.

b. Rowan premium plan

This plan was originated by David rowan. This plan guarantees an hourly rate to all workers. A worker is paid the fixed rate per hour for the actual time spent on the job plus a premium or bonus based on the time saved. The amount of premium or bonus is not a fixed percentage of the wages of time saved but it various according to the extent of the time saved. The amount of bonus or premium payable under this plan depends on the percentage of time saved by the workers. The bonus is calculated the such percentage out of the basis wages.

Formula for to calculated total wages or total earning of the worker under, Rowan premium plan:

Basis wages = time taken x standard time rate = TT x SR

Bonus = time saved/ standard time

Total wages under rowan plan = basis wages = bonus = TT x SR = TS/SR

Effective wages rate under rowan plan = total wages/TT

Advantages of rowan premium plan

i. This plan guarantees minimum wages and provides incentive for efficiency.

ii. It does not induce to rush through work for increase bonus earning because the bonus increase at a decreasing rate with higher levels of efficiency. Thus, an automate check for limiting production of inferior quaintly of goods is ensured.

iii. The per unit fixed cost decrease with the increase in production

iv. The per unit fixed cost decrease with increase in production

v. Under this method, the per unit cost decrease due to decrease in per unit labour cost.

Disadvantages of Rowan premium plan

i. As the bonus is to be shared by employees and employees, it is not welcomed by employees. They expect full benefit for their extra efficiency.

ii. The calculation earnings under this method is comparatively complicated and time consuming.

iii. The preparation of Lanzhou budget and estimated product labor cost are made difficult by the varying labor costs under this plan.

iv. Payment under this plan is much less than that under the Halsey plan by way of bonus below 50% of the time saved.

Why rowan plan is better than Halsey plan?

- In the Halsey plan, bonus is usually set at 50% of the time saved. It does not serve as a strong incentive. On the other hand under the Rowan plan, bonus is that proportion of the wages of the time taken which the time save bears to the standard time; it serves as a strong incentive for increasing the efficiency.

- In the Rowan plan, the quality of work is not affected much. The worker is not induced to rush through the work because bonus increases at a decreasing

rate at higher levels of efficiency. In the Halsye plan. A worker is induced to rush through the because he get extra wages for every 50% of the time saved.

- The effective labour rate per hour in the Rowan plan is higher up to 50% of the time saved and falls there after whereas in the Halsey plan, the effective labor rate per hour up to 50% of the time saved and can be double thereafter. Usually, worker are not able to save more than 50% of the time allowed, so worker prefer the Rowan plan for earning more wages

c. Taylor's differential piece rate system

This scheme was originated by F.W. Taylor, who knows a the "father of science management". Taylor suggests that the worker producing the below standard level be paid according to the low piece rate. Similarly, the worker producing at or above standard should be paid according to high piece rate. For this, a standard time is fixed and the worker who finished the assigned work before the standard time or at standard are paid at a higher rate and the worker who cannot complete the task within the standard time are paid at a lower rate. This standard should be set up very accurately with the help of time and motion studies because it is the demarcating line for higher and lower and lower rates of wages. Thus, two piece-rates are fixed, one for those who perform the standard task in standard time (may be termed as efficient workers) and the other for those who perform less than the standard task in the standard rate time (may be termed as inefficient worker). Usually rates are 120% and 80% of the piecework rate for efficient and inefficient workers respectively.

Requirements for calculating total wages or earnings of the worker under Taylor's differential piece rate system:

Standard output/ standard yield:

Standard rate per unit/ normal piece rate = standard wage rate for a period/ standard yield for the period

Advantages of Taylor's Differential piece-rate system

i. This system provides a great incentive to workers to achieve the standard output and the slow workers always try to achieve greater efficiency.

ii. The system is beneficial to workers as well as employers, since the workers get wages at an increased rate according to units produced and the employer get increased output at lower cost of production.

Disadvantages of Taylor's differential piece-rate system

i. This system is different to apply due to the fixation of different rates.

ii. The standard output cannot be justified because if a worker just fails to reach the standard output, the low rate of wages will be given to him. However, if the just reaches the standard, higher rate of wages will be payable to him.

iii. There is a great difference of wages between the higher and lower rates. It creates a large variation in the earnings of the workers and confection may emerge among them.

iv. Moreover, employer-employees relations may also be stained; tankard is put at a very high level.

d. Gantt's task and Bonus Scheme

This scheme was originated by Mr. Gantt. This scheme is a combination of time rate, differential piece-rate and bonus system and guarantees a minimum time rate. Under this system, minimum wages are guaranteed to workers who fail to reach the standard. If the output of the worker is below standard, the worker is paid guaranteed time rate or equal to standard output. In this system, low rate is not necessary to determine total wages for below standard and if a worker's output is at or above standard, he is paid a high piece rate (output 120% of normal rate) for the actual output. The remuneration under this method is computed as follows:

Requirements for calculating total wages/earnings of the worker under Gantt's task bonus plan:

Standardoutput/standardyield

Standard rate per units/normal piece rate/guaranteed piece rate

High piece rate for at or above standard, generally=120% of normal piece rate

Advantages of Gantt's Task and bonus scheme

The advantages of Gantt's Task and Bonus Scheme are mentioned below:

i. This system encourages the worker to improve the level of performance.

ii. The workers feel that they are getting the reward, which they are entitled to. Thus, it promotes satisfactions among the employees.

iii. This method is very useful in jobs involving engineering activities.

Disadvantages of Gantt's Task and Bonus Scheme

i. Extreme care is to be exercised in fixing the guaranteed time rate and determination of standard output. Any error caused due to lack of experience will lead to unfavorable consequences.

ii. If the guaranteed time rate is fixed high, the incentive effect of the plan will deteriorate.

Group Bonus Schemes/What is a Group Bonus Schemes?

In the premium plans discussed so far, the bonus payable to an individual was ascertained. Sometimes it is not possible to apply an incentive plan to an individual employees and it may be possible to apply such a plan to the group of employees only. The group bonus system is especial applicable when the worker act in a group as a term. The group incentive plans can be successfully implemented where:

i. Output depends on teamwork and joint efforts of group of workers.

ii. It is difficult to measure the individual result rather than group's result.

iii. It is necessary to work as a member of a team rather than on individual basis, e.g. in chemical process industry, an individual worker cannot influence the production of the plant.

iv. Both direct and indirect workers need to be compensated equally.

v. Skills of the workers in the group do not vary widely.

Advantages of Group Bonus Scheme

i. Increase in production and saving in cost of production can be achieved.

ii. Supervision cost will be reduced substantially.

iii. The quality of work is improved.

iv. Absenteeism is reduced to minimum and creates interest in work among the workers.

v. Routing and scheduling problems are eliminated.

vi. It creates team spirit and reduces cost per unit.

vii. Minimizes waste and reduces cost per unit.

viii. Clerical work in calculation of bonus is reduced.

Disadvantages of Group Bonus Scheme

i. Individual skill and efficiency are not considered in these systems.

ii. Difficult may arise in calculated of bonus and method of its distribution to all workers in the group.

iii. The bonus is paid on group efforts an individual worker may not put his maximum effort in view of equal sharing of bonus to inefficient workers.

iv. An inefficient leader may cause the entire group to suffer.

a. Priest man's plan

Under this system, standard output and standard time for each department is predetermined is consultation with the workers. Bonus is payable to the department when the actual production exceeds the standard production. When the production does not exceed standard, no bonus is paid but times rates are guaranteed. The bonus is calculated as a percentages on such excess production and distributed to all employees in that particular department by increasing their normal wages by the same percentages the actual production increased over the standard.

In this system, the time wages are guaranteed if actual production of the particular division, department, and group is less than the standard output. This method is not only applicable for excess of actual production over the standard but also saving in material and labour costs is also considered for payment of bonus. The main drawback in this system is the efficiency of individual worker is not considered and incident workers can also claim for-bonus.

1. Write/what is the meaning of labour cost.

Labour cost refers to any remuneration paid to the employees by the organization in the form of wages, salary, bonus, allowances etc. for their time and effort used in payable goods or services. In other words, mantel and physical sacrifice is called the labour cost.

The labour cost can be analyses into the following:

Monetary benefits: salaries and wages, dearness or other allowances, production incentive or bonus, overtime allowances, pension fund, payment for insurance scheme, old age pension, retirement gratuity, salary in lien of leave, profit linked bonus etc are the benefit that are provided to the workers in monetary forms.

Non-monetary benefit or fringe benefits: subsidized food and housing, subsidized or free transportation, clothing, education to employee's c hidden, medical and recreational facilities etc. are the benefit that are provided to the workers in non-monetary forms.

2. Write about direct and indirect labor cost.

The labour cost can be classified into direct and indirect and indirect labour cost as mentioned below:

a. **Direct labour cost:** direct labour cost is that portion of wages and salary, which can be identified and charged to a single costing unit. It is remuneration of the employees who are direct unit. It is the remuneration of the employees who are directly connected with the manufacturing operations or the conversion of raw materials into finished products. The example of direct labour cost is wages paid to workmen put on definite jobs or products in the factory.

b. **Indirect labour cost:** indirect labour cost is the remuneration of the employees who are not directly connected with manufacturing with the conversion process but assist in the process by way of supervision, maintenance, transportation of materials, materials handling etc. their work benefits all the items being produced and cannot be specifically identified with the individual product. These costs are accumulated and apportioned to

different cost centers are accumulated and apportioned to different cost center on equitable basis and assorted into product cost by applying the overhead absorption rate. Wages or salaries paid to the supervision, foremen, storekeeper, clerical staff, etc, are the example of indirect labour costs.

3. Write any five differences between direct and indirect labour cost.

The different between the direct and indirect labour costs are mentioned below:

a. **Meaning**: direct Balfour cost is directly involved in the production but indirect cost is not directly involved in the production.

b. **Volume of production**: direct labour cost depends on the volume of production whereas indirect labour cost is separated.

c. **Separation:** direct labour cost can be separated in cost, cost center, or unit cost but indirect labour cost cannot is a direct expenditure.

d. **Used:** direct labour cost is used to convert raw materials into finished goods but indirect labour cost is used in the production process.

e. **Payment:** payment of direct labour cost is a direct expenditure and, payment of indirect labour is an indirect expenditure.

4. What is labour cost control?

Labour cost may be very high due to inefficiency of labour, wastage of materials, idle time and unusual overtime, inclusive of dummy names in the pay rolls and other related factors. Inefficient uses of labour not only increase the cost of production but also adversely affected the quality of products. The primary objective of the management, therefore, is to utilize the labour as economically as possible. It is therefore necessary for the management to device a proper system of labour cost control.

Control over labour costs requires proper employment and efficient utilization of labour force. These factors affect the cost and quality of the products of any individual undertaking and ultimately its profitability. Labour cost control involves employment of efficient workers, proper training of workers, proper time keeping and time booking and proper accounting for the wages paid to them.

3.9 Introduction - Labour cost

Labour cost is a second major element of cost . under the present political with a restive labour in organised industry, it is very difficult to reduce labour cost. Therefore, proper control and accounting for labour cost is one of the most important problems of a business enterprise. But contro of labour cost presents certain practical difficulties unlike the control of material cost. The human element in labour makes difficult the ocntorl of labour cost whereas materials, beingin animate in nature, could be subjected to a rigid control. Labour is the most perishable commodity and as such should be effectively utilised immediately. Labour, once lost, cannot be recouped and is bound to increase the cost of production. On the other hand, materials being durable , can be used as and when required and can be stored without having to incur immediate loss.

3.10 Types of labour

1. Direct labour: it is that labour which is directly engaged in the production of goods or services and which can be conveniently allocated to the job, process or commodity unit. For example, labour engaged in making the bricks in a kiln is direct labour because labour charges paid for making 1,000 bricks can be conveniently allocated to the cost of 1,000 bricks.

2. Indirect labour: It is the labour which is not directly engaged in the production of goods and services but which indirectly helps the direct labour engaged in production. For example, mechanics, supervisor,chowkidars, sweepers , foremen, watchmen, time- keeper, cleaners, repairers,etc.

3.11 Labour (employee) costs

CAS- 7 defines labour or employee cost as the aggregate of all kinds of consideration paid, payable and provisions made for future payments for the services rendered by employees of an enterprise including temporary part time and contract employees. Consideration include wages salary contractual payment and benefits as applicable or any payment made on behalf of employee.

Labour cost represents the various items of expenditure incurred on workers by the employer and would include payment made in cash or kind. For example, employees cost and benefits generally include paid holidays, leave with pay, statutory provisions

for insurance against accident or health scheme.

3.12 Labour turnover :

Labour Turnover

Labour turnover denotes the percentage change in the labour force of an organisation.

There are frequent changes in the labour force because of recruitment of new workers and workers leaving the orginisation. High percentage of labour turnover denotes that labour is not stable. A high labour turnover is not desirable. The definitions of labour turnover are given below :

(1) Labour turnover according to separation method

$$= \frac{\text{Number of employees left during a period}}{\text{Average number of employees during a period}} \times 100$$

This definition does not take into consideration the fact of surplus labour. This definition will give incorrect result when the surplus workers are discharged because labour turnover calculated in this way will be high.

(2) Labour turnover according to flux method

$$= \frac{\text{Number of additions + Separation during a period}}{\text{Average number of employees during a period}} \times 100$$

This definition will not be applicable when the organisation is expanding. In such a case,many new workers are engaged and there may be no separation ; even then labour turnover

calculated will be high.

(3) Labour Turnover $= \dfrac{\dfrac{\text{Number of additions + separations during a period}}{2}}{\text{Average number of employees during a period}} \times 100$

This definition will misguide when an organisation has reached its optimum size and does

not require expansion at all. In such a case, labour turnover, as per this definition, will show

half the actual percentage of labour turnover.

(4) Labour turnover according to replacement method

$$\frac{\text{Number of workers replaced during a period}}{\text{Average number of workers during the period}} \times 100$$

This definition takes into account the surplus labour. This definition will also give correct labour turnover when the factory is expanding because all additions are not to be taken, only workers replaced due to leavers are to be taken.

3.12.1 Effects of labour turnover:

There must be some labour turnover due to personal and unvavoidable causes. It has been observed by employers that a normal labour turnover, which is between 3 % and 5 % need not cause much anxiety. But a high labour turnover is always detrimental to the organisation. The effect of excessive labour turnover is low labour productivity and increased cost of production. This is due to the following reasons:

1. Frequent changes in the labour force give rise to interruption in the continuous flow of production with result that overall production is reduced.
2. New workers take time to become efficient. Hence, lower efficiency of new workers increases the cost of production.
3. Selection and training costs of new workers recruited to replace the workers who have left increae the cost of production.
4. New workers being unfamiliar with the work give more scrap, rejects and defective work which increase the cost of production .
5. New workers being inexperienced workers cause more depreciation of tools and machinery. Due to faulty handling of new workers, breakdown of tools

and machinery may also occur very often and hamper production.

3.13 Idle time:

it is the difference between the time for which employees are paid and the employee's time booked against the cost objective. The time for which the employees are paid include holidays, paid leave and other allowable offs such as lunch, tea breaks. Cost of idle time is ascertained by the idle hours multiplied by the hourly rate applicable to the idle employee or a group of employees. Treatment of idle time cost will depend on the type of idle time. For example, if out of eight hours that a worker is supposed to put in the factory the worker's job card shows only seven hours spent on jobs, one hour will be the idle time in such a case. Idle time is of two types: normal idle time and abnormal idle time.

a) Normal idle time : It is inherent in any work situation and cannot be eliminated. This represents the time, the wastage of which cannot be avoided and therefore, the employer must bear the labour cost of this time. But every effort should be made to reduce it to the lowest possible level.

b) Abnormal idle time: it is that time the wastage of which can be avoided if proper precautions are taken. For example: the time wasted due to breakdown of machinery on account of the inefficiency of the works enginner.

3.14 Allocation Of Overheads

Overheads are common costs incurred for the benefits of a number of costs centers or cost units. Therefore, they can not be identified and allocated directly to a particular unit of output. As such, they are to be allocated among the units of output of a particular department or a number of departments or cost centers.

Allocation of overheads is the process of charging overhead costs to a particular department or cost center. It is the allotment or assignment of an overhead cost to a particular cost unit. If the overhead cost is associated with a single department or cost center, the whole amount is charged or distributed among the units of output of that particular department. For example, the whole amount of repair and maintenance expenses for a machine is charged or allocated to that department where the machine

has been installed.

3.15 Apportionment Of Overheads

Distribution of an overhead cost to several departments or cost centers is known as apportionment of overheads. It is the process of charging or apportioning costs to a number of cost centers or cost units. If a given cost is common to two or more departments or cost centers, such cost should be apportioned or divided among these departments on an equitable basis. For example, the amount of factory rent should be apportioned to all the departments. Similarly, the amount of remuneration of the general manager should be distributed to the production, administration and marketing departments as the general manager is associated with all these departments.

3.16 Meaning of absorption of overheads

CIMA defines Absorption of Overheads as **"the process of absorb, overhead costs allocated or apportioned over a particular cost centre or production department by the units produced".**

Absorption of overheads refers to charging of overheads to individual products or jobs. It is a process of distribution of overheads allotted to a particular department or cost centre over the units produced. The absorption of overhead is done by applying overhead absorption rates. The overheads allocated or apportioned over different cost centres or cost units are again absorbed into unit cost on some equitable basis.

Overheads absorption is a process of charging of overheads to cost units by means of rates separately calculated for each cost centre. In most cases the rates are predetermined. The overhead to be absorbed by a particular cost unit will be calculated by dividing the producing cost centre overhead for a period by the cost units produced by that centre in the period.

When a cost centre produces dissimilar units e.g., jobs to customer order, the volume of production must be expressed in a common measurement e.g., direct labour hours, machine hours etc. When a cost unit passes through several centres, the overhead absorbed should be separately for each centre.

The overhead absorption rate is calculated as follows:

The overhead absorption rate is calculated as fallows:

$$\frac{\textbf{Cost centre overhead (Rs)}}{\textbf{Cost centre volume (Level of activity)}}$$

Difference between allocation and apportionment

Allocation:

- Allocation means the allotment of whole items of cost to cost centres or cost units.
- It deals with the whole items of cost.
- Cost is directly allocated to any cost centre or cost units.
- Cost is allocated when the cost centre uses whole of the benefits of the expenses

Apportionment:

- Apportionment means allotment of proportion of items of cost to cost centres or cost units.
- It deals with only proportion of items of cost.
- It needs a suitable basis for subdivision of cost by cost centres or cost units. Thus it is indirect process of allotment.
- Cost is apportioned when cost centres use only a proportion of the benefits of the whole expenses.

3.17 Methods of Overhead Absorption:

The important methods used in absorption of overhead are discussed below:

i. Production Unit Method:

Under this method, overhead absorption rate is calculated by dividing the overhead cost by number of units produced or expected to be produced as shown below:

Budgeted or Actual Overhead

No of units Produced or Budgeted

For example, the budgeted overhead is Rs. 2,00,000 p.a. and the budgeted production is 50,000 units p.a.

$$\frac{\text{Rs } 2{,}00{,}000}{50{,}000} = \text{Rs } 4 \text{ per unit}$$

Advantages:

(a) Where the manufacturing methods are simple and the company makes only one product, this method can be used.

(b) It is simple to understand and easy to apply.

(c) This method is suitable if production consists of products that are more or less identical and which take approximately the same time to produce.

ii. Percentage of Direct Material Cost Method:

Under this method overhead is absorbed based on the actual or predetermined absorption rate calculated by expressing the overhead cost as percentage of direct materials for the same period.

The absorption rate is calculated as follows:

$$\frac{\text{Budeted or Actual Overhead}}{\text{Budgeted or Actual Direct Material Cost}} \quad 100$$

For example, budgeted overhead is Rs. 1,00,000 and the budgeted direct material cost is Rs. 4,00,000, then overhead absorption rate is:

Advantages:

(a) This method is useful if materials are a major part of the cost of units made in the cost centre.

(b) This method is simple to understand and easy to apply.

Disadvantages:

(1) The cost of materials is often subject to considerable fluctuations which will not be accompanied by similar fluctuations in overhead.

(2) Most of the overheads are attributable to time spent on the job or cost unit and this factor is completely ignored in this method.

For example, cheap raw material may take longer time for process than expensive quality material. The unit with cheap raw material should absorb higher overhead cost than the unit processed with high quality raw material.

iii. Percentage of Direct Labour Cost Method:

Under this method, overhead absorption rate is calculated by expressing the overhead expense to be absorbed as a percentage of cost of direct labour for the same period, as shown below:

$$\frac{\textbf{Budgeted or Actual Overhead Cost}}{\textbf{Budgeted or Actual Direct Labour Cost}} \times 100$$

For example, the budgeted overhead is Rs. 1,00,000 and the budgeted direct labour cost is Rs. 5,00,000.

The absorption rate is calculated as shown below:

$$\frac{\text{Rs } 1,00,000}{\text{Rs } 5,00,000} \times 100 = \textbf{20\% of Direct cost}$$

Advantages:

(a) This method is used where labour cost is an important part of total unit cost.

(b) This method is fair in situation where more than one product is made, and each product requires different amounts of various grades of labour, which are paid at different rates.

(c) It is simple to understand and easy to apply.

(d) This method is better than percentage of direct material cost, since labour rates fluctuate less frequently than the rate of materials.

Disadvantages:

(1) It ignores time taken for completion of the job or unit, as job performed by a skilled worker takes lesser time than an unskilled worker.

(2) It ignores the work performed by machine where the labour is a mere attendant.

(3) If a job undertaken by a skilled worker may have a higher labour cost than one undertaken by an unskilled worker, but if the two jobs take equal amounts of time to complete, it might be unfair to charge different amounts of overhead to them.

iv. Percentage of Prime Cost Method:

This method is a combination of both direct material cost and direct labour cost method. The overhead absorption is calculated as follows:

$$\frac{\text{Budgeted or Actual Overhead}}{\text{Budgeted Prime Cost}} \times 100$$

For example, the budgeted overhead is Rs. 2,00,000 and the budgeted prime cost is Rs. 8,00,000.

$$\frac{\text{Rs } 2,00,000}{\text{Rs } 8,00,000} \times 100 = \textbf{25\% of Direct cost}$$

Disadvantages:

(1) This method suffers from the disadvantages of both the methods.

(2) It gives equal weightage to both material and labour.

(3) Where the cost of material is predominating item of prime cost, insufficient allowance is given for the time factor.

v. Direct Labour Hour Rate Method:

Under this method, overhead absorption rate is calculated by dividing the overhead with the number of direct labour hours.

Budgeted or Actual Overhead

Budgeted or Actual Direct Labour Hours

Rs 2,00,000

Rs 8,00,000 Rs5 per Direct Labour Hour

For example, the budgeted overhead of production centre is Rs. 2,00,000 and the budgeted direct labour hours for the period is 40,000.

Advantages:

(a) This method takes into account the time spent by the labour in production of each unit where the production units are not uniform or identical.

(b) It is more appropriate in a labour intensive cost centre where proper records are maintained for time booking.

(c) It is adopted where labour is the limiting factor.

Disadvantages:

(1) It is not suitable in mechanized and capital intensive production.

(2) Maintenance of labour time records is difficult.

(3) No distinction of hours spent by skilled worker and unskilled worker.

vi. Machine Hour Rate Method:

CIMA defines Machine Hour Rate as an **"actual or predetermined rate of cost apportionment or overhead absorption, which is calculated by dividing the cost to be apportioned or absorbed by a number of hours for which a machine or machines are operated or expected to be operated."**

In a manufacturing environment where automatic and semi-automatic capital intensive machinery used, machine hour rate is applied in absorption of overheads. This is the most scientific method of absorption of factory overheads, the budgeted overhead cost to be absorbed is divided by the budgeted hours for which the machine or machines will work.

The machine hour rate is calculated as follows:

Budgeted or Actual Overhead

Budgeted or Actual Machine Hours During the Period

For example, the budgeted production overhead is Rs. 3,00,000 and estimated machine hours is 15,000.

Then machine hour rate is:

$$\frac{\text{Rs } 3{,}00{,}000}{\text{Rs } 15{,}000} \quad \text{Rs20 per Machine Hour}$$

Advantages:

1. It is used in mechanized production environment where machine time is vital and limiting factor.
2. Machine hour rate will be able to account for varying lengths of time taken by products or jobs as they are worked on by the various machines in the department.
3. It is more realistic because machine hour rate is applied only when the machine is used in production of the job or cost unit.
4. Machine hour rate can be computed for the entire plant (called composite machine hour rate) or machine hour rate for individual machines (simple machine hour rate).

Disadvantages:

(1) In labour intensive industries machine hour rate is not suitable.

(2) It is difficult to maintain detailed record of machine usage.

(3) Ascertainment of machine hour rate requires skill and detailed working knowledge.

3.18 Criteria for Overheads allocation and Apportionment

The following are the criteria used for the purpose of allocation and apportionment of overheads.

1. Neutral

The basis for cost allocation is neutral. It does not interfere with the decision making process even after the allocation. A decision is taken on the basis of neutral allocation of overhead; certainly, there is a possibility of optimum utilization of resources.

2. Ability to Bear

The overheads are allocated on the basis of ability of each department to bear the expenses. Sales revenue, total value of assets and gross profits are the some examples of basis for allocation. It is assumed that maximum ability department bears maximum expenses and vice versa.

3. Cause and Effect Relationship

There may be a meaningful casual relationship between the cost objects and the costs to be allocated. For example: Insurance might be allocated among the various departments in proportion to the value of fixed assets handled by each department. If so, there is a meaningful relationship between insurance and value of fixed assets.

4. Benefits Received

The overheads are allocated on the basis of benefits received by the each department. For example: Power expenses. The power expenses might be allocated in proportion to the consumption of power by the different departments or divisions.

5. Equity or Fairness

The basis for allocation of overheads is just and fair to all parties involved. Each party should bear an equitable share of the allocated costs.

3.19 Employee Placement Requisition. The process of recruitment starts when the personnel department receives a copy of the employee placement requisition. The requisitionis sent to the personnel department whenever a worker is needed by a department. On receipt of such a requisition, the personnel department takes action to recruit a new worker or for re-assigning a present worker. It is a task of the personnel department to receive formal applications, interview applicants and select them for positions and inform the department in need of workers of the selection. The ruling of the employee placement requisition may be as follows:

EMPLOYEE PLACEMENT REQUISITION

Department…… Requisition No……

Date.....

Please arrange the following workers with effect from ……

Number of employees required	Categories	Job specification	Description	Remarks

Requisitioned By..... Approved by.....

On employment each worker is allotted a number known as ticket number or token number or clock number and this number is changed when the worker is transferred from one department to another. This number is written oh all documents wherever the name of theworker appears because it is useful for the identification of workers having the same names, for recording of attendance and in maintaining mechanised accounting.

All recruitments are made in accordance with a labour budget and employee placement requisitions. The labour budget specifies the number of workers under each grade category and skill which may be employed in a department. The personnel department should see that the number of workers employed should not exceed the specified number except in special circumstances necessitating recruitment of more workers. Recruitment of more workers should be authorised by a competent authority before recruiting them.

Employee's History Card. The personnel department should keep a full record of

every worker employed in the organisation. The record is kept on a card known as employee's history card. This card includes details about the worker : Name and address, Department, The name of former employer and reasons for leaving him, Date of employment. Category, Rate of pay, Promotions, and Reasons for leaving. The last column is very important because it helps the management to take steps to improve the working conditions so that there may be no frequent changes in the labour force. Columns are provided generally on the reverse side of the card to give information as to details of holidays taken by the worker. A specimen of an employee's history card is given below :

EMPLOYEE'S HISTORY CARD

No.…………………

Name …………………..	Category…………………………..
Department……………..	Engaged on………………………..
Address …………………	As………………………………..
Date of Birth……………..	Grade…………………………
Education………………..	Starting Pay……………………..
Previous employer……………..	Children…………………
Reasons for leaving him…………………..	
Reasons for leaving us…………………..	Re-engage………………..

PARTICULARS OF CHANGES IN PAYMENT AND SERVICE

Date	Trade Grade	Pay	Reason for Change (increment, promotion, , demotion etc.)	Remarks

LEAVE RECORD

Date	Entitlement	Leave taken	Reason

In order to exercise proper control on the recruitment of labour, following steps should be taken :

1. All recruitments should be made only through the personnel department.
2. The personnel manager should examine each employee placement requisition and see whether there is any possibility of transferring surplus labour from other areas.
3. Employment of cas.ual or temporary workers should be preferred to recruitment of permanent workers if additional labour is not absolutely essential.
4. Preventive steps should be taken to reduce absenteeism and inefficiency. The preventive aim of steps..should be to keep workers satisfied.Good working conditions and many other facilities such as medical, housing and recreational facilities should be made available to workers so that they may not leave the organisation and work at their maximum efficiency.
5. Mechanisation of operations should be considered if it is helpful in reducing labour costs.
6. Labour utilisation reports should be introduced in each department. These reports will show the extent of utilisalion of available labour and percentage of efficiency attained by the labour so employed.

The submission of various reports to the top management, such as weekly reports on absenteeism, labour turnover, labour productivity, level of activity, accidents disciplinary action, idle time, overtime, casual workers etc. is also considered to-be the important function of a personnel department. Let us consider labour turnover and labour productivity in detail.

3.20 Causes of Labour Turnover

The various Causes of labour turnover can be classified under the following

heads:

1. Personal causes ; 2. Unavoidable causes ; and 3. Avoidable causes.

1. Personal Causes. Workers may leave the organisation purely on personal

e.g. (a) Domestic troubles and family responsibilities. (b) Retirement due to old age. (c) Accident making workers permanently incapable of doing work (d) Women worker mayleave after marriage in order to take up household duties. (e) Dislike for the job or place. (f) Death. (g)'Workers finding better jobs at some other places. (h) Workers may leave just because of their roving nature. (i) Cases involving moral turpitude.

In all such cases, labour turnover is unavoidable and the employer can practically nothing to reduce the labour turnover.

2. Unavoidable Causes. In certain circumstances it becomes necessary for themanagement to ask some of the workers to leave the organisation. These circumstances may be as follows:

(a) Workers may be discharged due to insubordination or inefficiency. (b) Workers maybe discharged due to continued or long absence. (c) Workers may be retrenched due toshortage of work.

3. Avoidable Causes. (a) Low wages and allowances may induce workers to leave the factory and join other factories where higher wages and allowances are paid. (b) Unsatisfactory working conditions e.g., bad environment, inadequate ventilation etc. leading to strained relations with the employer. (c) Job dissatisfaction on account of wrong placement of workers may become a cause of leaving the organisation. (d) Lack of accommodation medical, transport and recreational facilities. (e) Long hours of work. (f) Lack of promotion opportunities. (g) Unfair methods of promotion. (h) Lack of security of employment. (i) Lack ofproper training facilities. (j) Unsympathetic attitude of the management may force the workers to leave.

3.21 Effects of Labour Turnover

There must be some labour turnover due to personal and unavoidable causes. It has been observed by employers that a normal labour turnover, which is between 3% and 5% need not cause much anxiety. But a high labour turnover is always

detrimental to theorganisation. The effect of excessive labour turnover is low labour productivity and increased cost of production. This is due to the following reasons :

- Frequent changes in the labour force give rise to interruption in the continuous flow of production with result that overall production is reduced.
- New workers take time to become efficient. Hence lower efficiency of new workers increases the cost of production.
- Selection and training costs of new workers recruited to replace the workers who have left increase the cost of production.
- New workers being unfamiliar with the work give more scrap, rejects and defective work which increase the cost of production. r New workers being inexperienced workers . cause more depreciation of tools and machinery. Due to faulty handling of new workers, . breakdown of tools and machinery may also occur very often and hamper production.
- New workers being inexperienced workers are more prone to accidents. Consequently, all costs associated with accidents such as loss on account of output lost, compensation for the injured workers, damage of materials and equipment due to accidents etc. increase the cost of production.

3.22 Reduction of Labour Turnover

As already pointed out, normal labour turnover is advantageous because it allows injection of fresh blood into the firm. But excessive labour turnover is not desirable because it shows that labour force is not contended. Therefore, every effort should be made to remove the avoidable causes which give rise to excessive labour turnover. Following steps may betaken to reduce the labour turnover :

- **Scientific system** of recruitment, placement and promotion should be followed.
- **Enlighted attitude** of management tor creating a healthy work atmosphere should help in reducing labour turnover.

- **Committees** comprising of members from management and workers may be used to deal with issues like control over workers, handling grievances, etc.
- **A suitable personnel policy** should be framed for employing the right man for the right job and giving a lair and equal treatment to all workers.
- **Good working conditions** which may be conducive to health and efficiency should be provided
- **Fair rates of pay** and allowances and other monetary benefits should be introduced.
- Maximum **non-monetary benefits** (i.e., fringe benefits) should be introduced.
- **Distinction** should be made between **efficient** and **inefficient** workers by introducing incentive plans where by efficient workers may be rewarded more as compared to inefficient workers.
- An **employee suggestion box scheme** should be introduced whereby workers who suggest improvements in the method of production should be suitably rewarded.
- Men-management relationships should be improved by encouraging **labour participation in management**.

In addition to the above steps, the personnel department should prepare periodical reports on the labour turnover listing out the various reasons due to which workers have left the organisation. The report should be sent to the management with the necessary recommendations so that corrective measures may be taken to reduce labour turnover.

3.23 Cost of Labour Turnover

The cost of labour turnover can be divided under two heads : (i) Preventive Costs.; (ii) Replacement Costs.

(i) Preventive Costs. These are costs which are incurred to prevent excessive labour turnover. The aim of these costs is to keep the workers satisfied so that they may not leave the factory.

These costs may include:

1. Cost of providing good working conditions.
2. Cost of providing medical, housing and recreational facilities to workers.
3. Cost of providing educational facilities to the children of the workers.
4. Cost of providing subsidised meals.
5. Cost of providing other welfare facilities.
6. Cost of providing safety measures against working conditions.
7. Measures of security and retirement benefits such as pension, gratuity, employer's contribution to provident fund and other measures over and above the compulsory legal provisions.

As prevention is better than cure", preventive cost should be incurred to prevent excessive labour turnover. This cost of labour turnover should be apportioned among different departments on the basis of average number of employees in each department and justifiably treated as overhead. lf preventive cost is incurred for reasons of image or status of the employer or non-economical corporate goals, it may be debited to the Costing Profit and Loss Account. If preventive cost is incurred for a particular department, it may be taken as overhead of that department.

(ii) Replacement Costs. These costs are associated with replacement of workers include :

1. Cost of recruitment of new workers.
2. Cost of training new workers.
3. Loss of production due to (a) interruption in production, and (b) inefficiency of new workers
4. Loss of profit due to toss of production.
5. Loss in fixed overhead cost because of less production on inexperienced workers.

6. Wastage due to excessive spoilage on account of inept handling of machines, and materials by new workers recruited as a result of labour turnover.

7. Cost of accidents because of new workers having more proneness to accidents.

These costs should be distributed among different departments on the basis of number of workers replaced in each department and treated as overhead.

3.24 Labour Productivity

Productivity simply expresses relationship between output and input and is used to assess the utilisation of various factors of production like materials, machines, labour, power, capital etc. Labour being one of the lactors of production has to be accounted for. Labour pr6ductivity measures the efficiency of workers in an organisation. lt refers to the quantity of output obtained for a given quantity of input. The output is measured in units like kgs., tonnes, gallons, litres, etc. While input is expressed in terms of time, wages paid or number of workers.

Labour productivity can be measured in the following ways :

1. Output per man hour = $\frac{\text{Output}}{\text{Man hours used}}$

2, Output per rupee of wages paid = $\frac{\text{Output}}{\text{Total Wages}}$

3. Output per worker = $\frac{\text{Output}}{\text{Total No. of Workers}}$

4. Sale value per worker = $\frac{\text{Sales Value}}{\text{Total No. of Workers}}$

5. Added value per rupee of wages = $\frac{\text{Added Value of Product}}{\text{Total Wages}}$

6. Wages per unit of product = $\frac{\text{Direct Wages.}}{\text{No. of Units}}$

Labour productivity so calculated has to be compared with standards. It is also compared with previous period's figures and with the productivity of similar units in the industry

3.24.1 Improving Labour productivity

Labour productivity can be improved by the following means :

(i) By, having a check at idle time of workers (ii) By avoiding or discouraging over time (iii) By reducing labour turnover (iv) By proper recruitment, selection and training of personnel. (v) By setting up different standards for workers. (vi) By providing fair remuneration to workers. (vii) By introducing incentive schemes. (viii) By providing various fringe benefits like free accommodation, medical facilities, subsidized food etc. (ix) By providing proper and congenial atmosphere for work. (x) By motivating workers and creating a will to work with zeal in them

2. Engineering Department

This department is required to maintain control over working conditions and methods for each job and department by performing the following functions:

1. Preparation of plans and specifications for each job scheduled for production.
2. Inspection of jobs al successive stages of production to make sure that jobs are being done according to the plans and specifications laid down.
3. Inspection of jobs after they are completed to ensure that they are satisfactorily completed.
4. Maintaining safety conditions so that there may be minimum possible number of accidents
5. Maintaining good working conditions conducive to health and efficiency of workers.
6. Conducting research and experimental work before undertaking new jobs.

3. Rate or Time and Motion Study Department

This department works in close harmony with the personnel, engineering and

cost departments. This department performs the functions of making of time and motion studies of labour and plant operations, and making job analysis and Setting piece rates.

(a) Motion Study

There can be several methods of performing an operation but the determination of the best way of performing an operation is made possible by motion study. It is a study of the movements of a worker or a machine in performing an operation for the purpose of eliminating useless, ill directed and inefficient motions in order to improve productivity. Motionstudy was developed by F.B. Gilbrith, an American management expert. The definition given by him in his book "Applied Motion Study" is reproduced as below :

"Motion study consists in dividing work into most fundamental elements possible ;studying these elements separately and in relation to one another and from these studied elements when timed, building methods of least waste." Mr. Gilbrith hasproved that motion study opens up great opportunities for time saving by eliminating wasteful motions and making necessary motions less tiring.

For conducting motion study, workers are studied at their jobs and all their movements and motions are noted. Each movement is known as therblig (Gilbrith spelt backwards). Time spent on each therblig involved in an operation is collected by the use of a stopwatch. All motions are carefully studied to find out the motions which are very much needed to perform operation. The purpose of such study is to determine the best way of performing an operation involved in a job which every worker is supposed to follow. Motion study is also known as Methods Study because it aims at finding out the best methods of completing the work.

Advantages of Motion or Methods Study

1. The efficiency of workers is increased because they are asked to follow correctmethods, use proper tools and eliminate wasteful motions. Effective use of men and machines is ensured.
2. It helps in simplifying the existing operations by laying down the best

sequence of essential operations. It leads to economy in labour and reduction of fatigue.

(b) Time Study or Work Measurement

Time study may be defined primarily as the art of observing and recording the timerequired to do each detailed element of an industrial operation. The main object of time study is to determine the proper time required to complete the job. Before studying the time required for a job, the job is divided into a number of operations which are to be studied separately and the time needed for their completion is ascertained. Such study is conducted after the motion study because time is to be noted down for the necessary movements,which are decided by motion study. In computing the time required (or standard time) to do each operation, it is only fair to use average workers rather than exceptionally fast or slow workers. It is also fair to allow some time for fatigue and personal requirements of workers like smoking, going to urinals, drinking water and the like. Thus, steps involved in time study are as follows :

(a) Analysis of work. The first step is the analysis of each job to examine each operation in the job.

(b) Standardisation of methods. With the help of motion. study, unnecessary movements or motions are eliminated and standard methods of doing a particular job are determined.

(c) Making time study of standard methods. The time taken by an average worker for the completion of a job by doing it by following standard methods is determined with the help of a stop watch. Such noted time is recorded on a time study sheet element by element and then is totalled to know the total time required for the completion of a job. To such time, some time for fatigue and personal requirements of workers is added to establish the standard time.

Thus, time study is not only a study of the time a worker takes to do a given piece of work but it takes into consideration-all the factors given above. According to F.W. Taylor, "Mere statistics as to time which a man takes to do a given piece of work do not constitute a time study. Time study involves careful study of the time in which work ought to be done."

Advantages of Time Study

1. The standard time, ascertained with the help of time study, serves as a basis for wage payment and calculating the premium or bonus payable under incentive schemes of wage payment.
2. The efficiency of workers is increased because time study determines standard time for the completion of a job which can be used as a yardstick for assessing the performance of each worker'
3. The labour requirements are correctly assessed because standard times for various jobs are known.
4. These studies facilitate budgeting of labour costs.
5. These studies help in exercising cost control through proper production control.
6. Attention of the management can be drawn to the causes of idle time of men and machines when more than the standard time is taken.
7. These studies can help in the determination of correct costs because labour cost standards are based on the basis of results of these studies.

Time and motion study is also known as Work Study. As pointed out earlier, time study is also known as work measurement and motion study as-methods study.- Thus,work(study is a combination of two techniques, namely, methods study and work measurement.

(c) Job Analysis

Another important function of the rate department is determine the making of analysis of each job to a list of qualifications needed by workers to perform the work satisfactorily. An excellent definition of job analysis has been developed by the United States Department of labour. It is as follows :

"Job analysis is defined as the process of determining, by observation and study end reporting pertinent information relating to the nature of a specific job. It is the determination of the tasks which comprise the job and the skills, knowledge, abilities and responsibilities required of the worker for successful performance and which

differentiates the job from all others."

Thus job analysis is the complete study of the job (or position) embodying every known and determinable factor, including the duties and responsibilities involved in its performance; the conditions under which performance is carried on, the nature of the task; the qualifications requires in the worker; and the conditions or employment, such as hours, opportunities and privileges.

The different sub-heads under which. in formations pertaining to specific jobs are classified, can be divided broadly into two categories as follows :

(a) Informations which relate to the job .i.e. requirements of a particular job. The requirements of a job are known as job descriptions.

(b) Informations which concern the job-holder i.e., qualities demanded from the holder . Qualities demanded from the job-holder is technically known as Job specifications.

Advantages of Job Analysis

1. Job Analysis helps in fixing suitable rates for different jobs because rates are fixed according to the work characteristics of the jobs. Inequality of rates can be eliminated for comparable jobs.
2. Job evaluation affords no scope for personal prejudices in establishing rates to favour Certain employees because in job evaluation the job is rated and not the employees. To calculate the worth of a job, job contents are essential to be evaluated which in turn are known by the process of job analysis.
3. To have right recruitment, selection and placement of workers, it is essential to know the contents of the jobs to be performed and the qualities to be possessed by the workers who fill up these jobs. The informations regarding these two areas are provided by job analysis.
4. It assists training and development programme. Workers are given training in the skills which are needed for the completion of jobs. Job information provided by job analysis may prove beneficial to persons who administer training programmes because it would help in determining the content and subject matter needed in a training programme.

5. Exact knowledge of the work and working conditions provided by job analysis is needed to settle dispute of workers as to duties and to serve as a basis for the assignment of new duties to workers.

(d) Job Evaluation

Job evaluation is a systematic technique which is used to determine the worth of a job. This technique is used for determining the relative worth of various jobs within an organization and for establishing an adequate wage structure.

Job evaluation should not be confused with job analysis. Job analysis is not concerned with the calculation of job's worth. It is concerned with the discovery of facts concerning a job. On the other hand, job evaluation is concerned with the ascertainment of , money value of a job and should follows the job analysis process which provides the basic data of job descriptions and specifications for measuring the money of a job.

Job evaluation involves evaluating jobs in terms of their characteristics. In general, the. more difficult a job, the more it is worth. The more skill, education, responsibility, risk and experience required in a job, the more is its worth. All the characteristics are given points according to their importance. After all the characteristics have been evaluated, the total points are recorded for a job. The total points of each job help in determining the money value of jobs. The more points a job obtains, the more it is worth.

Advantages of Job Evaluation

1. Job evaluation process helps in the development of rational wage and salary structure because rates are fixed according to the characteristics of the jobs held by job-holders.
2. It is helpful in developing harmonious relationship between the employer and the employees because no scope is left for personal bias of the employer for fixing the wage rates. No scope for personal bias is left because in job evaluation the job is rated and not the employee. Therefore, it provides a sound basis for personnel administration.
3. It brings into focus the particular needs of a job and a worker who possesses

the particular needs is asked to do the job.

4. As we know, job evaluation is followed by job analysis, so advantages of job analysis are available with job evaluation. These advantages may be proper recruitment, selection, placement, training, promotion, transfer etc.

5. It helps in job classification and work simplification.

6. It helps in bringing uniformity in wage structure.

7. Employees are satisfied because of proper placement and right job allocation.

(e) Merit Rating

While job evaluation aims at determining the worth of a job compared with other jobs, merit rating aims at evaluating the workers actually performing the jobs. The purpose behind merit rating is to suitably reward an employee on the basis of his merit. Merit rating system being a scientific tool to assess individual abilities of workers brings out differences among workers. In merit rating system, a number of traits are measured to know an employee's worth. The personal qualities of employees which are usually appraised through merit rating are as follows :

(1) Knowledge, skill and experience of the work. (2)Aptitude for the work. (3) Quality of work done, (4) Quantity of work done. (5) Attendance and punctuality. (6) Reliability and integrity. (7) Supervisory qualities like leadership, initiative, self-confidence and sense of judgement. (8) Co-operation and discipline. (9) Quality of adjustability in unusual circumstances.

Each of the above traits is assigned point value and each employee is evaluatedaccording to the degree of traits he possesses. The employees may be rated either individually in order of points they secure or they may be arranged in groups according to their common ratings.

Importance of Merit Rating

Merit rating has been developed as a valuable toot of personnel management. It has the following advantages :

1. It helps the supervisor in evaluating the performance of his subordinates which is helpful in knowing the different qualities. In this way, suitable task

can be assigned to the labour force on the basis of their qualities.

2. It pinpoints defects of workers so that they may improve their performance.
3. Merit rating of workers helps in determining wage increases and promotions.
4. Merit rating reveals weaknesses of workers and indicates the areas in which systematic training is needed.
5. Merit rating develops a sense of confidence among workers because they are convinced of the basis of evaluation of their abilities. In this way, it is helpful in removing the grievances of workers.
6. Merit rating is helpful in determining the wages of workers on the basis of their abilities.

Limitations of Merit Rating

1. There is a 'blending tendency' in merit rating as there is a tendency to rate the worker on the basis of one factor only. If he is good in one factor, it is possible that he may be rated good in other factors also by the rater even though he may not be good in other factors
2. There may be variations in the ratings of different members of the merit rating committee with the result that final rating may not be satisfactory.
3. Generally, there is a tendency to rate the employees keeping them in the average category though some may belong to the extreme categories i.e., excellent or poor.
4. The results of merit rating cannot be raised above the personal honesty and judgement of the men doing merit rating. They are influenced by the personal bias of the men doing merit rating because of differing perceptions.

Job Evaluation and Merit Rating-Distinction

(i) Job evaluation is the assessment of the relative worth of jobs within a company whereas merit rating is the assessment of the relative worth of man behind the job.

(ii) Job evaluation and its accomplishments are means to set up a rational wage

and salary structure whereas merit rating provides a scientific basis for determining fair wages for each worker based on his ability and performance

(iii) Job evaluation simplifies wage administration by bringing uniformity in wage rates whereas merit rating is used in determine fair rate of pay for different workers.

Job evaluation is a method of evaluating the job in terms of its money value whereasmerit rating is a systematic evaluation of the abilities and capacities of the man doing the job for suitably rewarding him. The purpose of job evaluation is to fix fair wages for the job whereas the purpose of merit rating may be the. evaluation of the workers for wages increase, promotion, training etc. The two should be used in conjunction with each other for scientific classification of jobs, placement of right man for the right job and establishment of a fair wage structure.

4. Time-keeping Department

This department is concerned with the recording of time of each worker engaged in the factory. The recording of time is for two purposes, i.e., tor Time-keeping and Time Booking.

Time-keeping is concerned with the recording of time of workers for the purpose of attendance and wage calculations whereas time booking is the reporting of each worker's time for each department, operation and job for the purposes of cost analysis and apportionment of labour costs between various jobs and departments. These two recordings should be regularly reconciled to establish the accuracy of recording of time because wages calculated on the basis of time-keeping, should agree with the wages charged to the various jobs or production orders on the basis of time booking.

(a) Time-keeping

Time-keeping will serve these purposes i.e. preparation of Pay Rolls in case of time paid workers, meeting the statutory requirements, ensuring discipline in attendance, recording of each worker's time 'in and out' of the factory making distinction between normal time, overtime, late attendance and early leaving and for overhead distribution when overheads are absorbed on the basis of labour hours.

If the size of the factory and volume of work permit, there should be a separate timekeeping office near the factory gate for recording the time of workers. lf the size of the factory is small, time-keeping office may form a part of the personnel or gate office. Payment of wages to workers who work on time basis is dependent upon time spent by them ; so an accurate record of time should be maintained. Even in case of piece workers where payment of wages does not depend upon time, recording of time is essential.

Time Recording for Piece Workers

Recording of time in case of place workers is necessary due to the following reasons:

1. Workers should come and leave the factory in time, as there cannot be a uniform flow of production if workers come late or leave early. Time cards should be maintained for piece workers to ensure discipline, otherwise workers who are paid by time are likely to be dissatisfied.
2. Time cards are to be maintained for piece workers if they are guaranteed a minimum payment for the time spent by them irrespective of their output.
3. Time recording is essential il apportionment of overheads is made on the basis of labour hours.
4. Time recording is essential because it facilitates the calculation of overtime wages, dearness allowance, leave with pay and production bonus.
5. Time recording facilitates the fixation of differential piece rates.
6. Time recording is necessary when statistical records of time may be required for research or complying with legal requirements.

Methods of Time-keeping

There are two methods of time-keeping. They are the manual methods and theme chanical methods. The choice of a particular method depends upon the requirements and policy of a firm. But whichever method is followed, it should make a correct record of the Iincurring the minimum possible expenditure and should minimise the risk of fraudulent payments of wages.

Manual Method

The manual methods of time-keeping are as follows :

(a) Attendance Register Method, and (b) Metal Disc Method.

(a) Attendance Register Method. It is the oldest method of recording time, Under this method, an attendance register (also known as Muster Roll) is kept in the time office adjacent to the factory gate or in each department for workers employed therein. The attendance register contains such columns as the name of the worker, the worker's number, the department in which he is working, the rate of wages, the time of arrival and departure, normal time and overtime. The time of arrival and departure may be noted down by an employee known as time-keeper. lf the workers are literate, they may make a record of time themselves in the presence of a time-keeper or foreman.

This method is simple and inexpensive and can be used in small firms where the number of workers is not large. This method may lead to dishonest practice of recording wrong time because there is possibility of collusion between some of the workers and the time-keeper.

However, for recording the time of workers who work at customers' premises and places which are situated at a distance from the factory, this may be the only suitable method.

(b) Metal Disc Method. Under this method, each worker is allotted a metal disc or a token with a hole bearing his identification number. A board is kept at the gate with pegs on it and all tokens are hung on this board. These boards can be maintained separately for each department so that the workers could remove their tokens from the board without undue delay. As the workers enter the factory gate, they remove their respective discs or tokens and place them in a box or tray kept near the board. Immediately after the scheduled time for entering the factory, the box is removed and the late comers will have to give their tokens to the time-keeper personally so that the exact time of their arrival could be recorded. The discs or tokens still left on the board represent the absentee workers. Later the time-keeper records the attendance in a register known as Daily Muster Roll which is subsequently passed on to the Pay Roll Department.

This method is simple because illiterate workers can very easily recognize their tokens and put in the box. This method is better than attendance register method and is useful when the number of employees is not large. But it has certain disadvantages of its own as given below:

1. There are chances that a worker may try to remove his companion's token from the board in order to get his presence marked when he is absent.
2. There are chances of disputes regarding the exact time of arrival of a worker because the time-keeper marking the attendance can commit mistakes deliberately or through carelessness. There is no authentic proof of the presence or absence of the workers.
3. There are chances of inclusion of dummy or ghost workers by the time-keeper in the attendance register or Daily Muster Roll.

Mechanical Methods. The mechanical methods that are generally used for the recording of time of workers may be as follows :

(i) Time Recording Clocks ; and (ii) Dial Time Records.

(l) Time Recording Clocks. The time recording clock is a mechanical device which automatically records the time of the workers. This method has been developed to obviate some of the difficulties experienced in case of manual methods and this method is useful when the number of workers is fairly large. Under this method, each worker is given a Time card usually of one week duration" Time cards are serially arranged in a tray near the factory gate and as the worker enters the gate, he picks up his card from the tray, puts it in the time recording clock which prints the exact time of arrival in the proper space against the particular day. This process is repeated for recording time of departure for lunch, return from lunch and time of leaving the factory in the evening. Late arrivals, early leavings and overtime are printed in red to attract the attention of the management.

A time card may also give such particulars as hourly rate, total gross wages less deductions and net wages payable. If these particulars are included in the time card, it would be known as combined time and pay-roll card divided into two parts, the upper part being the record of time and the lower one serving as the wage

ticket. Wages are calculated on the basis of time recorded in the upper portion and are entered in the lower portion by the pay-roll

department. The specimen of a combined time and pay-roll card may be as given on next page.

The main advantage of this method is that there are no chances of disputes arising in connection with recording of time of workers because time is recorded by the time recording clock and not by the time-keeper. There is no scope for partiality or carel6ssness of the timekeeper as it is in case of manual methods. But this method suffers from the following defects

1. There are chances that a worker may try to get his friend's time card from the tray in order to get him marked present in time when he is actually late or get his presence marked when he is absent. This drawback can be removed il the time-keeper doesnot show carelessness.
2. Sometimes, the time recording clock goes out of order and the work of recording of time is dislocated.

(ii) Dial Time Records. The dial time recorder is a machine which has a dial around the clock. This dial has a number of holes (usually about 150)and each hole bears a number corresponding to the identification number of the worker concerned. There is one radial arm at the centre of the dial. As a worker enters the factory gate, he is to press the radial arm after placing it at the hole of his number and his time will automatically be recorded on roll of a paper inside the dial time recorder against the number. The sheet on which the time is recorded provides a running account of the worker's time. This machine allows greater accuracy and can itself transcribe the number of hours to the wages sheets. This machine can also calculate the wages of the workers and thus avoids much loss of time. However, the high installation cost of the dial time recorder and its use for only a limited number of workers are the drawbacks of this method.

Combined Time and Pay Roll Card

Name of the worker..... Week ending……

No. of the worker.....

Department…….

Day		Regular		Overtime		Total Time	
		In	**Out**	**In**	**Out**	**Normal Time**	**Overtime**
Monday	A.M.						
	P.M.						
Tuesday	A.M.						
	P.M.						
Wednesday	A.M.						
	P.M.						
Thursday	A.M.						
	P.M.						
Friday	A.M.						
	P.M.						
Saturday	A.M.						
	P.M.						
Sunday	A.M.						
	P.M.						
Calculation of Wages		Normal Time Over Time	Hours worked	Rate	Amount	Deductions	Net Amount
Total							

Time-keeper…….. Pay Roll Clerk.....

Foreman.....

Received the net amount as above Worker.....

Requisites of a Good Time-keeping System

A good time-keeping system should have the following requisites :

1. System of time-keeping should be such which should not allow proxy for another worker under any circumstances.
2. There should also be a provision of recording of time of piece workers so that regular attendance and discipline may be maintained. This is necessary to maintain uniformity of flow of production.
3. Time of arrival as well as time of departure of workers should be recorded so that total time of workers may be recorded and wages may be calculated accordingly.
4. As far as possible, method of recording of time should be mechanical so that chances of disputes regarding time may not arise between workers and the time-keeper.
5. Late-comers should record late arrivals. Any relaxation by the time-keeper in this regard will encourage indiscipline.
6. The system should be simple, smooth and quick. Unnecessary queuing at the factory gate should be avoided. Sufficient clocks should be installed keeping in view the number of workers so that workers may not have to wait for a long period for recording their time of arrivals and departures.
7. A responsible officer should pay frequent visits at the factory gate to see that proper method of recording of time is being followed.

(b) Time Booking

As stated earlier, time booking is the recording of time spent by a worker on different jobs or work orders carried out by him during his period of attendance in the factory. The objects of time booking are:

1. To ensure that time paid for according to time-keeping is properly utilised on different Jobs or work orders.
2. To ascertain the labour cost of each individual job or work order.

3. To provide a basis for the apportionment of overhead expenses over various Jobs or work orders when the method for the allocation of overheads depends upon time spent on different jobs.

4. To ascertain unproductive time or idle time so as to make efforts to keep it in limit.

5. Bonus payable under incentive schemes of wage payment is dependent upon the time taken for completing a job, so it is necessary to know the time taken to complete a particular job.

6. To know the efficiency of workers, it is necessary to make the comparison of actual time taken with time allowed for completing a particular task.

Following documents are generally used for time booking :

(i) Daily Time Sheets, (ii) Weekly Time Sheets, (iii) Job Tickets or Job Cards.

(i) **Daily Time Sheets**. Each worker is given a daily time sheet in which he records the particulars of his time spent on each job or work order. This sheet is a daily record of the work done by a worker on different jobs. These sheets are used in small organisations which cannot afford the expense of a card time recorder. The worker completes the sheet (given to him) every day and gives it to the foreman for signature to ensure the correctness of the sheet The specimen of this sheet is given below:

Daily Time Sheet

Worker's Name..... No.....

Worker's Number..... Date.....

Department……

Job or Work Order No	Work done	Description	Time		Hours	For Cost Office	
			On	Off		Rate	Amount

Worker..... Foreman..... Costed by.....

Entered in Wages Sheet by.....

(ii) Weekly Time Sheet. These sheets record the same particulars for a week as the Daily time sheets for a day. These sheets are an improvement over the daily time sheets because the number of documents to be prepared is considerably reduced. On the other hand, there are chances of these sheets being lost or mutilated because they are continuously left in the hands of the workers for a long period of one week. This drawback of weekly sheets can be removed if they are kept with a departmental clerk and are printed on cards instead of on sheets. These sheets can be filled up by the workers or foreman or departments clerk. It is better if these sheets are filled up by the departmental clerk so that there may not be incorrect recording by the worker and the, foreman may not waste his precious time in filling up these sheets. The specimen of weekly time sheet can be given as below :

Daily Time Sheet

Worker's Name..... No.....

Worker's Number..... Week Ending.....

Department.....

Day	Job no	Work done	Description	Time		Hours	For Cost Office	
				On	Off		Rate	Amount
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
Sunday								
Total								

Worker..... Foreman..... Costed by.....

Entered in Wages Sheet .....

(iii) Job Cards. A job card is used to keep a close watch on the time spent by a worker on each job so that labour cost of a job may be conveniently ascertained. Four types of job cards are generally used :

1. Combined Time and Job Card. This type of card is useful in small organisations where the number of workers is small and the worker works for the whole day on the same job. In small organisation, there is no need of recording the arrival and departure of a worker, and the time spent by him on different jobs separately. Only combined time and job card can serve the purpose of time keeping and time booking. A specimen of combined time an job card is given below :

Combined Time and Job Card

Worker's Name.....

Worker's Number..... Week Ending.....

Department.....

Day	Job no	Time		Time		For Cost Office	
		On	Off	Normal	Overtime	Rate	Amount
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
Sunday							
Total							

Worker..... Foreman..... Costed by.....

Entered in Wages Sheet by .....

2. Job Card for Each Worker. This job card (a specimen is given below) is kept in the department and is maintained in addition to the time card to know how the worker's time shown by the time card is spent on various jobs. A reconciliation is possible between the time shown by the timecard and the time booked against jobs. Every worker is given one fob card at the beginning of each week and the time spent by the worker on different jobs during the week is noted in this card. Specimen of this card is as follows :

Job Card for Each Workers

Worker's Name.....

Worker's Number..... Week Ending.....

Day	Job no	Description	Time		Hours	For Cost Office	
			On	Off		Rate	Amount
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
Sunday							
Total							

Worker..... Foreman..... Costed by.....

Entered in Wages Sheet .....

3. Job Card for Each Job. The two types of job cards mentioned above are issued to each worker and an analysis of the time-spent on various jobs during the week is shown therein. But if the purpos6 is to know at a glance the total labour cost of a job, a job card should be issued for each job and not for every worker. This is a card which travels along with the job from worker to worker, and each worker records time spent by him on it. This job card is useful in those organisations where the number of jobs is very large. and each job passes through different

workers of different grades. The most important advantage of this type of job card is that there is no need of the preparation of separate abstracts of the job card for cost purposes and as stated earlier, the labour cost of a job can be known at a glance' The ruling of this card is given below

Job Card for Each Job

Job No.

Job Description.....

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

Day	Worke's No.	Deptt.	Brief Description of Work Done	Time		Total Time	For Cost Office	
				On	off		Rate	Amount

Total Time Amount

Checked and verified

. Total

Department Foreman			

Costed by

4. Piece Work Card. In a factory where workers are paid on piece basis, a piece work card (a specimen given below) is issued to each worker. In case of piece basis quantity of

PIECE WORK CARD

Worker's Name..... Week Ending.....

Worker's No.....

Department:.....

Day	Brief Description of Work Done	Job. No.	No. of units		For Cost Office				Initials	
			Tendered	Accepted	Rate per Unit	Amount	Time		Worker	Inspection
							On	Off		
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Sunday										

Foreman..... Costed by.....

Entered in Wages Sheet.....

work done is important and time spent by the workers is not important but even then time column is provided for in these job cards because indirect expenses are apportioned to jobs on the basis of time taken for their completion.

Reconciliation of Gate Time (or Time-Keeping) with Time Booked (or Time Booking) Time booked to different jobs or work orders should agree with gate time. But usually it does not happen due to many reasons e.9., time taken in going from the factory gate to the department in which the worker is engaged, time

lost in waiting for materials, tools and instructions, time lost due to breakdown of machinery or power failure, etc. Therefore, Idle Time Card should be prepared to record the time which has been wasted. Time shown by time card will agree with the time shown in the job card and idle time card.

Idle time card will throw light on the reasons which are responsible for the idle time during which the workers had done no work although they were present in the factory. In process industries, need for reconciliation does not arise because there is no need to book time on job cards as the workers are usually employed on the same process throughout the period. Job cards may also not be required in case of long run jobs such as building contracts because workers are engaged on the same job for a long period. In such cases, only time cards kept under time-keeping system will serve the purpose ; so there is no necessity of reconciliation.

But, however, Idle Time Cards should be prepared to know the reasons of idle time so that corrective action may be taken to avoid the incurrence of idle time in future. Specimen of the idle time card is given below :

IDLE TIME CARD

Worker's Name.....

Worker's No.....

Department……

Reasons for Idle Time	Time		Time Lost	For Cost Office		Remarks
	On	off		Rate	Amount	
1. Waiting for materials						
2.Waiting for tools						
3.Waiting for instructions						
4.Machine breakdown						
5.Power failure						
6.Inspection						
7.Other reasons						

Worker ……. Foreman…….. Costed by.....

3.23 Numerical practical portion - Machine hour rate and labour rate

Problem 1: a machine is purchased for cash at Rs 9,200. Its working life is estimated to be 18,000 hours after which its scrap value is estimated at Rs 200. It is assumed from past experience that:

i) The machine will work for 1,800 hours annually.

ii) The repair charges will be Rs 1,080 during the whole period of life of the machine.

iii) The power consumption will be 5 units per hour at paise per unit.

iv) Other annual standing charges are estimated to be: a) rent of the department (machine occupies 1/5th of the total space) Rs 780 . b) light (12 points in the department - 2 points engaged in the machine) Rs 288 c) foreman's salary (1/4th of his time is occupied in the machine) Rs 6,000 d) Insurance premium fire for machinery Rs 36. e) cotton waste Rs 60. Compute machine hour rate.

Solution 1:

Standing charges:		
Rent [780 + 5]	156	
Light [288 x2] /12	48	
Insurance charges	36	
Cotton waste	60	
Foreman's salary (6,000 / 4)	1,500	
Total standing charges	1,800	
Hourly rate of standing charges (1,800 / 1,800)		1.00
Machine expenses		
Depreciation (9,200 – 200)/ 18,000		0.50
Repairs and maintenance (1,080/18,000)		0.06
Power (0.06 x 5)		0.30
Machine hour rate		1.86

Problem 2: calculate machine hour rate

i) Rent and rates to the floor space occupied for the shop Rs 4,800

ii) Depreciation on each machine Rs 500

iii) Repairs and maintenance for the 5 machines Rs 1,000

iv) Power consumption as per metre @ 5 paisa per unit for the Shop Rs 3,000

v) Attendants: There are two attendants for the five machines and they are each paid Rs 60 per month

vi) Supervision: for the five machines in the shop there is one supervisor whose emoluments are Rs 250 p.m

vii) Sundry supplies such as lubricants ,jute and cotton waste ,etc. for the shop Rs 450

viii) Hire purchase instalment payable for the machine including Rs 300 as interest Rs 1,200

The machine uses 10 units of power per hour.

Solution 2:

Annual working hours are calculated as under: -

Power consumed has been given for the purpose of calculating working hours.

Total amount of power consumed Rs 3,000

Rate of power 10 units @ 5 paisa per unit = Rs 50 paisa an hour

Total working hours of machine = 6,000 Hours = Rs 3,000/ 50 paisa

No. Of machines = 5

Working hours per machine = 6,000 / 5 = 1,200 hours a year.

Calculation of machine hour rate for the year

Standing charges:		
Rent and rates (1/5th of Rs 4,800)	960	
Lighting charges (1/5TH OF Rs 540)	108	
Attendants salary for machines (1/5th of 2 x Rs 60 x 12)	288	
Supervision per machine (1/5th of Rs 3,000)	600	
Sundry supplies per machine (1/5th of Rs 450)	90	
Total standing charges:	2,046	
Hourly rate of standing charges = Rs 2,046/ 1,200		1.70
Machine expenses:		
Depreciation (Rs 500/ 1,200)		0.42
Repairs and maintenance (Rs 200/ 1,200)		0.17
Power (10 units of power @ 5 Paisa per unit)		0.50
Machine hour rate		2.79

Problem 3: calculate hour rate

i) Original purchase price of the machine subject to depreciation at 10 % per annum on original cost Rs 324,000

ii) Normal working hours for the month (the machine works to only 75 % of capacity) 200 hours

iii) Wages of machineman Rs 125 per day of 8 hours

iv) Wages for a helper - machine attendant Rs 75 per day of 8 hours

v) Power cost for the month for the time worked Rs 15,000

vi) Supervision charges apportioned for the machine centre for the month Rs 3,000

vii) Electricity and lighting for the month Rs 7,500

viii) Repairs and maintenance including consumable stores per month Rs 17,500

ix) Insurance of plant and building apportioned for the year Rs 16,250

x) Other general expenses per annum Rs 27,500

The workers are paid a fixed dearness allowance of Rs 1,575 per month. Production bonus payable to workers in terms of an award is equal to 33.33 % of basic wages and dearness allowance. Add 10 % of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour wage for debit to production.

Solution 3 :

Fixed costs			
Supervision charges	3,000		
Electric and lighting	7,500		
Insurance of plant and building (Rs 16,250 x 1/12)	1,354.17		
Other general expenses (Rs 27,500 x ½)	2,291.67		
Depreciation (Rs 32,400 x 1/12)	2,700		
Total fixed costs	16,845.84		112.31
Variable costs			
Repairs and maintenance	17,500		116.67
Power	15,000		100
Wages of machine man			44.91
Wages of helper			32.97
			406.86

Calculation of wages of machineman and helper & annual working hours per month

Wages for 200 hours	3,125 (125 x 25 days)	1,875 (75 x 25 days)
Dearness allowance	1,575	1,575
Total of wages and D.A	4,700	3,460
Add: production bonus	1,567	1,150
Add: leave allowance	470	345
Effective wage rate per machine hour (150 hours in all)	44.91	32.97

Effective working hours of machine per month = 200 hours x 75 % = 150 hours

Working days in a month = 200 hours/ 8 hours = 25 days

Problem 4: A machine shop of avon ltd. has six identical machines managed by 6 operators. The machines cannot be worked without an operator wholly engaged on it. The cost of all these 6 machines including installation charges works out to Rs 12 lakhs and these machines are deemed to have a scrap value of 10 % at the end of its effective life (9 year). These particulars are furnished for a six month period.

i) Normal available hours p.m 218

ii) Absenteeism without pay hours 18

iii) Leave with pay hours 20

iv) Stoppage for repairs and maintenance etc - hours 20

v) Average rate of wages per day of 8 hours Rs 80

vi) Production bonus estimated 15 % on wages

vii) Value of power consumed Rs 24,150

viii) Super vision and indirect labour Rs 9,900

ix) Lighting and electricity Rs 4,800

x) Repairs and maintenance including consumable Rs 36,000 p.a

xi) Insurance Rs 60,000 p.a

xii) Other sundry works expenses Rs 36,000 p.a

xiii) General management expenses allocated Rs 109,040

You are required to work out a machine hour rate for the machine shop

Solution 4: calculation of machine hour rate for six months for the machine shop

Operator's wages	72,000
Production bonus – 15 % of wages	10,800
Power consumed	24,150
Supervision and indirect labour	9,900
Lighting and electricity	4,800
Repairs and maintenance (36,000 / 2)	18,000
Machine (60,000 /2)	30,000
Other sundry expenses (36,000 /2)	18,000
General management expenses (Rs 109,040 /2)	54,520
Depreciation (12 lakhs – Rs 1.2 Lakhs) / 18	60,000
Total overheads	302,170
Machine hours utilised = Rs 5,760	
Machine hour rate = Rs 302,170/ 5,760	52.46

Calculation of total machine hours utilised

	hours	hours
Normal available hours per month		218
Less: unutilised hours due to :		
Absenteeism	18	
Leave	20	
Stoppage for repairs and maintenance	20	58
Total hours utilised per month		160
Total hours utilised for six months for 6 operators = 6 x 6 x 160 = 5,760 hours		

Calculation of total wages payable to 6 operators for six months

Average rate of wages per hour = Rs 80 / 8 = Rs 10

Normal hours for which wages are to be paid = 218 - 18 = 200 hours

Wages for 6 months for 6 operators @ 10 = 200 x 6 x 6 x Rs 10 = Rs 72,000

problem 5: find out the labour cost per hour if a worker is paid Rs 200 per month in addition to D.A of Rs 50 p.m. he is entitled to bonus @ 10 % on wages. Employer's maintains a canteen where subsidised tea and lunch are provided to workers and a employees who take advantage of this canteen is 200. Normal idle time amounts 20 %. The average working days in a month are 25 of 8 hours each.

solution 5:

calculation of total expenses incurred per month:

Wages	200
Dearness allowance	50
Bonus 10 % of wages (Rs 200 x 10) / 100	20
Contribution towards contributory Provident fund @ 8 1/3 % of wages (200 x 25)/ 3 x 100	16.67
Contribution towards ESI scheme (Rs 200 x 1) / 100	2
Proportion of canteen's subsidy (Rs 1,000 / 200)	5
total	293.67

calculation of number of working hours:

Working days in a month	25
Working days per day	8
Total working hours in a month	200
Less: 1/20 for leave (200 x 1) / 20	10
	190
Less: 20 % for normal idle time (190 x 20) /100	38
Effective hours in a month	152
Total expenses per month	293.67
Labour cost per hour = Rs 293.67/ 152	1.93

Problem 6 : from the particulars given below, prepare labour cost per Man - day of 8 hours:

i) Basic salary Rs 2 per day

ii) Dearness allowance 25 Paisa per every point over 100 cost of living index for working class. Current cost of living index is 700 points.

iii) Leave salary 10 % of i) and ii)

iv) Employers contribution to provident fund 8 % of i) , ii) & iii)

v) Empoyers contribution to state insurance 2.5 % of i), ii) and iii)

vi) Expenditure on amenities to labour Rs 20 per head per mensum

vii) Number of working days in month 25 days of 8 hours each.

Solution 6 :

Basic salary	2
D.A @ 25 paise every point over cost of living index for a month of 25 days (Rs600 x 25 x 1)/ 100 x 25	6
Leave salary – 10 % of i) and ii) (8 x 10) /100	0.80
Employers contribution to provident fund - 8 % of of i) , ii) & iii) (Rs 8.80 x 8) / 100	0.70
Empoyers contribution to state insurance 2.5 % of i), ii) and iii) (Rs 8.80 x 2.5) / 100	0.22
Expenditure on amenities to labour Rs 20 per head per mensum of 25 days of 8 hours each (Rs 20/ 25)	0.80
Total	10.52

Problem 7:

Calculate the earnings of workers A and B from the following particulars for a month, and allocate the earnings to each job X, Y and Z.

	A	B
Basic wages	Rs 100	Rs 100
Dearness allowance	50 %	55 %
Provident fund on basic wages	8 %	8 %
Employee's state insurance on basic wages	2 %	2 %
Overtime	10 hrs.	-
Idle time and leave	-	16 hrs.

The normal working hours for a month are 200 hours. overtime is paid at double the normal wages plus dearness allowance. Employer's contributions to state insurance and provident fund are at equal rate with the employee's contributions. The month contains 25 working days and one paid holiday. The two workers were employed on jobs X,Y and Z in the following proportions:

Solution 7:

	Worker A	Worker B
Basic wages	100	100
Overtime 10 hours @ 1.50	50	55
	15	-
Gross wages	165	155
Less: deductions:		
Employees contribution to provident fund (8 % on basic wages) Rs 8	10	10
Employees contribution to ESI (2 % on basic wages) Rs 2		
Net wages payable	155	145

Alloction of labour cost of jobs

	Worker A	Worker B
Gross wages excluding overtime wages	150	155
Employer's contribution to PF and ESI	10	10
	160	165
Normal working hours per month	200 hours	200 hours

labour cost per hour worker A = Rs 160/200=Rs0.80 , Worker B = Rs 165/ 200= Rs 0.83

		total	Job X	Job Y	Job Z
Worker A	Ordinary wages	160	64	48	48
	Overtime wages	15	-	15	-
Worker B	Ordinary wages	165	82.50	33	49.50
		340	146.50	96	97.50

Working notes

calculation of overtime wages in made as fallows

Basic wages p.m	100
D.A	50
Total of basic wages and D.A	150
Normal working hours p.m	200
Normal rate per hour = Rs 150 /200	0.75

Therefore, overtime rate is Rs 1.50 because overtime is paid at double the normal rate . Overtime wages for 10 hours @ Rs 1.50 = Rs 15

Problem 8: the total available working hours in a month in respect of a machine is 200 hours. the idle time card reveals follows:

Tea break 20 hours, waiting for Job 10 hours, waiting for tools 6 Hours, break down (Major) 10 hours. Report the idle time cost to the management under the appropriate category if hourly fixed costs of the machine amount to Rs 4.25 and the operator is paid Rs 0.75 per hour.

Solution 8:

Total available working hours	200
Capacity usage ratio	90 %
Standard capacity expected = 90 % of 200	180 hours
Unavoidable idle time	20 hours
Capacity utilisation ratio	80 %
Actual worked hours 180 x 80 / 100	144 hours
Idle time cards reveals:	
Waiting for material	10 hours
Waiting for tools	6 hours
Break down	10 hours
Total	26 hours
Avoidable idle time is 36 – 26= 10 hours	
Hourly idle time cost:	
Fixed expenses for machine	Rs 4.25
Fixed expenses for machine	Rs 0.75
Operator's hourly wages	Rs 0.75
	Rs 5.00

Unavoidable idle time	IDLE TIME REPORT				Cost @ Rs 5	
	W.T	W.M	B.D	Idle time	Unavoidable	Avoidable
20 Hours	6	10	10	10 hrs	Rs 100	Rs 180

Problem 9: The following information is collected from the personnel department of ST limited for the year ending 31st march, 2016

Number of workers at the beginning of the year 8,000 ; number of workers at the end of the year 9,600; number of workers left the company during the year 500; number of workers discharged during the year 100; number of workers replaced due to left and discharges 700; additional workers employed for expansion during the year 1,500; you are required to calculate labour turnover rate by using separation method, replacement method and flux method.

Solution 9 :

Separation method

$$\text{Labour turnover rate} = \frac{\text{number of workers separated during the year}}{\text{Average no.of workers on rolls during the year}} \times 100$$

= 600/ 8,800 x 100 = 6.82 %

Average number of workers separated during the year = 500 number of workers left the company during the year + 100 number of workers discharged during the year = 600

Average number of workers on rolls during the year = 8,000 + 9,600 / 2 = 8,800

Replacement method

$$\text{Labour turnover rate} = \frac{\text{number of workers replaced during the year}}{\text{Average no. Of workers on rolls during the year}} \times 100$$

= 700 / 8,800 x 100 = 7.95 %

Flux method

$$\text{Labour turnover rate} = \frac{\text{number of workers separated + number of workers replaced}}{\text{Average no. Of workers on rolls during the year}} \times 100$$

= (600 + 700)/ 8,800 x 100 = 14.77 %

Problem 10 : from the following data provided to you find out the labour turnover rate by applying: flux method , replacement method and separation method

No. Of workers on the payroll - at the beginning of the month 500 ; at the end of the month 600. During the month, 5 workers left, 20 persons were discharged and 75 workers were recruited. Of these, 10 workers were recruited in the vacancies of those leaving, while the rest were engaged for an expansion scheme.

Solution 10: Labour turnover rate by applying flux method

= number of additions + no. Of separations x 100 = 75 + 5 + 20 x 100 = 100 x 100 = 18.2 %

Average no. Of workers during a period ½ (500 + 600) 550

Labour turnover rate by applying replacement method

= number of workers replaced x 100 = 10 x 100 = 1.8 %

Average no. Of workers ½ (500 + 600)

Labour turnover rate by separation method

$$\frac{\text{Number of separations}}{\text{Average no. Of workers}} \times 100 = \frac{5 + 20}{\frac{1}{2}(500 + 600)} \times 100 = \frac{25 \times 100}{550} = 4.5\ \%$$

Problem 11: The cost accountant of Y Ltd. has computed labour turnover rates

For the quarter.ended.3l st March, 2016 as 10%, 5% and 3% respectively under Flux Method, Replacement method and separation Method. lf the number of worker replaced during the Quarter is30, find out the number of (1) workers recruited and joined and (2) workers left and discharged.

SOLUTION

Calculation of Average Number of Workers on Roll

$$\text{Labour Turnover Rate (under Replacement Method)} = \frac{\text{No. of Replacements}}{\text{Average No of Workers}}$$

$$\frac{30}{5\text{\%}} = \text{Average No. of Workers}$$

$$\text{Average No. of Workers} = \frac{30}{5\%} = 30 \times \frac{100}{5} = 600$$

(1) Calculation of Number of Workers Recruited and Joined

$$\text{Labour Turnover Rate (Under Flux Method)} = \frac{\text{No. of Separations + No. of Accessions}}{\text{Average No. of Workers}}$$

$$10\% = \frac{18 \text{ [Refer to Solution (2)]} + \text{No. of Accessions}}{\text{Average No. of Workers}}$$

$$\frac{10}{100} = \frac{18 + \text{No of Accessions}}{600}$$

$$\text{No. of Accessions} = 69 - 18 = 42$$

(2) Calculation of No. of Workers Left and Discharged

$$\text{Labour Turnover Rate (Under Separation Method)} = \frac{\text{No. of Separations}}{\text{Average No of workers}}$$

$$3\% = \frac{\text{No. of Separations}}{600}$$

$$\frac{3}{100} = \frac{\text{No. of Separations}}{600}$$

$$\text{No. of Separations} = 600 \times \frac{3}{100} = 18$$

Thus, number of workers left and discharged is 18.

Problem 12: The management of Sunshine Ltd. wants to have an idea ofprofit lost/ foregone as a result of labour turnover last year . Last year sales amounted to Rs 66,00,000 and the P/V/Ratio was 20%. The total number

of actual hours worked by the direct labour force was 3.45 lakhs. As a result of the delays by

the Personnel Department in filling vacancies due to labour turnover, 75,000

productive hours were lost. The actual direct labour hours included 30,000 hours attributable

to training new recruits, out of which half of the hours were unproductive. The costs incurred

consequent on labour turnover revealed on analysis the following :

	Rs		Rs
Settlement cost due to leaving	27,420	Selection costs	12,750
Recruitment costs	18,725	Training costs	16,105

Assuming that the potential production lost due to labour turnover could have been sold at prevailing prices, ascertain the profit foregone/lost last year on account of labour turnover.

SOLUTION

Calculation of Actual Productive Hours

Actual hours worked	3,45,000
Less: Hours lost due to training workers (unproductive hours i.e. ½ of 30,000 hours)	15,000
Actual Productive Hours	3,30,000

Sales per Productive Hour = $\frac{\text{Total}}{\text{Actual Productive Hours}} = \frac{\text{Rs.66,00,000}}{\text{3,30,000}} = \text{Rs 20}$

Potential productive hours lost as a result of labour turnover hours	75,000
Sales forgone @ Rs 20 per hour (75,000 x Rs 20)	Rs 15,00,000
P/V Ratio	20%
Contribution forgone (Rs 15,00,000 x 20%)	

STATEMENT OF PROFIT FOREGONE

	Rs
Contribution foregone	3,00,000
Add: Settlement cost due to leaving	27,420
Recruitment costs	18,725
Selection costs	12,750
Training costs	16,105
Total Profit foregone as a result of labour turnover	3,75,000

Problem 13: From the following particulars related to years 2015 and 2016 comment on the overall performance in the year 2016. Also give the suitable ,reasons for such performance.

	2015	2016
No. of workers	1,000	1,200
Manhours used (hrs.)	5,000	6,000
Output (units)	20,000	30,000
Wages (T)	1,00,000	1,20,000

SOLUTION

To assess the overall performance, the following ratios are calculated :

	2016	2017
(i) Output per man hour	$\frac{\text{Output}}{\text{Man hours}} = \frac{20,000}{5,000} = 4$ units	$\frac{30,000}{6,000} = 5$ units
(ii) Output per rupee of wages paid	$\frac{\text{Output}}{\text{Total wages}} = \frac{20,000}{\text{Rs } 1,00,000} = 0.20$ units	$\frac{30.000}{\text{Rs } 1,20,000} = 0.5$ units
(iii) Output per worker	$\frac{\text{Output}}{\text{No. of workers}} = \frac{20,000 \text{ units}}{1000} = 20$ units	$\frac{30,000 \text{ units}}{1,200} = 25$ units

Output per manhour and per worker has shown a considerable increase in the year 2016. obtained for one rupee or wages spent has also shown an increase from 0.20 to 0.25 in the year 2016 Due to this increase in labour productivity, the overall performance has improved in 2016.

Problem 14: A work measurement study was carried out in a firm for 10 hours

and the following information was generated :

Units produced 350 ; Idle time 15% ; Performance rating 120% ; Allowance time 10%

standard time.

What is standard time for the task ?

SOLUTION

Units produced 350 ; Time spent 10 hours ; Idle time 15%

Therefore, observed time per unit in minutes = $\frac{10 \times 60 \times 85/100}{350} = 1,457.$

Time per unit is 1.457 minutes when performance rating is 120 %.Therefore, normal time per unit at 100% performance rating is :

Normal time = 1.457 x 120/100 = 1.748 minutes

Allowance time = 10% of standard time

Therefore, standard time = $1.748 \times \frac{110}{100} = 1.923$ minutes

Alternatively, standard time may be calculated as follows ; $1.748 \times \frac{100}{90} = 1.942$ minutes.

3.26 Numerical unsolved practical portion- machine hour rate and labour rate

1. calculate machine hour rate of A machine

Consumable stores Rs 600 for A machine ; consumable stores Rs 1,000 of B machine ; Repairs Rs 800 of A machine ; Repairs Rs 1,200 of B machine; heat and light Rs 360; rent Rs 360; Insurance of building Rs 4,800; Insurance of Machines Rs 800; Depreciation of Machines Rs 700; Room service Rs 60; General charges Rs 90. Additional information :

	Working hours	Area in sq. Mtr.	Book value
A machine	10,000	100	Rs 12,000
B machine	25,000	500	Rs 20,000

2. Calculate machine hour rate from the following:

Cost of machine Rs 19,200; estimated scrap value Rs 1,200; average repairs and maintenance charges per month Rs 150; standing charges allocated to machine per month Rs 50; effective working life of machine 10,000 Hours; running time per month 166 hours; power used by machine : 5 units per hour @ 19 paisa per unit.

3. Calculate machine hour rate

Cost of machine Rs 190,000; freight and installation charges Rs 10,000; working life 5 years; repairs and maintenance 40 % of depreciation; annual power expenses @ 25 paise per unit Rs 6,000 . Eight hourly day charges (1) power Rs 24 (2) lubricating oil Rs 20 (3) consumable stores Rs 28; (4) wages Rs 80

4. From the following data , calculate the total monthly remuneration of three workers A,B and C.

Standard production per month per worker is 1,000 units; actual production during a month: A - 850 Units , B- 720 units and C- 960 Units; piece work rate per month of actual production - 20 paise; dearness wages - Rs 50 per month; HRA - Rs 20 per month; time allowance - Rs 20 per month, additional production bonus at the rate of Rs 5 for each percentage of actual production exceeding 80 % of the standard

3 Numerical practice practical questions - machine hour rate and labour rate

1. calculate machine hour rate if cost of machine Rs 25 lakhs having a scrap value of Rs 1 Lakh after 10 years. The machine will be operated for three shifts of 7 hours each for 300 working days in a year of which 300 hours will be utilised for minor repairs and maintenance. The other information are as under:-

(a) Wages payable Rs 8,000 payable for an operator and Rs 3,000 p.m for a helper for every shift. Rs 16,000 p.m to one supervisor per shift for the department accommodating four machines including the above machine.

(b) power consumption 25 units @ Rs 4.80 per unit

Repairs and maintenance Rs 30,000 p.a

General lighting and heating: Rs 4,000 p.m for the whole department having the four machines.

Insurance Rs 18,000 per machine p.a

Rent, rates and taxes Rs 3,000 p.m for the department

Factory overheads Rs 36,000 p.a for the department.

2. compute the machine hour rate from the following data:

Cost of machine Rs 100,000; installation charges Rs 10,000; estimated Scrap value after the expiry of its life of 15 years Rs 5,000; rent and rates for the shop p.m Rs 200; general lighting for the shop p.m Rs 300; insurance premium for the machine

p.a Rs 960; repairs and maintenance expenses p.a Rs 1,000; power consumption - 10 units per hour, rate of power per 100 units Rs 20; estimated working hours p.a - 2,200 . This includes setting up time of 200 hours . shop supervisor's salary p.m Rs 600. The machine occupies 1/4th of the total area of the shop. The supervisor is expected to devote 1/5th of his time for supervising the machine.

3. Rahul industries ltd. is a single product organisation having a manufacturing capacity of 6,000 units per week of 48 hours. The output data vis -a - vis different elements of cost for three consecutive weeks are given below:

Units produced	Direct material	Direct labour	Total factory overheads
2,400	4,800	6,000	37,200
2,800	5,600	7,000	38,400
3,600	7,200	9,000	40,800

As a cost accountant , you are asked by the company management to work out the selling price assuming an activity level of 4,000 units per week and a profit of 20 % on selling price.

4. Raju manufactured stools , tables and chairs. The material and wages cost are separated as follows:

	stool	Chair	Table
Materials per unit in Rs	36	60	440
Wages per unit in Rs	48	40	120
Units produced	600	300	60

Factory overhead Rs 60,000. You are required to determine the works and cost of each type of furniture after assuming that one table is equivalent to four stools and two chairs are equivalent to one table for the purpose of factory overhead allocation.

3.28 Summary

Remuneration to workers is the most complex problem in a democratic country like india. There is no single method of wage payment which is acceptable both to the employers and employees. Wages as a means of providing income for the workers become the only source of income which determines their economic survival in the society. On the other hand, employers in their anxiety to keep down the labour cost try to pay less. Even high wages may lead to low cost of production as high wages give incentive to workers to become efficient and produce more and high wages will help in recruiting the most suitable workers. CAS- 3 revised deals with the principles and methods of classification,measurement and assignment of overheads for determination for the cost of product or service and for the presentation and disclosure in cost statements. This standard shall be applied to cost statements, which require classification, measurement, assignment, presentation, and disclosure of overheads including those require attestation.

3.29 Glossary

Allocation, absorption, piece wage system, mensum, machineman, machine hour rate, defective work, direct labour, indirect labour, remuneration , variable cost, fixed cost.

3.30 References

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Course Code: BCG-501 **UNIT -IV**

Course Title : Cost Accounting **LESSON NO. 10-12**

4.1 Introduction

4.2 Objectives

4.3 Introduction - Process Costing

4.4 Meaning of Process Costing

4.4..1 Features of Process Costing

4.4.2 Advantages of Process Costing

4.4.3 Disadvantages of Process Costing

4.5 Costing procedure

4.6 Application of Process Costing

4.7 Distinguish between Job Costing and Process Costing

4.8 Treatment of normal loss, abnormal process loss, abnormal process gain.

4.9 Process of equivalent production

4.10 Numerical solved practical portion - Process costing

4.11 Meaning of Contract Costing

4.12 Features of Contract Costing

4.13 Difference between Job Order Costing and Contract Costing

4.14 Similarities between Job Order Costing and Contract Costing

4.15 Types of Contracts

4.16 Preparation of a Contract account

4.17 Treatment of materials in Contract account.

4.18 Treatment of plant in Contract account

4.19 Method of Transferring profit

4.20 Items used in Contract Costing account

4.21 Treatment of normal loss, abnormal loss and abnormal gain in process

costing.

4.22 Numerical solved practical portion - Contract Costing

4.23 Numerical unsolved practical portion - Process and Contract Costing account

4.24 Numerical practice questions

4.25 Summary

4.26 Glossary

4.27 References

4.1 Introduction

Contract costing is the tracking of costs associated with a specific contract with a customer contract costing can involve a considerable amount of overhead allocation work. In some industries such as government contracting and commercial construction, contract costing is the primary task of the accounting department or may even be organized as an entirely separate department. Proper contract costing can contribtute a considerable amount of profits and so is typically staffed with more experienced contract managers and accountants. It is also known as terminal costing. The contract costing method is used mostly by builders , civil contract , ship builders and construction and mechanical engineering firms. The contract is undertaken at the site of contract . The period inquired to complete a contract is fairly long time or usually more than one year.

The term 'contract' refers to the agreement between two parties to carry out a certain work in a specified period of time A contract is generally related to a large size with high amount of money and performed at site. There are two parties involved in a contract namely the contractor and contracted. The person or party executing the contract under certain terms and conditions is called contractor. The person to whom the work or job is executed is known as contracted. The contract and the contracted make an agreement to get the work done against a ceratin sum of money which is called the contract price. A contract is generally related to construction of building , dam bridge road plants etc. The main objective of the contract costing is to ascertain the total cost of contract so as know the profit or loss incurred form the context.

Process costing is an according methodology that traces and accumulates di-

rect costs and allocates indirect costs of a manufacturing process. Costs are assigned to produce usually in a large batch which might include an entire months production process costing is usually a significant method of assigning costs to units of production in companies producing large quantities of homogenous products. It is a type of operation costing which is used to ascertain the cost of a product at each process or stages of manufacture . The costing method applicable when goods or service result form a sequence of continuous or repetitive operations or process. It is suitable for industries poducing homogenous products and where production is a continuous flow. A process can be referred to as the sub unit if an organisation specifically defined for cost collection purpose.

4.2 Objective

- to understand the concept of contract costing
- to know about the abnormal wastages
- to undersatnd the conept of process costing

4.3 Introduction- process Costing

Process costing is a form of operations costing which is used where standardized homogeneous goods are produced. This costing method is used in industries like chemicals, textiles, steel, rubber, sugar, shoes, petrol etc. Process costing is also used in the assembly type of industries also. It is assumed in process costing that the average cost presents the cost per unit. Cost of production during a particular period is divided by the number of units produced during that period to arrive at the cost per unit.

4.4 Meaning of process costing

Process costing is a method of costing under which all costs are accumulated for each stage of production or process, and the cost per unit of product is ascertained at each stage of production by dividing the cost of each process by the normal output of that process.

CIMA London defines process costing as "that form of operation costing which applies where standardize goods are produced"

Process costing is that aspect of operation costing which is used to ascertain the cost of the product at each process or stage of manufacture. This method of

accounting used in industries where the process of manufacture is divided into two or more processes. The objective is to find out the total cost of the process and the unit cost of the process for each and every process. Usually the industries where process costing used are textile, oil industries, cement, pharmaceutical etc

4.4.1 Features of Process Costing:

(a) Production is done having a continuous flow of products having a continuous flow of identical products except where plant and machinery is shut down for repairs etc.

(b) Clearly defined process cost centres and the accumulation of all costs by the cost centres.

(c) The maintenance of accurate records of units and part units produced and cost incurred by each process.

(d) The finished product of one process becomes the raw material of the next process or operation and so on until the final product is obtained.

(e) Avoidable and unavoidable losses usually arise at different stages of manufacture for various reasons.

(f) In order to obtain accurate average costs, it is necessary to measure the production at various stages of manufacture as all the input units may not be converted into finished goods.

(g) Different products with or without by-products are simultaneously produced at one or more stages or processes of manufacture. The valuation of by-products and apportionment of joint cost before joint of separation is an important aspect of this method of costing.

(h) Output is uniform and all units are exactly identical during one or more processes. So the cost per unit of production can be ascertained only by averaging the expenditure incurred during a particular period

4.4.2 Advantages of process costing:

1. Costs are be computed periodically at the end of a particular period
2. It is simple and involves less clerical work that job costing
3. It is easy to allocate the expenses to processes in order to have accurate costs.
4. Use of standard costing systems in very effective in process costing situations.
5. Process costing helps in preparation of tender, quotations
6. Since cost data is available for each process, operation and department, good managerial control is possible

4.4.3 Limitations of process costing

1. Cost obtained at each process is only historical cost and are not very useful for effective control.
2. Process costing is based on average cost method, which is not that suitable for performance analysis, evaluation and managerial control.
3. Work-in-progress is generally done on estimated basis which leads to inaccuracy in total cost calculations.
4. The computation of average cost is more difficult in those cases where more than one type of products is manufactured and a division of the cost element is necessary.
5. Where different products arise in the same process and common costs are prorated to various costs units. Such individual products costs may be taken as only approximation and hence not reliable.

4.5 Costing procedure

For each process an individual process account is prepared. Each process of production is treated as a distinct cost centre.

Items on the Debit side of Process A/c. Each process account is debited with -

a) Cost of materials used in that process.

b) Cost of labour incurred in that process.

c) Direct expenses incurred in that process.

d) Overheads charged to that process on some pre determined.

e) Cost of ratification of normal defectives.

f) Cost of abnormal gain (if any arises in that process)

Items on the Credit side:

Each process account is credited with

a) Scrap value of Normal Loss (if any) occurs in that process.

b) Cost of Abnormal Loss (if any occurs in that process)

4.6 Applications of Process Costing:

The industries in which process costs may be used are many. In fact a process costing system can usually be devised in all industries except where job, batch or unit or operation costing is necessary. In particular, the following are examples of industries where process costing is applied:

Chemical works Textile	Soap making
, weaving, spinning etc	Box making
Distillation process	Canning factory
Coke works	Paper mills
Paint, ink and varnishing etc	Biscuit works
Meat products	factory Oil refining
Milk dairy	Food products

4.7 Difference between Job Costing and Process Costing

	Job Costing	Process Costing
1	The form of specific order costing which applies where the work is undertaken to customer's special requirements	That form of costing which applies where standardised goods are produced and production is in continuous flow, the products being homogeneous.
2	The job is the cost unit and costs are col lected for each job.	Costs are collected by process or department on time basis and divided by output for a period to get an average cost per unit
3	Losses are generally not segregated.	Normal losses are carefully predetermined and abnormal losses are segregated.
4	Overheads are allocated and apportioned to cost centres then absorbed by jobs, in proportion to the time taken	Units pass through the same processes. Overheades are apportioned to processes on some suitable basis, some times, predetarmined rates may be used
5	Joint products / By-products do not usually arise in jobbing work.	Joint products/By-products do arise and joint cost apportionment is necessary.
6	Standard costing is generally not suitable for jobbing work.	The standardised nature of products and processing methods lends itself to the adoption of standard costing
7	Work-in-progress valuation is specific and is obtained from analysis of outstanding jobs.	For WIP valuation operating costs have to be spread over fully complete output and partially complete products using the concept of equivalent units.
8	Each job is separate and independent of others. Costs are computed when a job is complete.	Products lose their individual identity as they are manufactured in a continuous flow. Costs are calculated at the end of cost period
9	There are usually no transfers from one job to another unless there is a surplus work or excess production.	Transfer of costs from one process to another is made, as the product moves from one process to another.

10	There may or may not be work-in-progress at the beginning or end of the accounting period.	There is always some work-in-process at the beginning as well as at the end of the accounting period.
11	Proper control is comparatively difficult as each product unit is different and the prod uction is not continuous	Proper control is comparatively easier, as the production is standardised and is more stable.
12	It requires more forms and details.	It requires few forms and less details.

4.8 Meaning of Normal Process Loss, abnormal process loss and abnormal gain

Normal process loss

It is the loss which is unavoidable on account of inherent nature of production process. Such loss can be estimated in advance on the basis of past experience or available data. The normal process loss is recorded only in terms of quantity and the cost per unit of usable production is increased accordingly. Where scrap possesses some value as a waste product or as raw material for an earlier process, the value thereof is credited to the process account. This reduces the cost of normal output; process loss is shared by usable units.

Abnormal Process Loss

Any loss caused by unexpected or abnormal conditions such as plants breakdown, sub-standard materials, carelessness, accident etc., or loss in excess of the margin anticipated for normal process loss should be regarded as abnormal process loss. The units of abnormal loss or gain are calculated as under:

Abnormal loss (or gain) = Total Loss - Normal Loss

The valuation of abnormal loss should be done with the help of this formula:

Value of Abnormal Loss = (Normal Cost of Normal Output) x Units of Abnormal Loss (Normal Output)

Abnormal Gain:

We know that margin allowed for normal loss is an estimate, (i.e., on the basis of expectation in process industries in normal conditions) and slight differences are bound to occur between the actual output of a process and that anticipated. These differences will not always represent increased loss, on occasions the actual loss will be less than that expected. Thus, when actual loss in a process is smaller than that was expected, an abnormal gain results. The value of the gain will be calculated in similar manner to an abnormal loss.

The Abnormal Gain Account is to be debited for the loss of income on account of less quantity of sale of scrap available as a result of abnormal gain and Normal Process Loss Account credited accordingly. The balance is transferred to Costing Profit and Loss Account as abnormal gain.

4. 9 process of Equivalent Production:

This represents the production of a process in terms of completed units. In other words it means converting the incomplete production units into its equivalent of complete units. In each process an estimate is made of the percentage completion of any work-in-progress. A production schedule and a cost schedule will then be prepared. The work-in-progress is inspected and an estimate is made of the degree of completion, usually on a percentage basis. It is most important that this estimate is as accurate as possible because a mistake at this stage would affects the stock valuation used in the preparation of final accounts.

The formula for equivalent production is: Equivalent units of work-in-progress = Actual no.of units in process of manufacture x Percentage of work completed

For example, if 20% work has been done on the average of 1,000 units still in process, then 1,000 such units will be equal to 200 completed units. The cost of work-in-progress will be equal to 200 completed units.

Calculation of Equivalent Production:

The following steps are worth noting in its calculation:

(a) State the opening work-in-progress in equivalent completed units by applying

the percentage of work needed to complete the unfinished work of the previous period. If the opening work-in-progress is 100 units which is 40 percent completed, then the equivalent units of this will be 100 x 60% i.e. 60 units.

(b) Add to (a), the number of units started and completed during the period. This can be found out by deducting the units in the closing work-in-progress from the number of units put into the process.

(c) Add to the above, the equivalent completed units of closing work-in-progress. This can be found out by applying the percentage of work done on the finished units at the end of the period.

There are mainly three methods of calculating cost per unit, out of which FIFO method and Weighted Average Method is used in equivalent production

First In First Out Method [FIFO]:

In this method, the assumption is that the incomplete units from the opening stock are completed first and then the units introduced in the process are completed. The costs added in each process during the current period is prorated to the production necessary to complete the opening work in progress, to complete the units added in the process and units in the work in progress. The objective of the first in first out method is to value the inventory at the current costs and as such the main problem is to calculate the equivalent production under this method.

Average Method:

Process costs are sometimes computed on the basis of average costs. Where degree of completion of opening work in progress is not given, average method is used. The average process cost is obtained by adding the cost of opening work in progress and the cost of units introduced in the process during the current period and dividing this total cost by total equivalent units obtained by adding the number of units completed and equivalent units of the closing work in progress of each element, material, labor and overheads. The main object of average method is to even out the fluctuations in prices and hence is used when the prices fluctuate widely during a particular period.

Weighted Average Method:

If a manufacturing unit is manufacturing two or more products, which are quite dissimilar to each other, weighted average method is used. Under this method, weighted average is computed and used in valuation of the incomplete units.

4.10 Numerical solved practical portion - process costing

Problem 1: a product passes through three distinct processes to completion. These processes are numbered respectively I,II and III. During the week ended 15th January 2016, 500 units are produced. Following information is obtained .

	Process I	Process II	Process III
Direct materials	35,000	16,000	15,000
Direct labour	25,000	20,000	25,000

The overhead expenses for the period were Rs 14,000 apportioned to the processes on the basis of wages. No work in progress or process stocks existed at the beginning or at the end of the week. Prepare process accounts.

Solution 1:

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To direct materials	70	35,000	By process no. II a/c	130	65,000
To direct labour	50	25,000	(transferred to next process)		
To overhead expenses (25,000 / 70,000) of Rs 14,000	10	5,000			
	130	65,000		130	65,000

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To process no. I a/c	130	65,000	By process no. III a/c	210	105,000
To direct materials	32	16,000	(transferred to next process)		
To direct labour	40	20,000			
To overhead expenses (20,000 / 70,000) of Rs 14,000	8	5,000			
	210	105,000		210	105,000

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To process no. II a/c	210	105,000	By finished stock a/c	300	150,000
To direct materials	30	15,000			
To direct labour	50	25,000			
To overhead expenses (25,000 / 70,000) of Rs 14,000	10	5,000			
	300	150,000		300	150,000

Problem 2: Bengal chemical co. ltd produced three chemicals during the month of july, 2016 by three consecutive processes. In each process 2 % of the total weight put in is lost and 10 % is scrap which from processes 1 and processes 2 realises Rs 100 a ton and from process 3 Rs 20 a ton

The products of three processes are dealt with as follows:

	Process 1	Process 2	Process 3
Passed on to next process	75 %	50 %	-
Sent to warehouse for sale	25 %	50 %	100 %

	Process 1		Process 2		Process 3	
	In Rs.	In tons	In Rs.	In tons	In Rs	In tons
Expenses incurred:						
Raw materials	120,000	1,000	28,000	140	107,840	1,348
Manufacturing wages	20,500	-	18,520	-	15,000	-
General expenses	10,300	-	7,240	-	3,100	-

-

Prepare process cost accounts

Solution 2:

Process 1 account

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To direct materials	1,000	120,000	By loss of weight (2 % of	20	-
To manufacturing wages		20,500	1,000 tons)		
To general expenses		10,300	By sale of scrap (10 % of	100	10,000
			1,000 tons)		
			By transfer to wharehouse	220	35,200
			By transfer to process 2 (cost	660	105,600
			per		
	1,000	150,800	ton Rs 160)	1,000	150,800

Process 2 account

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To Process 1 a/c	660	105,600	By loss of weight (2 % of 800	20	-
To direct materials	140	28,000	tons)		
To manufacturing wages	-	18,520	By sale of scrap (10 % of 800	100	8,000
To general expenses	-	7,240	tons)		
			By transfer to wharehouse	220	75,680
			By transfer to process 3 (cost	660	75,680
			per ton Rs 215)		
	800	159,360		800	159,360

Process 3 account

Particulars	*Cost p.u*	*Total cost*	*Particulars*	*Cost p.u*	*Total cost*
To Process 2 a/c	352	75,680	By loss of weight (2 % of	34	-
To direct materials	1,348	107,840	1,700 tons)		
To manufacturing wages	-	15,000	By sale of scrap (10 % of	170	3,400
To general expenses	-	3,100	1,700 tons)		
			By transfer to wharehouse	1,496	198,220
	1,700	201,620	(cost per ton Rs 132.50)	800	201,620

Problem 3: A company manufacture a chemical produce by a series of operations in three processes. Raw materials is fed into process I and the finished chemical that comes out of process III is transferred to finished goods store. The following particulars relating to operations for April 2016 are given below:

	Process I	Process II	Process III
Raw materials issued 80,000 kgs.	960,000	-	-
Direct wages	125,600	172,000	142,500
Overhead costs	168,000	177,280	124,690
Normal processing loss (% of input)	3 %	2 %	1 %
Output transferred to next process	74,000 kgs.	69,400 kgs.	69,000
Work in progress (processed material awaiting transfer to next process)	3,000	2,400	Kgs. -

Prepare the processes a/c I,II and III and also abnormal loss and abnormal gain accounts, if any.

	Qty. In kgs.	Rs.		Qty. In kgs.	Kgs.
To material issued	80,000	960,000	By normal loss a/c	2,400	-
To direct wages		125,600	By abnormal loss a/c	600	9,693
To overheads		168,000	(12,53,000 / 77,600 =		48,464
			Rs 16.1546)		11,95,443
			By work in progress	3,000	
			by process II a/c	74,000	
	80,000	12,53,000		80,000	12,53,000

Process I account

	Qty. In kgs.	Rs.		Qty. In kgs.	Kgs.
To process I a/c	74,000	11,95,443	By normal loss a/c	1,480	-
To material issued		172,000	By abnormal loss a/c		9,693
To direct wages		177,280	(15,44,723 / 74,000 =	720	15,336
To overheads			Rs 21.30)		
			By work in progress	2,400	51,122
			by process II a/c	69,400	14,78,265
	74,000	15,44,723		74,000	15,44,723

Process II account

	Qty. In kgs.	Rs.		Qty. In kgs.	Kgs.
To process II a/c	69,400	14,78,265	By normal loss a/c	694	-
To direct wages		142,500	By finished goods a/c	69,000	17,32,924
To overheads		124,690			
To abnormal gain					
(17,45,455/ 68,706 =					
25.404)	294				
	69,694	17,52,924		69,694	17,52,924

Solution 3:

Process I account

	Kgs.	Rs.		Kgs.	Rs.
To process I	600	9,693	By costing p/l a/c	1,320	25,029
To process II	720	15,336			
	1,320	25,029		1,320	25,029

Abnormal gain account

	Kgs.	Rs		Kgs.	Rs
To costing p/l a/c	294	7,469	By process III a/c	294	7,469

Problem 4: RST ltd. processes product Z through two distinct processes , process I and process II . On completion, it is transferred to finished stock . From the following information for the year 2015 -16, prepare process I and Process II and finished stock a/c.

	Process I	Process II
Raw materials used	7,500 Units	-
Raw material cost per unit	Rs 60	-
Transfer to next process/ finished stock	7,050 units	6,525 Units
Normal loss on inputs	5 %	10 %
Direct wages	Rs 135,750	Rs 129,250
Direct expenses	60 % of direct wages	65 % of direct wages
Manufacturing expenses	20 % of direct wages	15 % of direct wages
Realisable value of scrap per unit	Rs 12.50	Rs 37.50

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work in progress.

Solution 4 :

Process I account	Qty. In kgs.	Rs.		Qty. In kgs.	Kgs.
To raw material	7,500	450,000	By normal loss a/c	375	4,688
To direct wages		135,750	(5 % of 7,500)		
To direct expenses(60 % of direct wages)		81,450	By abnormal loss a/c (694,350 – 4,688) / 7,125	75	7,260
To manufacturing overheads (20 % of direct wages)		27,150	= 96.79	7,050	682,402
	7,500	694,350	by process II a/c	7,500	694,350

Process II account

	Qty. In kgs.	Rs.		Qty. In kgs.	Kgs.
To process I a/c	7,050	682,402	By normal loss a/c (10	705	26,438
To direct wages		129,250	%)	6,525	913,823
To direct expenses (65 % of direct wages)		84,013	By finished stock a/c		
To manufacturing overheads (15 % of direct wages)		19,387			
To abnormal gain (915,052 – 26,438) / 6,345	180	25,209			
	7,230	940,261		7,230	940,261

Finished stock account

	Qty.	rate	Rs.		Qty.	rate	Rs.
To process II	6,525	140.15	913,823	By sales a/c	6,000	161.06	966,341
TO P/L a/c				By balance c/d	525	140.05	73,526
	6,525	140.15	913,823		6,525		10,39,867

Problem 5:

A product passes through three processs - P,Q and R. The details of expenses incurred on the three processes during the year 2016 were as under:

Units issued			
Cost per unit			
Sundry materials			
Labour			
Sale price of output per unit			

Management expenses during the year were Rs 80,000 and selling expenses were Rs 50,000. These are not allocable to the processes.

Actual output of the three processes was : process P - 9300 Units, process Q - 5,400 units ; process R - 2,100 units. Two -thirds of the process P and ½ of the output of process Q was passed on to the next process and the balance was sold. The entire output of process R was sold. The normal loss of the three processes, calculated on the input of every process, was process P - 5 %; process Q - 15 % and process R - 20%.

The loss of process P was sold at Rs 2 Per unit , that of process Q at Rs 5 per unit and that of process R at Rs 10 per unit.

Solution 5 :

Process P account

	units	Rs.		units.	Kgs.
To cost of input units	10,000	10,00,000		500	1,000
To sundry materials		16,000	By normal loss a/c	200	22,000
To labour		30,000	By abnormal loss a/c		
			@ Rs 110 per unit	6,200	682,000
			by process Q a/c	3,100	341,000
	10,000	10,46,000	By p/l a/c	10,000	10,46,000

	UNITS	Rs.		units	Rs
	6,200	682,000		930	4,650
To process P a/c		33,150	By normal loss a/c	2,700	405,000
To Sundry materials		80,000	By process R a/c	2,700	405,000
To direct labour			By p/l a/c		
To abnormal gain	130	19,150			
@ Rs 150 each	6,330	814,650		6,330	814,650

Process II account

	UNITS.	Rs.		units	Rs
To process Q a/c	2,700	405,000	By normal loss a/c	540	5,400
To Sundry materials		32,200	By abnormal loss a/c @ 230	60	13,800
To direct labour		65,000	By p/l a/c	2,100	483,000
	2,700	502,200		2,700	502,200

Process III account

	units	Rs		units	Rs
To process P @ 110	3,100	341,000	By sales		
To Process Q @ 150	2,700	405,000	P @ Rs 120	3,100	372,000
To process R @ 230	2,100	483,000	Q @ Rs 165	2,700	445,500
To management		80,000	R @ Rs 250	2,100	525,000
expenses		50,000	By net loss		16,500
To selling expenses					
	7,900	13,59,000		7,900	13,59,000

Problem 6: The product manufactured by the standard chemicals ltd. passes through three processes I, II & III . Following costs have been incurred for the month of September, 2015.

Details	Process I	Process II	Process III
Materials consumed	40,000	7,500	5,000
Direct wages	22,500	10,000	10,000
Direct expenses	20,500	2,250	2,505
Total	83,000	19,750	17,505
	Units	Units	Units
Output	3,900	3,850	3,200
Finished process stock:			
1-9-2015	600	550	800
30-09-2015	500	800	Nil
Stock valuation on 1-9- 2015 (Per unit)	2,450	31.00	37.00
Percentage of loss	2	5	10
Net realisable value of loss per unit (Rs)	13.50	16.25	21.00

Four thousand units of raw materials were introduced in process No. 1 at cost of Rs 20,000. Stocks are valued and transferred to subsequent processes at weighted average cost . The percentage of loss is computed on the number of units entering the process concerned. Prepare process stock a/c, normal loss a/c, abnormal loss a/c, gain or / effective a/c.

Solution 6: Process I account

	Units	Rs		units	Rs
To units introduced	4,000	20,000	By normal loss	80	1,080
To materials		40,000	By abnormal loss	20	520
To direct wages		22,500	(101,920) x 20		
To direct expenses		20,500	3,920		
			By process I stock a/c@		101,400
			26 per unit	3,900	
	4,000	103,000		4,000	103,000

: Process I Stock account

	Units	Rs		units	Rs
To opening balance	600	14,700	By transfer to process II	4,000	103,200
@ 24.50 per unit			a/c		
To process I a/c	3,900	101,400	By closing balance @	500	12,900
			25		
	4,500	116,100	.80 per unit	4,500	116,100

Process II Stock account

	Units	Rs		units	Rs
To process I stock a/c	4,000	103,200	By normal loss a/c	200	3,250
To material consumed		7,500	By process II stock a/c	3,850	121,275
a/c		10,000	@31.50 per unit		
To direct wages a/c		2,500			
To direct expenses a/c					
To abnormal gain a/c	50	1,575			
(119,700 x 50) / 3,800	4,050	124,525		4,050	124,525

Process II Stock account

	Units	Rs		units	Rs
To opening balance @ 31 per unit	550	17,050	By transfer to process III a/c	3,600	113,175
To process II a/c	3,850	121,275	By closing balance	800	25,150
	4,400	138,325		4,400	138,325

Process III a/c

	Units	Rs		units	Rs
To process II stock a/c	3,600	113,175	By normal loss a/c	360	7,560
To material consumed		5,000	By abnormal loss a/c	40	1,520
a/c		10,000	By process III stock a/c	3,200	121,600
To direct wages a/c		2,505	@38 per unit		
To direct expenses a/c					
	50	1,575			
	3,600	130,680		3,600	130,680

Process III a/c

	Units	Rs		units	Rs
To opening balance @ 37 per unit	800	29,600	Bycost of goods sold	4,000	151,200
To process III a/c	3,200	121,600			
	4,000	151,200		4,000	151,200

Normal a/c

To normal loss a/c	50	812.50	By process II a/c	50	1,575
To costing p/l a/c		762.50			
	50	1,575		50	1,575

Normal loss a/c

To process I a/c	80	1,080	By abnormal gain a/c	50	812.50
To process II a/c	200	3,250	By cash / debtors a/c	590	11,077.50
To process III a/c	360	7,560			
	640	11,890		640	11,890

Normal loss a/c

To process I a/c	20	520	By cash a/c	60	1,110
To Process II a/c	40	1,520	By costing p/l a/c		930
	60	2,040		60	2,040

4.11 Meaning of contract costing

The term **'contract'** refers to the agreement between two parties to carry out a certain wok in a specified period of time. A contract is generally related to a large size with high amount of money and performed at site. There are two parties involved in a contact namely the contractor and the contracted. The person or party executing the contract under certain terms and conditions is called the contractor. Similarly, the person or party to whom the work or job is executed is known as the contracted. The contract and the contracted make an agreement to get the work done against a certain sum of money which is called the contract price. A contract is generally

related to contraction of building, dam, bridge, road, plants etc.

ICMA defines. **"Contract costing is that form of specific order costing which applies where work is undertaken to customer's special requirements and each order is of long-term duration."**

Contract costing is a form of job costing in which a separate ledger i.e. contract ledger is maintained for each job. It is also known terminal costing as the contract account is remained or closed after the completion of the work or contract. The main objective of the contract costing is to ascertain the total cost of contract so as know the profit or loss incurred form the contract.

Contract costing is the tracking of costs associated with a specific contract with a customer. For example, a company bids for a large construction project with a prospective customer, and the two parties agree in a contract for a certain type of reimbursement to the company. This reimbursement is based, at least in part, on the costs incurred by the company in order to fulfill the terms of the contract. The company must then track the costs associated with that contract so that it can justify its billings to the customer.

The most typical types of cost reimbursement are:

- Fixed fee. The company is paid a fixed total amount for completing the project, possibly including progress payments. Under this arrangement, the company will want to engage in contract costing to compile all of the costs relevant to the construction project, just to see if the company earned a profit on the deal.
- Cost plus. The company is reimbursed for the costs it incurred, plus a percentage profit or fixed profit. Under this arrangement, the company will be forced under the terms of the contract to track the costs related to the project, so that it can apply to the customer for reimbursement. Depending on the size of the project, the customer may send an auditor to examine the company's contract costs, and may disallow some of them.
- Time and materials. This approach is similar to the cost plus arrangement, except that the company builds a profit into its billings, rather than being

awarded a specific profit. Again, the company must track all contract costs carefully, since the customer may review them in some detail.

Contract costing can involve a considerable amount of overhead allocation work. Customer contracts typically specify exactly which overhead costs can be allocated to their projects, and this calculation may vary by contract.

In some industries, such as governm1ent contracting and commercial construction, contract costing is the primary task of the accounting department, or may even be organized as an entirely separate department. Proper contract costing can contribute a considerable amount of profits, and so is typically staffed with more experienced contract managers and accountants.

4.1 Feature of contract costing

The main features of contract costing are mentioned in the following points:

a. Co9ntracts are execute or performed at the site which are generally out of the contract's premises.

b. Most of the contracts involve jobs having large size and amount.

c. The duration of the completion of a contract may go beyond one accounting year

d. Each contract is treated as a separate unit of cost for the purpose of cost ascertainment.

e. The contracts are executed as per the agreed specifications provided by the contracted.

f. Most of the items of costs incurred in a contract are direct in nature since a contract is carried out are the site.

g. Te contractor carried out the work on behalf of the contractee against a certain amount. The agreed amount is called the contract price.

h. The contractee pays amount to the amount to the contractor an the basis of the work certified out of the completed work by the engineer of the contractee

4.13 Differences between job order and contract costing

Basis of difference	Job Order Costing	Contract Costing
1. size	The work performed under job order costing is comparatively small in size.	The work performed under contract costing is larger in size that the jobs order.
2. Place of work	The manufacturing of product is carved out inside the factory premises.	The production or construction work is carried out at site.
3. time	Takes comparatively lesser time to complete the work.	Management takes a longer time to complete a contract, even more than an accounting period.
4. Payment of price	The price under job order is paid after the completion of job.	The price under a contract is gradually paid in different installment before the completion f the work.
5. investment	Preliminary investment in assets is low.	Preliminary investment is assets are comparatively high.
6. Nature of expenses	The expenses are both direct and indirect in nature.	Generally, the expenses are direct in nature.
7. Transfers of profit	The entire amount of profit eared is transferred to profit and loss account.	The remaining amount of profit after transferring to reserve on the basis of work in progress is

4-14 Similarities between job order and contract costing

The similarities between job order and contact costing are mentioned below:

- Both jobs and contracts are based on the specific requirements of customers. As a result, each job or contract is 'tailor-made' and there is no exact repetition of a job or contract.
- Both job and contract is terminal. Each job and contract can be identified from start to finish and, therefore, costs can be identified for each job a contract.
- The basic principles of contract costing are similar to those applied in job costing.

4.15 Types of contracts

There are three types of contract which are mentioned below:

a. **Fixed price contract:** the contract that is executed with the fixed price which is agreed by the contract and the contractee is called the fixed price contract. Under

this contract, no modification is made in the agreed contract price irrespective of the changes in the price level of material and labour in feature. In such type of contract, the contractor is benefited when the price of material and labour decrease. In contrary to this, the contractee is benefited if the price of material and labour increase.

b. Fixed price contract with escalation and de-escalation clauses: escalation clause is a of agreement that that aims to reduce the risks that is causes due to the changes in the price of materials, labour and other services. Under this, the contract price is adjusted in accordance, with the changes in the price of material, labour and other services. The additional cost raised due to the increase in price is born by the contracted. Similarly, the contract price is reduced if the cost decreases below a certain percentage. It is called de-escalation or reverse clause. Escalation clause safe guides the interest of both the contractor and contractor against unfavorable price change in future. Such clause may also apply where material and labour utilization exceeds a particular limit. In this case, however, contractor will have to prove that excessive utilization is not because of decrease in efficiency. The contractor allows a rebate in the bills presented by him to the extent of the decrease in price.

c. Cost plus contract: the contract in which the contract price is determined by adding a certain percentage of profit on cost is known as cost plus contract. The cost plus contract is adopted to overcome with problem of fixing the contract price price caused due to nature of contract, duration of completion of contract, uncertainly of material, change in the price level, new technology etc. this type of contract is mostly followed by the government for production of special articles not usually manufactured, urgent repairs of vehicles, roads bridge etc. under this types of contract, the contract starts the work and payment is made by the contracted gradually on the basis of the cost incurred in the work completed plus certain percentage of profit.

4.16 Preparation of a contract account

Under the contract costing, a separate account is opened for each contract so as to ascertain the position of profit or loss. Such account is called a contract account.

All the expenses incurred in the contract like material, wages, direct expenses, plant and machinery etc. are debited whereas material returned, and material at end, plant at end, work in progress or contract price in case of completion of the contract etc. are credited in the contract account. The difference between the debit and credit represents the loss or profit. The profit earned under the completion of the contract is regarded as net profit or net loss in case of loss. The profit earned from the contract which is in progress or not completed is called notional profit. When loss takes place in such a situation, it is called net loss. It is because that a loss can never be notional, it is always real. The specimen of a contract account is presented below:

a. When contract is totally competed: some contracts are small and can be completed within a year. In such a case, total contract price is show on the credit side of the contract account as contracture's account. In this case, if credit is heavy then balancing figure on debit side is called profit and if the debit side is heavy, then the balance figure on credit side will be called a loss.

Contract account

Dr. **For the year ended...** Cr.

particulars	Rs.	particulars	Rs.
To: materials issued form store....	xxx	By materials at site.....	Xxx
To: materials purchase.....	xxx	BY material sold.....	Xxx
To plant.....	xxx	By plant sold.....	Xxx
To wage paid.....xx		By plant in hand.....xxx	
Add: outstanding.....xx	Xxx	Less: depreciation.....xx	Xxx
To: other expenses.....	Xxx	By work-in-progress a/c.....	
To national profit.....	Xxx	Work certified.....xx	
(when the credit side is heavier)		Work uncertified.....xx	Xxx
		By: net loss.....	Xxx
		(when the credit side is heavier)	
	xxx		xxx

- . **When contract is incomplete**: large contract take number of years to completion. In this situation, amount of work certified and uncertified are found in the contract. Such amount of work certified and uncertified should be shown on the credit side of the contract account under the head work-in progress account.

1. Work certified: the value of work completed and certified by contractee's engineers and architchets is called work certified. As per provision of the contract, a fixed percentage of such work certified is paid by contractee to contractor. Some percentage of work certified is retained money. The work certified included the portion of notional profit therefore, if the cost of certified is lower than the work certified, the different amount is called motioned ,profit, if the amount of cost of work certified is higher than the work certified, the different will be loss.

2. Work uncertified: on the date of preparation of contract account, there may be some competed but uncertified work. The work of contract which is completed but not certified by the engineers is called work uncertified. It is always recorded at cost price and not on contract prices so as to avoid any profit element in it. The work uncertified never includes the portion of notional profit.

Contract account

Dr. **For the year ended...** Cr.

particulars	Rs.	particulars	Rs.
To: materials issued form store....	xxx	By materials at site.....	Xxx
To: materials purchase.....	xxx	BY material sold.....	Xxx
To plant.....	xxx	By plant sold.....	Xxx
To wage paid.....xx		By plant in hand.....xxx	
Add: outstanding.....xx	Xxx	Less: depreciation.....xx	Xxx
To: other expenses.....	Xxx	By work-in-progress a/c.....	
To national profit.....	Xxx	Work certified.....xx	
(when the credit side is heavier)		Work uncertified.....xx	Xxx
		By: net loss.....	Xxx
		(when the credit side is heavier)	
	xxx		xxx

4.`17 Treatment of materials in contract account

The procedures of recording materials in a contract account are as follows:

items	Treatment
Stock of materials	The opening stock is debited and the closing is credited.
Purchase of materials	The material purchase for the contract is debited.
Transfer of materials	Material transferred to the contract from contracts is debited whereas to material transferred to other contract is credited.
Sales of material	The material sold from the contract is credited in the selling price.
Profit or loss sale	The profit on sale of material is credited.
Loss of materials	The losses of material due to theft, fire, damage etc, are credited. The claim accepted by the insurance company is credited like sales.

4.18 Treatment of plant in contract account

The machinery used for a contract is recorded in a contract account through two ways. They are

i. The cost of machinery and equipment to be used for a longer period or purchase for the contract is shown in the debit side of a contract account. The book value of the machinery and equipment is shown in credit side. The book value is calculated by deducting the depreciation from the cost of the machinery and equipment.

iii If the machinery and equipment is used for a short time in the contract, the amount of depreciation charged is only debited in the contract account. In such a situation, the purchase price in the debited side and the book value in the credit side are not shown. This is generally done, if the plant and equipment are not used till the end of te accounting period.

The treatments of plant and machinery in a contract account under different conditions have been presented below:

Items	Treatment
Plant at beginning	The value of plant at eh beginning of the contract period is debited whereas the plant at end is credited.
Purchase of machinery	The value of the plant purchase for a contract is debited.
Transfer of machinery	The value of machine transferred to the contract from other contracts is debited and the plant transferred to other contracts is credited.
Sales of machinery	The value of machinery sold is shown in credit side in selling prices or market value.
Profit or loss on sale	The profit eared through the sale of machinery is debited and the loss suffered is credited.
Loss of machinery	The losses of machinery due to theft, fire, damage etc. are shown in credit side of a contract account. However, the claim accepted by the insurance company is credited like sales.

Value of plant at site

Cost of plant sent to site		+
Less: cost of plant returned to store	+	
Cost of plant sold	+	
Cost of plant destroyed	+	
Cost of plant at site	+	++
Less: depreciation		+
Value of plant at site		++

4.19 Methods of transferring profit

The profit earned against the completion of a contract is assumed to be the net profit and transferred to profit and loss account. Generally, a contract is completed in a long-period of time and the profit/loss is to be calculated at the end of each

accounting period. Out of the national profit i.e. the profit earned during the work in progress, only some portion is to be transferred to profit and loss account. The during the work in progress, only some portion is to be transferred to profit and loss account. The remaining part of the notional profit is transferred to reserve. Therefore reason. There are some factors which are to be considered to transfer the proportion of notional profit to profit and loss account and reserved. They are:

a. Work certified: the work of a contract completed by a contractor is supervised and certified by the engineer of the contractee. The portion of the work completed and certified by the contractee is called the work certified. The work completed but not certified due to different treasons is called the work uncertified. Work certified is one of the bases of transferring the national profit to the profit and loss account.

b. Cash received: the contractor received cash from the contracted depending on the level of work completed. He/she received cash on the basis of work certified. The whole amount of work certified is not paid to the contractor. The portion of work certified that is not paid to the contractor is known as retention money. The relationship between the work certified and cash receipts is shown below:

Cash received (Rs.) = work certified x % of cash received

% of cash received = 100% - Retention rate

Wok certified = cash received (Rs.) x 100/ % cash received

The ways of transferring notional profit and loss account are given below:

a. Transfer of profit of incomplete contracts

The methods of transferring the motioned profit when is in profess are given below:

Stages of completion	Profit t be transferred to profit and loss a/c
Just started work i.e. less than ¼ of the total work is completed.	No profit is transferred.
Sufficient completion i.e. more than ¼ but less than ½ of the work is completed.	Notional profit x 1/3 x cash received/work certified
Almost completed i.e. work complete between 50% to 90% of the work.	Notional profit x 2/3 x cash received/ work certified

b. Transfer of profit if contracts are almost completed

The contact in which it is possible to estimate the of contract completion and feature cost to be incurred to completed the work and more than 90% of the work has been completed is called the almost completed contract. The methods of ascertainment of profit and transferring the profit and loss account are given below:

1. Ascertain the total estimated cost of the control	Total cost = cost of works to date + future estimated cost
2. Ascertain the estimated profit	Estimated profit = contract price – total cost
3. Transfer the portion of profit to profit and loss account by following any one of the methods	a. Estimated profit x work certified/ contact price b. Estimated profit x work certified/ contract price x cash received/ work certified Or, estimated profit x cash received/ contract price c. Estimated profit x cost of work to date/ total cost d. Estimated profit x cost of work of date/ total cost x cash received/ work certified

4.20 Some other items used in contract costing account

a. Labour cost: all the workers engaged at the site of a particular contract, irrespective of the nature of the work performed by items, are treated as direct workers and the amount of wages paid to them as direct wages. Such wages are to be charged to the particular contract directly. In case a worker (generally the supervisory staff) is engaged at two or more contracts, his total wages may be apportionment to different contract on the basis of time devoted to each contract or on some other equipment basis' wages accrued or outstanding at the end of the accounting period should appear on the debit side of the contract account.

b. Direct expenses: all expenses (other than material cost and direct wages)which have been incurred specifically for a particular contract are direct expenses and

shall be debited to contract a/c. example of direct expenses are: here charges of special plant (not owned), carriage on materials purchase, travelling expenses relating to contract, etc.

c. Indirect expenses: there are certain expenses, which cannot be directly charged to a particular contract e.g., salary of general manager, salary of architect engaged at a number of contract simultaneously, salary of storekeeper, expenses of store and office expenses. Since these expenses are incurred for the business as a whole, they are to be apportioned to the different contract on some equitable basis.

d. Cost of sub-contracts: generally, the work of a specialized character e.g., road construction in a building, installation of lifts, electrical fittings, is passed on to some other contractor by the main contractor. In such cases, the work performed by the sub-contractor forms a direct charged to be contractor concerned and the sub-contractor price paid shall be debited to contract account.

e. Cost of extra work: sometimes, in case of a contract, some additional work o variations of the work originally contracted for may be required by the contractee. Since the additional work required will not be covered by the terms and condition of original contract, it will be the subject of a separate charge., if the additional work required by the contractee is quite substation, it should be treated as a separate contract and dealt with in a separate account to be opened for it. But in case the additional work is not substantial, the expenses incurred on extra work should be debited to contract account as 'cost of extra work' and the extra amount which the contractee has agreed to pay to the contractor should be added to the original contract price.

f. Contract price: the contract price is the agreed price at which the contractor undertakes to execute to contractor. The contractor account is credited with the contractor price if it has been completed. In such a case, the amount of contract price is debited to the 'contractee's personal account and credited to the 'contract account'. No entry is passed in respect of the contract price in case of incomplete contracts.

g. Retention money: generally, the terms of the contract provide that the whole of the amount shown by the archive's certificate shall not be paid to the contractor but

a specified percentage or portion money (say 10% or 20%) thereof shall be retained by the contractee till the contract. Te money so retained is known as 'Retention money'. The cash received from the contractee is credited to his personal account. The value of work (certified and uncertified) is debited to work-in progress account. The work-in-progress account is shown as an asset in the balance sheet after deducting the amount received from the contractee. In the beginning of the next year the work-in-progress account is transferred to the debit side of the contract account. On competition of the contract, the contractee's account is debited and contract account is credited by total contract price.

4.21 Treatment of normal loss, abnormal loss and abnormal gain in process costing

Normal Loss:

Normal loss means that loss which is inherent in the processing operations. It can be expected or anticipated in advance i.e. at the time of estimation.

Accounting Treatment:

The cost of normal loss is considered as part of the cost of production in which it occurs. If normal loss units have any realisable scrap value, the process account is f credited by that amount. If there is no abnormal gain, then there is no necessity to maintain a separate account for normal loss.

Journal Entry:

(i) Normal Loss A/c …Dr.

To Process A/c

(ii) Cost Ledger Control A/c …Dr.

(Scrap value) To Normal Loss

Abnormal Loss:

Abnormal loss means that loss which is caused by unexpected or abnormal conditions such as accident, machine breakdown, substandard material etc. From accounting point of view we can say that abnormal loss is that loss which occurred over and

above normal loss. These losses are segregated from process costs and investigated to prevent their occurrence in future.

Process account is to be credited by abnormal loss account with cost of material, labour and overhead equivalent to good units and the loss due to abnormal is transferred to Costing Profit and Loss Account.

Journal Entries:

(i) Abnormal Loss A/c …Dr.

To Process A/c

(ii) Cost Ledger Control A/c …Dr. (Scrap value)

Costing Profit & Loss A/c …Dr.

To Abnormal Loss

Abnormal Gain:

If the actual loss of a Process is less than that of expected loss then the difference between the two will be treated as abnormal gain. In another way we can define it as the difference between actual production and expected production.

Accounting Treatment:

The value of abnormal gain is transferred to the debit side of the relevant process and ultimately closed by crediting it to the Costing Profit and Loss Account.

Journal Entries:

(i) Process A/c ..Dr.

To Abnormal Gain

(ii) Abnormal Gain A/c ..Dr.

To Normal Loss

To Costing Profit & Loss A/c

4.20 Numerical solved practical portion - Contract costing

Problem 1: Calculate work certified if (a) contract price Rs 40,000 work certified 80 % (b) cash received Rs 800,000 being 80 % of the work certified

Solution 1: a) work certified = contract price x work certified as a percentage of contract price = Rs 400,000 x 80 % = Rs 320,000

b) work certified = cash received / cash as percentage of work certified = 800,000/ 80% = 100,000

Problem 2 : calculate work uncertified if a) total cost incurred to date Rs 500,000, cost of work certified Rs 400,000 b) total cost incurred to date Rs 600,000 to compare 60 % of the contract work. The architect gave certificate for 50 % of the contract price

Solution 2: a) cost of work uncertified = Rs 5 lakh - Rs 4 lakh = Rs 1 lac

b) cost of work uncertified = Rs 6 lakh x 10%/ 60 % = Rs 1 lac

problem 3: Calcualte cash received if a) work certified Rs 800,000, payment received from the contractee 80 % b) contract price Rs 12,00,000 , work certified 80 % , payment received from the contractee 90 %

solution 3 :a) Cash received = Rs 8

00,000 x 80 % = Rs 100,000

b) cash received = Rs 12 lakh x 80 % x 90% = Rs 864,000

problem 4: A Company undertook a contract for construction of a large building complex. The construction work completed on 1st April, 2016 and the following data are available for the year ended 31st march, 2017

Contract price	35,000	Plant hire charges	1,750
Work certified	20,000	Wages related costs	500
Progress payments received	15,000	Site office costs	678
Materials issued at site	7,500	Head office expenses apportioned	375
Planning and estimating costs	1,000	Site expenses incurred	902
Direct wages paid	4,000	Work not certified	149
Materials returned from site	250		

The contractors own a plant which originally cost Rs 20 lac has been continuously in use in this contract throughtout the year . The residual value of the plant after 5 years of life is expected to be Rs 5 lacs. Straight line method of depreciation is in use. material which cost Rs 150,000 was destroyed by fire.

As on 31st march, 2016 the direct wages due and payable amounted to Rs 270,000 and the materials at site were estimated at Rs 200,000.

Prepare contract account for the year ended 31st march, 2017 and account of contractee and profit and loss account showing the relevant items.

Solution 4: Contract account

For the year ended 31st March, 2017

To materials		7,650	By materials required		250
To direct wages	4,000		By materials at site		200
Add: outstanding	270	4,270	By work in progress:		
To wages related costs		500	- Work certified	20,000	
To site expenses		902	- Work uncertified	149	20,149
To plant hire charges		1,750	By profit and loss a/c		150
To planning and estimating costs		1,000	(material destroyed by fire)		
To site office costs		678			
To H.O expenses apportioned		375			
To depreciation on plant					
(20,00,000 – 500,000)/ 5		300			
To notional profit c/d		3,324			
		20,749			20,749
To profit and loss a/c		1,662	By notional profit b/d		3,324
(2/3 x 3,324 x 15,000 / 20,000)					
To work in progress a/c (Reserve)		1,662			
		3,324			3,324

To contract a/c (loss of material due to fire)	150	By contract a/c (profit on contract)	1,662
	1,512		
To net profit	1,662		1,662

To balance c/d	15,000	By contract a/c	15,000

Liabilities	Rs	Assets	Rs
Outstanding wages	270	Plant at site (2,000-300)	1,700
Profit and loss a/c	1,662	Materials at site:	200
		Work in progress:	
		- Work certified 20,000	
		- Work uncertified 149	
		20,149	
		Less: profit in reserve 1,662	
		18,487	3,487
		Less: cash received from The contractee	
		15,000	

Problem 5 : an expenditure of Rs 192,000 has been incurred on a contract upto the end of 31st march, 2016. The value of work done and certified is Rs 210,000. The cost of work done but not yet certified is Rs 12,000. It is estimated that the contract will be completed by 30th june, 2016 and an additional expenditure of Rs 18,000 will have to be incurred to complete the contract. The total estimated expenditure on the contract is to include a provision of 12.5 % for contingencies. The contract price is Rs 280,000 and Rs 168,000 has been realised in cash up to 31st march, 2016. Calculate the proportion of profit to be taken to profit and loss account as on 31st march, 2016 under different methods.

Solution 5:

Working notes:

1. The estimated profit is computed first as follows:

Total expenditure upto 31st march, 2016	192,000
Add: additional total expenditure	18,000
	210,000
Add: provision for contingencies	
(12.5 % on total expenditure i.e., 12.5 % / 87.5 % x 210,000) 30,000	
Estimated total expenditure	240,000
Contract price	280,000
Estimated total profit	40,000
2. Computation of notional profit	
Value of work certified 210,000	
Less: cost of work certified	180,000
Notional profit	30,000

a) Estimated total profit x $\frac{\text{value of work certified}}{\text{Contract price}}$ = 40,000 x $\frac{210,000}{280,000}$ = Rs 30,000

b) Estimated total profit x $\frac{\text{value of work certified}}{\text{Contract price}}$ x $\frac{\text{cash received}}{\text{work certified}}$

= 40,000 x $\frac{210,000}{280,000}$ x $\frac{168,000}{210,000}$ = Rs 24,000

a) Estimated total profit x $\frac{\text{value of work certified}}{\text{Contract price}}$ = 40,000 x $\frac{210,000}{280,000}$ = Rs 30,000

b) Estimated total profit x value of work certified x cash received
Contract price work certified

= 40,000 x 210,000 x 168,000 = Rs 24,000
280,000 210,000

c) Estimated total profit x cost of work to date x cash received
Estimated total cost work certified

= 40,000 x $\frac{192,000 \times 168,000}{240,000 \quad 210,000}$ = Rs 25,600

d) Estimated total profit x $\frac{\text{cost of work to date}}{\text{Estimated total cost}}$ = Rs 40,000 x $\frac{192,000}{240,000}$ = Rs 32,000

e) Profit = notional profit x $\frac{\text{work certified}}{\text{Contract price}}$ = Rs 30,000 x $\frac{210,000}{280,000}$ = Rs 22,000

f) Profit = notional profit x 2/3 x $\frac{\text{cash received}}{\text{Work certified}}$ = Rs 30,000 x 2/3 x $\frac{168,000}{210,000}$ = Rs 16,000

g) Profit = notinal profit x $\frac{\text{work certified x cash received}}{\text{Contract price work certified}}$ = 30,000 x $\frac{210,000 \times 168,000}{280,000 \quad 210,000}$ = Rs 24,000

Most conservative profit is Rs 16,000, Therefore ,profit to be transfered to profit and loss acount is Rs 6000.

Problem 6: A contract is estimated to be 80 % complete in its first year of construction as certified. The contractee pays 75 % of value of work certified,as and when certified and makes the final payment on the completion of contract. Following information is available for the first year.

Cost of work in progress uncertified 8,000

Profit transferred to p/l a/c at the end of year 1 on incomplete contract 60,000

Cost of work to date 88,000

Calculate the value of work in progress certified and amount of contract price.

Solution 6 :

As the contract is 80 % complete, so 2/3rd of the notional profit on cash basis has been transferred to p/l a/c in the first year of contract.

Amount transferred to p/l a/c = 2/3 x notinal profit x % of cash received

60,000 = 2/3 x notional profit x 75%

Notinal profit = 60,000 x 3 x 100 = Rs 120,000

Contract price work certified 280,000 210,000

2 x 75

Computation of value of work certified

Cost of work to date 88,000

Add: notional profit 120,000

208,000

Less: cost of work uncertified 8,000

Value of work certified 200,000

Since the value of work certified is 80 % of the contract price, therefore,

Contract price = value of work certified = Rs 200,000 = Rs 250,00

80 % 80 %

Problem 7 : Surya construction ltd. with a paid up share capital of Rs 50 lakhs undertook a contract to construct MIG apartments. The work commenced on the

contract on 1st april. 2015. The contract price was Rs 60 lakhs. Cash received on account of the contract upto 31st march, 2016 was 18 lakhs (being 90 % of the work certified), work completed but not certified was estimated at Rs 100,000. As on 31st march, 2016 material at site was estimated at Rs 30,000 , machinery at site costing Rs 200,00 was returned to stores and wages Outstanding were Rs 5,000. Plant and machinery at site is to be depreciated at 5 %.

Following were the ledger balances (Dr.) as per trial balance as on 31st march, 2016:

Land and building	23,00,000	Site expenses	5,000
Plant and machinery (60 % at site)	25,00,000	Office expenses	12,000
Furniture	60,000	Rates and taxes	15,000
Materials	14,00,000	Cash at bank	133,000
Fuel and power	125,000	wages	250,000

Contract account For the year ended 31st march 2016

To materials	14,00,000	By materials at site		30,000
To wages (250,000 + 5,000)	255,000	By machine returned (Rs 200,000- 5%		190,000
To plant and machinery at site (60 %)	15,00,000	of Rs 200,000)		12,35,000
To fuel and power	125,000	By plant and machinery at site (		
To site expenses	5,000	13,00,000)		
To office expenses	12,000	By work in progress a/c		
To rates and taxes	15,000	- Work certified	20,00,000	
To notional profit c/d	243,000	(18 lakhs x 100/ 90)		21,00,000
	35,55,000	- Work uncertified	100,000	35,55,000
To profit and loss a/c	72,900			243,000
(243,000 x 1/3 x 90 %)	170,100	By notional profit b/d		
To work in progress (reserve)				
	243,000			243,000

Liabilities	Rs	assets		Rs
Share capital	50,00,000	Land and building		23,00,000
Profit and loss a/c	72,900	Plant and machinery at site		12,35,000
Wages outstanding	5,000	Plant and machinery (store)		11,90,000
		Furniture		60,000
		Cash at bank		133,000
		Work in progress:		
		- Certified work	20,00,000	
		- Uncertified work	100,000	
			21,00,000	
		Less: cash received	18,00,000	
			300,000	
		Less: reserve	170,100	129,900
		Materials at site		30,000
	50,77,900			50,77,900

Problem 8: construction ltd. is engaged on two contracts A and B during the year. Following particulars are obtained at the year end (December, 31)

Date of commencement Contract A

April 1 Contract B

September 1

Date of commencement	Contract A April 1	Contract B September 1
Contract price	600,000	500,000
Materials issued	160,000	60,000
Materials returned	4,000	2,000
Materials at site (dec . 31)	22,000	8,000
Direct labour	150,000	42,000
Site expenses	66,000	35,000
Establishment expenses	25,000	7,000
Plant installed at site	80,000	70,000
Value of plant (dec. 31)	65,000	64,000
Cost of contract not yet certified	23,000	10,000
Value of contract certified	420,000	135,000
Cash received from contractees	378,000	125,000
Architect's fees	2,000	1,000

During the period materials amounting to Rs 9,000 have been transferred from contract A to contract B . You are required to show contract accounts, contractee's account, and extract from balance sheet as on December , 31 ,clearly showing the calculation of work in progress.

Solution 8 :

Particulars	A	B	Particulars	A	B
To materials issued		60,000	By materials consumed	4,000	2,000
To materials from contract A	160,000	9,000	By materials at site (dec.	22,000	8,000
To direct labour	-	42,000	31)		
To site expenses	150,000	35,000	By materials transferred to	9,000	-
To establishment expenses	66,000	7,000	contract B		
To depreciation on plant	25,000	6,000	BY Work in progress (A)		
To architect's fees	15,000	1,000	-work certified 420,000	443,000	
To notional profit c/d	2,000	-	-work uncertified 23,000		
To profit and loss a/c	60,000		BY Work in progress (B)		
(60,000 x 2/3 x 378,000 /			-work certified 135,000		145,000
420,000)			-work uncertified 10,000		5,000
To work in progress (Reserve)			By p/l a/c (loss)		
	478,000	160,000		478,000	160,000
	36,000	-		60,000	
	24,000		By notional profit b/d		
	60,000	-		60,000	

Balance sheet

As on 31st December

p/l a/c			Plant less depreciation (150,000 –		129,000
profit of A Contract	36,000		21,000)		
less: loss of contract B	5,000	31,000	Stock of materials		
			Contract A	22,000	30,000
			Contract B	8,000	
			Work in progress (A)		
			Work certified	420,000	
			Work uncertified	23,000	
				443,000	
			Less: profit in reserve	24,000	
				419,000	41,000
			Less: cash received	378,000	
			Work in progress (B)		
			Work certified	135,000	
			Work uncertified	10,000	
				145,000	
			Less: profit in reserve	nil	
				415,000	20,000
			Less: cash received	125,000	

Problem 9: Mr. Bhagwandas undertook a contract for Rs 15 lac on an arrangement that 80 % of the value of the work done as certified by the architect of the contractee, should be paid immediately and that the remaining 20 % be retained until the contract was completed.

In 2014, the amounts expended were - Materials Rs 180,000; wages Rs 170,000; carriage Rs 6,000; cartage Rs 1,000; sundry expenses Rs 3,000. The work was certified for Rs 365,000 and Rs 300,000 paid as agreed.

In 2015, the amounts expended were - materials Rs 220,000 ; wages Rs 230,000; carriage Rs 23,000; cartage Rs 2,000; sundry expenses Rs 4,000. Three -fourth of the contract was certified as done by 31st December and 80 % of this was received

accordingly. The value of the work uncertified was ascertained at Rs 20,000.

In 2016, the amounts expended were:Materials Rs 126,000; wages Rs 170,000; carriage Rs 6,000; sundry expenses Rs 3,000; and on 30th June the whole contract was Completed.

Prepare contract account , contractee's account and balance sheet in the books of contractor

2014		2014	
To materials	180,000	By work in progress a/c c/d	360,000
To wages	170,000		
To carriage	6,000		
To cartage	1,000		
To sundry expenses	3,000		
	360,000		360,000
2015		2015	
To work in progress a/c b/d	360,000	By work in progress a/c	
To materials	220,000	- Work certified	11,25,000
To wages	230,000	- Work uncertified	20,000
To carriage	23,000		
To cartage	2,000		
To sundry expenses	4,000		
To notional profit c/d	306,000		
	11,45,000		1145,000
			306,000
To P/L a/c	163,200	By notional profit b/d	
(306,000 x 2/3 x 4/5)	1142,800		
To work in progress a/c (Reserve)			
	306,000		306,000
2016	11,45,000	2016	142,800
To work in progress a/c b/d	126,000	By work in progress a/c b/d	15,00,000
To materials	170,000	By contractee's a/c	
To wages	6,000		
To carriage	3,000		
To sundry expenses	192,800		
To p/l a/c	16,42,800		16,42,800

2014	To balance c/d	300,000	2014	By cash	300,000
2015	To balance c/d	900,000	2015	By cash	900,000
2016	To balance c/d	15,00,000	2016	By cash	15,00,000

Problem 10 : following trial balance was extracted on 31st December , 2015 from the books of swastika co. ltd , contractors

Share capital : shares of Rs 10 each		351,800	
Profit and loss account on 1st January, 2015		25,000	
Provision for depreciation on machinery			63,000
Cash received on account : contract 7		12,80,000	
Creditors		81,200	
Land and buildings (cost)	74,000		
Machinery (cost)	52,000		
Bank	45,000		
Contract 7 :			
Materials	600,000		
Direct labour	830,000		
Expenses	40,000		
Machinery at site (cost)	160,000		
	18,01,000		18,01,000

Contract 7 was begun on 1st January, 2015 . The contract price is Rs 24,00,000 and the customer has so far paid Rs 12,80,000 being 80 % of the work certified.

The cost of the work done since certification is estimated at Rs 16,000.

On 31st December, 2015 , after the above trail balance was extracted, machinery costing Rs 32,000 was returned to stores, and materials when at site were valued at Rs 27,000. Provision is to be made for direct labour due Rs 6,000 and for depreciation of all machinery at a12.5 % on cost. You are required to prepare the contract account and the balance sheet of company as on 31st December assuming that this was the only contract in hand during the period.

Solution 10:

Contract account

To materials	600,000	By work in progress a/c	
To direct labour		- Work certified	
830,000	836,000	16,00,000	16,16,000
Add: provision for direct labour	40,000	- Work uncertified	16,000
6,000	160,000	By machinery returned to stores	28,000
To expenses	147,000	32,000	27,000
To machinery		Less: depreciation	
To notional profit c/d		4,000	112,000
	17,83,000	By materials in hand	17,83,000
	784,000	By value of machinery	147,000
	68,600	128,000	
To p/l a/c (147,000 x 2/3 x 4/5)	147,000	Less: depreciation	147,000
To work in progress a/c (Reserve)		16,000	
		By notional profit b/d	

Share capital		351,800	Land and buildings		74,000
p/l a/c	25,000		Machinery	212,000	
add: profit	78,400		Less: provision		
	103,400		(63,000 + 20,000 + 6,500)	89,500	122,500
Less: depreciation	6,500	96,900	Work in progress:		
Provision for direct labour		6,000	- Work certified	16,00,000	
creditors		81,200	- Work uncertified	16,000	
				16,16,000	
			Less: Reserve	68,600	
				15,47,400	
			Less: cash received	12,80,000	267,400
			Materials in hand		27,000
			bank		45,000
		535,900			535,900

Problem 11: M/s KK & Co. commenced the work on a particular contract on 1st april, 2015. They close their books of accounts for the year on 31st December each year. Following information is available from their costing records on 31st December, 2015.

Material sent to site Rs 50,000 ; wages Rs 100,000;foremen 's salary Rs 12,000

A machine costing Rs 32,000 remained in use on site for 1/5th of the year. Its working life was estimated at 5 years and scarp value at Rs 2,000. A supervisor is paid RS 2,000 Per month and had devoted one- half of his time on the contract.

All other expenses were Rs 15,000 . The material at site was Rs 9,000. The contract price was Rs 400,000. On 31st December, 2015, 2/3 of the contract was completed. However, the architect gave certificate only for Rs 200,000 on which 75 % was paid. Prepare contract account.

Solution 11:

To material	50,000	By material at site	9,000
To wages	100,000	By work in progress	
To foremen's salary	12,000	- Work certified 200,000	
To depreciation (32,000 – 2,000) x 1/5	1,200	- Work uncertified 44,550	244,550
5	9,000		
To supervisor's salary			
(9 x 2,000 x 1)			
2	15,000		
To other expenses	66,350		
To notional profit c/d	253,550		253,550
To p/l a/c	33,175	By notional profit b/d	66,350
(66,350 x 2/3 x3/4)	33,175		
To work in progress a/c (Reserve)	66,350		66,350

4.23 Numerical unsolved practical portion - Process and contact costing

1. Rishab & sons co. have obtained a contract for the construction of a flyover bridge. The value of the contract is Rs 14 lac and the work commenced on 1 july, 2016. Following details are shown in their books for the year ended 3oth june, 2017: plant purchased 80,000; wages paid Rs 320,000; materials issued to the site Rs 400,000; site or direct expenses Rs 16,000; general overheads apportioned Rs 46,000; wages accrued as on 30- 6- 2017 Rs 12,000; materials at site as on 30-06-2017 Rs 10,000; direct expenses accrued as on 30-06-2017 Rs 1,700; work not certified at cost Rs 15,000; cash received being 70 % of work certified Rs 700,000; life of the plant purchased is 10 years and scrap value is nil. Prepare contract account

2. A road contractor makes up his accounts to 31st march, contract no. LSM/ 0225 for the construction of roads between Gandhi nagar and jewel commenced on 1st july, 2016. The costing department shows the following information as at

march, 31st 2017. Materials charged out to site Rs 67,320; labour Rs 71,675; foremen's salary Rs 23,407; a machine costing Rs 45,000 installation charges Rs 20,000 and scrap value of Rs 5,000 has been on site for 90 days . its working life is estimated at five years; a supervisor who is paid Rs 50,000 p.a has spent approximately 1/5th time on this contract; all administration and other office expenses amount to 23,000; material in store at site at the end of the year cost Rs 13,069; the contract price is Rs 600,000. But at the end of the year two - thirds of the contract was completed for which amount, the architect's certificate has been issued and Rs 300,000 has so far been received on account. it was decided that the profit made on the contract in the year should be arrived at by deducting the cost of work certified from the total value of the architect's certificate that 1/3rd of the profit so arrived at should be regarded as a provision against contingencies and that such provision should be increased by taking to the credit of profit and loss account only such portion of the 2/3rd profit as the cash received before to the work certified. Prepare contract account

3. Product X is obtained after it passes through three distinct processes. Following information is obtained from the accounts for the month ending march 31, 2016.

Items	Total (in Rs)	Process I	Process II	Process III
Direct material	7,542	2,600	1,980	2,962
Direct wages	9,000	2,000	3,000	4,000
Production overheads	9,000	-	-	-

1,000 units at Rs 3 each were introduced to process I. There was no stock of material or work -in- progress at the beginning or end of the period. The output of each process passes direct to the next process and finally to finished stores. Production overhead is recovered on 100 per cent of direct wages.

% of normal loss to input	5 %	10 %	15%
Output in units during the month	950	840	750
Value of scrap per unit (in Rs)	2	4	5

Prepare process cost accounts and other related accounts.

4. In a factory the product 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 wastage. During April, 2016, 10,000 units of material costing Rs 6 per unit were introduced in process A. The other costs are: -

	Process A	Process B
Materials	-	6140
Labour	10,000	6000
overheads	6000	4000

The output was 9,300 units from Process A . 9,200 Units were produced by Process B, which were transferred to the warehouse.

8,000 units of the finished product was sold @ Rs15 per unit. The selling and distribution expenses were Rs 2 per unit. Prepare process account and a statement of profit or loss

4.24 Numerical practice questions - Process and contract costing.

1. Bharat chemicals ltd. manufacture and sell their chemicals produced by consecutive processes:

The products of these processes are dealt with as under:-

	Process I	Process II	Process III
Transferred to next process	66 .67 %	60 %	-
Transferred to warehouse for sale	33.33 %	40 %	100%
Raw materials used in tons	1,400	160	1,260
Rate per ton	Rs 10	Rs 16	Rs 7
Wages and other expenses	Rs 5,152	Rs 3,140	Rs 2,898

In each process 4 % of the weight put is lost and 6 % is scrap which from process I realised Rs 3 per ton, from process II Rs 5 per ton and from process III Rs 6 per ton. Prepare process accounts showing cost per ton of each product.

2. In a factory , a product is produced through two distinct processes; Process A and process B. On completion, the product is transferred to finished stock account. during the month of june, 2017 the following information was obtained.

	Process A	Process B
Units produced	3,000	-
Units transferred to next process	2,800	-
Units transferred to finished stock	-	2,750
Cost of units introduced (In Rs)	21,000	-
Material (in Rs)	-	3,000
Labour (In Rs)	10,600	5,500
Overheads (In Rs)	3,350	3,820

The normal loss in each process was 5 % which was sold at Rs 5 per unit. There was no stock of raw material or work in progress in the beginning or at the end of the month. You are required to prepare the process accounts and finished stock

account.

3. M/s promising company undertook a contract for erecting sewerage treatment plant for prosperous municipality for a total value of Rs 24 lakhs. It was estimated that the job would be completed by 31st January, 2017

You are asked to prepare the contract account for the year ending 31st January, 2017 form the following particulars:

Materials	300,000
Wages	600,000
Overhead charges	120,000
Special plant	200,000
Work certified was for Rs 16 lakh and 80 % of the same was received in cash	
Material lying at site as on 31-1-2017 Rs 400000	
Depreciate plant by 10 %	
5 % of the value of material issued and 6 % of wages may be taken to have been incurred for the portion of the work completed, but not yet certified. Overheads are charged as a percentage of direct wages.	
Ignore depreciation of plant for use on uncertified portion of work	

Ascertain the amount to be transferred to P/L a/c on the basis of realised profit.

4.25 Summary

Contract costing is a form of order costing which deals with the construction contracts for the construction of an asset or combination of assets which together constitute a single project. This covers various activities such as construction of plants, bridges,

roads, dams, ships, buildings,etc. Process costing is that form of operation costing which is used to calculate the cost of the product at each process or stage of manufacture. It is

4.26 Glossary

Work cetified, work uncertified,work in progress, job order, contract costing.

4.27 References

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