

II B.COM B COST ACCOUNTING

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COST ACCOUNTING

Part : III

Core Course : CC7

Maximum Marks : 100

Instruction Hours : 6

Code No. : 18K4CO07

No. Of Credits : 5

OBJECTIVE : To enable the students to understand the Principles of cost Accounting.

UNIT-I :INTRODUCTION

Cost Accounting – Meaning – Objectives – Advantages - Limitations - Cost Units - Cost Centre - Elements of Cost – Cost sheet.

UNIT-II : MATERIAL COST

Material Cost – Material Control – Material purchase – Levels of stock – Economic Order Quality – ABC Analysis – Perpetual Inventory System - Materials Recording - Bin Card - Store Ledger - Pricing of Materials – FIFO- LIFO - Simple Average - Weighted Average Method.

UNIT III : LABOUR COST

Labour Cost – Methods of Remuneration – Time and Piece Rate System, Bonus System – Idle Time and Over Time – Labour Turnover – Methods.

UNIT–IV : OVERHEADS

Overheads - Classification–Allocation - Apportionment of Overheads Reapportionment of Overheads - Absorption of Overheads – Machine Hour Rate.

UNIT–V : METHODS OF COSTING

Process Costing (Excluding Inter process, Joint products, Equivalent production) – Normal Loss – Abnormal Loss – Abnormal Gain – Job & Batch Costing - Contract Costing

(Theory 20%, Problems 80%)

TEXT BOOK

R.S.N.Pillai & Bhagavathi : Cost Accounting S. Chand & Co, New Delhi.

BOOKS FOR REFERENCE

1. S.P. Jain & K.L. Narang : Cost Accounting, Kalyani publishers, New Delhi.
2. S.Khanna, Arora, Ahuja & Pande: Cost Accounting, S.Chand & Co, New Delhi.
3. Srinivasan & Ramachandran : Cost Accounting, Sriram publications, Trichy.

Question Paper Pattern

Maximum Marks = 75

Exam Duration Hours : 3 Hours

Part A :10 x 2 = 20 (Two Questions from Each Unit)

Part B :5 x 5 = 25 (Either or Type - One Question from Each Unit)

Part C :3 x 10 = 30 (One Question from Each Unit)

UNIT I

What is Cost Accounting – Introduction

The terms 'Costing' and 'Cost Accounting' are often used interchangeably. But there is a little difference between the two. Costing simply means cost finding by any process or technique. The Chartered Institute of Management Accountant (CIMA) has defined costing as – “The techniques and processes of ascertaining cost.”

Cost Accounting is a formal system of accounting for costs in the books of accounts by means of which cost of products and services are ascertained and controlled.

According to definition given by CIMA, London “Cost Accounting is the process of accounting for cost from the point at which expenditure is incurred to the establishment of its ultimate relationship with cost centres and cost units”.

Costing, Cost Accounting and Cost Accountancy:

Costing refers to the technique and process of ascertaining costs. The technique consists of the principles and rules for determining the cost of products and services. The process of costing is the day-to-day routine of ascertaining costs. Cost accounting, on the other hand, is defined as the process of accounting for cost from the point at which expenditure is incurred or committed.

Cost accounting denotes the formal mechanism by means of which costs are ascertained and data are provided for various purposes of management.

Cost accountancy is a wide term which includes several subjects such as costing, cost accounting, cost control, budgetary control and cost audit.

The Chartered Institute of Management Accountants, London, defines cost accountancy as “the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control. It includes the presentation of information derived there from for the purposes of managerial decision-making.”

The term 'Cost Accounting' is defined in different ways by various authorities as follows:

Kohler – “It is that branch of accounting dealing with the classification, recording, allocation, summarisation and reporting of current and prospective costs”.

Wheldon – “It is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services, the relation of these costs to sales values and the ascertainment of profitability”.

Van Sickle – “Cost Accounting is the science of recording and presenting business transactions pertaining to the production of goods and services, whereby these records become a method of measurement and means of control”.

Shilling – “Cost Accounting as a body of concepts, methods and procedures used to measure, analyse or estimate the costs, profitability and performance of individual products, departments and other sequences of a company's operations, for either internal or external use or both and to report on these questions to the interested parties”.

The main objectives of cost accounting are as follows:

1. **Ascertainment of cost** – This is the primary objective of cost accounting. For cost ascertainment different techniques and systems of costing are used under different circumstances.
2. **Control of cost** – Cost control aims at improving efficiency by controlling and reducing cost. This objective is becoming increasingly important because of growing competition.
3. **Guide to business policy** – Cost accounting aims at serving the needs of management in conducting the business with utmost efficiency. Cost data provide guidelines for various managerial decisions like make or buy, selling below cost, utilisation of idle plant capacity, introduction of a new product, etc.
4. **Determination of selling price** – Cost accounting provides cost information on the basis of which selling prices of products or services may be fixed. In periods of depression, cost accounting guides in deciding the extent to which the selling prices may be reduced to meet the special situation

5. Matching cost with revenue – The determination of profitability of each product, process, department etc., is the important object of costing.
6. Special cost studies and investigations – It undertakes special cost studies and investigations and these are the basis for the management in decision making policies.
7. Preparation of financial statements – To prepare the financial statements like profit and loss account and balance sheet etc., the value of stock, work in progress the costing is very much essential

Advantages of cost accounting.

1. Helps to ascertain cost
2. Helps in price fixation
3. Helps to eliminate wastages
4. Helps to identify and eliminate unprofitable activities
5. Helps to check statement accuracy
6. Helps in inventory control
7. Helps for cost and revenue estimation
8. Helps to increase productivity and earning capacity
9. Helps investor's, moneylenders and other financial institutions to know about the business
10. Helps in formulating efficient policy for day-to-day business activities
11. Helps cost control.

Major Disadvantages

1. Involves heavy expenditure since the system has to maintain numerous records
2. Not applicable for all types of industry
3. No standard system for all industry
4. It is mechanical in nature
5. It is stereotyped
6. Common notion is that it cannot control costs and can contribute for operating efficiency. But can only give information on the same.
7. “Cost Concept Terminology” interpretation during decision making according to the convenience of cost accountants acts as a hurdle for standards
8. Considered “Empirical Science”

Functions of cost accounting can be enumerated as follows:

1. To calculate the cost per unit of the various products manufactured by the firm.
2. To prepare a correct cost analysis of both by process or operations, and by the different elements of cost.
3. To ascertain the wastage in each process of manufacture and to prepare reports which can assist wastage control.
4. To provide the necessary information for the determination of selling prices.
5. To compute product-wise profit, and advise the management for the enhancement of profit.
6. To serve the management in the valuation of goods-in-process and finished goods, so that the minimum capital is blocked up in the stocks.
7. To install and implement cost control systems (budgetary control or standard cost system) for the control of material, labour, and overhead expenses.
8. To advise the management for the formulation of future expansion policies and proposed capital outlays.

9. To establish an effective reporting system. This will help the different levels of management to receive the necessary cost data in time in order to enable them to fulfil their individual responsibilities in an efficient manner.
10. To guide the management in the preparation and implementation of incentive schemes based on productivity and cost savings.
11. To advise the management on the profitability of present or new lines of products, the comparative advantages and disadvantages of different types of production methods, the replacement of manual operations by automation, and other such policy matters which have a direct impact on the development of the company.
12. To supervise punched card accounting or data processing division operations.
13. To organize internal audit system so that the effective working of the accounting control and production control methods can be introduced from time to time and be well ensured.
14. To coordinate with the industrial engineers for the introduction and implementation of methods suggested for improvement and or redundancy of programmes and data.
15. To provide the Government or other public bodies with the specialized service of cost audit.

Requisites of a Good Cost Accounting System

1. Simple and Easy to Operate – The system of Cost Accounting should be simple to be understood by an average person. All important informations, facts and figures must be provided with cost records to make it more meaningful and enable the managers to exercise the cost control.
2. Suitable to the Business – A Cost Accounting system should be designed according to the nature, type and size of the business. It should serve the business by providing all necessary informations.
3. Flexible – A Cost Accounting system should be flexible enough to be changed according to the business environment and conditions. For example, if a business expands this system should absorb in it. This feature is necessary because business environment is not stable.
4. Economy – The cost of operating costing system must be minimum. Its benefits should exceed its cost.
5. Comparability – The cost records should be maintained in such a way to facilitate comparison between present and past figures.

6. Minimum changes to the existing one- when introducing a costing system, it may cause minimum disturbance to the existing set up of the business.
7. Uniformity of forms - forms of different colours can be used to distinguish them.
8. Less clerical work – printed forms will involve less labour to fill in as the workers may be little educated.
9. Efficient material control and wage system – there must be a proper procedure for recording the time spent on different jobs, by workers for the payment of wages .
10. A sound plan – there must be proper and sound plans to collect, to allocate and to apportion overhead expenses on each job or product in order to find out the cost accurately.
11. Reconciliations - the system of costing and financial accounting must be facilitated to reconcile in the easiest manner.
12. Overall efficiency of cost accountant – the work of the cost accountant under a good system of costing must be clearly defined as to his duties and responsibilities to the firm are very essential.

Cost Accounting Procedures:

1. Cost classification—arrangement of items of cost accumulated, in logical groups having regard to their nature and purpose (subjective as well as objective classification);
2. Cost allocation—assigning a whole item of cost, or of revenue, to a single cost unit, centre, account or time period,
3. Cost apportionment—to spread revenues or costs over two or more cost units, centres, accounts or time periods (also known as ‘indirect allocation’);
4. Overhead absorption—assigning or attaching overhead to products or services by means of absorption rates.

The elements of cost

1. Direct material cost – example cloth in garments, leather in shoe making, spare parts in radio, cycle, scooter etc.,
2. Direct wages – labour engaged in actual production, inspector, analysts etc.,
3. Direct expenses – travelling expense, excise duty, royalty, repair and maintenance etc.,
4. Indirect materials – lubricant, cotton waste, oil, stationery etc.,
5. Indirect labour - salaries and wages to foremen, supervisors, store keepers etc.,
6. Indirect expenses - rent, rates, insurance, depreciation, welfare and medical expenses etc.,

TYPES OF COSTS.

Fixed Costs

The costs that remain constant despite changes in production, process or projects are referred to as fixed costs. For example, in a manufacturing unit the salaries of the office staff will remain fixed irrespective of the production.

Variable costs

These costs vary with the production, process or project changes. For example, in an organization manufacturing toy the material and labour cost will be dependent on the production.

Opportunity cost

The cost incurred in selecting one option over another is called opportunity cost. For example in a toy manufacturing unit with limited labour hours and material, the decision to produce one particular toy say 'Dancing Monkey' will result in non-production of an other toy say 'Spinning top'. So while considering the profitability of toy 'Dancing Monkey' the organization has to consider the profit of 'Spinning top' that it forgoes.

Sunk cost

Certain costs are incurred and cannot be recovered these are sunk costs. Continuing with our example of toy manufacturing unit, sunk costs would refer to machinery cost that has been incurred.

TECHNIQUES OF COSTING

Marginal Costing

As per this technique, the management may decide the number of units to be produced. Suppose a toy unit is already producing 100 units of 'Dancing Monkey' toy, this technique will help the management understand that if the production is increased to 150, will it be profitable. In this technique, only the variable costs for additional units produced will be considered. Fixed costs are not taken into consideration as they do not vary with changes in production.

Standard Costing

In this technique of costing the costs incurred are compared to the predetermined cost of the product, process or project. The variances are analyzed to bring about cost-effectiveness.

Direct Costing

In this technique all the direct costs incurred for a particular product, process or project are charged to it and the indirect costs are written off to profit and loss.

Historical Costing

It is comparison of all costs incurred after the process is performed.

Uniform Costing

In this technique same costing practices are followed across certain units to facilitate comparison.

Absorption costing

This is a method of full costing. In this all costs are charged to the product, process or project.

IMPORTANT METHODS OF COSTING:

Unit costing: It is also called the single output costing. It is used in costing of products that are expressed in identical units and suitable for products that are manufactured by continuous activity.

Example: Cement manufacturing, Dairy, Mining etc.

Job costing: Under this method, costs are ascertained for each work order separately as each has its own specification and scope. Tailor made products also get covered by this type of costing.

Example: Repair of buildings, Painting etc

Contract costing: In this method costing is done for jobs that involve heavy expenditure and stretches over long period and across different sites. It is also called as terminal costing.

Example: Construction of roads and bridges, buildings etc

Batch costing: Through this method the costing is done for units that are produced in batches that are uniform in nature and design.

Example: Pharmaceuticals

Process costing: It is used for the products which go through different processes. Like in the process of manufacturing cloth, different processes are involved namely spinning, weaving and finished product. Each process gives an output that is a finished product in itself and can be sold. That is why; process costing is used to ascertain the cost of each stage of production

Service or operating costing : It is the method used for the costing of operating a service such as Public Bus, Railways, Nursing home. It is used to ascertain the cost of a particular service.

Multiple costing: When the output comprises different assembled parts like in televisions, cars or electronic gadgets, cost has to be ascertained for the component as well as the finished product. Such costing may involve different / multiple methods of costing.

Product Costing: Product costing methods are used to assign cost to a manufactured product. The main costing methods available are process costing, job costing and direct costing. Each of these methods apply to different production and decision environments.

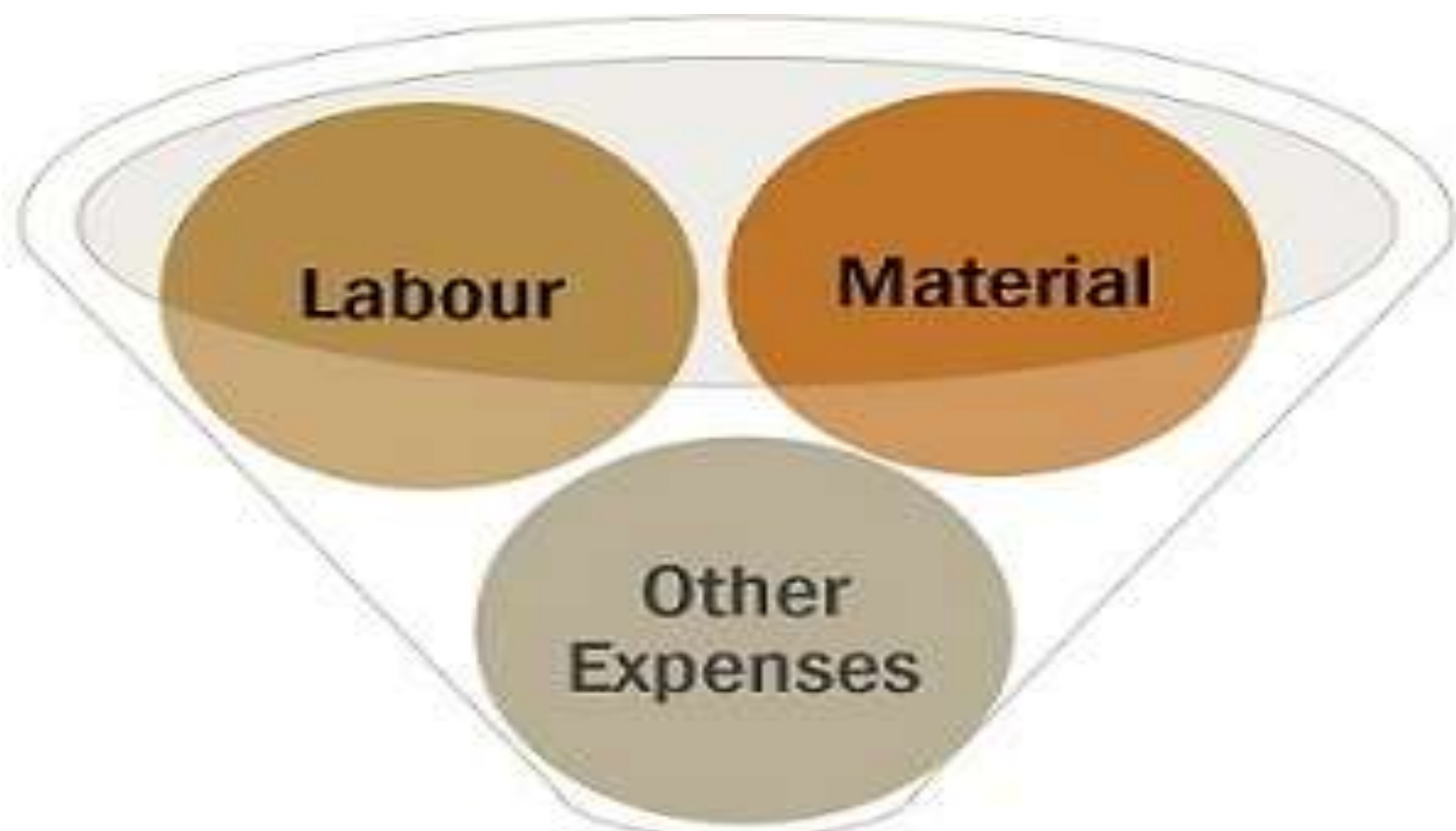
The main product costing methods are:

Job costing: This is the assignment of costs to a specific manufacturing job. This method is used when individual products or batches of products are unique, and especially when jobs are being billed directly to customers or are likely to be audited by customers.

Process costing: This is the accumulation of labor, material and overhead costs across departments or entities, with the total production cost then being allocated to individual units. Process costing is used when large quantities of the same product are manufactured, usually in long production runs.

Cost Classification

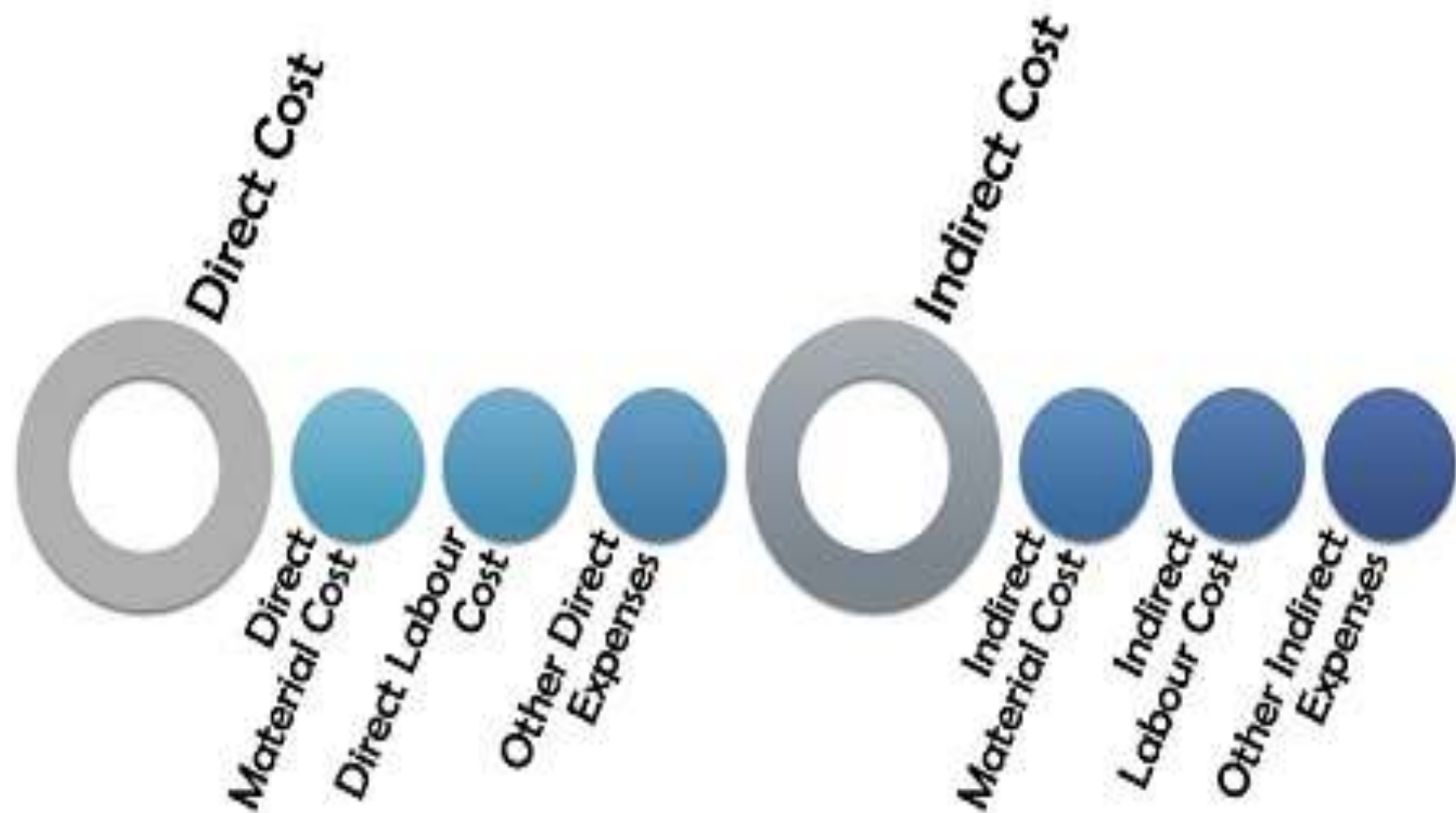
1. Cost Classification by Nature
2. Cost Classification by Relation to Cost Centre
3. Cost Classification by Functions
4. Cost Classification by Behaviour
5. Cost Classification by Management Decision Making
6. Cost Classification by Production Process
7. Cost Classification by Time



Cost Classification by Nature

- ❖ **Material:** Material cost is the cost of the raw material and its related cost such as procurement cost, taxes, insurance, freight inwards, etc.
- ❖ **Labour:** Labour cost is the salary and wages paid to the employees, i.e. permanent, temporary or contractual employees working in an organisation. It also includes PF contribution, bonus, commission, incentives, allowances, overtime pay, etc.
- ❖ **Other Expenses:** All the other overheads excluding material and labour comes under this head. Some of these are packaging, promotion, job processing charges, etc

Cost Classification by Relation to Cost Centre



- **Direct Cost:** Direct cost is the significant cost immediately associated with a production process. It can be seen as a prime cost for any business. It is sub-divided into direct material cost, direct labour cost and other direct expenses.
- **Indirect Cost:** Indirect cost is the cost which cannot be directly allocated to a particular process of production. It is a secondary cost and is majorly seen as of three types – indirect material cost, indirect labour cost and other indirect expenses.

Cost Classification by Functions

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graph TD; A[Cost Classification by Functions] --> B[Production]; A --> C[Administration]; A --> D[Selling]; A --> E[Distribution]; A --> F[Research and Development];
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Production

Administration

Selling

Distribution

**Research and
Development**

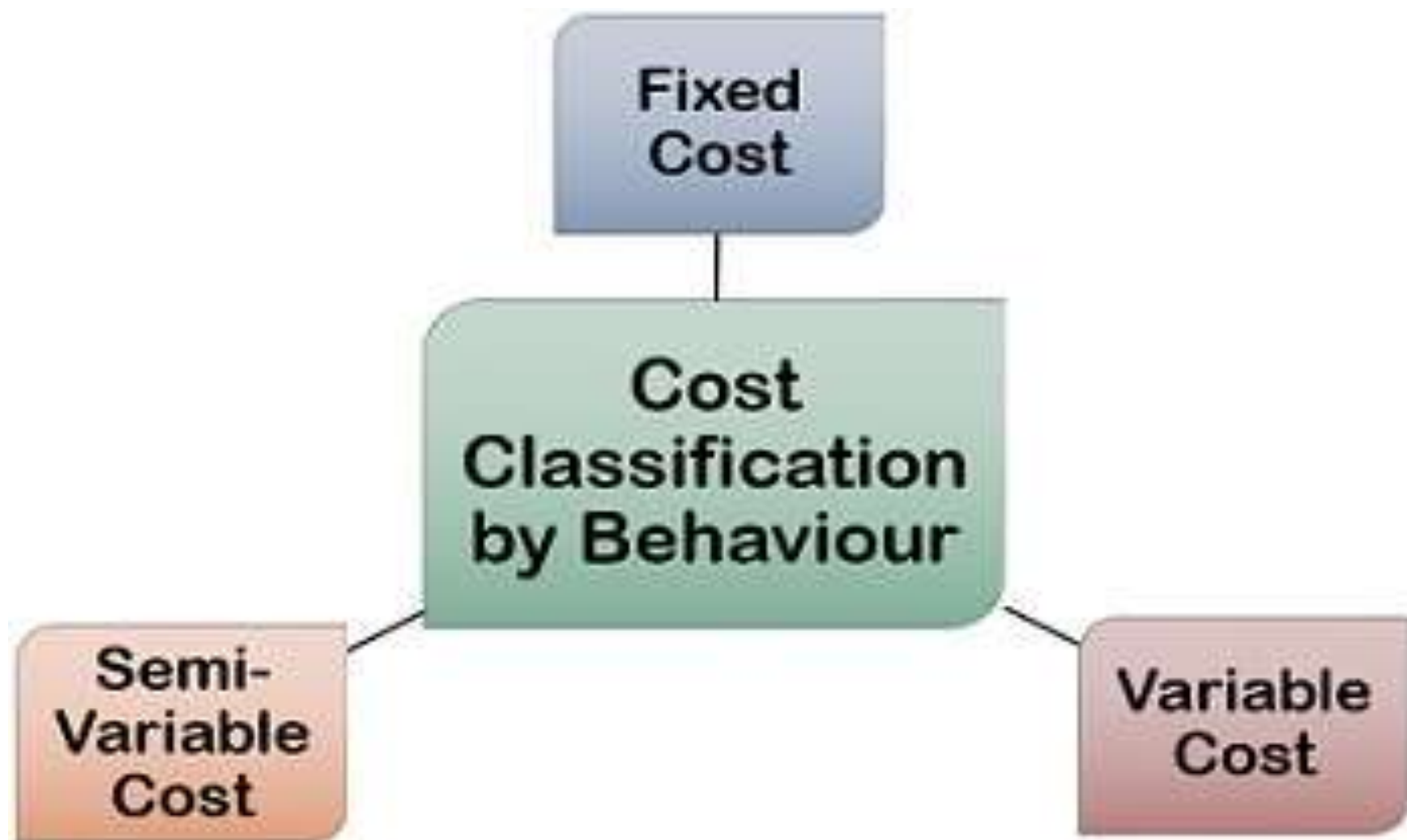
- **Production:** Production cost comprises of all the direct and indirect costs incurred in the production of goods and services.
- **Administration:** The costs involved in the management activities of an organization like electricity, stationery, telephone expenses, rent etc. These are also known as administrative overheads.
- **Selling:** The indirect costs incurred on the sales function of the goods and services like an advertisement, promotion, research, customer service, etc. are clubbed under selling cost.
- **Distribution:** Distribution cost refers to the cost incurred for making the goods or services available to the customers. These are warehousing, delivery service, transportation, etc.
- **Research and Development:** Research is essential to develop a new product or modify an existing one. The cost incurred on the research team, research implementation, findings, etc. comes under this category.

**Fixed
Cost**

**Cost
Classification
by Behaviour**

**Semi-
Variable
Cost**

**Variable
Cost**



- **Fixed Cost:** The cost which is hardly affected by the temporary change taking place in business activity is known as a fixed cost. It includes rent, [depreciation](#), lease, salary, etc.
- **Variable Cost:** The cost which changes proportionately with the change in production quantity or other business activity is termed under variable cost. Raw material, packaging, sales commissions, wages, etc. are variable costs.
- **Semi-Variable Cost:** The cost which is moderately influenced by the change in business activity is called semi-variable cost. It includes power consumption, maintenance cost, management cost, supervision cost, etc.

Cost Classification by Management Decision Making

Marginal Cost

Differential Cost

Opportunity Cost

Replacement Cost

Relevant Cost

Imputed Cost

Sunk Cost

Normal Cost

Abnormal Cost

Avoidable Cost

Un-avoidable Cost

- **Marginal Cost:** Marginal cost is the cost of producing an additional unit and its impact on the total cost of production.
- **Differential Cost:** When there is an increment or decrement in the cost of bulk production, the change in the cost of a single unit is also determined which is known as differential cost.
- **Opportunity cost :** The value of one or more products given up to acquire the desired product or service is known as opportunity cost. For instance; while choosing green tea, a person has to give up the value he must have derived from coffee or regular tea.
- **Replacement Cost:** When machinery or any other asset becomes obsolete or involve high maintenance cost, and simultaneously a better asset is available in the market which can replace it, then the cost involved in such substitution is known as replacement cost. For example; a transportation company needs to replace its trucks from time to time to avoid excessive repairing expenses.
- **Sunk Cost:** The cost which has been born by the organisation in the past and cannot be recovered at any stage of the business process is termed as a sunk cost. Freight inwards paid at the time of buying machinery has to be written off at the time of selling it.

- **Normal Cost**: The routine cost associated with the manufacturing of goods or services under usual circumstances is called a normal cost. It includes all direct expenses such as salary, material, rent, etc.
- **Abnormal Cost**: The cost that arises suddenly and unknowingly under unfavourable situations is known as abnormal cost. For instance; workers go on strike, theft or robbery, fire in the premises, etc.
- **Avoidable Cost**: Such costs are under the control of management and can be prevented as per the organisational need. For example; an enterprise upgrades its technology by installing self-operative machines to avoid the labour charges it pays.
- **Unavoidable Cost**: The cost which is pre-determined and inevitable is called an unavoidable cost.



- ✚ **Batch Cost:** The cost incurred while producing a whole lot comprising of identical products (batch) is known as batch cost. Each batch differs from the other, and the units lying under a batch are identified by their batch number. Pharmaceuticals, automobiles, electronic products are some of the examples.
- ✚ **Process Cost:** The cost incurred on performing different operations in a streamlined production process is termed as a process cost. By dividing the total cost of a process with the number of units produced, we can derive the process cost of a single unit or product.
- ✚ **Operation Cost:** The cost involved in a particular business function contributing to the production process is known as operation cost. It helps in regulating the mechanism of business activities by monitoring the cost incurred on each business operation.

- ✚ **Operating Cost:** Operating cost refers to the day to day expenses incurred by an organisation to ensure uninterrupted functioning of the business is known as an operating cost.
- ✚ **Contract Cost:** The cost of entering into a contract with a buyer or seller by mutually agreeing to the terms and conditions so mentioned is called a contract cost. It includes a bidding contract, price escalation contract, tenders, etc.
- ✚ **Joint Cost:** The combined cost involved in the production of two or more useful products simultaneously is known as the joint cost. For example; the cost of processing milk to get cottage cheese and buttermilk.

Historical Cost

Pre-determined Cost

**Cost
Classification
by Time**

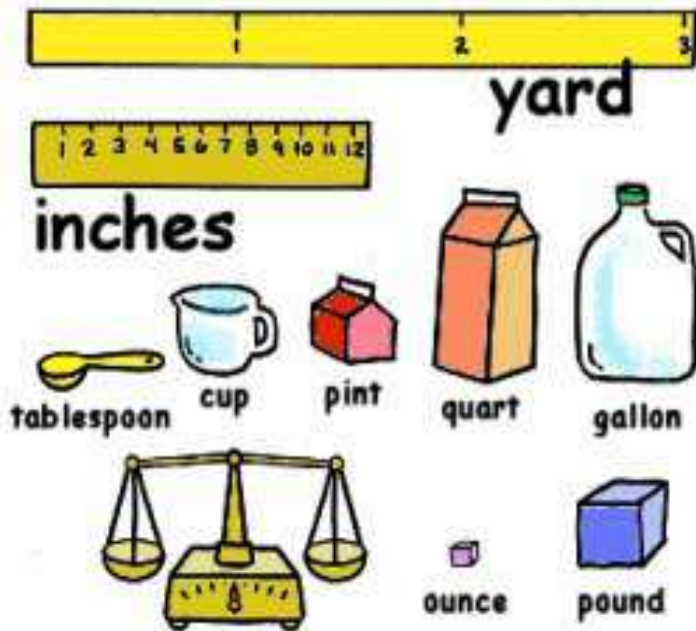
Standard Cost

Estimated Cost

- **Historical Cost:** Any actual cost ascertained and evaluated after it has been incurred, is termed a historical cost. It can be committed either on the production of goods and services or asset acquisition.
- **Pre-determined Cost:** The cost which can be identified and calculated before the production of goods and services based on the cost factors and data is called a pre-determined cost. It can be either a standard cost or an estimated cost.
- **Standard Cost:** An actual cost which is pre-determined as per certain norms and guidelines to provide as a base for cost control, is termed as a standard cost.
- **Estimated Cost:** The cost of business operation presumed on the grounds of experience is known as an estimated cost. It is merely based on assumptions and therefore considered to be less accurate to determine the actual cost.

What is Cost Unit?

A cost unit refers to the unit of quantity of product, service or time (or combination of these) in relation to which costs may be ascertained or expressed.



COST UNITS

WHAT IS COST UNIT? ←
FORMS OF ←
MEASUREMENTS

Sl. No	Cost Unit Basis	Types of Industries
1	Number	Automobile
2	Metre or Kilometre	Cable, Rope, Road Construction, Wire
3	Tonne	Iron and steel, Sugar, Cement, Mines and Quarries
4	Litre, Kilogram, Tonne	Chemicals
5	Cubic Metre	Gas, Casting
6	Square Metre	Metal Plating, Fabric Printing
7	Gross or Bag of Standard Weight	Nuts and Bolts
8	Kilo-watt hour	Power (Electricity)
9	Tonne-Kilometre, Passenger Kilometre	Transport
10	Thousand	Bricks

Definition of Cost Centre:

According to E. L. Kohler, a cost centre is “an organisational division, department or self-division, a group of machines, men or both. It includes any unit of activity into which a manufacturing plant or other operating organisation is divided for purposes of cost assignment and allocation”.

Similarly, according to the Terminology of CIMA, London, a cost centre “is a location, person or item of equipment or group of these, for which cost may be ascertained and used for the purpose of cost control.”

Types of Cost Centre:

- (a) **Personal Cost Centre:** When a Cost Centre deals with a person or group of persons, it is known as Personal Cost Centre.
- (b) **Impersonal Cost Centre:** When a Cost Centre deals with a location or equipment or both, it is called Impersonal Cost Centre.
- (c) **Production Cost Centre:** When a Cost Centre deals with a product/manufacturing work e.g. machine shop, it is called Production Cost Centre.
- (d) **Service Cost Centre:** When a Cost Centre deals with or is engaged in rendering services to the Production Cost Centre, it is called Service Cost Centre.
- (e) **Operation Cost Centre:** It is applicable in case of manufacturing concerns. It consists of machines or persons which follow similar activities.
- (f) **Process Cost Centre:** It is also applicable in case of manufacturing concerns. Process Cost Centre is applied in case of particular or specific process of a manufacturing enterprise.

Purposes of Cost Centre:

- (i) Cost Centre brings responsibility and, as such, it is also called Responsibility Centre. In other words, for controlling cost of a centre, the manager of that cost centre is, no doubt, responsible for the purposes.

- (ii) Cost Centre helps to recover the overhead expenses.

BASIS FOR COMPARISON	COST ACCOUNTING	FINANCIAL ACCOUNTING
Meaning	Cost Accounting is an accounting system, through which an organization keeps the track of various costs incurred in the business in production activities.	Financial Accounting is an accounting system that captures the records of financial information about the business to show the correct financial position of the company at a particular date.
Information type	Records the information related to material, labor and overhead, which are used in the production process.	Records the information which are in monetary terms.
Which type of cost is used for recording?	Both historical and pre-determined cost	Only historical cost.
Users	Information provided by the cost accounting is used only by the internal management of the organization like employees, directors, managers, supervisors etc.	Users of information provided by the financial accounting are internal and external parties like creditors, shareholders, customers etc.
Valuation of Stock	At cost	Cost or Net Realizable Value, whichever is less.
Mandatory	No, except for manufacturing firms it is mandatory.	Yes for all firms.

Time of Reporting	Details provided by cost accounting are frequently prepared and reported to the management.	Financial statements are reported at the end of the accounting period, which is normally 1 year.
Profit Analysis	Generally, the profit is analyzed for a particular product, job, batch or process.	Income, expenditure and profit are analyzed together for a particular period of the whole entity.
Purpose	Reducing and controlling costs.	Keeping complete record of the financial transactions.
Forecasting	Forecasting is possible through budgeting techniques.	Forecasting is not at all possible.

BASIS OF COMPARISON	COST ACCOUNTING	MANAGEMENT ACCOUNTING
Meaning	The recording, classifying and summarising of cost data of an organisation is known as cost accounting.	The accounting in which the both financial and non-financial information are provided to managers is known as Management Accounting.
Information Type	Quantitative.	Quantitative and Qualitative.
Objective	Ascertainment of cost of production.	Providing information to managers to set goals and forecast strategies.
Scope	Concerned with ascertainment, allocation, distribution and accounting aspects of cost.	Impart and effect aspect of costs.
Specific Procedure	Yes	No
Recording	Records past and present data	It gives more stress on the analysis of future projections.
Planning	Short range planning	Short range and long range planning
Interdependency	Can be installed without management accounting.	Cannot be installed without cost accounting.

Cost Sheet of _____ for the month of _____

Particulars	Details	Total Cost	Cost/ Unit
Direct Material (Raw Material Consumed):			
Opening Stock of Raw Material	X		
Add: Material Purchased	X		
Add: Carriage Inward	X		
	X		
Less: Closing Stock of Raw Material	(X)	X	X
Direct Labour		X	X
Direct Expenses		X	X
Prime Cost		X	X
Add: Factory Overhead:			
Indirect Material	X		
Indirect Labour (Wages)	X		
Factory Rent and Rates	X		
Power and Fuel	X		
Factory Lighting and Supervision	X		
Factory/Works Manager Salary	X		
Factory Water Supply	X		
Factory Insurance	X		
Factory Stationery	X		
Factory Cleaning			
Drawing Office Expenses	X		
Depreciation of Plant and Machinery	X		
Cost of Research and Equipment	X		
Other Factory Expenses	X		
	X		
Less: Sale of Scrap	(X)	X	X
		X	X
Add: Opening Stock of Work-in-Progress		X	X
		X	X
Less: Closing Stock of Work-in-Progress		(X)	X
Works Cost		X	X
Add: Office or Administration Overhead:			
Office Rent and Rates	X		
Office Lighting	X		
Office Stationery	X		
Depreciation and Repairs of Office Furniture	X		
Office Salaries	X		
Management Expenses	X		
Office Telephone and Postage Charges	X		
Legal Charges	X		
Bank Charges and Commission	X		
Office Cleaning	X		
Audit Fees	X		
Office Insurance	X		
Other Office Expenses	X		
		X	X
Cost of Production		X	X
Add: Finished Goods (Opening)		X	
		X	
Less: Finished Goods (Closing)		(X)	
Cost of Production of Goods Sold		X	X
Add: Selling and Distribution Overhead:			
Salesmen Salaries	X		
Salesmen Commission	X		
Showroom Expenses	X		
Showroom Rent and Rates	X		
Advertisement	X		
Sales Office Rent and Rates	X		
Travelling Expenses	X		
Warehouse Rent and Rates	X		
Warehouse Staff Salaries	X		
Depreciation and Repairs of Delivery Vehicle	X		
Carriage Outwards	X		
Debt Collection Charges	X		
Other Selling and Distribution Expenses	X		
		X	X
Total Cost / Cost of Goods Sold		X	X
Profit / Loss (difference of Sales and COGS)		X / (X)	X
Sales		X	X

Problem No. 1 Preparation of cost sheet

The accounts of Balu Manufactures Ltd. for the year ended 31st December 1988 show the following:

	Rs.
Stock of Material on 1.1.88	6,720
Materials Purchased	1,50,000
Materials returned to suppliers	2,000
Direct Labour	50,000
Direct Expenses	20,000
Factory Expenses	15,300
Office & Administrative Expenses	8,000
Selling & Distribution Expenses	7,900
Stock of Materials on 31.12.88	7,720
Profit	10,000

Find out:

- (a) Material Consumed (b) Prime Cost
(c) Works Cost (d) Cost of Production
(e) Total cost (f) Sales

Statement of Cost for the year ended 31.12.88

<i>Particulars</i>	<i>Rs.</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening Stock of Materials		6,720	
Add : Purchases of Material	1,50,000		
Less : Materials returned of Suppliers	2,000	1,48,000	
		1,54,720	
Less : Closing Stock of Materials		7,720	
RAW MATERIALS CONSUMED		1,47,000	
Direct Labour		50,000	
Direct Expenses		20,000	
PRIME COST			2,17,000
Factory Overhead			
Factory Expenses			15,300
WORKS COST			2,32,300
Office & Administration Overhead			
Office & Administration Expenses			8,000
COST OF PRODUCTION			2,40,300
Selling & Distribution Overhead			
Selling & Distribution Expenses			7,900
TOTAL COST/COST OF SALES			2,48,200
PROFIT			10,000
SALES			2,58,200

Problem No. 2 Preparation of cost sheet

Prepare a Cost Sheet for the year ended 31.3.86 from the following figures extracted from the books of Best Engineering Co.

Opening Stock:

(i) Raw Material 40,350, (ii) Work-in-Progress 15,000 (iii) Finished Stock 35,590.

Cost incurred during the period:

Materials purchased 2,50,000, Wages paid 2,00,000, Carriage inward 2,000, Consumable Stores 10,000, Wages of Storekeeper 7,000, Depreciation of Plant & Machinery 10,000, Materials destroyed by Fire 5,000, Repairs & Renewals 5,010, Office Manager's Salary 10,000, Salary to Office Staff 20,500, Printing & Stationary 10,000, Power 10,500, Lighting for Office Building 2,000, Carriage outward 3,000, Freight 5,000, Entertainment 2,500, Warehousing charges 1,500, Legal charges 2,000, Expenses for participating in Industrial exhibition-6,000.

Closing Stock:

(i) Raw material 35,000, (ii) Work-in-Progress 14,500, (iii) Finished Stock 40,030. Profit 25% on cost.

Cost Sheet of Best Engineering Co.,

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening Stock of Raw Materials	40,350	
Add : Purchases	2,50,000	
Add : Carriage inward	2,000	
Add : Freight	5,000	
	2,97,350	
Less : Materials destroyed by fire	5,000	
	2,92,350	
Less : Closing Stock of Raw Materials	35,000	
RAW MATERIALS CONSUMED	2,57,350	
Wages	2,00,000	
PRIME COST		4,57,350
Factory Overhead		
Consumable Stores	10,000	
Wages of Storekeeper	7,000	
Depreciation of Plant & Machinery	10,000	
Repairs & Renewals	5,010	
Power	10,500	
		42,510
		4,99,860
Add : Opening work-in-progress		15,000
		5,14,860
Less : Closing Work-in-Progress		14,500
WORKS COST / Factory cost		5,00,360
Office & Administrative Overhead		
Office Manager's Salary		10,000
Salary to Office Staff	20,500	
Printing & Stationery	10,000	
Light for Office Building	2,000	
Legal Charges	2,000	
		44,500
COST OF PRODUCTION		5,44,860
Add : Opening Finished Stock		35,590
		5,80,450
Less : Closing Finished Stock		40,030
COST OF GOODS SOLD		5,40,420

Selling & Distribution Overhead		
Carriage outward	3,000	
Entertainment	2,500	
Warehousing charge	1,500	
Expenses in Industrial Exhibition	6,000	
		13,000
COST OF SALES		5,53,420
PROFIT [25% ON 5,53,420]		1,38,355
SELLING PRICE		6,91,775

Problem No.3 Calculation of Prime cost

From the following particulars of a manufacturing concern, ascertain the Prime Cost:

	Rs.
Opening stock of raw materials	20,000
Closing stock of raw materials	30,000
Purchase of raw materials	1,05,000
Import duty paid on raw material purchased	15,000
Carriage Inward	5,000
Primary packing materials	3,000
Productive wages	95,000
Opening stock of work-in-progress at prime cost	17,000
Closing stock of work-in-progress at prime cost	10,000
Hire charge paid on plant	14,000
Other chargeable expenses	6,000

Solution**Statement showing the Prime Cost**

	Rs.	Rs.
Opening Stock of raw materials		20,000
<i>Add</i> : Purchase of raw materials	1,05,000	
<i>Add</i> : Import duty	15,000	
Carriage Inward	5,000	
Primary packing materials	3,000	1,28,000
		<hr/>
		1,48,000
<i>Less</i> : Closing Stock of raw materials		30,000
Raw materials consumed		<hr/>
		1,18,000
<i>Add</i> : Direct wages		95,000
<i>Add</i> : Direct Expenses		
Hire charges on plant	14,000	
Other chargeable expenses	6,000	20,000
		<hr/>
		2,33,000
<i>Add</i> : Opening Stock of W.O.P. at prime cost		17,000
		<hr/>
		2,50,000
<i>Less</i> : Closing Stock of W.I.P. at prime cost		10,000
PRIME COST		<hr/>
		2,40,000

Problem No.4 Calculation of Works cost

From the following information ascertain the Works Cost for the month of August 1997:

		Rs.
Stock of raw materials on 1.8.1997	-	40,000
Work-in-Progress on 1.8.1997	-	25,000
Purchase of raw materials	-	1,00,000
Carriage Inwards	-	10,000
Direct Wages	-	60,000
		Rs.
Cost of special drawing	-	15,000
Hire charge for machinery	-	12,000
Return of raw material	-	20,000
Carriage on return	-	3,000
Rent, rates and insurance of works	-	6,000
Cost of factory supervision	-	4,000
Sale of Scrap	-	500
Cost of rectification of defective works	-	1,500
Stock of raw materials on 31.8.1997	-	15,000
Stock of W.I.P. on 31.8.1997	-	12,000

Solution

Statement showing the Works Cost for the month of August 1997.

	Rs.	Rs.
Opening Stock of raw materials	40,000	
Add : Purchase	1,00,000	
	1,40,000	
Add : Carriage Inwards	10,000	
	1,50,000	
Less : Return of raw materials	20,000	
	1,30,000	
Less : Closing stock of raw materials	15,000	
Raw materials consumed		1,15,000
Add : Direct wages		60,000
Add : Chargeable Expenses :		
Cost of Special drawings	15,000	
Hire charge of machinery	12,000	27,000
PRIME COST		2,02,000
Add : Factory Overheads		
Rent, rates and insurance of works	6,000	
Cost of factory supervision	4,000	
Cost of rectification of defective works	1,500	
Carriage on return	3,000	
	14,500	
Add : Opening Stock of W.I.P.	25,000	
	39,500	
Less : Closing Stock of W.I.P.	12,000	
	27,500	
Less : Sale of Scrap	500	
		27,000
WORKS COST		2,29,000

Problem No.5 Preparation of Cost Sheet

The following particulars have been obtained from the cost records for the year 1997:

	Rs.
Materials used in manufacturing	1,10,000
Materials used in primary packing	20,000
Materials used in selling the product	3,000
Materials used in the factory	1,500
Productive Wages	30,000
Factory Supervision expenses	4,000
Materials used for office	2,500
Chargeable expenses	10,000
Indirect expenses – factory	2,000

	Rs.
Administration expenses	3,000
Depreciation on Factory Building	3,500
Depreciation on Office Building	1,500
Freight on materials purchased	5,000
Depreciation on Delivery Van	1,000
Salary paid to the driver of Delivery Van	3,600
Advertisement	2,000
Bad Debt	1,500

Assume that all products manufactured during the year have been sold to earn a profit of 20% on selling price.

Solution

Statement of Cost and Profit
for the year 1997

	Rs.	Rs.
Direct Materials		
Direct Materials used	1,10,000	
Materials used in primary packing	20,000	
Freight on materials purchased	5,000	
		1,35,000
Direct Labour		
Productive wages		30,000
Direct Expenses		
Chargeable expenses		10,000
PRIME COST		1,75,000
<i>Add :</i> Factory Overheads		
Materials used in factory	1,500	
Factory supervision expenses	4,000	
Factory indirect expenses	2,000	
Depreciation on factory building	3,500	11,000
WORKS COST		1,86,000
<i>Add :</i> Office and Administrative Overheads		

Materials used in office	2,500	
Administration expenses	3,000	
Depreciation on office building	1,500	7,000
COST OF PRODUCTION		1,93,000
<i>Add :</i> Selling Overheads		
Materials used in selling the product	3,000	
Advertisement	2,000	
Bad Debt	1,500	6,500
		1,99,500
<i>Add :</i> Distribution Overheads		
Depreciation on Delivery van	1,000	
Salary to driver of delivery van	3,600	4,600
COST OF SALES/TOTAL COST		2,04,100
<i>Add :</i> Profit @ 20% on sales i.e. 25% on cost		51,025
SALE PRICE		2,55,125

Working Note : When sale price is 100, cost is Rs. 80 and Profit is Rs. 20

$$\text{So, Profit} = \frac{\text{Cost} \times 100}{100 - 20} = \frac{2,04,100 \times 20}{80} = \text{Rs. } 51,025.$$

$$\text{or, } 25\% \text{ of Cost} = 2,04,100 \times \frac{1}{4} = 51,025$$

Problem No. 6 Preparation of Cost Sheet

Prepare cost sheet from the following information

	Rs.		Rs.
<u>Work in progress at the beginning</u>		Expenses on purchase	2000
At prime cost	51000	Manufacturing	84000
Manufacturing expenses	15000	expenses	
<u>Work in progress at the end</u>		Direct labour	171000
At prime cost	45000	Stock of raw	204000
Manufacturing expenses	9000	materials at the end	
Stock of raw materials	225000	Administrative	105000
Purchase of raw material	475000	expenses	
Sales	975000	Selling & distribution	35000
		expenses	

Cost sheet

Particulars	Rs.	Rs.
Opening stock of raw materials	275000	
Add: Purchase of raw materials	475000	
Add: Expenses on purchases	<u>2000</u>	
	702000	
Less : Closing stock of raw materials	<u>204000</u>	
Materials consumed		498000
Direct labour		<u>171000</u>
		669000
Add: Opening Work in progress at prime cost		<u>51000</u>
		<u>720000</u>
Less: Closing work in progress at prime cost		<u>45000</u>
Prime cost		675000

Manufacturing expenses		<u>84000</u>
		759000
Add: Opening work in progress at works cost (man.exp.)		<u>15000</u>
		774000
Less : Closing work in progress at works cost(man.exp.)		<u>9000</u>
Works cost		765000
Administrative expenses		<u>105000</u>
Cost of production		870000
Selling and distribution expenses		<u>35000</u>
Cost of sales		905000
Profit (balancing figure)		<u>70000</u>
Sales		<u>975000</u>

Problem No. 7 Preparation of Cost Sheet - Assignment

Prepare cost sheet from the following information for the year ended 31.12.2008

Particulars	1.1.2008 (Rs.)	31.12.2008 (Rs.)
Raw materials	100000	123500
Finished goods	71000	42000
Work in progress	31000	34000
Purchase of raw materials		88000
Direct wages		70000
Indirect wages		2500
Works expenses		37000
Administrative expenses		13000
Sale of factory scrap		2000
Selling and distribution expenses		15000
Sale of finished goods		275000

Problem No. 8 Preparation of Cost Sheet

Prepare cost sheet from the following information

Particulars	(Rs.)	Particulars	(Rs.)
Raw materials consumed	40000	Directors fees	6400
Indirect materials	9000	Legal expenses	3600
Wages traceable to job	15000	General expenses	1250
Wages to maintenance worker	7500	Gas & water	750
Lubricating oil	3750	Advertising	4900
Consumable stores	4250	Packing charges	2200
Repairs to plant & machinery	5100	Managers salary (2/3 factory , 1/3 office)	12000
Repairs to office building	1500	Interest received	1900
Postage	1200	Loss on sale of plant	4000
Audit fees	2800	Payment of sales tax	3100
Travelling expenses	2500	Sales	150000

Cost sheet

Particulars	Rs.	Rs.
Raw materials consumed		40000
Wages traceable to jobs		<u>15000</u>
Prime cost		55000
Factory overheads:		
Indirect materials	9000	
Wages to maintenance worker	7500	
Lubricating oil	3750	
Consumable stores	4250	
Repairs to plant & machinery	5100	
Gas and water	750	
Manager's salary Rs.12000x2/3	<u>8000</u>	<u>38350</u>
Works cost		93350

Administrative overheads:		
Repairs to office building	1500	
Postage	1200	
Audit fees	2800	
Directors fees	6400	
Legal expenses	3600	
General expenses	1250	
Managers salary Rs.12000x1/3	<u>4000</u>	
Cost of production		<u>20750</u>
		114100
Selling & Distribution overheads:		
Advertising	4900	
Packing charges	2200	
Travelling expenses	<u>2500</u>	
Cost of sales		<u>9600</u>
Profit (balancing figure)		<u>26300</u>
Sales		<u>150000</u>

Problem No. 9 Preparation of Cost Sheet

Prepare cost sheet from the following information

Particulars	(Rs.)	Particulars	(Rs.)
Inventories at the beginning		Salaries :	
Raw materials	16000	Works manager	62250
Finished goods	10500	General manager	57000
Inventories at the end		Sales manager	50000
Raw materials	12000	Lighting :	
Finished goods	7000	Factory	6500
Purchase of raw materials	3400	Office	5600
Expenses:		Showroom	4400
Direct	6250	Insurance :	
Factory	3750	Factory	3200
Office	5500	Office	2400
Selling	4500	Carriage :	
Productive wages	10000	Inwards	1250
Bad debts	1000	Outwards	1750
Discount allowed	1150	Transfer fees	3750
Good will written off	2500	Sales	300000

Cost sheet

Particulars	Rs.	Rs.
Opening stock of raw materials	16000	
Add: Purchase of raw materials	34000	
Carriage inwards	<u>1250</u>	
	51250	
Less : Closing stock of raw materials	<u>12000</u>	
Materials consumed		39250
Productive wages		10000
Direct expenses		<u>6250</u>
Prime cost		55500
Factory overheads:		
Factory expenses	3750	
Works manager's salary	62250	
Factory lighting	6500	
Insurance	<u>3200</u>	<u>75700</u>
Factory cost		131200
Administrative overheads:		
Office expenses	5500	
General manager's salary	57000	
Office lighting	5600	
Insurance	<u>2400</u>	<u>70500</u>

Cost of production		201700
Add: Opening stock of finished goods		<u>10500</u>
		212200
Less : Closing stock of finished goods		<u>7000</u>
Cost of goods sold		205200
Selling & Distribution overheads:		
Selling expenses	4500	
Sales manager's salary	50000	
Lighting of showroom	4400	
Carriage outwards	1750	
Bad debts	<u>1100</u>	<u>61650</u>
Cost of sales		266850
Profit (balancing figure)		<u>33150</u>
Sales		<u>300000</u>

Problem No. 10 Preparation of Cost Sheet

Prepare cost sheet from the following information

Particulars	(Rs.)	Particulars	(Rs.)
Materials purchased	100000	Plant and machinery	40000
Freight on purchase of material	2000	Office furniture	25000
Royalties	2700	Agents commission	3000
Opening stock of raw materials	20000	Demonstration expenses	2500
Direct wages	7500	Excise duty on production	2000
Indirect wages	1250	Administrative expenses	
Other materials	1000	5% on sales	
Direct accrued expenses	1500	Rent of warehouse	5000
Indirect accrued expenses	750	Tools consumed	1500
Closing stock of raw materials	15000	Normal idle time cost	800
Employees state insurance	4000	Sales	175000

Cost sheet

Particulars	Rs.	Rs.
Opening stock of raw materials	20000	
Add: Purchase of raw materials	100000	
Freight	<u>2000</u>	
	122000	
Less : Closing stock of raw materials	<u>15000</u>	
Materials consumed		107000
Direct wages		7500
Direct accrued expenses		<u>1500</u>
Prime cost		116000
Factory overheads:		
Indirect wages	1250	
Indirect accrued expenses	750	
Other materials	1000	
Employees state insurance	4000	
Tools consumed	1500	
Excise duty on production	2000	
Normal Idle time cost	800	
Royalties	<u>2700</u>	<u>14000</u>
Factory cost		130000

Administrative overheads - Rs.175000x5/100		<u>8750</u>
Cost of production		138750
Selling & Distribution overheads:		
Agents commission	3000	
Demonstration expenses	2500	
Rent of warehouse	<u>5000</u>	<u>10500</u>
Cost of sales		149250
Profit (balancing figure)		<u>25750</u>
Sales		<u>175000</u>

Problem No. 11 Preparation of Cost Sheet - Assignment

Prepare cost sheet from the following information

Particulars	1.4.2018 (Rs.)	30.04.2018 (Rs.)
Raw materials	26000	15000
Work in progress	15000	10000
Finished goods	40000	51000
Purchase of raw materials		174000
Wages:		
Direct		73000
Indirect		17000
Rent & Rates:		
Factory		24800
Office		18750
Warehouse		10500
Sales		580000

Salaries :**Factory****55500****Office****50250****Salesmen****47750****Expenses:****Direct****18500****Indirect****16200****Depreciation :****Plant and machinery****14000****Office building****12000****Delivery van****7500****Income tax****4500****Dividend****6000****Debenture interest****5400**

Problem No. 12 Preparation of Cost Sheet

Prepare cost sheet from the following information

Particulars	(Rs.)	Particulars	(Rs.)
Materials used in manufacturing	30000	Storage of raw materials	1200
Materials used in primary packing	5000	Administrative expense	7000
Materials used in factory	4000	Donations	1800
Materials used in selling	2000	Loss of materials- breakage	250
Materials used in office	1500	Property tax on fact. building	1000
Labour in production	10000	Counting house salary	750
Labour for supervision	1000	Branch expense	3000
Normal loss of materials	750	Insurance (office)	4500
Canteen expenses	1250	Insurance – finished stock	2250
After sales expenses	500	Cash discount	400
Packing and distribution	600	Transfer to sinking fund	1600
Expenditure on sales depots	400	Profit 20% on selling price	

Cost sheet

Particulars	Rs.	Rs.
Materials used in manufacturing	30000	
Materials used in primary packing	5000	
Labour in production	<u>10000</u>	
Prime cost		45000
Factory overheads:		
Materials used in factory	4000	
Labour for supervision	1000	
Normal loss of materials	750	
Canteen expenses	1250	
Storage of raw materials	1200	
Property tax on fact. Building	<u>1000</u>	<u>9200</u>
Factory cost		54200
Administrative overheads:		
Counting house salary	750	
Insurance – office	4500	
Materials used in office	<u>1500</u>	<u>6750</u>
Cost of production		60950

Selling and distribution overheads:		
Materials used in selling	2000	
After sales expenses	500	
Packing & Distribution	600	
Expenditure on sales depots	400	
Branch expenses	3000	
Insurance – finished stock	<u>2300</u>	<u>8800</u>
Cost of sales		69750
Profit (69750x20/80)		<u>17438</u>
Sales		<u>87188</u>

Problem No. 13 Preparation of Cost Sheet

Prepare cost sheet from the following information

Particulars	(Rs.)
Direct materials	200000
Factory expenses	120000
Prime cost	410000
Office expenses	90000
10% of the output is in stock	
Sales	650000

Cost sheet

Particulars	Rs.
Direct materials	200000
Direct wages (balancing figure)	<u>210000</u>
Prime cost	410000
Factory overheads	<u>120000</u>
Works cost	530000
Administrative overheads – office expenses	<u>90000</u>
Cost of Production	620000
Less : Closing stock of finished goods- $620000 \times 10/100$	<u>62000</u>
Cost of sales	558000
Profit (balancing figure)	<u>92000</u>
Sales	<u>650000</u>

Problem No. 14 Preparation of Statement of Cost and profit

Prepare statement of cost and profit from the following information

Particulars	(Rs.)
Opening stock of raw materials	10000
Purchase of raw materials	40000
Materials returned to supplier	2000
Closing stock of raw materials	8000
Direct wages	20000
Works on cost 25% on wages	
Office on cost 20% on works cost	
Selling on cost 10% on works cost	
Profit 10% on cost	

Statement of cost and profit

Particulars	Rs.	Rs.
Opening stock of raw materials	10000	
Add: Purchase of raw materials	<u>40000</u>	
	50000	
Less : Materials returned to stores	<u>2000</u>	
	48000	
Less : Closing stock of raw materials	<u>8000</u>	
Materials consumed		40000
Direct wages		<u>20000</u>
Prime cost		60000
Works on cost $25/100 \times 20000$		<u>5000</u>
Works cost		65000
Office on cost $20/100 \times 65000$		<u>13000</u>
Cost of Production		78000
Selling on cost $10/100 \times 65000$		<u>6500</u>
Cost of sales		84500
Profit $10/100 \times 84500$		<u>8450</u>
Sales		<u>92950</u>

Problem No. 15 Preparation of Cost Sheet

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

Raw materials consumed Rs.80000

Direct wages Rs.48000

Machine hours worked 8000 hours

Machine hour rate Rs.4

Office overhead 10% on works cost

Selling overheads Rs.1.50 per unit

Units produced 4000

Units sold 3600 at Rs.50 each

Prepare a cost sheet and show (a) Cost per unit

(b) Profit for the period

Cost sheet for the month of April

Particulars	Total cost Rs.	Cost p.u. Rs.	4000 Units produced
Raw materials consumed	80000	20.00	80000/4000
Direct wages	<u>48000</u>	<u>12.00</u>	48000/4000
Prime cost	128000	32.00	
Factory overheads - 8000hours x Rs.4	<u>32000</u>	<u>8.00</u>	32000/4000
Works cost	160000	40.00	
Office overheads – 10/100x160000	<u>16000</u>	<u>4.00</u>	16000/4000
Cost of Production	176000	44.00	
Less : Closing stock of finished goods- (4000-3600units = 400 units x Rs.44)	<u>17600</u>	--	
Cost of goods sold	158400	44.00	
Selling overheads – 3600 units XRs.1.50	<u>5400</u>	<u>1.50</u>	Given
Cost of sales	163800	45.50	
Profit (balancing figure)	<u>16200</u>	<u>4.50</u>	Bal.fig.
Sales 3600 unitsxRs.50	<u>180000</u>	<u>50.00</u>	Given

Problem No. 16 Preparation of Cost Sheet - Assignment

Mr. Gopal furnishes the following data relating to the manufacture of a standard product during the month of April.

Raw materials consumed Rs.15000

Direct wages Rs.9000

Machine hours worked 900 hours

Machine hour rate Rs.5

Administrative overhead 20% on works cost

Selling overheads Rs.0.50 per unit

Units produced 18000

Units sold 17100 at Rs.4 each

Prepare a cost sheet and show (a) Cost per unit

(b) Profit for the period

UNIT II

Material control is a systematic control over purchasing, storing and consumption of materials, so as to maintain a regular and timely supply of materials, at the same time, avoiding overstocking.”

“Material control refers to the management function concerned with acquisition, storage, handling and use of materials so as to minimise wastage and losses, derive maximum economy and establish responsibility for various operations through physical checks, record keeping, accounting and other devices.”

In simple words, material control refers to the various measures adopted to reduce the amount of loss of materials at the time of receiving, storing and issuing the raw materials. Material control in practice is exercised through periodical records and reports relating to purchase, receipt, inspection, storage and issuing direct and indirect materials. Proper control over material can contribute substantially to the efficiency of a business.

Objectives of Materials Control:

- (a) To enable uninterrupted production: The main object of material control is to ensure smooth and unrestricted production. Production stoppages and production delays cause substantial loss to a concern.
- (b) To ensure requisite quality of materials: The quality of finished products depends mainly on the quality of raw materials used. If quality of the raw materials is not up to desired standards, the end product will not be of desired quality which affects the sale of the product in the market resulting in loss of profits as well as goodwill of the concern. It is of vital importance to exercise strict control and supervision over the purchases, storage and handling of materials.
- (c) To minimise wastage: The loss of material may occur on account of rust, dust, dirt or moisture, bad and careless handling of materials, poor packing and many other reasons. The causes responsible for such losses must be brought to light and utmost efforts should be made to minimise the wastage of raw materials. This is possible only by introducing an efficient materials control system.

(d) To fix responsibility: A proper system of materials control also aims at fixing responsibility of operating units and individuals connected with the purchase, storage and handling of materials.

(e) To provide information: Another objective of materials control is to provide accurate information regarding material cost and inventory whenever needed by management.

Necessity and importance of material control:

1. For keeping the stock of raw materials within limits in the stores i.e., to avoid overstocking and understocking of raw materials, materials control is significant.
2. It ensures proper storage of materials. For the proper preservation and safety of materials, adequate storage facilities are to be provided. With the help of proper storing of materials, quantity of materials as and when required can be issued to various jobs.
3. For knowing proper cost of production, control over materials is indispensable.
4. Certain techniques and methods are developed under the system of materials control thereby ensuring optimum utilisation of materials.
5. In order to undertake continuous checking of materials, the necessity of a proper system of materials control cannot be ignored.
6. A well managed system of materials control ensures the availability of different kinds of materials without delay.

Advantages of Material Control

1. Materials control eliminates wastage in use of raw materials and supplies in course of purchase, storage, handling and use.
2. It ensures uninterrupted flow of right quality and quantity of materials to the production department.
3. It reduces the risk of fraud and theft.
4. It facilitates the preparation of various monthly financial statements.
5. The valuation of materials is very easy.
6. It requires minimum amount of capital to buy materials.
7. It fixes the responsibility on the part of the employers who are handling the materials at the maximum.

Essentials of Material Control:

1. **Co-Ordination:** Effective control of material requires effective co-ordination among the departments involved in purchasing – receiving, and inspection, storage, production, sales and accounting departments so that adequate materials are available for continuous production and sales. At the same time excessive investment in materials and over stocking are avoided.
2. **Centralised Purchasing:** In order to economise the buying and to avoid reckless buying of raw materials the purchasing function is to be centralised.
3. **Proper scheduling of materials requirements** ensures availability of materials at the right time.
4. **Classification and codification of material** leads to easy identification and proper control of materials.
5. **Receipt of Materials:** Checking and inspection of material by receiving department ensure correct quantity and quality of material as ordered by the organisation.
6. **Usage of Forms:** Standard forms are to be designed and used for purchase requisition, purchase order, receiving of materials, requisition of materials and transfer of material from jobs to stores or to other jobs.
7. **Storage of materials** should be entrusted to a qualified store keeper to plan effective storage and avoid losses due to obsolescence, pilferage and theft.

8. Issue of Materials: A good method of issue of materials to various jobs, processes and orders should be devised to ensure delivery of right material at the right time and right quantity and quality for smooth flow of production.
9. Stock Taking: Perpetual inventory should be followed for stock verification to reveal differences in stock due to pilferage theft and wastage. Moreover perpetual inventory system avoids closing down of factory for stock verification and valuation.
10. Levels of stocks are to be maintained in the form of reorder level, maximum level and minimum level to avoid shortage and over stocking of materials.
11. Economic ordering quantity is to be operated for each type of materials to optimise the cost of buying and storage.
12. Pricing of Issues: A suitable method of pricing is to be followed for correct, valuation of material cost of jobs, orders, processes and valuation of closing stocks.
13. Control of Materials during the Production Process: Proper Accounting and records are to be maintained to avoid wastage of materials during consumption.
14. Suitable reporting system helps management to take decisions regarding investment in materials and avoidance of obsolete, dormant and slow moving materials.

What is a perpetual inventory system?

A perpetual inventory system is a method of inventory management that records real-time transactions of received or sold stock through the use of technology – generally considered a more efficient method than a periodic inventory system.

What are the 2 types of inventory systems?

There are two main types of inventory systems, the perpetual inventory system and the periodic inventory system. The main difference between the two systems is how often inventory data is updated

Advantages of Perpetual Inventory Control

1. Quick valuation of closing stock: On account of continuous stock taking, the value of closing stock can be known at any time during the year. It greatly facilitates the preparation of profit and loss account and balance sheet at the end of the financial period.
2. Lesser investment in materials: By introducing a system of perpetual inventory control, a regular check on the receipt and issue of materials and stores is undertaken. This considerably reduces the investment in materials and storage expenses are also minimised.
3. Helpful in formulating proper purchase policies: A storekeeper can easily know the time when the quantity of materials will be required by each department of the factory (as various levels of each type of material are clearly determined). All this information is very useful in formulating proper purchase policies.

4. Immediate detection of theft and leakages etc: With the help of a properly planned system of perpetual inventory control, wastages, leakages and thefts of materials are at once brought to light and causes for such discrepancies can be known without delay,
5. Adequacy of working capital: The system ensures an effective control over the storing, issuing and using of materials. This leads to avoidance of unnecessary locking up of capital in stock. This makes available adequate supply of working capital which can be applied in other profitable spheres of the concern.
6. Beneficial in ascertaining efficiency of stores organisation: Perpetual inventory control system acts as an important instrument to ascertain efficiency and working of stores in a production undertaking as it ensures continuous check on the working and operations of stores. Besides the above mentioned advantages, a proper system of perpetual inventory control ensures many other advantages viz., ensuring timely replenishment of fresh stock (materials), stores records are maintained up-to-date, fixing percentage of normal loss by exercising strict control over wastages and losses. Moreover, business operations need not be closed on account of yearly stock taking.

Bin card

Bin card is the record maintained under the perpetual inventory system by the stores department and shows the quantities of materials received, issued and balance in hand after each receipt and issue. It is also known as stock card or bin tag. ... It records only quantity of materials not the value

Bin card is the statement of all the receipts and issue of the stock from the store department. It is also called stock card or bin tag. It is the responsibility of the store keeper to write every in and out of stock from the store. The physical stock count and the stock quantity reported according to the bin card should be equal; otherwise internal audit department will have the right to investigate the matter with management.

Stores Ledger

A stores ledger is a manual or computer record of the raw materials and production supplies stored in a production facility. It is maintained by the person responsible for these assets, such as the warehouse manager

Difference between Bin Card and Stores Ledger

Bin Card	Stores Ledger
<ol style="list-style-type: none">1. It is used only to record receipts and issues of quantity and the balance therein.2. It is maintained by the store in-charge or store keeper.3. It is kept inside the store department.4. It is updated as and when receipts and issues are made in the store department.5. Transactions are updated individually because at every point of time, store keeper needs to be aware of the actual position of the stock.	<ol style="list-style-type: none">1. Stores ledger is used to record both quantity and the amount of receipts and issues.2. It is maintained by the costing accounting department of the entity.3. It is kept outside the store department or at a place where store keeper has no access.4. It is updated when the costing department gets the proper documents from the relevant department normally from store department.5. It is normally updated after a certain period and one entry is posted for similar items.

What is ABC analysis?

In materials management, ABC analysis is an inventory categorization technique. ABC analysis divides an inventory into three categories—"A items" with very tight control and accurate records, "B items" with less tightly controlled and good records, and "C items" with the simplest controls possible and minimal records.

Meaning of ABC Analysis:

For selective inventory control, three classes of materials and not more than that have been found to be convenient. This is known in general as the ABC Classification. The alphabets A, B & C stand for the three different classes and it is popularly known as Always Better Control.

ABC analysis is a basic analytical management tool. The greatest effort for the greatest results is ultimate yield of such analysis of materials. There are areas in material management which need selective control such as inventory, criticality of items, obsolete stocks, purchasing order, receipt of materials, inspection, store-keeping and verification of bills.

The annual consumption analysis on the basis of money value indicates that about 10 percent of the high value items account for a substantial portion of about 75 percent of the total consumption value. There are vital "A" basis; 70 percent of the total number of items are trivial ; there are bottom items accounting for 10 percent of the consumption value, and termed as "C" items. In between 'A' and 'C' items—between top and bottom—the items are known as 'B' category items.

Objectives of ABC Analysis:

The ultimate objective of ABC analysis is to secure economy through efficient materials management. It has also the object of developing policy guide lines for selective control. Confronted with a huge number of items when the material management is baffled to which to give attention, the ABC analysis helps the managements to discriminate items and concentrate on the most important items first, then on the second grade items and then on the rest — the third grade.

This graded attention to the graded material is not only scientific but also very much pragmatic for its due weightage to materials on the basis of their consumption value. The rigorous procedure in regard to 'A' items ensures better “materials planning, forecasts, ordering, review, record, postings, revisions, lead time analysis, safety stock, material consumption control, purchase budget, delivery schedule, value analysis follow-up, efforts, physical stock verifications, receipt issue, stores accounting and inspection — G. krisnan & Sundareshan.” The objective of securing overall efficiency in materials management is then assured through ABC analysis.

Limitations of ABC Analysis:

ABC analysis suffers from certain limitations. It is not fully effective without standardisation and codification. ABC analysis is based on gradation, programme of the material being the main criterion, that is by V.E.D — Vital, Essential and Desirable.

Even some items with less monetary value may be vital for the plant and may need special attention. If the inventory position is analysed according to the value i.e., XYZ analysis, the result of ABC and ABC analyses will be different depending upon the nature of obsolete items. The ABC analysis needs periodical review and updating.

Some very common may become vital as we find in case of diesel oil during power crisis. The limitations in a system are quite likely to exist; but what is needed is to overcome them after being guarded against any pitfall.

ADVANTAGES

- ❑ It gives the management a structured view of all the inventory items with their quantum and value.
- ❑ It allows the company to control items, which require substantial working capital.
- ❑ Since it lowers focus on less essential items, this helps to save unnecessary staff and storage expenses.
- ❑ It helps to keep track of the inventory and ensures optimum stock at all times.
- ❑ It helps in improving the stock turnover ratio because of the systematic control of inventories.
- ❑ A company can maintain items in Category C without compromising on the relevant items.
- ❑ This inventory management technique helps with cycle counting systems. For instance, it helps the manager to decide the items to count once a quarter, or once every six months, or once in a year and so on.

Types of Stock levels of Inventory

Minimum Level - The minimum level of stock refers to the minimum quantity of inventory that should be always maintained within the business premises. It is also termed as safety level or precautionary level of inventory as this quantity is must to be maintained always to keep the organization functioning. If the stock level falls below this point, then the organization will stop working due to a shortage of materials.

Minimum level of inventory = (Maximum usage × Maximum lead time) –
(Average usage × Average lead time)

OR

Minimum Level of inventory = Re-order level – (Average usage × Average lead time)

Maximum Level - The maximum level of stock refers to the maximum quantity of inventory a firm can hold and cannot exceed this level. Any quantity of stock beyond this level will be termed as overstocking which will have adverse effects on firm and results in high material cost. The maximum level is decided considering various factors like availability of capital and storage facilities, rate of consumption of materials, availability of materials, fluctuations in material price, the possibility of fashion change, etc.

The maximum level of inventory = Reordering Level + Reordering Quantity – (Minimum Consumption x Minimum Reordering period)

Average Stock Level - The average stock level refers to the average quantity of stock held by companies for a given period of time. It offers a balanced solution and therefore is calculated and maintained by many firms. The average stock level is a level that is above the minimum level and below the maximum level.

Average Stock Level = Minimum stock Level + $1/2$ of Reorder Quantity.

Danger Level - Danger stock level is one where the issue of material is temporarily stopped. It is an alarming situation for the organization and should always be avoided. If a stock level approaches danger level which is below a minimum level, management should take immediate action to acquire the required materials in less time.

Danger Level of inventory = Average Consumption x Maximum reorder period for emergency purchases.

Re-Ordering Level- The re-ordering level is a point at which the company should start a new manufacturing run or place a new order with the supplier to procure materials. In simple words it is a level at which purchase order is place. It is a level that is fixed in between the minimum and maximum levels of inventory. Identifying the right reorder level is a must to avoid any understocking or overstocking. A purchase order is put before the stock reaches the minimum stock level.

Reorder level or Ordering level = Maximum rate of consumption × Maximum reorder period.

What Is Economic Order Quantity (EOQ)?

Economic order quantity (EOQ) is the ideal order quantity a company should purchase to minimize inventory costs such as holding costs, shortage costs, and order costs. This production-scheduling model was developed in 1913 by Ford W. Harris and has been refined over time.

$$\text{EOQ} = \sqrt{2AO/C}$$

A = ANNUAL CONSUMPTION IN UNITS

O = ORDERING AND RECEIVING COST PER ORDER

C = COST OF CARRYING INVENTORY PER UNIT PER ANNUM

Methods of Pricing Material Issues:

1. Actual Cost Method
2. First-In First-Out (FIFO) Method
3. Last-In First-Out (LIFO) Method
4. Highest-in First-Out (HIFO) Method
5. Simple Average Cost Method
6. Weighted Average Cost Method
7. Periodic Average Cost Method
8. Standard Cost Method
9. Replacement Cost Method
10. Next in First Out (NIFO) Method
11. Base Stock Method.

Problem No. 1 – Stock levels

From the following information, calculate

(i) Maximum level (ii) Minimum level (iii) Reorder level

Minimum consumption	240 units per day
Normal consumption	300 units per day
Maximum consumption	420 units per day
Reorder quantity	3600 units
Reorder period	10 – 15 days
Normal order period	12 days

Reorder level = Maximum consumption x Maximum reorder
period

$$= 420 \text{ units} \times 15 \text{ days} = 6300 \text{ units}$$

Minimum level = Reorder level – (Normal consumption x
Normal reorder period)

$$= 6300 \text{ units} - (300 \text{ units} \times 12 \text{ days})$$

$$= 6300 - 3600 = 2700 \text{ units}$$

Maximum level = Reorder level + Reorder quantity –
(Minimum consumption x Minimum reorder period)

$$= 6300 \text{ units} + 3600 \text{ units} - (240 \text{ units} \times 10 \text{ days})$$

$$= 9900 - 2400 = 7500 \text{ units}$$

Problem No. 2 – Stock levels

From the following information, calculate

(i) Maximum level (ii) Minimum level (iii) Reorder level

Minimum consumption	60 units per day
Normal consumption	100 units per day
Maximum consumption	130 units per day
Reorder quantity	5000 units
Reorder period	25 – 30 days

Reorder level = Maximum consumption x Maximum reorder
period

$$= 130 \text{ units} \times 30 \text{ days} = 3900 \text{ units}$$

Minimum level = Reorder level – (Normal consumption x
Normal reorder period)

Normal reorder period = $25+30 \text{ days}/2 = 27.5 \text{ days}$

$$= 3900 \text{ units} - (100 \text{ units} \times 27.5 \text{ days})$$

$$= 3900 - 2750 = 1150 \text{ units}$$

Maximum level = Reorder level + Reorder quantity –
(Minimum consumption x Minimum reorder period)

$$= 3900 \text{ units} + 5000 \text{ units} - (60 \text{ units} \times 25 \text{ days})$$

$$= 8900 - 1500 = 7400 \text{ units}$$

Problem No. 3 – Stock levels

From the following information, calculate

- (i) Maximum level (ii) Minimum level (iii) Reorder level
(iv) Danger level

Minimum consumption	100 kgs per day
Normal consumption	120 kgs per day
Maximum consumption	150 kgs per day
Reorder quantity	1500 kgs
Reorder period	10 – 15 days
Normal order period	12 days
Time for emergency supplies	3 days

Reorder level = Maximum consumption x Maximum reorder
period

$$= 150 \text{ kgs} \times 15 \text{ days} = 2250 \text{ kgs.}$$

Minimum level = Reorder level – (Normal consumption x
Normal reorder period)

$$= 2250 \text{ kgs} - (120 \text{ kgs} \times 12 \text{ days})$$

$$= 2250 - 1440 = 810 \text{ kgs.}$$

Maximum level = Reorder level + Reorder quantity – (Minimum
consumption x Minimum reorder period)

$$= 2250 \text{ kgs} + 1500 \text{ kgs} - (100 \text{ kgs} \times 10 \text{ days})$$

$$= 3750 - 1000 = 2750 \text{ kgs}$$

Danger level = Minimum consumption x Emergency delivery time

$$= 100 \text{ kgs} \times 3 \text{ days} = 300 \text{ kgs.}$$

Problem No. 4 – Stock levels

Two components A & B are used as follows:

Normal usage	50 units each per week
Minimum usage	25 units each per week
Maximum usage	75 units each per week
Reorder quantity	A = 300 units; B = 500 units
Reorder period	A = 4 – 6 weeks B = 2 – 4 weeks

Calculate for each component

- (i) Maximum level (ii) Minimum level (iii) Reorder level (iv) Average stock level

Reorder level = Maximum consumption x Maximum reorder
period

$$A = 75 \text{ units} \times 6 \text{ weeks} = 450 \text{ units}$$

$$B = 75 \text{ units} \times 4 \text{ weeks} = 300 \text{ units}$$

Minimum level = Reorder level – (Normal consumption x
Normal reorder period)

$$A = 450 \text{ units} - (50 \text{ units} \times 5 \text{ weeks} (4+6/2)) = 450-250 = 200 \text{ units}$$

$$B = 300 \text{ units} - (50 \text{ units} \times 3 \text{ weeks} (2+4/2)) = 300-150 = 150 \text{ units}$$

Maximum level = Reorder level + Reorder quantity – (Minimum consumption x
Minimum reorder period)

$$A = 450 + 300 \text{ units} - (25 \text{ units} \times 4 \text{ weeks}) = 750 - 100 = 650 \text{ units}$$

$$B = 300 + 500 \text{ units} - (25 \text{ units} \times 2 \text{ weeks}) = 800 - 50 = 750 \text{ units}$$

Average stock level = Maximum level + $\frac{1}{2}$ of Reorder quantity

$$A = 200 \text{ units} + \frac{1}{2} \times 300 \text{ units} = 350 \text{ units}$$

$$B = 150 \text{ units} + \frac{1}{2} \times 500 \text{ units} = 400 \text{ units}$$

Problem No. 5 – Stock levels – Assignment

Two types of materials X & Y are used in a factory as follows:

Normal usage	600 units each per week
Minimum usage	300 units each per week
Maximum usage	900 units each per week
Reorder quantity	X = 4800 units; Y = 7200 units
Reorder period	X = 4 – 6 weeks Y = 2 – 4 weeks

Calculate for each material

- (i) Maximum level (ii) Minimum level (iii) Reorder level (iv) Average stock level

Problem No. 6 – Economic order quantity

Calculate Economic Order Quantity

Annual requirements 3600 kgs.

Cost of placing and receiving one order Rs.10

Annual carrying and storage cost Rs.20 per unit

Solution :

$$\mathbf{EOQ} = \sqrt{2AO/C}$$

A= Annual consumption = 3600 kgs

O = Cost of placing an order = Rs.10

C= Carrying cost p.u. = Rs.20

$$\mathbf{EOQ} = \sqrt{2 \times 3600 \text{ kgs.} \times \text{Rs.}10 / \text{Rs.}20}$$

= 60 kgs.

Problem No. 7 – Economic order quantity

Calculate Economic Order Quantity

Consumption during the year	600 units
Ordering cost	Rs.12
Carrying cost	20%
Price per unit	Rs.20

Solution :

$$\mathbf{EOQ} = \sqrt{2AO/C}$$

A= Annual consumption = 600 units

O = Ordering cost = Rs.12

C= Carrying cost p.u. = $20/100 \times \text{Rs.}20 = \text{Rs.}4$

$$\begin{aligned}\mathbf{EOQ} &= \sqrt{2 \times 600 \text{ units} \times \text{Rs.}12 / \text{Rs.}4} \\ &= 60 \text{ units}\end{aligned}$$

Problem No. 8 – Economic order quantity

A Ltd., manufactures product X and provides the following information,
Calculate EOQ.

Monthly demand	2000 units
Ordering cost	Rs.180
Annual Carrying cost	12%
Price per unit	Rs.25 per kg
Raw material required per unit of finished product	2 kg.

Solution :

$$\mathbf{EOQ} = \sqrt{2AO/C}$$

A= Annual consumption = 2000 unitsx12monthsx2kg.=48000 units

O = Ordering cost = Rs.180

C= Carrying cost p.u. = 12/100 x Rs.25 = Rs.3

$$\mathbf{EOQ} = \sqrt{2 \times 48000 \text{ units} \times \text{Rs.}180 / \text{Rs.}3}$$
$$= 2400 \text{ units}$$

Problem No. 9 – Economic order quantity

From the following information, Calculate EOQ.

Consumption	250 to 750 units per week
Ordering cost	Rs.100
Annual Carrying cost	6.5%
Purchase Price per unit	Rs.20
Normal consumption	400 units per week

Solution :

$$\mathbf{EOQ} = \sqrt{2AO/C}$$

A= Annual consumption = 400 unitsx52 weeks =20800 units

O = Ordering cost = Rs.100

C= Carrying cost p.u. = 6.5/100 x Rs.20 = Rs.1.3

$$\mathbf{EOQ} = \sqrt{2 \times 20800 \text{ units} \times \text{Rs.}100 / \text{Rs.}1.3}$$
$$= 1789 \text{ units}$$

Problem No. 10 – Economic order quantity – Assignment

Calculate EOQ.

Annual usage Rs.120000

Cost of placing an order Rs.15

Annual carrying cost 10% of the inventory value

$$\text{EOQ} = \sqrt{2 \times \text{Rs.120000} \times \text{Rs.15} / 10 / 100}$$

$$= \sqrt{2 \times \text{Rs.120000} \times \text{Rs.15} \times 100 / 10}$$

Problem No. 11 – Economic order quantity – Assignment

Calculate EOQ.

Monthly consumption 125 units

Purchase price per unit Rs.25

Monthly carrying cost 1%

Ordering cost per order Rs.22.5

Problem No. 12 – Stores ledger FIFO & LIFO method

From the following particulars prepare stores ledger account under (i) FIFO (ii) LIFO method.

March 2nd Purchases 200 units @ Rs.200
4th Issued 150 units
6th Purchases 200 units @ Rs.220
10th Issued 100 units
16th Purchases 200 units @ Rs.210
18th Issued 220 units
24th Purchases 150 units @ Rs.230
25th Issued 190 units
28th Issued 30 units

Stores ledger account FIFO method

Date	Receipts			Issues			Balance		
March	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
2	200	200	40000				200	200	40000
4				150	200	30000	50	200	10000
6	200	220	44000				50 200	200 220	10000 44000
10				50 50	200 220	10000 11000	150	220	33000
16	200	210	42000				150 200	220 210	33000 42000
18				150 70	220 210	33000 14700	130	210	27300
24	150	230	34500				130 150	210 230	27300 34500
25				130 60	210 230	27300 13800	90	230	20700
28				30	230	6900	60	230	13800

Stores ledger account LIFO method

Date	Receipts			Issues			Balance		
March	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
2	200	200	40000				200	200	40000
4				150	200	30000	50	200	10000
6	200	220	44000				50	200	10000
							200	220	44000
10				100	220	22000	50	200	10000
							100	220	22000
16	200	210	42000				50	200	10000
							100	220	22000
							200	210	42000
18				200	210	42000	50	200	10000
				20	220	4400	80	220	17600
24	150	230	34500				50	200	10000
							80	220	17600
							150	230	34500
25				150	230	34500	50	200	10000
				40	220	8800	40	220	8800
28				30	220	6600	50	200	10000
							10	220	2200

Problem No. 13 – Stores ledger FIFO & LIFO method

The stock of materials as on 1st April was 200 units at Rs. 2 each. The following purchases and issues were made, prepare stores ledger account under FIFO and LIFO method.

April 5th Purchases 100 units @ Rs.2.20 each
10th Purchases 150 units @ Rs.2.40 each
20th Purchases 180 units @ Rs.2.50 each
2nd Issues 150 units
7th Issues 100 units
12th Issues 100 units
28th Issues 200 units

Stores ledger account FIFO method

Date	Receipts			Issues			Balance		
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							200	2.00	400
2				150	2.00	300	50	2.00	100
5	100	2.20	220				50 100	2.00 2.20	100 220
7				50 50	2.00 2.20	100 110	50	2.20	110
10	150	2.40	360				50 150	2.20 2.40	110 360
12				50 50	2.20 2.40	110 120	100	2.40	240
20	180	2.50	450				100 180	2.40 2.50	240 450
28				100 100	2.40 2.50	240 250	80	2.50	200

Stores ledger account LIFO method

Date	Receipts			Issues			Balance		
April	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							200	2.00	400
2				150	2.00	300	50	2.00	100
5	100	2.20	220				50 100	2.00 2.20	100 220
7				100	2.20	220	50	2.00	100
10	150	2.40	360				50 150	2.00 2.40	100 360
12				100	2.40	240	50 50	2.00 2.40	100 120
20	180	2.50	450				50 50 180	2.00 2.40 2.50	100 120 450
28				180 20	2.50 2.40	450 48	50 30	2.00 2.40	100 72

Problem No. 14 – Stores ledger FIFO & LIFO method

The following is the record of receipts and issues of material A in a factory during the month of January

January 1st Opening balance 100 kg. @ Rs.10
Issues 60 kg.
2nd Received 120 kg. @ Rs.11
3rd Issues 50 kg. (stock showed a loss of 5 kgs.)
4th Received back from orders 20 kg. (previously issued at Rs.9 per kg.)
6th Issued 80 kg.
7th Received 45 kg. @ Rs.12
10th Issued 50 kg.

Prepare stores ledger under FIFO & LIFO method.

Stores ledger account FIFO method

Date	Receipts			Issues			Balance		
January	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							100	10	1000
1				60	10	600	40	10	400
2	120	11	1320				40	10	400
							120	11	1320
3				40	10	400			
				10	11	110			
				(loss) 5	11	55	105	11	1155
4	20	9	180				105	11	1155
							20	9	180
6				80	11	880	25	11	275
							20	9	180
7	45	12	540				25	11	275
							20	9	180
							45	12	540
10				25	11	275			
				20	9	180			
				5	12	60	40	12	480

Stores ledger account LIFO method

Date	Receipts			Issues			Balance		
January	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							100	10	1000
1				60	10	600	40	10	400
2	120	11	1320				40	10	400
							120	11	1320
3				50	11	550	40	10	400
				(loss)5	11	55	65	11	715
4	20	9	180				40	10	400
							65	11	715
							20	9	180
6				20	9	180	40	10	400
				60	11	660	5	11	55
7	45	12	540				40	10	400
							5	11	55
							45	12	540
10				45	12	540			
				5	11	55	40	10	400

Problem No. 15 – Stores ledger FIFO & LIFO method

Details of receipts and issues of a material in a factory during March are as follows:

- March 1st Opening balance 500 quintals @ Rs.25
- 3rd Issued 70 quintals
- 4th Issued 100 quintals
- 8th Issued 80 quintals
- 13th Received from vendor 200 quintals @ Rs.24.50
- 14th Return of surplus from a work order 15 quintals @ Rs.24
- 16th Issued 180 quintals
- 20th Received from vendor 240 quintals @ Rs.26
- 24th Issued 280 quintals
- 25th Issued 140 quintals
- 27th Return from a work order 12 quintals @ Rs.24.50
- 28th Received from vendor 100 quintals @ Rs.25
- 29th Returned to vendor 50 quintals.

There was shortage of 5 quintals on 15th and 8 quintals on 27th. Write up stores ledger using FIFO and LIFO method.

Stores ledger account FIFO method

Date	Receipts			Issues			Balance		
March	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							500	25	12500
3				70	25	1750	430	25	10750
4				100	25	2500	330	25	8250
8				80	25	2000	250	25	6250
13	200	24.50	4900				250	25	6250
							200	24.50	4900
14	15 (returns)	24	360				250	25	6250
							200	24.50	4900
							15	24	360
15				5 (shortage)	25	125	245	25	6125
							200	24.50	4900
							15	24	360
16				180	25	4500	65	25	1625
							200	24.50	4900
							15	24	360

20	240	26	6240				65 200 15 240	25 24.50 24 26	1625 4900 360 6240
24				65 200 15	25 24.50 24	1625 4900 360	240	26	6240
25				140	26	3640	100	26	2600
27	12 (returns)	24.50	294				100 12	26 24.50	2600 294
27				8 (shortage)	26	208	92 12	26 24.50	2392 294
28	100	25	2500				92 12 100	26 24.50 25	2392 294 2500
29				50 (returns)	26	1300	42 12 100	26 24.50 25	1092 294 2500

Stores ledger account LIFO method

Date	Receipts			Issues			Balance		
March	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.
1							500	25	12500
3				70	25	1750	430	25	10750
4				100	25	2500	330	25	8250
8				80	25	2000	250	25	6250
13	200	24.50	4900				250	25	6250
							200	24.50	4900
14	15 (returns)	24	360				250	25	6250
							200	24.50	4900
							15	24	360
15				5 (shortage)	24	120	250	25	6250
							200	24.50	4900
							10	24	240
16				10	24	240	250	25	6250
				170	24.50	4165	30	24.50	735

20	240	26	6240				250 30 240	25 24.50 26	6250 735 6240
24				240 30 10	26 24.50 25	6240 735 250	240	25	6000
25				140	25	3500	100	25	2500
27	12 (returns)	24.50	294				100 12	25 24.50	2500 294
27				8 (shortage)	24.50	196	100 4	25 24.50	2500 98
28	100	25	2500				100 4 100	25 24.50 25	2500 98 2500
29				50 (returns)	25	1250	100 4 50	25 24.50 25	2500 98 1250

Problem No. 16 – Stores ledger FIFO & LIFO method - Assignment

Record the following transactions in stores ledger under FIFO & LIFO method.

- May 1st 50 units @ Rs.25 per unit
 3rd Received 300 units @ Rs.30 per unit
 5th Issued 200 units
 7th Issued 120 units
 8th Received back 10 units (issued on 7th May)
 10th Returned to vendor 15 units purchased on 3rd May
 15th Received 200 units @ Rs.32
 18th Issued 150 units
 19th Issued 50 units.

The stock verifier found a shortage of 10 units on 20th May.

Problem No. 17 – Stores ledger Simple Average & Weighted method

Prepare stores ledger account, pricing issued at
(a) Simple average (b) Weighted average method

15.03.2019 Receipts 200 units @ Rs.2

18.03.2019 Receipts 300 units @ Rs.2.40

25.03.2019 Issues 250 units

28.03.2019 Receipts 250 units @ Rs.2.60

30.03.2019 Issues 200 units

Stores ledger account Simple Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
15.3.19	200	2.00	400				200	400
18.3.19	300	2.40	720				500 (200+300)	1120 (400+720)
25.3.19				250	2.20 (2+2.40/2)	550	250 (500-250)	570 (1120-550)
28.3.19	250	2.60	650				500 (250+250)	1220 (570+650)
30.3.19				200	2.50 (2.40+2.60/2)	500	300 (500-200)	720 (1220-500)

Stores ledger account Weighted Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
15.3.19	200	2.00	400				200	400
18.3.19	300	2.40	720				500 (200+300)	1120 (400+720)
25.3.19				250	2.24 (1120/500)	560	250 (500-250)	560 (1120-560)
28.3.19	250	2.60	650				500 (250+250)	1210 (560+650)
30.3.19				200	2.42 (1210/500)	484	300 (500-200)	726 (1210-484)

Problem No. 18 – Stores ledger Simple Average & Weighted method

From the following particulars prepare stores ledger account under (a) Simple average (b) Weighted average method

Date	Particulars	Units	Rate p.u. Rs.
January 1 st	Balance	100	6
5 th	Purchases	600	7
20 th	Issues	400	-
February 5 th	Issues	200	-
6 th	Purchases	500	8
March 10 th	Issues	400	-
12 th	Issues	200	-

Stores ledger account Simple Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
Jan.1							100	600
Jan.5	600	7	4200				700 (100+600)	4800 (600+4200)
Jan.20				400	6.50 (6+7/2)	2600	300 (700-400)	2200 (4800-2600)
Feb.5				200	7	1400	100 (300-200)	800 (2200-1400)
Feb.6	500	8	4000				600 (100+500)	4800 (800+4000)
Mar. 10				400	7.50 (7+8/2)	3000	200 (600-400)	1800 (4800-3000)
Mar.12				200	8	1600	--	200 (1800-1600)

Stores ledger account Weighted Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
Jan.1							100	600
Jan.5	600	7	4200				700 (100+600)	4800 (600+4200)
Jan.20				400	6.86 (4800/700)	2744	300 (700-400)	2056 (4800-2744)
Feb.5				200	6.85 (2056/300)	1370	100 (300-200)	686 (2056-1370)
Feb.6	500	8	4000				600 (100+500)	4686 (686+4000)
Mar. 10				400	7.81 (4686/600)	3124	200 (600-400)	1562 (4686-3124)
Mar.12				200	7.81 (1562/200)	1562	--	--

Problem No. 19 – Stores ledger Simple Average & Weighted method

From the following particulars prepare stores ledger account under (a) Simple average (b) Weighted average method

January 1st Stock on hand 100 units @ Rs.2

5th Purchases 200 units @ Rs.3

10th Issues 120 units

16th Purchases 250 units @ Rs.3.20

20th Issues 150 units

31st Purchases 100 units @ Rs.3.40

February 10th Issues 300 units

15th Purchases 200 units @ Rs.3.60

20th Issues 150 units

25th Purchases 100 units @ Rs.4

Stores ledger account Simple Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
Jan.1							100	200
Jan.5	200	3	600				300	800
Jan.10				120	2.50 (2+3/2)	300	180	500
Jan.16	250	3.20	800				430	1300
Jan.20				150	3.10 (3+3.20/2)	465	280	835
Jan.31	100	3.40	340				380	1175
Feb.10				300	3.20 (3+3.20+3.40/3)	960	80	215
Feb.15	200	3.60	720				280	935
Feb.20				150	3.50 (3.40+3.60/2)	525	130	410
Feb.25	100	4	400				230	810

Stores ledger account Weighted Average Method

Date	Receipts			Issues			Balance	
	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.	Units	Amt. Rs.
Jan.1							100	200
Jan.5	200	3	600				300	800
Jan.10				120	2.67 (800/300)	320	180	480
Jan.16	250	3.20	800				430	1280
Jan.20				150	2.98 (1280/430)	447	280	833
Jan.31	100	3.40	340				380	1173
Feb.10				300	3.08 (1173/380)	926	80	247
Feb.15	200	3.60	720				280	967
Feb.20				150	3.45 (967/280)	517	130	450
Feb.25	100	4	400				230	850

Problem No. 20 – Stores ledger Simple Average & Weighted method - Assignment

From the following particulars prepare stores ledger account under (a) Simple average (b) Weighted average method

Receipts

3rd Oct. Purchased 500 units @ Rs.4

13th Oct. Purchased 900 units @ Rs.4.30

23rd Oct. Purchased 600 units @ Rs.3.80

Issues

5th Oct. Issued 400 units

15th Oct. Issued 400 units

25th Oct. Issued 600 units

UNIT III

What is Labour cost?

Labour cost represents human contribution. Labour cost is sensitive in nature. The reason is that the labour cost is fully based on the human behavior i.e. labour behavior.

Classification of Labour Cost

1. Direct Labour Cost

Direct Labour cost is that portion of salary or wage, which can be identified with and charged to a single unit cost of production.

Characteristics of Direct Labour Cost:

- It has direct relationship with the product or process or cost unit.
- It can be measured quantitatively.
- It is sufficiently material in amount.

2. Indirect Labour Cost

It is not identifiable within the production of goods and services even though directly incurred. These costs are incurred in the production place. Sometimes, some cost center may render service to the production departments or production activities. Such cost centers purchase, engineering and time keeping.

3. Controllable Labour Cost

A labour cost can be controlled by the management during production period and even during absence of production. A standard time and time rate may be fixed and request the labour to complete the job or order within such time. If so, the labour cost can be controlled to some extent.

4. Non-Controllable Labour Cost

A labour cost, which cannot be easily controlled by the management. A job or order can be completed by a group of labours. The efficiency of such group of labours differ in nature. A labour can use his/her efficiency in full as per the prevailing environment in the product place. If so, the cost cannot be controlled by the management.

The following information is required for labour cost control effectively

1. Cost of recruitment of labour.
2. Training cost of workers.
3. Labour Turnover.
4. Idle Time.
5. Over Time.
6. Shift Work.
7. Labour Efficiency.
8. Number of workers.
9. Wastage.
10. Spoilage.
11. Wages Paid.

Methods or ways of Labour cost control

1. Proper production planning.
2. Fixing of standard time.
3. Fixing of clear-cut wage structure.
4. An agreement with workers.
5. Preparation of labour budgets i.e. Labour Cost Budget and Labour Hours Budget.
6. Performance reports of labour.
7. Fixing of specific incentive payment.

Methods of time keeping:

1. Manual Method:

Under this method the attendance time of employees are recorded either by the time keeping officer or by employees themselves.

The manual methods of time keeping are as follows:

i. Attendance Register Method: Under this method, an attendance register is maintained for recording the attendance time. This method is followed in small sized concerns. This method is more suitable for recording the attendance time of clerical staff and other staff officers. Under this method two separate columns are maintained corresponding the names of every employee.

One column is to record arrival time and second column for recording departure time. The attendance time can be marked by the time keeping officer by calling out the name of every employee or alternatively the attendance register may be signed by every employee.

Merits:

- (1) It is simple to maintain attendance register.
- (2) It is an economical method in comparison to other methods.

Demerits:

- (1) This method is not suitable for medium and large sized businesses.
- (2) Where the attendance is marked by calling out the names of employees, there will be hold-ups near the factory gate.
- (3) Dishonest employees may mark the attendance of absentee employee.
- (4) Time keeping officer may show step motherly treatment to his friends and this will defect the purpose of time keeping.
- (5) It involves additional work for posting the entries into the individual working record

ii. Token or Disk Method: Under this method, each worker is allotted an identification number and that number is suitably painted or engraved on a round metal token (or disk) with the hole in it. All such tokens are hung in a serial order on a board at the factory gate. As the worker arrives he takes his token from the board and puts it in a box kept nearby, which is specially kept for this purpose. After the fixed time the board is removed. Those coming late have to hand over their token personally at the time office so that exact time of their arrival can be noted. The time office records attendance on the basis of tokens in the box. The absentees are indicated by the missing tokens. Similar procedure is followed at the departure time in the evening.

Merits:

- (1) It is simple to operate.
- (2) It does not involve heavy investment.
- (3) It suits to a factory which employs more number of employees.

Demerits:

- (1) Dishonest practice of inserting a disc of an absentee worker by another employee may take place.
- (2) It involves more clerical work to prepare an attendance record with the help of disc, where any mistake is committed in recording attendance time on the basis of disc and in case of any disputes between an employee and time keeping officer, disc cannot offer any proof.

2. Mechanical Method:

In modern age, mechanical methods of time keeping are used to save time and ensure greater accuracy. The machines record the exact time of the arrival and departure of employees. Thus, they avoid possible disputes and difference of opinions between employees and time keeping officers. Mechanical methods are used in medium and large sized industries as small sized concerns cannot afford to invest more capital on such equipment.

Following are the important mechanical methods of time recording:

- i. **Dial Time Recorder:** This method consists of a large dial on which there are about 150 holes corresponding to the number of workers. A clock is fitted within the circles of the dial together with a dial arm which operates from the centre of the circle. The worker while entering into the gate turns the dial arm. He then presses the button corresponding to his clock number. The time of his arrival is recorded on a sheet of paper kept inside the machine. The same procedure is followed before the employee leaves the factory gate.

Merits:

- (1) Time is recorded strictly according to pay roll order.
- (2) Provision can also be made out not only to record time but also to calculate wages.

Demerits:

- (1) A worker can record the time of an absentee worker.
- (2) Time of arrival and departure and separated out in two different sheets of paper which require additional clerical work.
- (3) A worker cannot see the time he has booked and disputes may arise afterwards.

ii. Card Time Recorder: This is a machine which is fitted with a clock on each side of which there is an 'in' and 'out' rack which contains the cards of the employees. The worker who enters the gate takes his and from the 'in' rack, inserts it in the machine. On pressing a lever the time of arrival is recorded on the card. Then the card is placed in the 'out' rack. At the time of departure from the factory the worker removes his card, inserts it in the machine to record the time of departure and finally places it in the 'in' rack.

Merits:

- (1) For each and every worker's time is recorded individually.
- (2) The absence of worker can be checked by a mere look at the 'out' rack.
- (3) This can be taken as a basis for wage calculation.

Demerits:

- (1) An employee can record the time of absentee worker.
- (2) Controlling and checking of cards becomes difficult

iii. Autograph or Signature Type Time Recorder: This type of machine is most commonly used in small sized business enterprise where supervision for time recording does not arise.

Its features can be summarised as follows:

- (1) It is a machine which is fitted with a clock and is connected to a printing mechanism on a roll of paper.
- (2) To operate the machine, the employee opens the shutter by pressing a lever which is at the side of the machine. This enables to uncover a small signature window.
- (3) The employee signs in this signature window and as he signs, the day and time is automatically recorded.
- (4) When the lever is released, the paper roll inside the machine is advanced, the shutter slides back over the signature window, and the machine is ready for the signature of the next worker.

Merits:

- (1) Recording of time is automatic and accurate.
- (2) Employees cannot see the recorded time.

Demerits:

- (1) The worker's name does not appear as per the pay roll order.
- (2) Breakdown in the machine leads to stoppage in the recording of attendance time.

What is idle time?

Idle time is the amount of time spent waiting to use viable equipment or the non productive time of employees, due to lack of demand or unforeseen work stoppage. If you don't have a piece of equipment scheduled to run or an asset is up and available, but not being used, that's considered idle time.

For example, a discrete manufacturing floor where you make numerous different types of products might have certain assets sit idle while you perform processes that don't use them.

Causes of idle time

Idle time is typically caused or started by factors outside of the person or machine's control. When it starts growing beyond that time, it's typically caused by simple human ignorance or laziness. It's the manager's responsibility to deal with idle time in proactive ways that take into account both the short and the long term.

- 1. Unexpected personal events :** When your employees are struggling with something personal in their lives, they are more likely to take advantage of the natural idle times in your day-to-day processes. Companies generally tend to acknowledge this, but it's good to remember that this can be a significant cause of idle time.
- 2. Natural storms or disasters :** Natural storms or disasters can have a sizable impact on your business' overall idle time, depending on your location and industry. For example, the shipping and trucking industry is very dependent on the local and global weather patterns.
- 3. Unexpected equipment breakdowns :** If a key part on a major piece of equipment decides to give out, everyone that uses or depends on that piece of equipment is going to face unexpected challenges.

4. System failures : To take equipment failures a bit further, when entire systems go down, people generally have to go home. The work can't be done. When a system fails, then resources are lost. And that's only one result of that forced idle time.

5. Lack of awareness : Finally, don't forget lack of awareness. A good example of this is that new hires may not understand company protocols and procedures in the first few weeks of working. This is just part of adjusting to the company and training usually helps reduce this.

How to minimize idle time?

Each of the scenarios outlined above have specific ways that companies could use to minimize idle time.

- 1. Improve your processes** : Unexpected breakdowns and system failures are a major cause of idle time. Improved processes can cut down on the amount of these surprises. In addition, when you overhaul and improve your processes, you can also work around the inevitable idle time that just happens.
- 2. Train employees** : Make sure managers and employees are up to date on what needs to be tracked and comply with any process changes. This reduces time spent in trying to figure out what they should be doing.
- 3. Set up a good preventive maintenance program** : To follow on from the last point, a well-constructed and maintained preventive maintenance program is one of the best ways to optimize your business practices. This optimization trickles down into every part of your business, including the wasted time. It's a great place to start.

4. **Maintain your equipment and employees in general** :Maintenance by its very definition deals with optimizing a company's assets. When you maintain your equipment and care for your employees, downtime does decrease. While it may seem small, that time builds up quickly.
5. **Monitor and track idle time** :Finally, when you know where idle time is happening in your company, you can monitor and track it. This gives you insights into where the company can do better and decrease that amount.

Types Of Idle Time

Normal idle time: Normal idle time is idle time which cannot be avoided & on the basis of the nature of industry it remains within the normal limit. Examples are: loss of time between the factory gate to the department due to personal needs, tea breaks, machine adjustments etc.; idle time normally arising between finishing of one job & beginning of the next job. Loss of time on account of waiting for instructions, job, material, tools, power etc. & due to breakdown of machinery for short period, load shedding for short period, adverse atmosphere etc.

Abnormal idle time: Abnormal idle time is that idle time, the occurrence of which is not normal & because of some unexpected reasons such occurrence takes place. Thus idle time arising due to machinery breakdown, long time failure of power or load shedding, sudden strike or lockout are abnormal idle time.

Concealed idle time: Idle time which arises due to worker's employment in unnecessary work only for the purpose of keeping them engaged & also idle time which arises when upper category workers are employed under lower category work. These types of idle time apparently look like working time, but since there is involvement of loss of wages, they mean idle time of concealed nature. Idle time, from the point of view of controllability, may be classified into two groups:-

Controllable idle time:- Controllable idle time is that idle time, the cause of which can be controlled. For example- idle time arising from waiting for instructions can be controlled provided instructions are prepared in advance & have been given to the workers without delay.

Uncontrollable idle time: - Idle time, the cause of which cannot be controlled is known as uncontrollable idle time. For example: When the factory has to depend on outside supply of power, idle time will be there due to load shedding, power utilization control etc. Uncontrollable shall not remain forever as such. For example-If own power house can be installed by the factory, idle time arising due to load shedding can be avoided.

Overtime : Overtime is the amount of wages paid for working beyond normal working hours as specified by Factories Act or by a mutual agreement between the workers union and the management. There is a practice is to pay for overtime work at higher rates. Hence, payment of overtime consists of two elements, the normal wages e.g., the usual amount, and the extra payment i.e., the premium. This amount of extra payment paid to a worker under overtime is known as overtime premium.

Treatment of Overtime Premium in Cost Accounting

1. If overtime is resorted to at the desire of the customer, then overtime premium may be charged to the job directly.
2. If overtime is required to cope with general production programme or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost center, which works overtime.
3. If overtime is worked in a department, due to the fault of another department, the overtime premium should be charged to the latter department.
4. Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost but to costing P/L A/c.

Steps for Controlling Overtime:

1. Entire overtime work should be duly authorized after investigating the reasons for it.
2. Overtime cost should be shown against the concerned department. Such a practice should enable proper investigation and planning of production in future.
3. If overtime is a regular feature, the necessity for recruiting more men and adding a shift should be considered.
4. If overtime is due to lack of plant and machinery or other resources, steps may be taken to install more machines, or to resort to sub-contracting.
5. If possible an upper limit may be fixed for each category of workers in respect of overtime.

Definition of Labour Turnover: Labour turnover refers to the rate at which employees leave employment. Labour turnover can be evaluated by relating the number of employees leaving their employment during a period of time to the total or average numbers employed in that period.

Causes of labour Turnover: Avoidable causes are:

(i) Lower wages;

(ii) Bad working conditions;

(iii) Unsympathetic attitude of the management;

(iv) Lack of opportunities for promotion;

(v) Lack of proper training;

(vi) Improper manpower planning;

(vii) Lack of proper incentives;

(viii) Bitter relationship between management and workers;

(ix) Lack of conveyance, accommodation, medical and educational facilities and recreational amenities etc.

Unavoidable causes: Sometimes workers have to leave the organisation because of management requirements and administrative actions. They also leave their employment at their own will, that is, on personal reasons. In the latter case the management can do nothing but remains a helpless onlooker. So, unavoidable causes may be administrative or personal.

(1) Administrative causes:

- (i) Termination of service due to indiscipline, insubordination, bad conduct etc.
- (ii) Retrenchment or lay-off due to shortage of resources, low demand for recession.

(2) Personal causes:

- (i) Change for better job;
- (ii) Death;
- (iii) Retirement due to old age;
- (iv) Change for better working conditions, better environment;

- (v) Change for secured job;
- (vi) Marriage, especially of women workers;
- (vii) Illness and accident rendering the worker permanently incapable of doing any work;
- (viii) Domestic need and responsibility etc.

Effects of Labour Turnover:

Labour turnover is harmful and costly. It results in increased cost of production due to the following reasons:

- (i) With frequent changes in labour force, production planning cannot be properly executed resulting in substantial loss in production.
- (ii) Since the new workers have no previous experience in production there is loss arising out of defective work, increased spoilage and wastage resulting in high cost of production.
- (iii) Newly recruited workers are likely to mishandle tools and equipment which results in breakages.
- (iv) The organisation has to incur extra cost for workers' training.
- (v) Labour turnover causes increased replacement cost.
- (vi) Labour cost increases because of lower productivity of newly recruited workers as they do not possess the same expertise as the old workers who have left the organisation.

Measurement of Labour Turnover:

Labour turnover rate can be measured by the application of any one of the following three methods:

(i) Separation method:

(ii) Replacement method:

(iii) Flux method:

A good wage system has the following features:

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 satisfactory 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.

TIME RATE SYSTEM

Time Rate System is otherwise called as Time Work, Day Work, Day Wages and Day Rate. It is the oldest method of remuneration. The time rate system is that [system of wage payment](#) in which the workers are paid on the basis of time spent by them in the factory. Under this system, the workers and employees are paid wages on the basis of the time they have worked rather than the volume of output they have produced. The wage rate is fixed on hourly, daily weekly, fortnightly or monthly on the basis of the nature of work. The time is the prevalent rate of the industry or area. The rate may either be a fixed one or there may be a progressive scale of pay that starts at minimum and rises up to a maximum, in various stages by way of increments.

Time Rate System Formula

This time rate system calculation is based on the working hours of the employee, that is the amount of time spent on the work along with the amount of work delivered within the specific period of time.

And the actual formula that helps to calculate the total amount by using this formula:

Formula: Wages= Total hours worked X Wages rate per hour.

Advantages of the Time Rate System:

- 1. Simple formulation:** The calculation and nature of the time rate system are very easy and simple to understand. It is one of the methods that can be understood by all the employers of the company. Its measurement and the calculation of this wage system provide the actual picture about the overall time rate system. Therefore, as it is mentioned earlier, it is easy and simple to understand and formulate in the company.
- 2. Easy access:** This time rate system is very easy to access and that is because of its brief and clear detailed information. The details collected and maintained through this time rate system are very economical. In other words, it is one of the simple methods of understanding the total wages of the employees of the company. It makes records maintenance, affordable and clear. Therefore, it is one of the economic methods of calculating wages under time rate systems.
- 3. Production quality:** As per the information provided by different sources of the production unit, the company performs better with these time rate systems. Eventually, the production quality will increase and the employer monitors all the production units without any mistakes.

- 4. Fixed wage:** Even when it comes to a salary expense calculation, the company earns better profits because of its fixed rate of price. The time rate systems incorporate fixed-wage systems because of which the company using it confirms a fixed rate of price per day. And this fixed rate per price helps to increase the profits of the company as its only a small amount of profit returns.
- 5. Improves equality among employees:** Because of the time rate system, the employees of the company may feel equal within themselves. Most of the time several companies face a certain kind of union problems and if the company incorporates these time rate system policy, then the possibility of inequality issue will be considerably less among the employees of the company. Therefore, all the employees of the company experience equality among them.

Disadvantages of Time Rate Systems:

- 1. It ignores efficiency:** As per the formulation of this time rate system, the actual focus of this time rate system is on the part of the production where the employee works according to the specific number of time and production. Most importantly the work delivered by the employees will be based on their total daily production output. And it is obvious that it completely ignores the efficiency of its employees, because of which deserving employee feels unappreciated for their work.

- 2. Loss of skilled workers:** As explained above, the company works according to the specific production rate and it totally ignores the efficiency of its employees and because of that, the employees of the company decide to leave the company. This is one of the disadvantages of this time rate system. Therefore, the company suffers a loss of their skilled workers because of the time rate system methods of wage calculations.
- 3. Inefficiency:** The workers and the employees of the company eventually understand that the company expects a certain level of production from them not the quality of work from them. This kind of ignorance creates inefficiency among the employees of the company. Therefore, all the employees of the company decide to work as per their specific production expectation and they try to not bring efficiency in their work because their efficiency will not reward them for their excellent work delivery.
- 4. Conflicts of thinking:** Most of the time the company incorporates some kind of rules and regulations in the company without consulting their employees of the company. And when it comes to the wage system and salary system, then the employees of the company will definitely have some conflicts of thinking. This conflict of thinking creates a communication difference between the employees and the employers of the company which is not at all good for the company development.

- 5. Cost of production:** As the company prefers its employees to provide a specified number of productions and the employees of the company meet their daily production unit, then there is a possibility that the company might increase the production output. This increment in production output leads to the increment of cost of production. Therefore, this can affect the company effectively because of this time rate system of the wage calculations.
- 6. Increased supervision cost:** When it comes to the cost of supervision the company may end up being in trouble because of these time rate systems. Therefore, the company needs to cut back its supervision cost so that they can regain the position of the company. And to make that happen, the company needs to cut back from the time rate systems so that they can reduce the cost of supervision eventually.

PIECE-RATE SYSTEM

This is that system of wage payment in which the workers are paid on the basis of the units of output produced. This system does not consider the time spent by the workers. Piece rate system is the method of remunerating the workers according to the number of unit produced or job completed. It is also known as payment by result or output. Piece rate system pays wages at a fixed piece rate for each unit of output produced. The total wages earned by a worker is calculated by using the following formula.

Total Wages Earned= Total units of outputs produced x Wage rate per unit of output.

OR

Total Wages Earned= Output x Piece Rate

Advantages:

- 1. Wages linked to efforts:** Under piece wage system, wages are linked to the output of a worker. The higher the output, higher will be the wages. Workers will try to put in more and more effort for increasing output because their wages will go up.
- 2. Increase in production:** Production goes up when wages are paid according to piece rate system. Workers will feel encouraged to increase output because their wages will also increase. This system is fair to both employees and employers. Efficient workers will try to exert maximum in order to raise their production and hence wages.
- 3. Better utilization of equipment/machines:** The machines and other equipment's are put to maximum utilization. Workers may not like to keep the machines idle. The use of machines will also be systematic because any breakdown in these may affect the workers adversely. Thus, better machine utilization will give better output.

- 4. Distinction between Efficient and Inefficient:** As in time wages system, efficient and inefficient workers are not given equal treatment in the piece wage system. Efficient workers will get more because of their better results. Inefficient workers on the other hand will get less because of low production. This method provides sufficient encouragement to efficient workers or showing better results.
- 5. Less supervision required:** Since payments are on the basis of output, workers will not waste time. They will continue to work irrespective of supervision. There may be more and more voluntary efforts on the part of workers and need for supervision is reduced to a minimum.
- 6. Effective cost control:** The increase in output will result in reduction of overhead expenses per unit. Some of the overhead expenses being fixed, increase in production will reduce expenses per unit. Reduction in cost may benefit consumers in the form of decrease in product price.
- 7. Better planning and control:** The certainty in achieving production targets will improve planning and control. When management is sure of certain quantity of production, then it can plan other things with more confidence, it will also ensure better control over production because targets may be regularly reviewed from time to time. Thus, better planning and control is possible.

Limitations:

- 1. No guarantee or minimum wage:** There is a direct relationship between output and wages. If a worker does not ensure certain productions, then wages may also be uncertain. Any type of interruption in work may reduce earnings of workers. So workers are not sure about getting minimum wages. So this system does not provide guarantee of minimum wages.
- 2. Poor quality of goods/products:** The workers will bother more about the number of units otherwise more supervisors are appointed to keep watch on quality of products being produced.
- 3. Not suitable for beginners:** The beginners will not be able to produce more goods because of less experience. They will earn much low wages as compared to experienced workers because their rate of production will be low. Thus, this system is not suitable for beginners.
- 4. Deterioration in health:** Workers may try to work more than their capacity. This may adversely affect their health. They may try to work even when they are not keeping good health, since wages are linked with production.

- 5. Cause of dissatisfaction:** There may be difference in earning of various workers. Some may earn less and others may earn more. Those who get low wages feel so jealous of others who earn more and this becomes a cause of dissatisfaction among slow workers. Thus, this system can see dissatisfaction among workers.
- 6. Opposition from unions:** Piece-rate system of paying wages is opposed by trade unions. There is an unhealthy competition among workers for increasing their wages. It encourages rivalry among workers and it may become a cause of disunity. The existence of unions is endangered when some section among them feel jealous of other. Union will never support a system where workers earn different amounts of wages and this becomes a cause of disharmony among them. So trade unions oppose this system.
- 7. Difficulty in fixing piece-rates:** The fixation of piece rates is not an easy job. If a low rate is fixed then workers may not feel encouraged to increase their production. When a high piece-rate is fixed then it will increase the cost of production of goods. The fixation of piece rate may become a cause of an industrial dispute. It may be very difficult to fix a rate acceptable to workers as well as management.

Suitability:

Piece rate system is suitable under following situations:

- (1) Where production quantity is more important than the quality of the product.
- (2) When the work is of repetitive nature.
- (3) When the mass manufacturing system of production is followed and the work is standardized suitable for continuous manufacturing.
- (4) When it is possible to measure the production output of worker separately.
- (5) When strict supervision is not required and difficult.
- (6) When the production is dependent on human efforts.

Types of Piece Rate System:

- (i) Straight piece rate
- (ii) Increasing piece rate
- (iii) Decreasing piece rate

(i) Straight piece rate: In this system, the piece rate forms the basis of payment i.e. payment for whole production is made on the basis of piece rate fixed. If the piece rate of Rs. 15 per unit is fixed, then the wages will be calculated by multiplying the output by the rate fixed. A worker producing 200 units will get Rs. 3000 (i.e. 200×15). If the production output is raised to 210 the wages will be Rs. 3150 (210×15). Thus a worker will have to increase the output in order to get higher wages. The rate of payment remains same irrespective of production level or level of output.

(ii) Increasing piece rate: In this system different rates are fixed for different levels of production. A certain production level is decided and if the production goes beyond that level, higher rates are given. For example, a piece rate of Rs. 21- per unit may be fixed for production up to 100 units, Rs 2.10 per unit for output between 101 to 150 units and Rs. 2.25 per unit for a production beyond 150 units and so no. There is an incentive to get higher rate for production beyond a certain level.

(iii) Decreasing piece rate: In certain cases, where quality is of great consideration, this system is followed to discourage negligence of workers. In this method, the rate per unit decreases with increase in output. For example Re. 1/- per unit may be allowed up to a certain production level say 100 units. Re. 0.95 per unit for production between 100 to 150 units and Re. 0.90 per unit for an output beyond 150 units and so on

Types of Incentive Plans

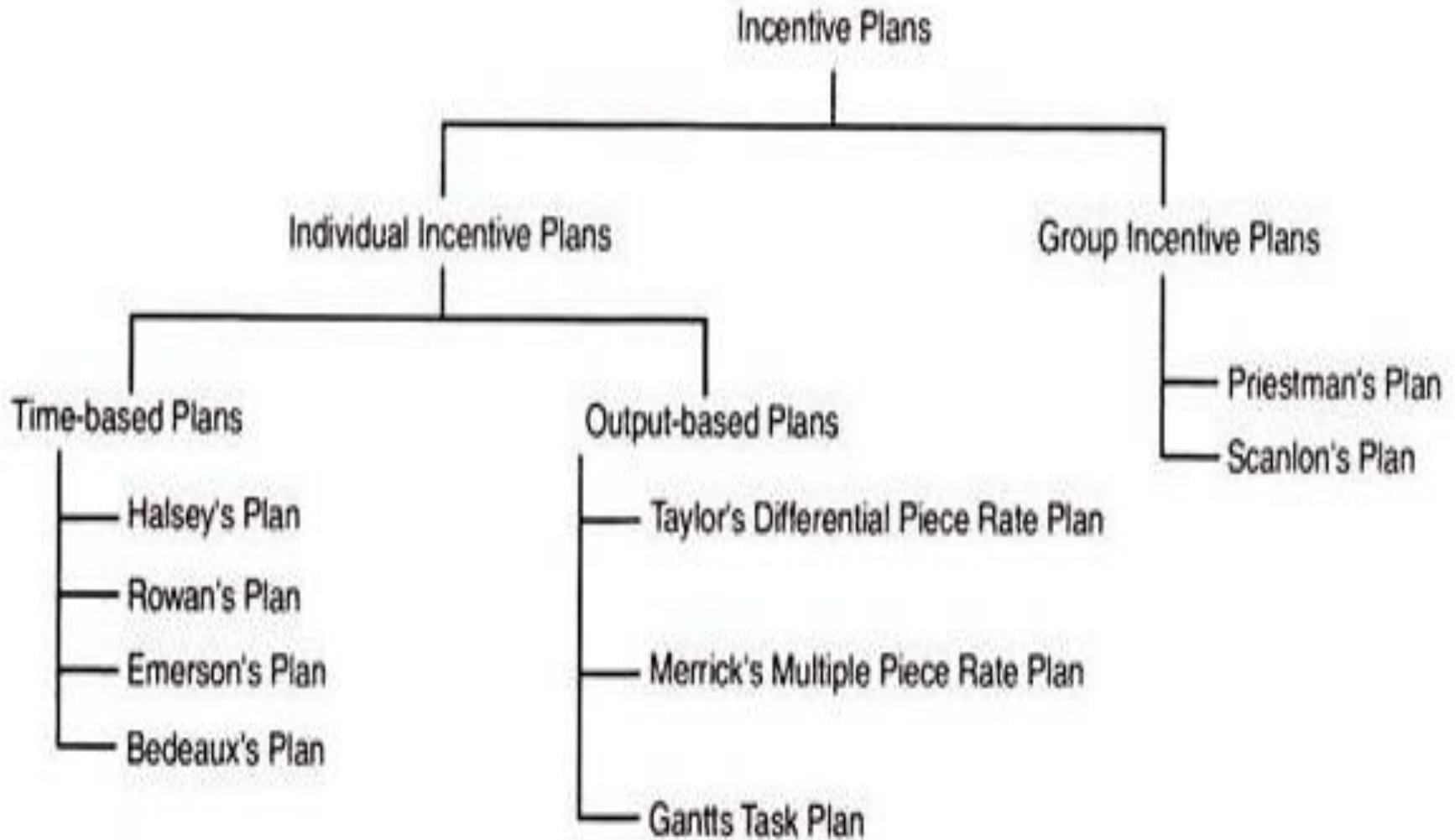


Fig. 12.1. Incentive Plans

Type I - Individual Incentive Plans:

Under individual incentive plan, individual employee is paid incentive on the basis of individual performance or output. The employers are liable to pay incentives to those employees who are producing more than the standard output. Individual incentive plans can be either time based or production based. In case of time based incentive plans, a standard time is determined for doing a job and this standard time served as a basis for giving incentive. A worker is considered as efficient, if he completes his job in less than standard time. The worker is awarded for his efficiency by giving incentive under some incentive plans.

Some of the time based incentive plans are:

- I. Halsey Incentive Plan.
- II. Rowan Incentive Plan.
- III. Emerson Efficiency Plan.
- IV. Bedeaux Incentive Plan.

Some of the production based incentive plans are:

- I. Taylor's differential piece rate system.
- II. Merrick's multiple piece rate plan.
- III. Gantt's task and bonus wage plan.

Time-Based Plans:

- I. Halsey Incentive Plan:** In this method a standard time is fixed for the completion of the job. A minimum base-wage is guaranteed to every worker. If a worker completes his job in just the standard time, he will not be given any incentive. If a worker performs his job in less than standard time, he is given incentive. The incentive will be equal to 50% of the time saved by the worker.

$$W = TR + (S - T)R\%$$

W = Total Wages

S = Standard time

T = Time taken to complete the job

% = Percentage of wages of time saved to be given as incentive

R = Rate;

Advantages:

- a. It is simple.
- b. Each worker is guaranteed a minimum wage.
- c. This is beneficial to efficient worker.
- d. Causes no harm to new worker, trainee, or slow worker.
- e. Management shares benefits of over-achievement by workers.

Disadvantages:

- a. Workers get only a percentage of return on their over-achievement.
- b. The quality of production may suffer as workers may do work in hurry,
- c. There may be difficulties in setting standard time for different jobs.

II. Rowan Plan: This plan is quite similar to Halsey plan. It differs only in terms of calculation of incentive for time saved. The worker gets the guaranteed minimum wages. The incentive for completing the job in time lesser than standard time is paid on the basis of a ratio, which is time saved over standard time per unit standard time.

Incentive is calculated as:

$$\text{Incentive or Bonus} = \frac{S-T}{S} \times T \times R$$

$$\text{Total wages} = T \times R + \text{incentive}$$

$$= T \times R + \frac{(S-T)}{S} \times T \times R$$

W=Total wages

S=Standard time

T=Time taken to complete the job

R=Rate;

Advantages:

- a. This system checks over-speeding and overstrain by worker.
- b. Each worker is guaranteed a minimum wage.
- c. Efficiency is rewarded.

Disadvantages:

- a. The workers find it difficult to understand.
- b. Discourages workers to over-achieve.
- c. Workers may not like sharing of profit for over-achievement.

III. Emerson's Efficiency Plan: In this plan, a minimum wage is guaranteed to every worker on time basis and incentive is given on the basis of efficiency. Efficiency is determined by the ratio of time taken to standard time. Payment of bonus/incentive is related to efficiency of the workers. Incentive will be given to those workers who attains more than $\frac{2}{3}$ rd i.e. 66.67% of efficiency. No incentive will be given at 66.67% efficiency. At 100% efficiency incentive is 20% of the hourly rate. For efficiency exceeding 100%, 1% incentive/bonus is paid for every 1% increase in efficiency.

Advantages:

- a. Minimum wages are guaranteed.
- b. It is simple to understand.

Disadvantages:

- i. Incentive after attaining standard is very low.

IV. Bedeaux Point Plan: Bedeaux system also called units or point system also guarantees a minimum base wage. Under this plan, the standard time and time taken for each job is reduced to minutes. Each minute is referred to, as 'B' i.e. one hour is the same as 60B's. The workers who complete the job within standard time are paid at a normal time rate.

Those who complete the job in less time are paid bonus. The bonus paid to the worker is 75% of the wages for time saved. The time saved is divided between workers and management.

The formula for calculating wages is:

$$W=TR+75\% (S-T)R$$

w= Total wages

S=Standard time

T=Time taken to complete the job

R=Rate;

Advantages:

- a. Minimum wages are guaranteed.
- b. Management also shares some percentage of bonus.

Disadvantages:

- a. Incentive after attaining standard is very low.
- b. Workers do not like their bonus to be shared by management.

Output-Based Plans:

I. Taylor's Differential Piece Rate System:

This system was introduced by Taylor, the father of scientific management. The main characteristics of this system are that two rates of wage one lower and one higher are fixed. A lower rate for those workers who are not able to attain the standard output within the standard time; and a higher rate for those who are in a position to produce the standard output within or less than the standard time

Advantages:

- a. Provides incentives to efficient worker.
- b. Inefficient worker is penalized.
- c. This system is simple and easy to implement.

Disadvantages:

- a. Minimum wage is not assured,
- b. There are chances that quality of work may suffer,
- c. This system is not liked by below average workers, as they do not get any incentive.

II. Merrick's Multiple Piece Rate Plan: To overcome the limitations of Taylor's differential piece rate system, Merrick suggested a modified plan in which, three-piece rates are applied for workers with different levels of performance.

- a. Workers producing less than 83% of the standard output are paid at basic rate.
- b. Workers producing between 83% and 100% of standard output will be paid 110% of basic piece rate.
- c. Those producing more than 100% of the standard output will be paid 120% of basic piece rate.

Advantages:

- a. Efficient workers are rewarded handsomely.
- b. Minimum wages are guaranteed.

Disadvantages:

- a. There is wide gap in slabs of differential wage rate.
- b. Over emphasis on high production rate.

III. Gantt's Task and Bonus Plan: This plan is based on careful study of a job. The main feature of this plan is that it combines time rate, piece rate and bonus. A standard time is fixed for doing a particular job. Worker's actual performance is compared with the standard time and his efficiency is determined. If a worker does not complete the job within standard time i.e. he takes more time than the standard time (efficiency below 100%), he will not receive any bonus but he is given wages for the time taken by him. If a worker completes the job within standard time (100% efficiency), he is given wages for the standard time and bonus of 20% of wages earned. If the worker completes the job in less than the standard time (i.e. efficiency more than 100%), wages are paid according to piece rate.

Advantages:

- a. Minimum wages are guaranteed.
- b. It is simple to understand.
- c. Efficient workers can earn more money.

Disadvantage:

- a. Emphasis on over speed or high production rate.

_Type II - Group Incentive Plans: A group incentive plan scheme is designed to promote effective teamwork, as the bonus is dependent on the performance and output of the team as a whole. Under group incentive plan, each employee is paid incentive on the basis of collective performance of his group to which he belongs. Within the group, each employee gets an equal share of the incentive.

I. Priestman's Plan: In this plan workers are not considered individually but collectively. This system considers the productivity of all workers as a whole. Bonus is paid in proportion in excess of standard output per week. If in a year, the output increases either above the standard output or the output of the previous year, the wages are increased in the same ratio.

II. Scanlon's Plan: A Scanlon plan is a type of gain sharing plan that pays a bonus to employees when they improve their performance or productivity by a certain amount as measured against a previously established standard. A typical Scanlon plan includes an employee suggestion program, a committee system, and a formula-based bonus system. A Scanlon plan focuses attention on the variables over which the organization and its employees have some control.

BASIS OF DIFFERENCE	TIME RATE SYSTEM	PIECE RATE SYSTEM
MEANING	Time rate system is a method of wage payment to workers based on time spent by them for the production of output.	Piece rate system is a method of wage payment to workers based on the quantity of output they have produced.
NATURE OF PAYMENT	Time rate system pays the workers according to the time spent in the factory.	Piece rate system pays the workers according to the units of output produced.
EMPHASIS	Time rate system emphasis on better quality of output.	Piece rate system gives emphasis on larger quantity of output.
DISCRIMINATION	Time rate system does not discriminate the workers and pays the same wages to efficient and inefficient workers.	Piece rate system discriminates the workers and pays more wages to efficient and skilled workers.
SUPERVISION	Time rate system requires strict supervision to get required quantity of output.	Piece rate system requires strict supervision to get the required quality output.
DETERMINATION OF LABOR COST	Time rate system does not help to fix labor cost per unit in advance.	Piece rate system helps to fix per unit labor cost in advance.
FLOW OF PRODUCTION	Time rate system helps maintain a uniform flow of production and ensures an efficient use of materials, tools and equipments.	Piece rate system does not bring uniformity in the flow of production and causes an excessive wastage of inputs.
IDLE TIME	There is possibility of excessive idle time.	There is a less chance of idle time in this system.

INCENTIVE	There is lack of incentive for efficient workers.	It motivates the workers to produce more and earn more.
CONTROL AND SUPERVISION	Control and Supervision is needed as the workers may not work properly.	Control and supervision are comparatively less required.
STABILITY OF JOB	Under this system, generally the employment is stable.	Under this system, generally the employment is unstable.
SUITABILITY	This method is suitable for the workers who are slow.	This method is suitable for the workers who are fast.
CERTAINTY OF AMOUNT OF WAGES	Under this system, the amount of wages is certain.	Under this system, the amount of wages is not certain.
LEAVE	Under this system, the workers want to take more and more leave.	Under this system, the workers want to take less leave.
LABOR UNION'S SUPPORT	The labor union supports this system.	The labor union does not support this system.
ENCOURAGEMENT TO WORK	This system does not encourages workers to work more and more.	This system encourages the workers to work more and more.
SUITABILITY FOR ARTISTIC WORK	This system of wage payment is suitable for artistic work.	This system of wage payment is not suitable for artistic work.
SLACKNESS IN WORK	Under this system, the workers want to pass their time, thus speed of work suffers.	Under this system, the workers do not want to waste even a single minute of their time. They want to work as fast as possible.

NATURE OF WORK	This system is suitable for the works that are not standardised and measurable.	This system is suitable for the works that are standardised and measurable.
AVERAGE COST OF PRODUCTION	Under this system, the average cost of production is generally high.	Under this system, the average cost of production is generally low.

Methods of Wage Payment

- Time Wage System
- Piece Rate System



"The Jews have the day off. He's showing you in the productivity analysis instead"



	Halsey Plan	Rowan Plan
Bonus	Under Halsey plan the bonus increases steadily with increase in efficiency.	In Rowan plan the bonus increases up to a certain point and starts declining thereafter. Rowan plan provides better bonus than Halsey plan till the work is completed in half the standard time.
Quality of Work	The quality of work is affected much under Halsey plan as the bonus increases steadily with increased work that makes the workers rush.	The quality of work is not affected much under Rowan plan as the bonus increases at a decreasing rate at higher levels of efficiency and the workers do not prefer to rush work.
Simplicity	It is simple to understand and calculate wages.	Difficult to understand.
Motivational	Motivates the employees.	Discourages the workers.
Overspeeding	No check on overspeeding	Overspeeding is avoided.
Overpayment	There is a danger of overpayment.	No danger for overpayment.

Problem No. 1 Labour Turnover

From the following particulars supplied by the personnel department of a company calculate the labour turnover by applying (a) separation method (b) replacement method © flux method

Total number of employees at the beginning	900
Total number of employees at the end	1100
Number of employees left	10
Number of employees discharged	40
Number of employees recruited	150,

of these 25 workers were recruited in the vacancies of those leaving , while the rest were engaged for an expansion scheme

(a) Separation method = No. of separation/Average no. of workers x100

$$\begin{aligned}\text{Average no. of workers} &= 900+1100/2 = 1000 \\ &= 10+40/1000 \times 100 = 5\%\end{aligned}$$

(b) Replacement method = No. of replacements/Average no. of workers x100

$$= 25/1000 \times 100 = 2.5\%$$

© Flux method = No. of separations + No. of replacements / Average no. of workers x 100

$$= 50+25/1000 \times 100 = 7.5\%$$

Problem No. 2 Labour Turnover - Assignment

From the following particulars supplied by the personnel department of a company calculate the labour turnover by applying (a) separation method (b) replacement method © flux method

Total number of employees at the beginning	2010
Total number of employees at the end	1990
Number of employees resigned	30
Number of employees discharged	50
Number of employees replaced	40

Problem No.3 Labour Cost

From the following particulars you are required to prepare a statement of labour cost showing the cost per day of 8 hours.

- (a) Monthly salary Rs.200
- (b) Leave salary 5% of salary
- (c) Employer's contribution to provident fund 8% of (a) & (b)
- (d) Employer's contribution to state insurance 2.5% of (a) & (b)
- (e) Pro rate expenditure on amenities to labour Rs.17.95 per head per month
- (f) No. of working hours in a month 200

Statement of labour cost per month

	Rs.
Salary	200.00
Leave salary 5/100xRs.200	10.00
Employers contribution to PF 8/100x Rs.210(200+10)	16.80
Employers contribution to SI 2.5/100xRs.210	5.25
Pro rata expenses on amenities to labour	<u>17.95</u>
Total labour cost for 200 hours	<u>250.00</u>

Labour cost per hour = $\text{Rs.}250/200 \text{ hours} = \text{Rs.}1.25$

Labour cost per day of 8 hours = $\text{Rs.}1.25 \times 8 \text{ hours} = \text{Rs.}10$

Problem No.4 Labour Cost

From the following particulars you are required to prepare a statement of labour cost showing the cost per day of 8 hours.

- (a) Basic wages Rs.5 per day
- (b) Dearness allowance 25 paise for every point over 100 cost of living index. Present cost of living index 800 points
- © Leave pay 5% of (a) & (b)
- (d) Employer's contribution to provident fund 8% of (a) & (b)
- (e) Employer's contribution to state insurance 5% of (a), (b) & ©
- (f) No. of working hours in a month 25 days of 8 hours each

Statement of labour cost per month

	Rs.
Basic wages (25days xRs.5)	125.00
Dearness allowance (700 (800-100)x0.25p)	175.00
Leave salary 5/100xRs.300(125+175)	15.00
Employers contribution to PF 8/100x Rs.300	24.00
Employers contribution to SI 5/100xRs.300+15	<u>15.75</u>
Total labour cost for 25 days	<u>354.75</u>

Labour cost per day of 8 hours = Rs.354.75/25 days = Rs.14.19

Problem No.5 Labour Cost - Assignment

From the following particulars you are required to prepare a statement of labour cost showing the cost per day of 8 hours.

- (a) Basic wages Rs.100 per day
- (b) Dearness allowance Rs.2.50 for every point over 100 cost of living index. Present cost of living index 700 points
- © Leave pay 10% of (a) & (b)
- (d) Employer's contribution to provident fund 8% of (a), (b) & ©
- (e) Employer's contribution to state insurance 2.5% of (a), (b) & ©
- (f) Expenditure to amenities to labour Rs.200 per head per month
- (g) No. of working hours in a month 25 days of 8 hours each

Problem No.6 Over time

Calculate wages due to a worker from the following data.

Number of hours in a week 44

Actual hours worked 50

Rate per hour - Rs.1.25

- overtime 200% of normal rate.

Solution:

Wages of normal hours 44 hours x Rs.1.25 Rs.55

Overtime wages (50-44hours) 6 hours XRs.2.50

(200/100xRs.1.25) Rs. 15

Total wages Rs. 70

Problem No.7 Overtime

Calculate the normal and overtime wages payable to a workman from the following data

<i>Days</i>	<i>Hours Worked</i>
Monday	8 hrs.
Tuesday	10 hrs.
Wednesday	9 hrs.
Thursday	11 hrs.
Friday	9 hrs.
Saturday	4 hrs.
Total	<u>51 hrs.</u>
Normal working hours	8 hours per day
Normal rate	₹ 1 per hour

Overtime rate

upto 9 hours in a day at single rate and over 9 hours in a day at double rate ; or up to 48 hours in a week at single rate and over 48 hours at double rate, whichever is more beneficial to the workman.

SOLUTION

Days	Total Hours	Normal Working Hours	Overtime Hours	
			At Single Rate	At Double Rate
Monday	8	8	—	—
Tuesday	10	8	1	1
Wednesday	9	8	1	—
Thursday	11	8	1	2
Friday	9	8	1	—
Saturday	4	4		
Total	51	44	4	3

Normal Wages for 44 hours @ ₹ 1 = ₹ 44

Overtime Wages :

At single rate for 4 hours @ ₹ 1 = ₹ 4

At double rate for 3 hours @ ₹ 2 = ₹ 6

Total Wages ₹ 54

Or

Normal Wages for 48 hours @ ₹ 1 per hour = ₹ 48

Overtime Wages for 3 hours @ ₹ 2 per hour = ₹ 6

Total Wages ₹ 54

Therefore, whichever method is followed, the amount of the wages payable to the worker is ₹ 54.

Problem No. 8 Time and Piece wages

In a factory, guaranteed wages are paid @ Rs. 2 per hour and the payment is made on a weekly basis for a week of 48 hours. By time and motion study it is estimated that manufacture of a product requires 25 minutes. To this, personal and contingency allowance of 20% is to be added. During one week Mr.D produced 110 articles. Calculate his wages under

- (a) Time rate
- (b) Piece rate with guaranteed weekly wages.

(a) Time rate = Hours worked x Rate per hour

$$= 48 \text{ hours} \times \text{Rs.}2 = \text{Rs.}96$$

(b) Piece rate = No. of units produced x Rate per unit

Time taken per unit = 25 minutes

Add: allowance $20/100 \times 25$ minutes = 5 minutes

Standard time = 30 minutes

For 30 minutes units produced = 1

For 60 minutes units produced = 2 (60/30x1)

For 2 units rate = Rs.2

For 1 unit rate = Rs.2/2 = Re.1

For production of 110 units rate = 110 units X Re.1 = Rs.110

Problem No. 9 Time and Piece wages

The standard time taken to complete a product is 12 hours at 25 paise per hour. Time wages are allowed to workers taking more than the time allowed. But workers who complete the job in standard time or less receive a starlight piece work rate plus 10% bonus i.e., 12 hours at Re.0.275. Calculate the wages earned by A,B,C, and D who complete the job in 15,12,10 and 8 hours respectively. What will be their effective hourly rate.

Solution :

Standard time for a product = 12 hours

Normal rate per hour = Rs.0.25

Earnings :

A time wages = hours worked x rate per hour
= 15 hours x Rs.0.25 = Rs.3.75

Effective rate per hour = wages/hours worked
= Rs.3.75/15 hours = Rs.0.25

B time wages = hours worked x rate per hour
= 12 hours x Rs.0.275 = Rs.3.30

Effective rate per hour = wages/hours worked
= Rs.3.30/12 hours = Rs.0.275

C time wages = hours worked x rate per hour
= 12 hours x Rs.0.275 = Rs.3.30

Effective rate per hour = wages/hours worked
= Rs.3.30/10 hours = Rs.0.33

D time wages = hours worked x rate per hour
= 12 hours x Rs.0.275 = Rs.3.30

Effective rate per hour = wages/hours worked
= Rs.3.30/8 hours = Rs.0.4125

Problem No. 10 Time and Piece wages - Assignment

The output of a worker A is 60 units in a 40 hours week. Guaranteed time rate is Rs.5 per hour. Ordinary piece rate is Rs.2 per unit. Show the earnings of worker A under time and piece rate system.

Problem No.11 Taylor's Differential Piece Rate System

With the help of the following information, ascertain the wages paid to workers Ram and Sam under Taylor's differential piece rate system.

Standard time allowed 40 unit per hour

Normal time rate Rs.4 per hour

Differentials to be applied : 75% of piece rate when below standard

125% of piece rate when at or above standard

In a day of 8 hours, Ram produced 280 units and Sam produced 400 units

Solution :

Standard production = 40 units per hour

Normal rate = Rs.4 per hour

For production of 1 unit normal rate = $\text{Rs.}4/40\text{units} = \text{Rs.}0.10$

Standard production per day = 40 units x 8 hours = 320 units

Ram's earnings = 280 units x $\text{Rs.}0.10 \times 75/100 = \text{Rs.}21$

Sam's earnings = 400 units x $\text{Rs.}0.10 \times 125/100 = \text{Rs.}50$

Problem No.12 Taylor's Differential Piece Rate System

Using Taylor's differential piece rate system find out the earnings of the worker from the following data.

Standard time per piece 20 minutes : Normal rate per hour Rs.1.50

In a day of 9 hours , X produces 25 units and Y produces 30 units.

Solution :

If the differential piece rate is not given in the problem, then the following rates will apply

For production below standard = 83% of time rate

For production above standard = 175% of time rate

Standard time per piece = 20 minutes

Standard production per hour = $60\text{minutes}/20\text{ minutes} = 3\text{ units}$

Normal rate per hour = Rs.1.50

Rate per unit = $\text{Rs.1.50}/3\text{units} = \text{Rs.0.50}$

Standard production per day of 9 hours = $3\text{ units} \times 9\text{ hours} = 27\text{ units}$

X's earnings = $25\text{ units} \times 83/100 \times \text{Rs.0.50} = \text{Rs.10.38}$

Y's earnings = $30\text{ units} \times 175/100 \times \text{Rs.0.50} = \text{Rs.26.25}$

Problem No.13 Taylor's Differential Piece Rate System-Assignment

Calculate earnings of workers A and B under Taylors differential piece rate system and straight piece rate system form the following particulars.

Normal rate per hour Rs.18

Standard time per unit 20 seconds

Differentials to be applied :

80% of piece rate below standard

120% of piece rate at or above standard

Worker A produces 1400 units per day and worker B produces 1500 units per day of 8 hours.

Merrick's Multiple Piece Rate System

Efficiency		Piece rate applicable
Upto 83%	-	Ordinary Piece rate
83% to 100%	-	110% of ordinary piece rate
Above 100%	-	120% of ordinary piece rate

Problem No.14 Merrick's Multiple Piece Rate System

The following particulars apply to a particular job:

Standard production per hour 6 units

Normal rate per hour Rs.1.20

In an 8 hour day – X produces 32 units; Y produces 42 units, Z produces 50 units. Calculate the wages of these workers under Merrick's Multiple Piece Rate System.

Standard production per day of 8 hours = 6 units x 8 hours = 48 units

Standard production per hour = 6 units

Normal rate per hour = Rs.1.20

For production of 1 unit, normal rate = Rs.1.20/6 units = 0.20 paise

X produces 32 units – efficiency = $32/48 \times 100 = 67\%$

Earnings = 32 units x 0.20 paise = Rs.6.40

Y produces 42 units – efficiency = $42/48 \times 100 = 87.5\%$

Earnings = 42 units x 0.20 paise x $110/100 = Rs.9.24$

Z produces 50 units – efficiency = $50/48 \times 100 = 104.16\%$

Earnings = 50 units x 0.20 paise x $120/100 = Rs.12$

Problem No.15 Merrick's Multiple Piece Rate System - Assignment

Calculate the earnings of workers under Merrick's Multiple Piece Rate System

Normal rate per hour Rs.1.80

Standard time per unit 1 minute

Output for 8 hours : A – 360 units, B – 420 units, C- 540 units.

Gantt's Task Bonus Plan

Output

Remuneration

Below standard

- Guaranteed time wages

At standard

- Wages for standard time + bonus of 20% on the wages earned

Above standard

- High piece rate on the workers whole output (or) piece wage + bonus of 20% on wages earned

Problem No.16 Gantt's Task Bonus Plan

The guaranteed time rate is Re.1 per hour. High piece rate is Re.0.20 per unit and the standard output is 10 units per hour. In a day of 8 hours A produces 70 units, B 80 units and C 90 units. Calculate the earnings under Gantt's task bonus plan

Solution:

Standard output for 8 hours = 10 units x 8 hours = 80 units

A produces 70 units that is below standard

$$\text{Earnings} = 8 \text{ hours} \times \text{Rs.}1 = \text{Rs.}8$$

B produces 80 units that is at standard

$$\text{Earnings} = 8 \text{ hours} \times \text{Rs.}1 + 20/100 \times \text{Rs.}8 = \text{Rs.}9.60$$

C produces 90 units that is above standard

$$\text{Earnings} = 90 \text{ units} \times \text{Rs.}0.20 = \text{Rs.}18$$

Problem No. 17 Gantt's Task Bonus Plan

From the following data calculate monthly remuneration of workers X,Y and Z under Gantt's Task Bonus Plan

Standard output per month per worker is 1000 units

Actual output : X – 850 units, Y – 1000 units, Z – 1100 units

Piece rate 50 paise per unit

Solution:

Standard production per month = 1000 units

X produces 850 units that is below standard

$$\text{Earnings} = 1000 \text{ units} \times \text{Rs.}0.50 = \text{Rs.}500$$

Y produces 1000 units that is at standard

$$\text{Earnings} = 1000 \text{ units} \times \text{Rs.}0.50 + 20/100 \times \text{Rs.}500 = \text{Rs.}600$$

Z produces 1100 units that is above standard

$$\text{Earnings} = 1100 \text{ units} \times \text{Rs.}0.50 + 20/100 \times \text{Rs.}550 = \text{Rs.}660$$

Problem No. 18 Gantt's Task Bonus Plan - Assignment

The standard job card of the workers provide the following data

Time rate Rs.5 per hour : Standard production 40 units per week

Piece rate above standard output Rs.6 per unit .Output for the week : P -32 units, Q – 37 units, R- 42 units.

Calculate the wages of the workers under Gantt's task plan

Problem No. 19 Halsey Plan

A worker is paid Re. 1 per hour for completing a work within 8 hours. If he completes his work within 6 hours, calculate his wages for 6 hours and 8 hours under Halsey plan when the rate of premium is 50%

Solution:

Earnings = Hours worked x Rate per hour + (50% of Time saved x
Rate per hour)

Time saved = Time allowed – Time taken = 8 hours – 6 hours = 2 hours

$$\begin{aligned}\text{For 6 hours} &= 6 \text{ hours} \times \text{Rs.}1 + (50/100 \times 2 \text{ hours} \times \text{Rs.}1) \\ &= 6 + (1 \times 1) = \text{Rs.}7\end{aligned}$$

$$\begin{aligned}\text{For 8 hours} &= 8 \text{ hours} \times \text{Rs.}1 + (50/100 \times 0 \times \text{Rs.}1) \\ &= 8 + 0 = \text{Rs.}8\end{aligned}$$

Problem No. 20 Halsey Plan

Standard time allowed for a job is 20 hours and time rate per hour is Rs.2 plus dearness allowance at 60 paise per hour worked. The actual time taken by the worker is 15 hours. Calculate the earnings under Halsey plan.

Solution:

Earnings = Hours worked x Rate per hour + (50% of Time saved x
Rate per hour)

Time saved = Time allowed – Time taken = 20 hours – 15 hours = 5 hours

$$= 15 \text{ hours} \times \text{Rs.}2 + (50/100 \times 5 \text{ hours} \times \text{Rs.}2)$$

$$= 30 + (2.5 \times 2) = \text{Rs.}35 + \text{DA } 15 \text{ hours} \times 0.60 \text{ paise}$$

$$= \text{Rs.}35 + \text{Rs.}9 = \text{Rs.}44$$

Problem No. 21 Halsey Weir Plan

Calculate the earnings of a worker under Halsey Weir plan.

Time allowed 48 hours, Time taken 40 hours, Rate per hour Rs.10

Solution:

Earnings = Hours worked x Rate per hour + (30% of Time saved x Rate per hour)

Time saved = Time allowed – Time taken = 48 hours – 40 hours = 8 hours

$$= 40 \text{ hours} \times \text{Rs.}10 + (30/100 \times 8 \text{ hours} \times \text{Rs.}10)$$

$$= 400 + (2.40 \times 10) = \text{Rs.}424$$

Problem No. 22 Rowan Plan

Calculate the earnings under Rowan plan

Standard time 10 hours; Time taken 8 hours; Time rate Rs.2 per hour.

Solution:

Earnings = Hours worked x Rate per hour + (Time taken/Time allowed x Time saved x
Rate per hour)

$$= 8 \text{ hours} \times \text{Rs.}2 + (8/10 \text{ hours} \times 2 \text{ hours} (10-8) \times \text{Rs.}2)$$

$$= 16 + 3.20 = \text{Rs.}19.20$$

Problem No. 23 Rowan Plan & Halsey Weir plan

Calculate the earnings of a worker under (a) Rowan Plan (b) Halsey Weir plan (40% to worker) from the following data. Hourly rate of wages (guaranteed) 0.75 paise. Standard time for producing 1 dozen articles is 3 hours. Actual time taken by the worker to produce 20 dozen articles is 48 hours.

Solution:

(a) Rowan plan

Earnings = Hours worked x Rate per hour + (Time taken/Time allowed x Time saved x Rate per hour)

Standard time for producing 20 dozen articles = 20 x 3 hours = 60 hours

Actual time taken = 48 hours therefore time saved = 60-48 hours = 12 hours

$$= 48 \text{ hours} \times \text{Rs.}0.75 + (48/60 \text{ hours} \times 12 \text{ hours} \times \text{Rs.}0.75) = \text{Rs.}43.20$$

(b) Halsey Weir Plan

Earnings = Hours worked x Rate per hour + (40% of Time saved x Rate per hour)

$$= 48 \text{ hours} \times \text{Rs.}0.75 + (40/100 \times 12 \text{ hours} \times \text{Rs.}0.75)$$

$$= 36 + 3.60 = \text{Rs.}39.60$$

Problem No. 24 Rowan Plan, Halsey & Halsey Weir plan - Assignment

Calculate the earnings of a worker under (a) Rowan Plan (b) Halsey Plan (c) Halsey Weir plan. Standard time 30 hours; Time taken 20 hours ; Hourly rate of wages is Re.1 per hour plus dearness allowance at 50 paise per hour worked.

Emerson's Efficiency Plan

Efficiency

Bonus

Below 66 2/3%

Time wages only

66 2/3% to 100%

The bonus increasing from
0.01% to 20% above

Over 100%

A bonus of 20% above basic wages
plus 1% increase for each 1% increase
in efficiency

Problem No. 25 Emerson's Efficiency Plan

Standard output per day of 8 hours is 16 units. Actual output of a worker for 8 hours is 20 units. Rate per hour is Rs.2.50. Calculate the wages payable to the worker according to Emerson's efficiency plan .

Solution:

Standard output per day = 16 units

Actual production = 20 units

Efficiency = $20/16 \times 100 = 125\%$

Bonus = at 100% = 20% of time wages

next 25% = 25% of time wages

total bonus 45%

Earnings = 8 hours x Rs.2.50 + $45/100 \times Rs.20 = Rs.29$

Problem No. 26 Emerson's Efficiency Plan

In a manufacturing concern the daily wages guaranteed to workers is Rs.2 . The standard output for the month is 1000 units representing 100% efficiency. The rate of wages is paid without bonus to those workers who show upto $66\frac{2}{3}\%$ efficiency. Beyond this, bonus is payable in a graded scale . 90% efficiency - bonus 10% ; 100% efficiency - bonus 20%. Further increase of 1% bonus for every 1% further rise in efficiency. Calculate the earnings of A,B,C & D who have worked 26 days in a month and their output was 500, 900, 1000 and 1200 units respectively.

Solution:

Standard output per month = 1000 units

A produces = 500 units : Efficiency = $500/1000 \times 100 = 50\%$ (below $66\frac{2}{3}\%$)

Earnings = 26 days x Rs.2 = Rs.52

B produces = 900 units : Efficiency = $900/1000 \times 100 = 90\%$

Earnings = 26 days x Rs.2 + $10/100 \times$ Rs.52 = Rs.57.20

C produces = 1000 units : Efficiency = $1000/1000 \times 100 = 100\%$

Earnings = 26 days x Rs.2 + $20/100 \times$ Rs.52 = Rs.62.40

D produces = 1200 units : Efficiency = $1200/1000 \times 100 = 120\%$

Earnings = 26 days x Rs.2 + $40/100 \times$ Rs.52 = Rs.72.80 (20% + 20% - 1 % for increase)

Problem No. 27 Bedaux Plan

Calculate the earnings of a worker under Bedaux Plan. Standard time allowed for a job is 20 hours. Actual time taken is 16 hours. Time rate is Rs.2 per hour.

Solution:

Standard time allowed = 20hours

Standard time allowed in Bedaux plan = 20 hours x 60 minutes
= 1200 minutes

Actual time taken = 16 hours x 60minutes = 960 minutes

Time saved = 1200 – 960 = 240 minutes

Earnings = Hours worked x Rate per hour + 75/100 of time saved x
Rate per hour

= 16 hours x Rs.2 + 75/100 x 240/60 minutes x Rs.2 = Rs.38

Problem No. 28 Bedaux Plan

Calculate the earnings of a worker under Bedaux Plan. Standard output per day of 8 hours is 120 units. A produces 150 units within 8 hours. Time rate is Rs.0.50 per hour.

Solution:

Standard production in 8 hours = 120 units

Standard production in Bedaux plan = 120 units x 8 hours = 480 minutes

For 120 units time allowed = 480 minutes

For 1 unit time allowed = 480 minutes/120 units = 4 minutes

For 1 unit standard time allowed = 4 minutes

For 150 units standard time allowed = 150 units x 4 minutes = 600 minutes

Time saved = 600 – 480 minutes = 120 minutes

Earnings = Hours worked x Rate per hour + 75/100 of time saved x

Rate per hour

$$= 8 \text{ hours} \times \text{Rs.}0.50 + 75/100 \times 120/60 \text{ minutes} \times \text{Rs.}0.50 = \text{Rs.}4.75$$

Problem No.29 Barth Premium Plan

Calculate the wages of workers under Barth premium plan

Standard time allowed 12 hours

Rate per hour 0.50 paise

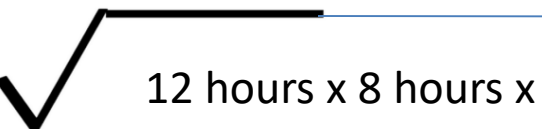
Actual time taken A = 16 hours, B = 12 hours, C = 8 hours

Solution:

Earnings =  Standard time x Actual time x Rate

A =  12 hours x 16 hours x Rs.0.50 = Rs.6.93

B =  12 hours x 12 hours x Rs.0.50 = Rs.6

C =  12 hours x 8 hours x Rs.0.50 = Rs.4.90

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