

NEW SYLLABUS



CA INTERMEDIATE
PAPER 4

COST & MANAGEMENT ACCOUNTING

MAY 2024 ONWARDS

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VOL - I HANDBOOK

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COST & MANAGEMENT ACCOUNTING

HANDBOOK FOR CA INTERMEDIATE

by

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PREFACE

It gives me immense pleasure to present this Handbook on Cost & Management Accounting designed specifically for students pursuing the Intermediate level of Chartered Accountancy (CA) course as per the **New Syllabus** notified in 2023 applicable from May 2024 exam onwards.

As per the **learning objectives** prescribed on the subject by The Institute of Chartered Accountants of India, a student at the Intermediate level is expected to develop an in-depth understanding of basic concepts and applications to establish the cost associated with the production of products and provision of services and apply the same to determine prices, develop an understanding of cost accounting statements and acquire the ability to apply information for cost ascertainment, planning, control, and decision making.

This Handbook is a classroom supplement and contains a rich collection of problems ranging from Easy to Difficult, that covers **100% of the Concepts, Illustrations, and Exercise Problems prescribed in ICAI Study Material**. An extensive and in-depth discussion on the concepts dealt with by these problems along with their solutions and tips on the presentation of answers in exams will be covered during the lectures.

I am forever grateful to **my parents** and my **brother Hari**, for their constant motivation and support in all walks of my life. Many thanks to my friends Mohit and Srinivas who have stood by me through thick and thin in various phases of my life no matter what. I also thank the efforts of my student Bharathi, who helped me in editing the contents of this book.

I dedicate this Handbook to my **Costing & FM Teacher CA V.N. Prabakar Sir** who not only inculcated me with interest in the subject but was also kind enough to provide his insights for preparing this book.

Finally, none of this would have been a reality without the blessings of **Shri Kanchi Maha Periyava** and I bow down to the great lineage of gurus originating from Shri Adi Shankaracharya.

I wish the students the very best in all their future endeavors. As the famous verse from the Bhagavad Gita goes - ***“Your right is for action alone, never for the results. Do not become the agent of the results of action. May you not have any inclination for inaction.”***

So, give your best and leave the rest. Success will automatically follow.

With Best Wishes,

CA Ganesh Bharadwaj

“Work Hard in Silence. Let your success make all the noise.”

SYLLABUS MAPPING WITH ICAI STUDY MATERIAL

HANDBOOK	CHAPTER	ICAI
Chapter - 01	Basic Cost Concepts	Chapter - 01
Chapter - 02	Cost Sheet	Chapter - 06
Chapter - 03	Overheads - Absorption Costing Method	Chapter - 04
Chapter - 04	Activity Based Costing	Chapter - 05
Chapter - 05	Cost Accounting Systems	Chapter - 07
Chapter - 06	Job Costing	Chapter - 09
Chapter - 07	Unit & Batch Costing	Chapter - 08
Chapter - 08	Material Cost	Chapter - 02
Chapter - 09	Employee Cost & Direct Expenses	Chapter - 03
Chapter - 10	Process & Operation Costing	Chapter - 10
Chapter - 11	Joint Products And By Products	Chapter - 11
Chapter - 12	Marginal Costing	Chapter - 14
Chapter - 13	Standard Costing	Chapter - 13
Chapter - 14	Budgets And Budgetary Control	Chapter - 15
Chapter - 15	Service Costing	Chapter - 12
Chapter - 16	Costing Theory	NA

CONTENTS

CHAPTER 01: BASIC CONCEPTS.....	3
CHAPTER 02: COST SHEET	9
CHAPTER 03: OVERHEADS – ABSORPTION COSTING METHOD.....	31
CHAPTER 04: ACTIVITY BASED COSTING	73
CHAPTER 05: COST ACCOUNTING SYSTEM.....	97
CHAPTER 06: JOB COSTING	117
CHAPTER 07: UNIT & BATCH COSTING	127
CHAPTER 08: MATERIAL COST	136
CHAPTER 09: EMPLOYEE COST AND DIRECT EXPENSES.....	181
CHAPTER 10: PROCESS & OPERATION COSTING	211
CHAPTER 11: JOINT PRODUCTS AND BY PRODUCTS.....	227
CHAPTER 12: MARGINAL COSTING	241
CHAPTER 13: STANDARD COSTING.....	277
CHAPTER 14: BUDGET AND BUDGETARY CONTROL	312
CHAPTER 15: SERVICE COSTING	356
CHAPTER 16: COSTING THEORY	385
CHAPTER 17: MULTIPLE CHOICE QUESTIONS (MCQs).....	434

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CHAPTER 01: BASIC CONCEPTS

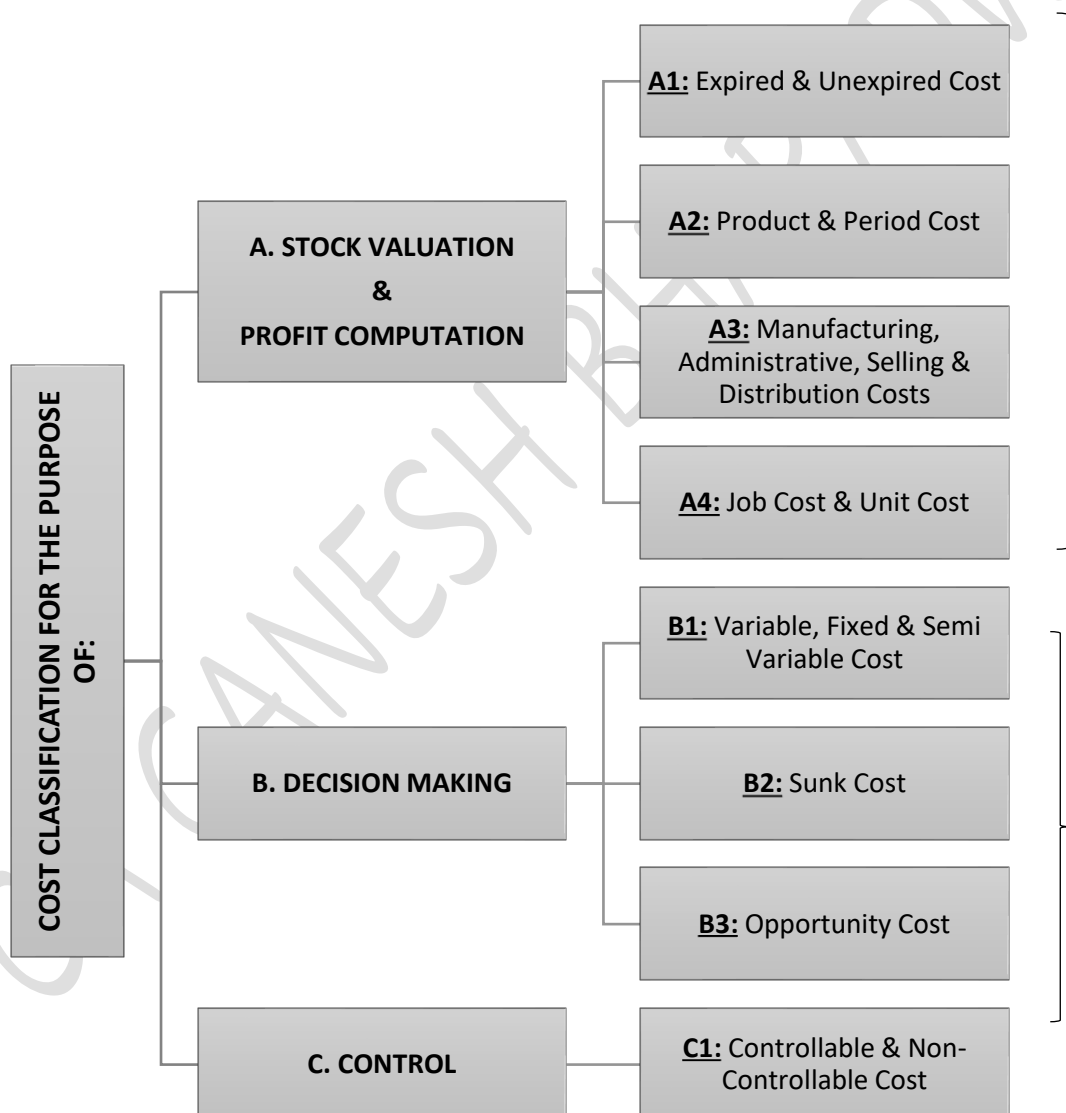
WHAT IS COST?

Cost means resources sacrificed for the purpose of carrying on business/profession which can be quantified in monetary terms.

It should be noted that there are three key terms in the above definition:

- Sacrifice of Resources
- Relating to Business/Profession
- Quantifiable in Monetary Terms

COST CLASSIFICATION



NOTE:

The above Cost Classification has been done by the faculty for a logical understanding of the subject.

A1. EXPIRED COST & UNEXPIRED COST

Expired Costs are those costs which are charged against revenue.

Unexpired Costs are those costs which are carried forward to the next accounting period through stocks.

A2. PRODUCT COST & PERIOD COST

Product Costs are those costs which are considered for Stock Valuation.

Period Costs are those costs which are not considered for Stock Valuation and expire fully in the current period.

A3. MANUFACTURING, ADMINISTRATIVE AND SELLING & DISTRIBUTION COSTS

Manufacturing Costs are those costs that are incurred from the purchase of Raw Materials till the primary packing of Finished Goods. In other words, Manufacturing Costs are all the costs that are incurred inside the factory and comprise Material Costs, Labour costs & Production Overheads.

Administrative Costs are those costs that are incurred in respect of activities relating to the general management and administration of an entity.

Selling Costs are the expenses related to the sale of products or services and include all indirect expenses incurred in selling the products or services.

Distribution Costs are the costs incurred in handling a product or service from the time it is ready for dispatch or delivery until it reaches the ultimate consumer.

A4. JOB COST & UNIT COST

Job Costing is the system that traces costs to specific jobs, contracts, or lots of goods where costs are ascertained on an individual basis.

Unit Costing is the system that collects costs incurred in a particular period to produce goods, the per unit cost of which is ascertained on an average basis.

B1. VARIABLE COSTS, FIXED COSTS & SEMI-VARIABLE COSTS

Variable Costs are costs that vary with a measure of activity. Variable Costs are costs which tend to directly vary with the volume of activity.

Fixed Costs are costs which do not vary with the change in the volume of activity. They remain constant irrespective of the volume level.

Semi-Variable Costs are costs containing both fixed and variable components which get partly affected by a change in the level of activity

B2. SUNK COSTS

These are costs that have been irreversibly incurred or committed and cannot, therefore, be considered relevant to a decision. Sunk costs may also be termed irrecoverable costs.

B3. OPPORTUNITY COSTS

It is the value of the best alternative course of action that was not chosen. In other words, it is what could have been accomplished with the resources used in the course of action if they were employed in the next best alternative. It represents opportunities for gone.

C1. CONTROLLABLE COST & NON-CONTROLLABLE COSTS

Controllable Costs are those costs which are subject to direct control at some level of managerial supervision. Non-controllable Costs are those costs which are not subject to control at any level of managerial supervision.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

ABC Pistons Ltd. operates an automobile service facility that specializes in replacing pistons on compact cars. The following table shows the costs incurred during a month when 600 pistons were replaced.

PARTICULARS	PISTON REPLACEMENTS		
	500	600	700
Fixed costs	a	₹ 42,000	b
Variable costs	c	₹ 30,000	d
Total costs	e	₹ 72,000	f
Cost per Piston Replacement:			
Fixed costs	g	h	i
Variable cost	j	k	l
Total cost per piston replacement	m	n	o

Required: Fill in the missing amounts, labelled (a) through (o), in the table.

PROBLEM – 2

A single-product manufacturing company gives the following budgetary details for a year when production is maintained at 80,000 units (80%).

Particulars	Cost per unit (₹)
Direct materials	40
Direct labour	25
Production overheads (60% fixed)	15
Administration overheads (100% fixed)	5
Selling and distribution overhead (60% variable)	10

Prepare the company's budgetary details per unit and in total when it works at 90% capacity.

PROBLEM – 3

A newly established manufacturing company has an installed capacity to produce 1,00,000 units of a consumer product annually. However, its practical capacity is only 90%. The actual capacity utilization may be substantially lower, as the firm is new to the market and demand is uncertain.

The following budget has been prepared for 90% capacity utilization:

Particulars	Cost per unit (₹)
Direct materials	12
Direct labour	8
Direct expenses	5
Production overheads (40% variable)	10
Administration overheads (100% fixed)	5
Selling and distribution (50% variable)	6

You are required to prepare a budget at 60%, 70% and 80% levels of capacity utilization giving clearly the unit variable cost, the unit fixed cost and the total cost under various heads at all the above levels.

PROBLEM – 4

Action plan manufacturers normally produce 8,000 units of their product in a month, in their Machine Shop. For the month of January, they had planned for a production of 10,000 units. Owing to a sudden cancellation of a contract in the middle of January, they could only produce 6,000 units in January.

Indirect manufacturing costs are carefully planned and monitored in the Machine Shop and the Forman of the Shop is paid 10% of the savings as a bonus when in any month the indirect manufacturing cost incurred is less than the budgeted provision.

The Forman has put out in a claim that he should be paid a bonus of ₹ 88.50 for the month of January. The Works Manager wonders how anyone can claim a bonus when the company has lost a sizeable contract. The relevant figures are as under:

Indirect Manufacturing Costs	Budgeted exp in (₹) for 8,000 units	Budgeted expenses in (₹) for 10,000 units	Actual cost in (₹)
Salary of foreman	1,000	1,000	1,000
Indirect labour	720	900	600
Indirect material	800	1,000	700
Repairs and maintenance	600	650	600
Power	800	875	740
Tools consumed	320	400	300
Rates and taxes	150	150	150
Depreciation	800	800	800
Insurance	100	100	100
Total	₹ 5,290	₹ 5,875	₹ 4,990

Do you agree with the works Manager? Is the Forman entitled to any bonus for the performance in January? Substantiate your answer with facts and figures.

PROBLEM – 5

Several costs incurred by Marina Beach Golf Equipment, Ltd., are listed below. For each cost, indicate which of the following classification best describe the cost.

More than one classification may apply to the same cost item. For example, a cost may be both a variable cost and a product cost.

Cost Classifications:

1. Variable
2. Fixed
3. Period
4. Product
5. Administrative
6. Selling
7. Manufacturing
8. Research and development
9. Direct material
10. Direct labour
11. Manufacturing overhead

Cost Items:

1. Metal used in golf clubs.
2. Salary of plant manager.
3. Cost of natural gas used to heat the factory.
4. Commissions paid to sales personnel.
5. Wages paid to employees who assemble golf bags.
6. Salary of an engineer who is working on a prototype of a new solar-powered golf cart.
7. Depreciation on the word processing equipment used by the company president's secretary.

CHAPTER 02: COST SHEET

INTRODUCTION

A Cost Sheet or Cost Statement is “a document which provides a detailed cost information. In a typical cost sheet, cost information is presented on the basis of functional classification. However, other classification may also be adopted as per the requirements of users of the information.

FUNCTIONAL CLASSIFICATION OF ELEMENTS OF COST

Under this classification, costs are divided according to the function for which they have been incurred. The following are the classification of costs based on functions:

- i. Direct Material Cost
- ii. Direct Employee (Labour) Cost
- iii. Direct Expense
- iv. Production/ Manufacturing Overheads
- v. Administration Overheads
- vi. Selling Overheads
- vii. Distribution Overheads
- viii. Research and Development costs etc.

COST HEADS IN A COST SHEET

The costs as classified on the basis of functions are grouped into the following cost heads in a cost sheet:

- i. Prime Cost
- ii. Cost of Production
- iii. Cost of Goods Sold
- iv. Cost of Sales

PRIME COST

Prime cost represents the total of direct materials costs, direct employee (labour) costs and direct expenses.

The total of cost for each element has to be calculated separately.

Direct Material Cost	xxx
Direct Employees (Labour) Cost	xxx
Direct Expenses	xxx
Prime Cost	xxx

Direct Material Cost

It is the cost of direct material consumed. The cost of direct material consumed is calculated as follows:

Opening Stock of Material	xxx
Add: Additions/ Purchases	xxx
less: Closing stock of Material	(xxx)
Direct materials Consumed	xxx

The valuation of materials purchased and issued for production shall be done as per methods discussed in the Chapter 'Material Cost. Few examples are:

- a. Cost of material;
- b. Freight inwards;
- c. Insurance and other expenditure directly attributable to procurement;
- d. Trade discounts or rebates (to be deducted);
- e. Duties & Taxes (if input tax credit is not available/ availed) etc.

Direct Employee (Labour) Cost

It is the total of payment made to the employees who are engaged in the production of goods and provision of services. Employee cost is also known as Labour cost; it includes the following:

- a. Wages and salary;
- b. Allowances and incentives;
- c. Payment for overtimes;
- d. Bonus/ ex-gratia;
- e. Employer's contribution to welfare funds such as Provident fund and other similar funds;
- f. Other benefits (medical, leave with pay, free or subsidized food, leave travel concession and provisions for retirement benefits) etc.

Direct Expenses

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

- i. Cost of utilities such as power & fuel, steam etc.;
- ii. Royalty paid/ payable for production or provision of service;
- iii. Hire charges paid for hiring specific equipment;
- iv. Fee for technical assistance and know-how;
- v. Amortized cost of moulds, patterns, patents etc.;
- vi. Cost for product/ service specific design or drawing;
- vii. Cost of product/ service specific software;
- viii. Other expenses which are directly related with the production of goods or provision of service.

COST OF PRODUCTION

In a conventional cost sheet, this item of cost can be seen. It is the total of prime cost and factory related costs and overheads.

Particulars	Amount (₹)
Prime Cost	xxx
Add: Factory Overheads	xxx
GROSS WORKS COSTS	xxx
Add: Opening stock of Work-in-process	xxx
Less: Closing stock of Work-in-process	xxx
FACTORY OR WORKS COSTS	xxx
Add: Quality Control Cost	xxx
Add: Research & Development cost (Process related)	xxx
Add: Administrative Overheads related with production	xxx
Less: Credit for recoveries (miscellaneous income)	xxx
Add: Packing Cost (Primary packing)	xxx
COST OF PRODUCTION	xxx

Factory Overheads:

It is also known as works/production/ manufacturing overheads. It includes the following indirect costs:

- i. Consumable stores and spares;
- ii. Depreciation of plant and machinery, factory building etc.
- iii. Lease rent of production assets;
- iv. Repair and maintenance of plant and machinery, factory building etc.
- v. Indirect employees cost related with production activities;
- vi. Drawing and Designing department cost;
- vii. Insurance of plant and machinery, factory building, stock of raw material & WIP etc.
- viii. Amortized cost of jigs, fixtures, tooling etc.
- ix. Service department cost such as Tool Room, Engineering & Maintenance, Pollution Control etc.

Stock of Work-in-process:

The cost of opening and closing stock of work- in-process (WIP) is adjusted to arrive at factory/ works cost. The WIP stock is valued on the basis of percentage of completion in respect of each element of cost. Students may refer the 'Chapter- Process & Operation Costing' to know the WIP valuation methods.

Quality Control Cost:

This is the cost of resources consumed towards quality control procedures.

Research & Development Cost:

It includes only those research and development related cost which is incurred for the improvement of process, system, product or services.

Administrative Overheads:

It includes only those administration overheads which are related to production. The general administration overhead is not included in production cost.

Credit for Recoveries

The realized or realizable value of scrap or waste is deducted as it reduces the cost of production.

Packing Cost (primary)

Packing material which is essential to hold and preserve the product for its use by the customer.

COST OF GOODS SOLD

It is the cost of production for goods sold. It is calculated after adjusting the values of opening and closing stocks of finished goods. It can be calculated as below:

Cost of Production	xxx
Add: Cost of Opening stock of finished goods	xxx
Less: Cost of Closing stock of finished goods	(xxx)
Cost of Goods Sold	xxx

COST OF SALES

It is the total cost of a product incurred to make the product available to the customer or consumer. It includes Cost of goods sold, administration and marketing expenses. It is calculated as below:

Cost of Goods Sold	xxx
Add: Administrative Overheads (General)	xxx
Add: Selling Overheads	xxx
Add: Packing Cost (secondary)	xxx
Add: Distribution Overheads	xxx
Cost of Sales	xxx

Administrative Overheads:

It is the cost related with general administration of the entity. It includes the followings:

- a. Depreciation and maintenance of, building, furniture etc. of corporate or general management.
- b. Salary of administrative employees, accountants, directors, secretaries etc.
- c. Rent, rates & taxes, insurance, lighting, office expenses etc.
- d. Indirect materials- printing and stationery, office supplies etc.
- e. Legal charges, audit fees, corporate office expenses like directors' sitting fees, remuneration and commission, meeting expenses etc.

Selling Overheads:

It is the cost related with sale of products or services. It includes the following costs:

- a. Salary and wages related with sales department and employees directly related with selling of goods.
- b. Rent, depreciation, maintenance and other cost related with sales department.
- c. Cost of advertisement, maintenance of website for online sales, market research etc.

Packing Cost (secondary)

Packing material that enables to store, transport, inform the customer, promote and otherwise make the product marketable.

Distribution Overheads

It includes the cost related with making the goods available to the customers. The costs are:

- a. Salary and wages of employees engaged in distribution of goods.
- b. Transportation and insurance costs related with distribution.
- c. Depreciation, hire charges, maintenance and other operating costs related with distribution vehicles etc.

COST SHEET/STATEMENT

Specimen Format of Cost Sheet for a Manufacturing entity

	Particulars	Total Cost (Rs.)	Cost per unit (Rs.)
1.	Direct materials consumed:	xxx	xxx
	Opening Stock of Raw Material	xxx	xxx
	Add: Additions/ Purchases	xxx	xxx
	Less: Closing stock of Raw Material	(xxx)	(xxx)
2.	Direct employee (labour) cost	xxx	xxx
3.	Direct expenses	xxx	xxx
4.	Prime Cost (1+2+3)	xxx	xxx

5.	Add: Works/ Factory Overheads	xxx	xxx
6.	Gross Works Cost (4+5)	xxx	xxx
7.	Add: Opening Work in Process	xxx	xxx
8.	Less: Closing Work in Process	(xxx)	(xxx)
9.	Works/ Factory Cost (6+7-8)	xxx	xxx
10.	Add: Quality Control Cost	xxx	xxx
11.	Add: Research and Development Cost	xxx	xxx
12.	Add: Administrative Overheads (relating to production activity)	xxx	xxx
13.	Add: Packing cost (primary)	xxx	xxx
14.	Less: Credit for Recoveries/Scrap/By-Products/ misc. income	(xxx)	(xxx)
15.	Cost of Production (9+10+11+12+13-14)	xxx	xxx
16.	Add: Opening stock of finished goods	xxx	xxx
17.	Less: Closing stock of finished goods	(xxx)	(xxx)
18.	Cost of Goods Sold (15+16-17)	xxx	xxx
19.	Add: Administrative Overheads (General)	xxx	xxx
20.	Add: Marketing Overheads:	xxx	xxx
	- Selling Overheads	xxx	xxx
	- Distribution Overheads	xxx	xxx
21.	Cost of Sales (18+19+20)	xxx	xxx

TREATMENT OF VARIOUS ITEMS OF COST IN COST SHEET/STATEMENT

Abnormal costs:

Any abnormal cost, where it is material and quantifiable, shall not form part of cost of production or acquisition or supply of goods or provision of service. Examples of abnormal costs are:

- Cost pertaining to or arising out of a pandemic e.g. COVID-19
- Cost associated with employees due to sudden lockdown.

Subsidy/Grant/Incentives:

Any such type of payment received/ receivable are reduced from the cost objects to which such amount pertains.

Penalty, fine, damages, and demurrage:

These types of expenses do not form part of cost.

Interest and other finance costs:

Interest, including any payment in the nature of interest for use of non-equity funds and incidental cost that an entity incurs in arranging those funds. Interest and finance charges are not included in cost of production. Interest and Financing Charges shall be presented in the cost statement as a separate item of cost of sales.

Advantages of Cost Sheet or Cost Statements

The main advantages of a Cost Sheet are as follows:

- i. It provides the total cost figure as well as cost per unit of production.
- ii. It helps in cost comparison.
- iii. It facilitates the preparation of cost estimates required for submitting tenders.
- iv. It provides sufficient help in arriving at the figure of selling price.
- v. It facilitates cost control by disclosing operational efficiency.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

Farewell Company is a metal and wood cutting manufacturer, selling products to the home construction market. Consider the following data for the year 20x1:

S No	PARTICULARS	AMOUNT
1	Sandpaper	₹ 2,000
2	Materials-handling costs	₹ 70,000
3	Lubricants and coolants	₹ 5,000
4	Miscellaneous indirect manufacturing Labour	₹ 40,000
5	Direct manufacturing labour	₹ 3,00,000
6	Direct materials, January 1, 20x1	₹ 40,000
7	Direct materials, December 31, 20x1	₹ 50,000
8	Finished goods, January 1, 20x1	₹ 1,00,000
9	Finished goods, December 31, 20x1	₹ 1,50,000
10	Work in process, January 1, 20x1	₹ 10,000
11	Work in process, December 31, 20x1	₹ 14,000
12	Plant-leasing costs	₹ 54,000
13	Depreciation – plant equipment	₹ 36,000
14	Property taxes on plant equipment	₹ 4,000
15	Fire insurance on plant equipment	₹ 3,000
16	Direct materials purchased	₹ 4,60,000
17	Revenues	₹ 13,60,000
18	Marketing promotions	₹ 60,000
19	Marketing salaries	₹ 1,00,000
20	Distribution costs	₹ 70,000
21	Customer-service costs	₹ 1,00,000

Required:

1. Prepare an income statement with a separate supporting schedule of cost of goods manufactured. For all manufacturing items, indicate by V or F whether each is basically a variable cost or a fixed cost (where the cost object is a product unit). If in doubt, decide on the basis of whether the total cost will change substantially over a wide range of units produced.
2. Suppose that both the direct materials and plant-leasing costs are tied to the production of 9,00,000 units. What is the unit cost for the direct materials assigned to each unit produced? What is the unit cost of the plant-leasing costs? Assume that the plant-leasing costs are a fixed cost.

3. Repeat the computation in requirement 2 for direct materials and plant-leasing costs, assuming that the costs are being predicted for the manufacturing of 10,00,000 units next year. Assume that the implied cost-behavior patterns persist.
4. As a management consultant, explain concisely to the president why the unit costs for direct materials did not change in requirements 2 and 3 but the unit costs for plant-leasing costs did change.

PROBLEM – 2

LG Manufacturing Corporation began operations at the beginning of the current year. One of the company's products, a refrigeration element, sells for ₹ 185 per unit. Information related to the current year's activities follows:

Variable costs per unit:	
Direct material	₹ 20
Direct Labour	₹ 37
Manufacturing overhead	₹ 48
Annual fixed costs:	
Manufacturing overhead	₹ 6,00,000
Selling and administrative	₹ 8,60,000
Production and sales activity:	
Production (units)	24,000
Sales (units)	20,000

LG carries its finished goods inventory at the average unit cost of production and is subject to a 30% income tax rate. There was no work in process at year-end.

Required:

1. Determine the cost of the December 31 finished goods inventory.
2. Compute LG's net income for the current year ended December 31.
3. If next year's production decreases to 23,000 units and general cost behaviour patterns do not change, what is the likely effect on:
 - The direct-Labour cost of 37 per unit? Why?
 - The fixed manufacturing overhead cost of 6,00,000? Why?
 - The fixed selling and administrative cost of 8,60,000? Why?
 - The average unit cost of production?

PROBLEM – 3

Prepare a cost sheet and compute the income for the given period.

Opening stock of Raw materials	10,000 kgs @ ₹ 20 per kg
Purchases	50,000 kgs @ ₹ 25 per kg
Consumption during the period	55,000 kgs
Direct wages	₹ 6,75,000
Production overheads	₹ 10,00,000
Work in process	Nil
Opening finished goods	1,000 units @ ₹ 550
Production	5,000 units
Units sold	4,500 units @ ₹ 750 per unit
Administration expenses	₹ 2,50,000
Selling expenses	₹ 3,00,000

PROBLEM – 4

Easy feet Shoe Co. manufactures two types of shoes A and B. production costs for the year ended 31st March 20X1 were:

Direct materials	₹ 15,00,000
Direct wages	₹ 8,40,000
Production overhead	₹ 3,60,000

There was no work in progress at the beginning or at the end of the year. It is given that

- a. Direct material in type A shoes consists twice as much as that in type B shoes.
- b. The direct wages for type B were 60% of those for type A shoes.
- c. Production overhead was the same per pair of A and B types.
- d. Administrative overhead for each type was 150% of direct wages.
- e. Selling cost was ₹ 1.50 per pair.
- f. Production during the year was:
 - Type A 40,000 pairs of which 36,000 were sold.
 - Type B 1,20,000 pairs of which 1,00,000 were sold.
- g. The Selling price was ₹44 for type A and ₹28 per pair for type B.

Prepare a Statement showing Cost and Profit for each pair of each type.

PROBLEM – 5

Bright Shoe Polish Company manufactures Black and Brown Polish in one standard size of tin retailing at ₹ 12.00 and ₹ 13.30 respectively. The following information is supplied to you –

PARTICULARS	OPENING STOCK	CLOSING STOCK	SALES
Black Polish	2,400 Tins	5,400 Tins	72,000 Tins
Brown Polish	8,000 Tins	3,000 Tins	30,000 Tins

Cost Details:

Direct Materials:	
Polish	₹2,46,000
Tins	₹1,20,000
Direct Wages	₹ 2,04,000
Production Overhead	₹ 3,06,000
Administration and Selling Overhead	₹ 1,02,000

The Opening Stock of Black and Brown Polish was valued at its Production Cost.

The Cost of Raw Materials for Brown Polish is 10% higher than that for Black, but there is no difference in the cost of tins.

Direct Wages for Brown Polish are 8% higher than those of Black Polish and Production OH are considered to vary with Direct Wages.

Administration and Selling OH are absorbed at a uniform rate per tin of polish sold.

Required:

Prepare a statement to show the Cost and Profit per tin of polish.

PROBLEM – 6

On April 12, after the close of business, Chung Brothers had a devastating fire that destroyed the company's work-in-process and finished- goods inventories. Fortunately, all raw materials escaped damage because materials owned by the firm were stored in another warehouse.

The following information is available:

PARTICULARS	AMOUNT
Sales revenue through April 12	₹3,30,000
Income before taxes through April 12	₹68,000
Direct labor through April 12	₹1,20,000
Cost of goods available for sale, April 12	₹2,75,000
Work-in-process inventory, January 1	₹21,000
Finished-goods inventory, January 1	₹37,000
Gross margin	30% of sales

Chung's accountants determined that the cost of direct materials used normally averages 25 per cent of prime costs (i.e., direct material + direct Labour). In addition, manufacturing overhead is 50 per cent of the firm's total production costs. (Networks cost)

Required:

Chung Brothers are in the process of negotiating a settlement with its insurance company. Prepare an estimate of the cost of work-in-process and finished goods inventories that were destroyed by the fire.

PROBLEM – 7

A distraught employee, Vinayak, put a torch to a manufacturing plant on a blustery February 26. The resulting blaze completely destroyed the plant and its contents. Fortunately, certain accounting records were kept in another building. They reveal the following for the period from January 1, 20X1, to February 26, 20X1:

Direct materials purchases	₹1,60,000
Work in process 1/1/20X1	₹34,000
Direct materials 1/1/20X1	₹16,000
Finished goods 1/1/20X1	₹30,000
Indirect manufacturing costs	40% of conversion costs
Revenues	₹5,00,000
Direct manufacturing labor	₹1,80,000
Prime costs	₹2,94,000
Gross margin percentage based on revenues	20%
Cost of goods available for sale	₹4,50,000

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

Required:

Calculate the cost of:

1. Finished goods inventory, 26/2/20X1.
2. Work-in-process inventory, 26/2/20X1.
3. Direct materials inventory, 26/2/20X1.

PROBLEM – 8

From the following particulars, prepare a Cost Statement showing the component of Total Cost and the Profit for the year ended 31 December.

PARTICULARS	ON 1 st JANUARY	ON 31 st DECEMBER
Stock of Raw Materials	₹ 4,00,000	₹ 5,00,000
Stock of Finished Goods	₹ 60,000	₹ 1,50,000
Stock of Work-In-Progress	₹ 1,50,000	₹ 1,00,000

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
Raw Materials Purchased	₹ 47,50,000	Sales for the year	₹ 90,00,000
Carriage Inwards	₹ 1,25,000	Selling Expenses	₹ 92,500
Wages	₹ 17,50,000	General Expenses	₹ 3,20,000
Works Manager's Salary	₹ 3,00,000	Debenture Interest	₹ 50,000
Salary-Factory Employees	₹ 3,00,000	Dividend Paid	₹ 10,000
Salary-Office Staff	₹ 2,00,000	Income-Tax Provision	₹ 5,000
Salary-Salesmen	₹ 1,00,000	Goodwill written off	₹ 1,00,000
Factory Rent & Insurance	₹ 72,500	Goods and Services Tax Collected and Paid	₹ 1,60,000
Power Expenses	₹ 95,000	Transfer to Machinery Replacement Fund	₹ 1,00,000
Other Production Expenses	₹ 4,20,000	Interest on Loan	₹ 75,000
Bad Debts written off	₹ 15,000	Bank Charges	₹ 5,000
Loose Tools written off	₹ 10,000	Discount Allowed	₹ 27,000
Quality Control Cost	₹ 15,000	Research and Development Cost	₹ 15,000

PROBLEM – 9

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March, 20x1:

Sl. No.	PARTICULARS	AMOUNT	AMOUNT
1	Raw materials purchased		₹10,00,00,000
2	GST paid on the above purchases @18% (eligible for input tax credit)		₹ 1,80,00,000
3	Freight inwards		₹ 11,20,600
4	Wages paid to factory workers		₹ 29,20,000
5	Contribution made towards employees' PF & ESIS		₹ 3,60,000
6	Production bonus paid to factory workers		₹ 2,90,000
7	Royalty paid for production		₹ 1,72,600
8	Amount paid for power & fuel		₹ 4,62,000

9	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)		₹ 8,96,000
10	Job charges paid to job workers		₹ 8,12,000
11	Stores and spares consumed		₹ 1,12,000
12	Depreciation on:		
	Factory building	₹ 84,000	
	Office building	₹ 56,000	
	Plant & Machinery	₹ 1,26,000	
	Delivery vehicles	₹ 86,000	₹ 3,52,000
13	Salary paid to supervisors		₹ 1,26,000
14	Repairs & Maintenance paid for:		
	Plant & Machinery	₹ 48,000	
	Sales office building	₹ 18,000	
	Vehicles used by directors	₹ 19,600	₹ 85,600
15	Insurance premium paid for.		
	Plant & Machinery	₹ 31,200	
	Factory building	₹ 18,100	
	Stock of raw materials & WIP	₹ 36,000	₹ 85,300
16	Expenses paid for quality control check activities		₹ 19,600
17	Salary paid to quality control staffs		₹ 96,200
18	Research & development cost paid for improvement in production process		₹ 18,200
19	Expenses paid for pollution control and Office engineering & maintenance		₹ 26,600
20	Expenses paid for administration of factory work		₹ 1,18,600
21	Salary paid to functional managers:		
	Production control	₹ 9,60,000	
	Finance & Accounts	₹ 9,18,000	
	Sales & Marketing	₹ 10,12,000	₹ 28,90,000
22	Salary paid to General Manager		₹ 12,56,000
23	Packing cost paid for:		
	Primary packing necessary to maintain quality	₹ 96,000	
	For re-distribution of finished goods	₹ 1,12,000	₹ 2,08,000
24	Interest and finance charges paid (for usage of non-equity fund)		₹ 7,20,000
25	Fee paid to auditors		₹ 1,80,000
26	Fee paid to legal advisors		₹ 1,20,000

27	Fee paid to independent directors		₹ 2,20,000
28	Performance bonus paid to sales staffs		₹ 1,80,000
29	Value of stock as on 1st April, 20x0:		
	Raw materials	₹ 18,00,000	
	Work-in-process	₹ 9,20,000	
	Finished goods	₹ 11,00,000	₹ 38,20,000
30	Value of stock on 31st March, 20x1:		
	Raw materials	₹ 9,60,000	
	Work-in-process	₹ 8,70,000	
	Finished goods	₹ 18,00,000	₹ 36,30,000

The amount realized by selling of scrap and waste generated during the manufacturing process is ₹ 86,000/-

From the above data you are required to PREPARE Statement of cost for Arnav Inspat Udyog Ltd. for the year ended 31st March 20x1, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales

PROBLEM -10

XYZ, a Manufacturing Firm, has revealed the following information for September:-

PARTICULARS	1 ST SEPTEMBER	30 TH SEPTEMBER
Raw Materials	₹ 2,42,000	₹ 2,92,000
Work-in-Progress	₹ 2,00,000	₹ 5,00,000

The Firm incurred the following expenses for targeted production of 1,00,000 units during the month:

PARTICULARS	₹
Consumable Stores and Spares of Factory	₹ 3,50,000
Research and Development Cost for process improvements	₹ 2,50,000
Quality Control Cost	₹ 2,00,000
Packing Cost (secondary) per unit of goods sold	₹ 2
Lease Rent of Production Asset	₹ 2,00,000
Administrative Expenses (General)	₹ 2,24,000
Selling and Distribution Expenses	₹ 4,13,000
Finished Goods (Opening)	Nil
Finished Goods (Closing)	5,000 units

- Defective Output which is 4% of targeted production, realizes 61 per unit.
- Closing Stock is valued at Cost of Production (excluding Administrative Expenses)
- Cost of Goods Sold, excluding Administrative Expenses amounts to ₹78,26,000.

- Direct Employees Cost is 1/2 of the Cost of Material Consumed.
- Selling Price of the Output is 110 per unit.

Required:

1. Calculate the Value of Material Purchased.
2. Prepare Cost Sheet showing the Profit earned by the Firm.

PROBLEM -11

The following figures are extracted from the Trial Balance of G.K Co. on 31st March:

PARTICULARS	Dr.	Cr.
	₹	₹
Inventories:		
Finished Stock	80,000	
Raw Materials	1,40,000	
Work-in-Process	2,00,000	
Office Appliances	17,400	
Plant & Machinery	4,60,500	
Building	2,00,000	
Sales		7,68,000
Sales Return and Rebates	14,000	
Materials Purchased	3,20,000	
Freight incurred on Materials	16,000	
Purchase Returns		4,800
Direct employee cost	1,60,000	
Indirect employee cost	18,000	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power	65,000	
Rates and Taxes	6,300	
Miscellaneous Factory Expenses	18,700	
Sales Commission	33,600	
Sales Travelling	11,000	
Sales Promotion	22,500	
Distribution Dept.—Salaries and Expenses	18,000	
Office Salaries and Expenses	8,600	
Interest on Borrowed Funds	2,000	

Further details are available as follows:

i. Closing Inventories:	
Finished Goods	1,15,000
Raw Materials	1,80,000
Work-in-Process	1,92,000
ii. Outstanding expenses on:	
Direct employee cost	8,000
Indirect employee cost	1,200
Interest on Borrowed Funds	2,000
iii. Depreciation to be provided on:	
Office Appliances	5%
Plant and Machinery	10%
Buildings	4%
iv. Distribution of the following costs:	
Heat, Light and Power to Factory, Office and Distribution in the ratio 8: 1: 1.	
Rates and Taxes two-thirds to Factory and one-third to Office.	
Depreciation on Buildings to Factory, Office and Selling in the ratio 8: 1: 1.	

With the help of the above information, you are required to PREPARE a condensed Profit and Loss Statement of G.K Co. for the year ended 31st March along with supporting schedules of:

- Cost of Sales.
- Selling and Distribution Expenses.
- Administration Expenses

PROBLEM – 12

A Ltd. Co. has the capacity to produce 1,00,000 units of a product every month.

Its works cost at varying levels of production is as under:

LEVEL (%)	WORK COST PER UNIT (₹)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340

80%	330
90%	320
100%	310

Its fixed administration expenses amount to ₹ 1,50,000 and fixed marketing expenses amount to ₹ 2,50,000 per month respectively. The variable distribution cost amounts to ₹ 30 per unit.

It can sell 100% of its output at ₹ 500 per unit provided it incurs the following further expenditure:

1. It gives gift items costing ₹ 30 per unit of sale;
2. It has lucky draws every month giving the first prize of ₹ 50,000; 2nd prize of ₹ 25,000, 3rd prize of ₹ 10,000 and three consolation prizes of ₹ 5,000 each to customers buying the product.
3. It spends ₹ 1,00,000 on refreshments served every month to its customers;
4. It sponsors a television program every week at a cost of ₹ 20,00,000 per month.

It can market 30% of its output at ₹ 550 per unit without incurring any of the expenses referred to in (a) to (d) above.

PREPARE a cost sheet for the month showing total cost and profit at 30% and 100% capacity level

PROBLEM – 13

ML Auto Ltd is a manufacturer of auto components and the details of its expenses for the previous year are given below:

PARTICULARS	AMOUNT
Opening Stock of Material	₹ 1,50,000
Closing Stock of Material	₹ 2,00,000
Purchase of Material	₹ 18,50,000
Direct Labour	₹ 9,50,000
Factory Overhead	₹ 3,80,000
Administrative Overhead related to Production Activity	₹ 2,50,400

During next year, the Company has received an order from a Car Manufacturer where it estimates that the Cost of Material and Labour will be ₹ 8,00,000 and ₹ 4,50,000 respectively. ML Auto Ltd charges Factory OH as a Percentage of Direct Labour and Administrative OH related to Production, as a Percentage of Factory Cost based on previous year's cost. The cost of delivery of the components at the Customer's Premises is estimated at ₹45,000.

You are required to -

- a. Calculate the Overhead Recovery Rates based on Actual Costs for the previous year.
- b. Prepare a detailed Cost Statement for the order received in the next year, and the price to be quoted if the Company wants to earn a profit of 10% on Sales.

PROBLEM – 14

A Company produces a Machine and sells it for ₹ 3,000. There is an increase of 20% in the Cost of Material, 10% in Labour, and 10% in Overhead Cost. The only figures available are that Material Cost is 50% of Cost of Sales, Labour Cost is 30% of Cost of Sales and Overhead Cost is 20% of Cost of Sales. The anticipated increased cost in relation to the present Sales Price would cause a 30% decrease in the amount of the present Gross Profit.

What would be the Selling Price of the machine to give the same percentage of Gross Profit as before?

PROBLEM – 15

In a manufacturing Company, Factory Overheads are charged as fixed percentage basis on Direct Labour and Selling Overheads are charged on the basis of percentage of Factory Cost. The following data is available for the year ending 31 March.

Particulars	Product A	Product B
Direct Materials	₹ 19,000	₹ 15,000
Direct Labour	₹ 15,000	₹ 25,000
Sales	₹ 60,000	₹ 80,000
Profit	25% on Cost	25% on Sales price

Ignoring Administration OH, find out-

- (a) % of Factory OH on Direct Labour, and
- (b) % of Selling OH on Factory Cost

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 4)**

The following data relates to the manufacture of a standard product during the month of April:

Particulars	
Raw materials	₹ 1,80,000
Direct wages	₹ 90,000
Machine hours worked (hours)	10,000
Machine hour rate (per hour)	₹ 8
Administration overheads (general)	₹ 35,000
Selling overheads (per unit)	₹ 5
Units produced	4,000
Units sold	3,600
Selling price per unit	₹ 125

You are required to PREPARE a cost sheet in respect of the above showing:

- Cost per unit
- Profit for the month

QFP 2 (Concept Similar to Problem – 2)

The following information has been obtained from the records of ABC Corporation for the period from June 1 to June 30.

Particulars	On June 1 (₹)	On June 30 (₹)
Cost of raw materials	₹ 60,000	₹ 50,000
Cost of work-in-process	₹ 12,000	₹ 15,000
Cost of stock of finished goods	₹ 90,000	₹ 1,10,000
Purchase of raw materials during June		₹ 4,80,000
Wages paid		₹ 2,40,000
Factory overheads		₹ 1,00,000
Administration overheads (related to production)		₹ 50,000
Selling & distribution overheads		₹ 25,000
Sales		₹ 10,00,000

PREPARE a statement giving the following information:

- Raw materials consumed;
- Prime cost;

- c. Factory cost;
- d. Cost of goods sold; and
- e. Net profit

QFP 3 (Concept Similar to Problem – 7)

The books of Adarsh Manufacturing Company present the following data for the month of April:

Direct Labour cost Rs. 17,500 being 175% of works overheads. Cost of goods sold excluding administrative expenses Rs. 56,000.

Inventory accounts showed the following opening and closing balances:

	April 1 (₹)	April 30 (₹)
Raw materials	8,000	10,600
Work-in-progress	10,500	14,500
Finished goods	17,600	19,000

Other data are:

	(₹)
Selling expenses	3,500
General and administration expenses	2,500
Sales for the month	75,000

You are required to:

FIND out the value of materials purchased.

PREPARE a cost statement showing the various elements of cost and also the profit earned

QFP 4 (Concept Similar to Problem – 9)

From the following particulars, you are required to PREPARE monthly cost sheet of Aditya Industries:

	(₹)
Opening Inventories:	
- Raw materials	12,00,000
- Work-in-process	18,00,000
- Finished goods (10,000 units)	9,60,000
Closing Inventories:	
- Raw materials	14,00,000
- Work-in-process	16,04,000
- Finished goods	?

Raw materials purchased	1,44,00,000
GST paid on raw materials purchased (ITC available)	7,20,000
Wages paid to production workers	36,64,000
Expenses paid for utilities	1,45,600
Office and administration expenses paid	26,52,000
Travelling allowance paid to office staffs	1,21,000
Selling expenses	6,46,000

Machine hours worked- 21,600 hours Machine hour rate- ₹ 8.00 per hour Units sold- 1,60,000

Units produced- 1,94,000 Desired profit- 15% on sales

CHAPTER 03: OVERHEADS –

ABSORPTION COSTING METHOD

INTRODUCTION

Overheads are the expenditure which cannot be conveniently traced to or identified with any particular cost unit. Such expenses are incurred for output generally and not for a particular work order e.g., wages paid to watch and ward staff, heating and lighting expenses of factory etc.

CLASSIFICATION OF OVERHEADS

	Description	Example
By Function		
Factory or Manufacturing or Production Overhead	Manufacturing overhead is the indirect cost incurred for manufacturing or production activity in a factory. Manufacturing overhead includes all expenditures incurred from the procurement of materials to the completion of finished product.	1. Stock keeping expenses, 2. Repairs and maintenance of plant, 3. Depreciation of factory building, 4. Indirect Labour, 5. cost of primary packing 6. Insurance of plant and machinery etc. Production overhead includes administration costs relating to production, factory, works or manufacturing.
Office and Administrative Overheads	Office and Administrative overheads are expenditures incurred on all activities relating to general management and administration of an organization. It includes formulating the policy, directing the organization and controlling the operations of an undertaking which is not related directly to production, selling, distribution, research or development activity or function.	1. Salary paid to office staffs, 2. Repairs and maintenance of office building, 3. Depreciation of office building 4. postage and stationery, 5. Lease rental in case of operating lease (in case of finance lease, lease rental excluding finance cost) 6. accounts and audit expenses etc.
Selling and Distribution Overheads	i. Selling overhead: expenses related to sale of products and included all indirect expenses in sales management for the organization.	1. Salesmen commission, 2. Advertisement cost, 3. Sales office expenses etc.

	ii. Distribution overhead: cost incurred on making product available for sale in the market.	1. Delivery van expenses, 2. Transit insurance, 3. warehouse and cold storage expenses, 4. secondary packing expenses etc.
By Nature		
Fixed Overhead	These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in Output.	1. Salary paid to permanent employees, 2. Depreciation of building and plant and equipment, 3. Interest on capital, 4. Insurance.
Variable Overhead	These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa.	1. Indirect materials, 2. Power and fuel, 3. lubricants, 4. tools and spares etc.
Semi-Variable Overheads	These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity.	1. Electricity cost, 2. water cost, 3. telephone and internet expenses etc.
By Element		
Indirect materials	Materials which do not normally form part of the finished product (cost object) are known as indirect materials.	1. Stores used for maintaining machines and buildings (lubricants, cotton waste, bricks etc.) 2. Stores used by service departments like power house, boiler house, canteen etc.
Indirect employee cost	Employee costs which cannot be allocated but can be apportioned to or absorbed by cost units or cost centres is known as indirect employee.	1. Salary paid to foreman and supervisor. 2. Salary paid to administration staff etc.
Indirect expenses	Expenses other than direct expenses are known as indirect expenses, that cannot be directly, conveniently and wholly allocated to cost centres.	1. Rates & taxes, 2. insurance, 3. depreciation, 4. advertisement expenses etc.

By Control		
Controllable costs	These are those costs which can be controlled by the implementation of appropriate managerial influence and proper policies.	1. Materials cost, 2. wages and salary, 3. power and fuel etc.
Uncontrollable costs	Overhead costs which cannot be controlled by the management even after the implementation of appropriate managerial influence and proper policies are known as uncontrollable costs.	1. Rates and taxes, 2. Depreciation, 3. Interest on borrowings.

ACCOUNTING AND CONTROL OF MANUFACTURING OVERHEADS

One method of working out the distribution of overheads over the various products could be to ascertain the amount of actual overheads and distribute them over the products. This, however, creates a problem since the actual amount of overheads can be known only after the financial accounts are closed. If we wait that long, the cost sheets lose their main advantages and utility to the management. All the decisions for which cost sheets are prepared are immediate decisions and cannot be postponed till the actual overheads are known. Therefore, some method has to be found by which overheads can be included in the cost of the products, as soon as prime cost, the cost of raw materials, direct employees and other direct expenses, is ascertained.

One method is to work out pre-determined rates for absorbing overheads. These rates are worked out before an accounting period begins by estimating the amount of overheads and the level of activity in the ensuing period. Thus, as soon as the prime cost of a product or a job is available, the various overheads are charged by these rates. Of course, this implies that the overheads are charged on an estimated basis. Later, when the actual overheads are known, the difference between the overheads charged to the products and actual overheads is worked out and adjusted.

Manufacturing Overheads:

Generally manufacturing overheads form a substantial portion of the total overheads. It is important, that such overheads should be properly absorbed over the cost of production. The following procedure may be adopted in this regard. The steps given below shows how factory overhead rates are estimated and overheads absorbed on that basis and the last one show how actual are compared with the absorbed amount.

Estimation and Collection of Manufacturing Overheads:

The first stage is to estimate the amount of overheads, keeping in view the past figures and adjusting them for known future changes. The sources available for the collection of factory overheads may include (a) Invoices, (b) Stores requisition, (c) Wage analysis book (d) Journal entries. etc.

Assignment of Manufacturing Overheads:

The guiding principle for assignment of manufacturing overheads to a cost object is the traceability of the overheads in an economically feasible manner.

Assignment of the manufacturing overhead is done on the basis of either of the following two principles:

- i. **Cause and Effect:** Cause is the process or operation or activity and effect is the incurrence of cost.
- ii. **Benefit received:** Manufacturing overheads are to be apportioned to various cost objects in proportion to the benefits received by them.

Cost Allocation

The term 'allocation' refers to the direct assignment of cost to a cost object which can be traced directly. It implies relating overheads directly to the various departments. The estimated amount of various items of manufacturing overheads should be allocated to various cost centres or departments.

Cost Apportionment

There are some items of estimated overheads (like the salary of the works manager) which cannot be directly allocated to the various departments and cost centres. Such un allocable expenses are to be spread over the various departments or cost centres on the basis of two principles. This is called apportionment.

Re-Apportionment

Up to the last stage all overheads are allocated and apportioned to all the departments- both production and service departments. Service departments are those departments which do not directly take part in the production of goods or providing services.

Absorption

After completing the distribution as stated above the overheads charged to department are to be recovered from the output produced in respective departments. This process of recovering overheads of a department or any other cost center from its output is called recovery or absorption.

Absorption of manufacturing overheads shall be as follows:

- i. **Variable Manufacturing overheads:** The variable manufacturing overheads shall be absorbed on the basis of actual production.
- ii. **Fixed Manufacturing overheads:** The fixed manufacturing overhead shall be absorbed on the basis of normal capacity.

Treatment Of Over and Under Absorption of Overheads

After the year end the total amount of actual factory overheads is known. There is bound to be some difference between the actual amount of overheads and the absorbed amount of overheads. So, the overheads are generally either under-absorbed or over-absorbed. The difference has to be adjusted keeping in view of such differences and the reasons therefore.

The whole discussion as above is meant to serve the following two purposes:

- i. to charge various products and services with an equitable portion of the total amount of factory overheads; and
- ii. to charge factory overheads immediately as the product or the job is completed without waiting for the figures of actual factory overheads.

STEPS FOR THE DISTRIBUTION OF OVERHEADS

Estimation and Collection of Overheads

The amount of overheads is required to be estimated. The estimation is usually done with reference to past data adjusted for known future changes. The overhead expenses are usually collected through a system of standing orders.

Allocation of Overheads Over Various Departments or Departmentalization of Overheads

Most of the manufacturing processes functions are performed in different departments of a factory. Some of the departments of the factory are engaged in production process while few may function as ancillary departments. The ancillary departments are service departments supporting the production departments in manufacturing, administration, selling & distribution of goods or services.

Advantages of Departmentalization

The collection of overheads department wise gives rise to the following advantages:

1. **Better Estimation of Expenses:** Some expenses which relate to the departments will be estimated almost on an exact basis and, to that extent, the accuracy of estimation of overheads will be higher.
2. **Better Control:** For the purpose of controlling expenses in a department, it is obviously necessary that the figures in relation to each department should be separately available. It is one of the main principles of control that one should know for each activity how much should have been spent and how much is actually spent. If information about expenses is available only for factory as a whole, it will not be possible to know which department has been over spending.
3. **Ascertainment of Cost for each department:** From the point of view of ascertaining the cost of each job, the expenses incurred in the departments through which the job or the product has passed should be known. It is only then that the cost of the job or the product can be charged with the appropriate share of indirect expenses. It is not necessary that a job must pass through all

the departments or that the work required in each department should be the same for all jobs. It is, therefore, necessary that only appropriate charge in respect of the work done in the department is made. This can be done only if overheads for each department are known separately.

- 4. Suitable Method of Costing:** A suitable method of costing can be followed differently for each department e.g., batch costing when a part is manufactured, but single or output costing when the product is assembled.

Apportioning Overhead Expenses Over Various Departments

	Overhead Cost	Bases of Apportionment
1.	i. Rent and other building expenses ii. Lighting and heating (conditioning) iii. Fire precaution service iv. Air- conditioning	Floor area, or volume of department
2.	i. Perquisites ii. Labour welfare expenses iii. Time keeping iv. Personnel office v. Supervision	Number of workers
3.	i. Compensation to workers ii. Holiday pay iii. ESI and PF contribution iv. Perquisites	Direct wages
4.	General overhead	Direct Labour hour, or Direct wages, Machine hours.
5.	i. Depreciation of plant and machinery ii. Repairs and maintenance of plant and machinery iii. Insurance of stock	Capital values
6.	i. Power / steam consumption ii. Internal transport iii. Managerial salaries	Technical estimates
7.	Lighting expenses (light)	No. of light points, or Area or Metered units

8.	Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed.
9.	i. Material handling ii. Stores overhead	Weight of materials, or volume of materials, or value of materials or unit of materials.

Difference between Allocation and Apportionment

Allocation	Apportionment
Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.	Apportionment deals with the proportions of an item of cost for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.
Allocation is a direct process of charging expenses to different cost centres	Apportionment is an indirect process because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.

RE-APPORTIONMENT OF SERVICE DEPARTMENT OVERHEADS OVER PRODUCTION DEPARTMENTS

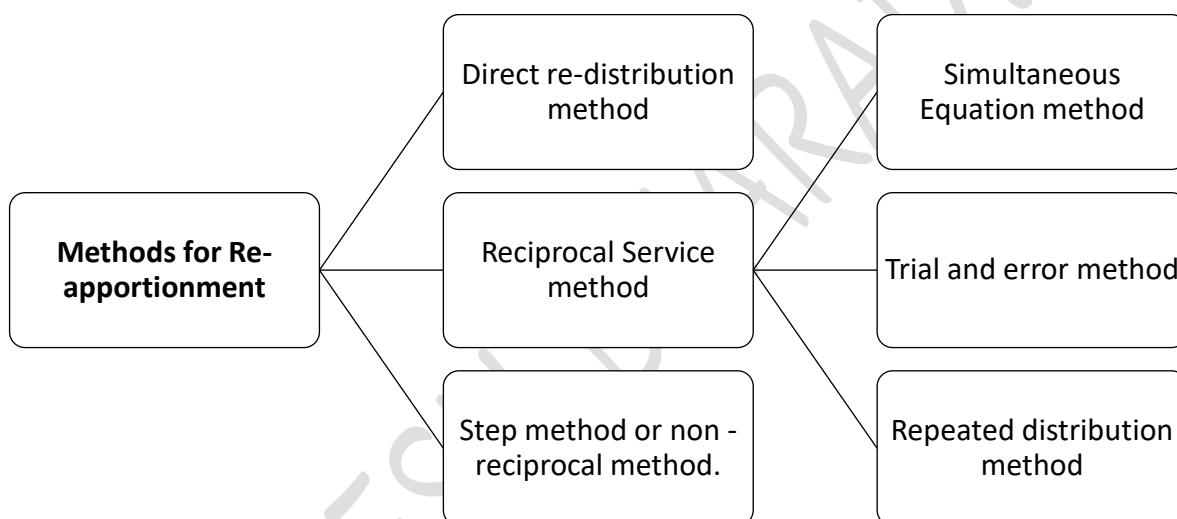
Cost of the Service Departments:	Basis
1. Maintenance and Repair shop 2. Planning and progress 3. Tool room	Direct Labour hours, Machine hours, Direct Labour wages, Asset value x Hours worked
4. Canteen and Welfare 5. Hospital and Dispensary 6. Personnel Department	No of direct workers No. of employees etc.
7. Time-keeping	No. of card punched, No. of employees
8. Computer Section	Computer hours, Specific allocation to departments
9. Power House (electric lighting cost)	Floor area, Cubic content, No. electric of Points, Wattage.
10. Power House (electric power cost)	Horse power, Kwh, Horse power x Machine hours, Kwh x Machine hours
11. Stores Department	No. of requisitions, Weight or value of Materials issued.

12. Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size
13. Fire Protection	Capital values
14. Inspection	Inspection hours

METHODS FOR RE-APPORTIONMENT

The re-apportionment of service department expenses over the production departments may be carried out by using any one of the following methods:

- i. Direct re-distribution method.
- ii. Step method of secondary distribution or non-reciprocal method.
- iii. Reciprocal Service method.



Direct Re-Distribution Method

Service department costs under this method are apportioned over the production departments only, ignoring the services rendered by one service department to the other.

Step Method or Non-Reciprocal Method

This method gives cognizance to the services rendered by service department to another service department. Therefore, as compared to previous method, this method is more complicated because a sequence of apportionments has to be selected here. The sequence here begins with the department that renders maximum number of services to the other service department(s).

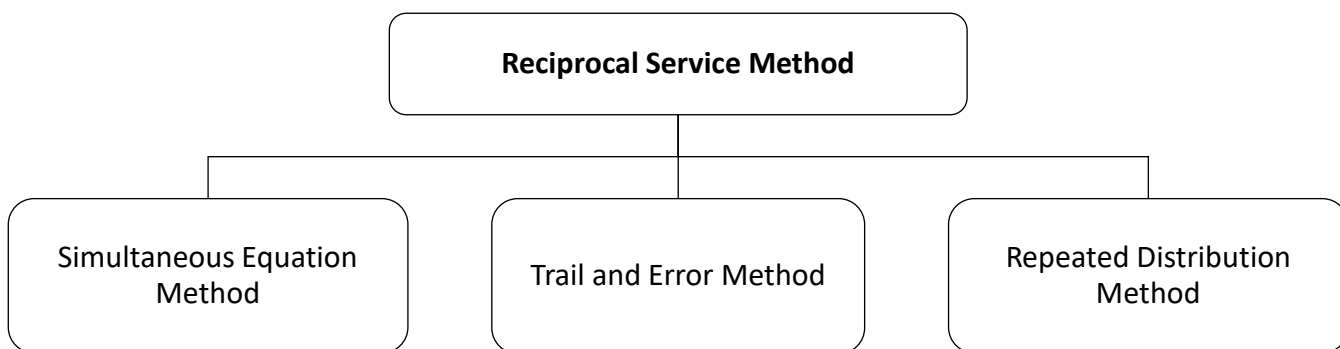
Reciprocal Service Method

This method recognizes the fact that where there are two or more service departments they may render services to each other and, therefore, these inter-departmental services are to be given due weight while re-distributing the expenses of the service departments.

The methods available for dealing with reciprocal services are:

- a. Simultaneous equation method;
- b. Trial and error method;

c. Repeated distribution method.

a. **Simultaneous Equation Method:**

According to this method firstly, the costs of service departments are ascertained. These costs are then re-distributed to production departments on the basis of given percentages.

b. **Trial and Error Method:**

According to this method the cost of one service cost centre is apportioned to another service cost centre. The cost of another service centre plus the share received from the first cost centre is again apportioned to the first cost centre. This process is repeated till the amount to be apportioned becomes negligible, that means repeated distribution method is followed to the extent of service departments only.

c. **Repeated Distribution Method:**

Under this method, service departments' costs are distributed to other service and production departments on agreed percentages and this process continues to be repeated, till the figures of service departments are either exhausted or reduced to too small a figure.

METHODS OF ABSORBING OVERHEADS TO VARIOUS PRODUCTS OR JOBS

The method selected for charging overheads to products or jobs should be such as will ensure:

- i. That the total amount charged (or recovered) in a period does not differ materially from the actual expenses incurred in the period and
- ii. That the amount charged to individual jobs or products is equitable. In case of factory overhead, this means:
 - a. that the time spent on completion of each job should be taken into consideration;
 - b. that a distinction should be made between jobs done by skilled workers and those done by unskilled workers
 - c. that jobs done by manual Labour and those done by machines should be distinguished.

In addition, the methods should be capable of being used conveniently; and yield uniform result from period to period as far as possible; any change that is apparent should reflect a change in the underlying situation such as substitution of human Labour by machines.

Several methods are commonly employed either individually or jointly for computing the appropriate overhead rate.

- I. Percentage of direct materials,
- II. Percentage of prime cost,
- III. Percentage of direct Labour cost,
- IV. Labour hour rate,
- V. Machine hour rate and
- VI. Rate per unit of Output

Percentage of Direct Material Cost

Under this method, the cost of direct material consumed is the base for calculating the amount of overhead absorbed. This overhead rate is computed by the following formula:

$$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Budgeted Direct Material cost of all products}} \times 100$$

Percentage of Prime Cost Method

This method is based on the fact that both materials as well as Labour contribute in raising factory overheads. Hence, the total of the two i.e. Prime cost should be taken as base for absorbing the factory overhead. The overhead rate in this method is computed by the following formula:

$$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Prime cost}} \times 100$$

Percentage of Direct Labour Cost

Formula to be used under this method is:

$$\text{Overhead rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Direct labour cost}} \times 100$$

Advantages	Disadvantages
i. The method is simple and economical to apply.	i. It gives rise to certain inaccuracies due to the time factor not being given full importance.
ii. The time factor is given recognition even if indirectly.	ii. Where machinery is used to some extent in the process of manufacture, an allowance for such a factor is not made.
iii. Total expenses recovered will not differ much from the estimated figure since total wages paid are not likely to fluctuate much.	iii. It does not provide for varying skills of workers

Labour Hour Rate Method

This method is an improvement on the percentage of direct wage basis, as it fully recognizes the significance of the element of time in the incurring and absorption of manufacturing overhead expenses. This method is admirably suited to operations which do not involve any large use of machinery. To calculate Labour hour rate, the amount of factory overheads is divided by the total number of direct Labour hours.

Formula to be used under this method is:

$$\text{Direct Labour Hour rate} = \frac{\text{Total Production Overheads of a Department}}{\text{Direct labour cost}} \times 100$$

Machine Hour Rate Method

Machine hour rate implies, cost of running a machine for an hour to produce goods. There are two methods of computing machine hour rates:

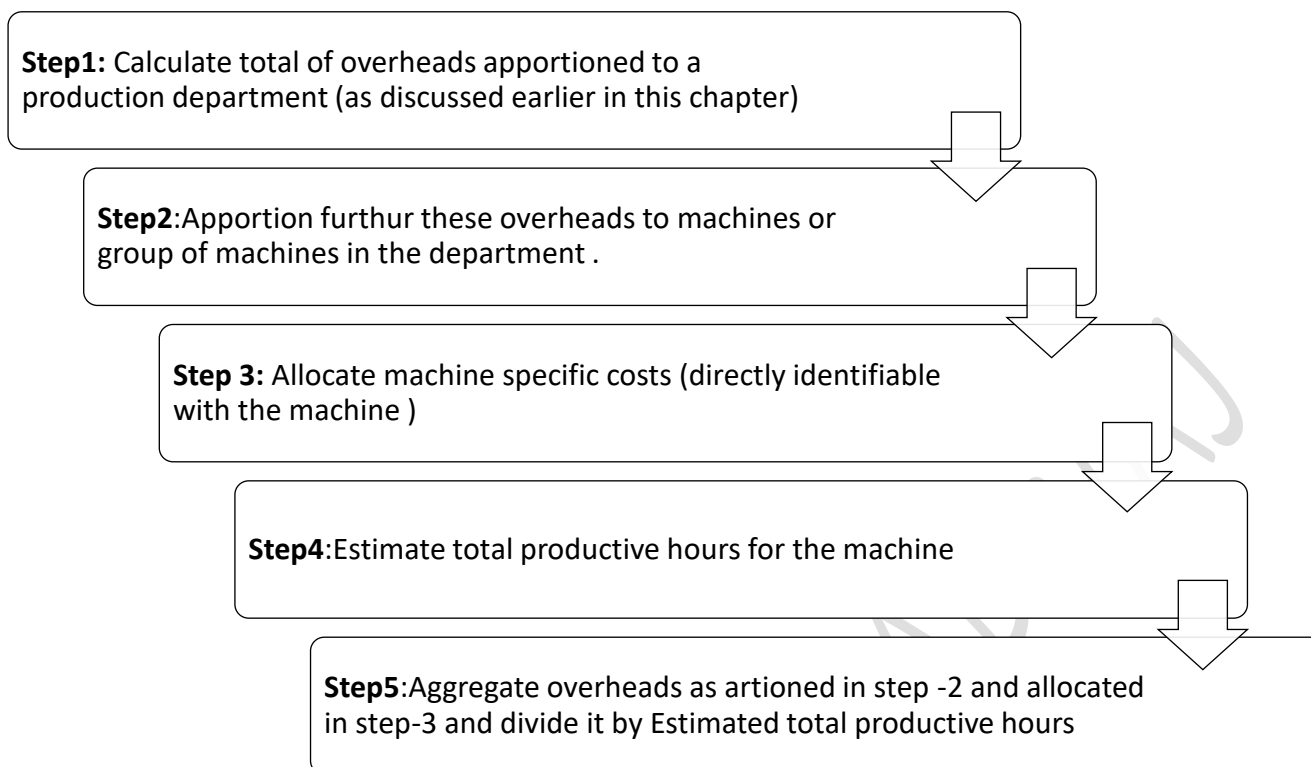
Direct Machine hour rate

According to the first method, only the expenses directly or immediately connected with the operation of the machine are taken into account e.g., power, depreciation, repairs and maintenance, insurance, etc.

Comprehensive Machine hour rate

It will be obvious, however, that in addition to the expenses stated above there may still be other manufacturing expenses such as supervision charges, shop cleaning and lighting, consumable stores and shop supplies, shop general Labour, rent and rates, etc. incurred for the department as a whole and, hence, not charged to any particular machine or group of machines.

The steps involved in determining of Machine hour rate are as follows:



Advantages and disadvantages of Machine hour rate:

Advantages	Disadvantages
1. Where machines are the main factor of production, it is usually the best method of charging machine operating expenses to production.	1. Additional data concerning the operation time of machines, not otherwise necessary, must be recorded and maintained.
2. The under-absorption of machine overheads would indicate the extent to which the machines have been idle.	2. As general department rates for all the machines in a department may be suitable, the computation of a separate machine hour rate for each machine or group of machines would mean further additional work.
3. It is particularly advantageous where one operator attends to several machines (e.g. automatic screw manufacturing machine), or where several operators are engaged on the machine e.g. the belt press used in making conveyer belts.	

TYPES OF OVERHEAD RATES

Type of Overhead Rates			
1. Normal Rate	2. Pre-determined Rate	3. Blanket Rate	4. Departmental Rate

Normal Rate: This rate is calculated by dividing the actual overheads by actual base. It is also known as actual rate. It is calculated by the following formula:

$$\text{Normal overhead Rate} = \frac{\text{Actual amount of overheads}}{\text{Actual base}}$$

Pre-determined Overhead Rate: This rate is determined in advance by estimating the amount of the overhead for the period in which it is to be used. It is computed by the following formula:

$$\text{Pre-determined Rate} = \frac{\text{Budgeted amount of overheads}}{\text{Budgeted base}}$$

The amount of overhead rate of expenses for absorbing them to production may be estimated on the following three bases.

1. The figure of the **previous year or period may be adopted** as the overhead rate to be charged to production in the current year. The assumption is that the value of production as well as overheads will remain constant or that the two will change, proportionately.
2. The overhead rate for the year may be determined on the basis of **estimated expenses and anticipated volume of production activity**.
For instance, if expenses are estimated at Rs.10,000 and output at 4,000 units, the overhead rate will be Rs.2.50 per unit.
3. The **overhead rate for a year may be fixed** on the basis of the normal volume of the business.

Blanket Overhead Rate: Blanket overhead rate refers to the **computation of one single overhead rate for the whole factory**. It is to be distinguished from the departmental overhead rate which refers to a separate rate for each individual cost centre or department. The use of blanket rate may be proper in certain factories producing only one major product in a continuous process or where the work performed in every department is fairly uniform or standardized. This overhead rate is computed as follows:

$$\text{Blanket Rate} = \frac{\text{Total overheads for the factory}}{\text{Total number of units of base for the factory}}$$

A blanket rate should be applied in the following cases:

1. Where only one major product is being produced.
2. Where several products are produced, but
 - a. All products pass through all departments; and
 - b. All products are processed for the same length of time in each department.

Where these conditions do not exist, departmental rates should be used.

Departmental Overhead Rate: It refers to the computation of one single overhead rate for a particular production unit or department. Where the product lines are varied or machinery is used to a varying degree in the different departments, that is, where conditions throughout the factory are not uniform, the use of departmental rates is to be preferred.

This overhead rate is determined by the following formula:

$$\text{Departmental overhead Rate} = \frac{\text{Overheads of department or cost centre}}{\text{Corresponding base}}$$

TREATMENT OF UNDER-ABSORBED AND OVER-ABSORBED OVERHEADS IN COST ACCOUNTING

Overhead expenses are usually applied to production on the basis of pre-determined rates. Production overheads are to be determined in advance for fixing selling price, quote tender price and to formulate budgets etc.

$$\text{Pre-determined overhead rate} = \frac{\text{Estimated/Normal overheads for the period}}{\text{Budgeted Number of units during the period}}$$

The actual overhead rate will rarely coincide with the pre-determined overhead rate, due to variation in pre-determined overhead rate and actual overhead rate. Such a variation may arise due to any one of the following situations:

- i. Estimated overheads for the period under consideration may remain the same or they coincide with actual overheads but the number of units produced during the period is either more or less in comparison with budgeted figure. In the former case actual overhead rate will be less and in the latter case, actual overhead rate will be more than the pre-determined overhead rate, hence over-absorption and under-absorption will occur respectively.
- ii. Similarly, if the number of units actually produced during the period remains the same as budgeted figure but the actual overheads incurred are more or less than the estimated overheads for the period, then a situation of under-absorption or over-absorption will arise respectively.
- iii. If changes occur in different proportion both in the actual overheads and in the number of units produced during the period, then a situation of under or over-absorption (depending upon the situation) will arise.
- iv. If the changes in the numerator (i.e. in actual overheads) and denominator (i.e. in number of units produced) occur uniformly (without changing the proportion between the two) then a situation of neither under nor of over-absorption will arise.

Such over or under-absorption as arrived at under different situations may also be termed as overhead variance. The amount of over-absorption being represented by a credit balance in the accounts and the amount of under-absorption as a debit balance.

The Accounting Is Done As Follows:

In case of Under-absorption:

	ACCOUNTS	DR/CR	CALCULATION OF AMOUNT
1.	Stock of Finished goods A/c	Debit	Units of Finished stock × Supplementary rate per unit
2.	Stock of Semi-finished goods (WIP) A/c	Debit	Equivalent completed units × Supplementary rate per unit
3.	Cost of Sales A/c	Debit	Units sold × Supplementary rate per unit

In case of Over-absorption:

	ACCOUNTS	DR/CR	CALCULATION OF AMOUNT
1.	Stock of Finished goods A/c	Credit	Units of Finished stock × Supplementary rate per unit
2.	Stock of Semi-finished goods (WIP) A/c	Credit	Equivalent completed units × Supplementary rate per unit
3.	Cost of Sales A/c	Credit	Units sold × Supplementary rate per unit

ACCOUNTING AND CONTROL OF ADMINISTRATIVE OVERHEADS

Definition - According to CIMA Terminology, Administrative overhead is defined as “The sum of those costs of general management and of secretarial accounting and administrative services, which cannot be directly related to the production, marketing, research or development functions of the enterprise.” According to this definition, administrative overhead constitutes the expenses incurred in connection with the formulation of policy directing the organization and controlling the operations of an undertaking. These overheads are also collected and classified in the same way as the factory overheads.

Accounting of Administrative Overheads

There are three distinct methods of accounting of administrative overheads, which are briefly discussed below:

a. Apportioning Administrative Overheads between Production and Sales Departments:

According to this method administrative overheads are apportioned over production and sales departments. The reason for the apportionment of overhead expenses over these departments, recognizes the fact that administrative overheads are incurred for the benefit of both of these departments. Therefore, each department should be charged with the proportionate share of the same. When this method is adopted, administrative overheads lose their identity and get merged with production and selling and distribution overheads.

Disadvantages:

1. It is difficult to find suitable bases of administrative overhead apportionment over production and sales departments.
2. Lot of clerical work is involved in apportioning overheads.
3. It is not justified to apportion total administrative overheads only over production and sales departments when other equally important department like finance is also there.

b. Charging to Profit and Loss Account: According to this method administrative overheads are charged to Costing Profit & Loss Account. The reason for charging to Costing Profit & Loss are firstly, the administrative overheads are concerned with the formulation of policies and thus are not directly concerned with either the production or the selling and distribution functions. Secondly, it is difficult to determine a suitable basis for apportioning administrative overheads over production and sales departments. Lastly, these overheads are the fixed costs. In view of these arguments, administrative overheads should be charged to Profit and Loss Account.

Disadvantages:

1. Cost of products is understated as administrative overheads are not charged to costs.
2. The exclusion of administrative overheads from cost of products is against sound accounting principle.

c. Treating Administrative Overheads as a separate addition to Cost of Production/ Sales: This method considers administration as a separate function like production and sales and, as such costs relating to formulating the policy, directing the organization and controlling the operations are taken as a separate charge to the cost of the jobs or a product, sold along with the cost of other functions. The bases which are generally used for apportionment are:

- i. Works cost
- ii. Sales value or quantity
- iii. Gross profit on sales
- iv. Quantity produced
- v. Conversion cost, etc.

Control of Administrative Overheads

Mostly administrative overheads are of fixed nature, and they arise as a result of management policies. These fixed overheads are generally non-controllable. But at the same time these overheads should not be allowed to grow disproportionately. Some degree of control has to be exercised over them. The methods usually adopted for controlling administrative overheads are as follows:

- i. **Classification and analysis of overheads by administrative departments according to their functions, and a comparison with the accomplished results:** According to this method the expenses incurred by each administrative department are collected under a standing order for each class of expenditure. These are compared with similar figures of the previous period in relation to accomplishment. Such a comparison will reveal efficiency or inefficiency of the concerned department.
However, this method provides only a limited degree of control and comparison does not give useful results if the level of activity is not constant during the periods under comparison. To overcome this difficulty, overhead absorption rates may also be compared from period to period; the extent of over or under absorption will reveal the efficiency or otherwise of the department. It may be possible to compare the cost of a service department with that of similar services obtainable from outside and a decision may be taken whether it is economical to continue the department or entrust the work to outsiders.
- ii. **Control through Budgets:** According to this method, administration budgets (monthly or annually) are prepared for each department. The budgeted figures are compared with actual ones to determine variances. The variances are analysed and responsibility assigned to the concerned department to control these variances.
- iii. **Control through Standard:** Under this method, standards of performance are fixed for each administrative activity, and the actual performance is compared with the standards set. In this way, standards serve not only as yardstick of performance but also facilitate control of costs.

ACCOUNTING AND CONTROL OF SELLING AND DISTRIBUTION OVERHEADS

Selling cost or overhead expenses are the expenses incurred for the purpose of promoting the marketing and sales of different products. Distribution expenses, on the other hand, are expenses relating to delivery and dispatch of goods sold. Examples of selling and distribution expenses have been considered earlier in this booklet. From the definitions it is clear that the two types of expenses represent two distinct type of functions. Some concerns group together these two types of overhead expenses into one composite class, namely, selling and distribution overhead, for the purpose of Cost Accounting.

Accounting of Selling and Distribution Overheads

The collection and accumulation of each expense is made by means of appropriate standing orders in the usual way. Where it is decided to apportion apart of the administrative overhead to the selling division the same should also be collected through appropriate standing orders.

As in the case of administrative overheads, it is not easy to determine an entirely satisfactory basis for computing the overhead rate for absorbing selling overheads. The bases usually adopted are:

- a. Sales value of goods;
- b. Cost of goods sold;
- c. Gross Profit on sales; and
- d. Number of orders or units sold.

It is considered that the sale value is ordinarily the most logical basis, there being some connection between the amount of sales and the amount of expenses incurred to achieve them. The cost of production, however, is not as satisfactory basis as it may not have any direct relationship with the selling and distribution cost.

The basis of gross profit on sales results in a larger share of the selling overhead being applied to goods yielding a large margin of profit and vice versa. The basis therefore follows the principle of 'ability to pay, it may not reflect costs or incurred efforts.

An estimated amount per unit - The best method for absorbing selling and distributing expenses over various products is to separate fixed expenses from variable expenses. Apportion the fixed expenses according to the benefit derived by each product and thus ascertaining the fixed expenses per unit.

We give below some of the fixed expenses and the basis of apportionment:

Expenses	Basis
Salaries in the Sales Department and of the sales men.	Estimated time devoted to the sale of various products.
Advertisement	Actual amount incurred for each product since these days it is usual to advertise each product separately; common expenses, such as in an exhibition, should be apportioned on the basis of advertisement expenditure on each product.
Show Room expenses	Average space occupied by each product.
Rent of finished goods godowns and Expenses on own delivery vans	Average quantities delivered during a period.

If a suitable basis for apportioning expenses does not exist it may be apportioned in the proportion of sales of various products.

The total of fixed expenses apportioned in this manner, divided by the number of units sold or likely to be sold, will give the fixed expenses per unit. To this should be added the variable expenses which will be different for each product. These expenses are, packaging, freight outwards, insurance in transit, commission payable to salesmen, rebate allowed to customers, etc. All these items will be worked out per unit for each product separately. These items added to fixed expenses per unit will give an estimated amount of the selling and distribution expenses per unit.

Control of Selling and Distribution Overheads

Control of selling and distribution expenses is a difficult task. The reasons for this are as follows:

1. The incidence of selling and distribution overheads depends mainly on external factors, such as distance of market, extent and nature of competition, terms of sales, etc. which are beyond the control of management.
2. These overheads are dependent upon the customers, behaviour, their liking and disliking, tastes etc. Therefore, as such control over the overheads may result in loss of customers.
3. These expenses being of the nature of policy costs are not amenable to control.

In spite of the above difficulties, the following methods may be used for controlling them.

- a. **Comparison with past performance** - According to this method, selling and distribution overheads are compared with the figures of the previous period. Alternatively, the expenses may be expressed as a percentage of sales, and the percentages may be compared with those of the past period. This method is suitable for small concerns.
- b. **Budgetary Control** - A budget is set up for selling and distribution expenses. The expenses are classified into fixed and variable. If necessary, a flexible budget may be prepared indicating the expenses at different levels of sales. The actual expenses are compared with the budgeted figures and in the case of variances suitable actions are taken.
- c. **Standard Costing** - Under this method standards are set up in relation to the standard sales volume. Standards may be set up for salesmen, territories, products etc. Once the standards are set up, comparison is made between the actuals and standards: variances are enquired into and suitable action taken.

CONCEPTS RELATED TO CAPACITY

- i. **Installed/ Rated capacity:** It refers to the maximum capacity of producing goods or providing services. Installed capacity is determined either on the basis of technical specification or through a technical evaluation. **It is also known as theoretical capacity** and is could not be achieved in normal operating circumstances.

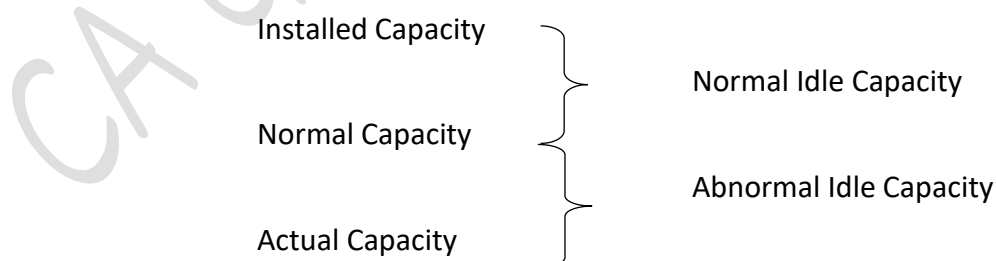
- ii. **Practical capacity:** It is defined as **actually utilized capacity of a plant. It is also known as operating capacity.** This capacity takes into account loss of time due to repairs, maintenance, minor breakdown, idle time, set up time, normal delays, Sundays and holidays, stock taking etc. Generally, practical capacity is taken between 80 to 90% of the rated capacity. It is also used as a base for determining overhead rates. Practical capacity is also called net capacity or available capacity.
- iii. **Normal capacity:** Normal capacity is the **volume of production or services achieved or achievable** on an average over a period under normal circumstances taking into account the reduction in capacity resulting from planned maintenance.

Normal capacity is determined as under:

Installed capacity		xxx
Adjustments for:		
i. Time lost due to scheduled preventive or planned maintenance	xxx	
ii. Number of shifts or machine hours or man hours		
iii. Holidays, normal shut down days, normal idle time	xxx	
iv. Normal time lost in batch change over	xxx	xxx
Normal Capacity		xxx

- iv. **Actual capacity:** It is the capacity actually achieved during a given period. It is presented as a percentage of installed capacity.
- v. **Idle capacity:** It is that part of the capacity of a plant, machine or equipment which cannot be effectively utilized in production.
- (a) **Normal Idle Capacity:** It is the difference between Installed capacity and Normal capacity.
- (b) **Abnormal Idle Capacity:** It is the difference between Normal capacity and Actual capacity utilization where the actual capacity is lower than the normal capacity.

The idle capacity may arise due to lack of product demand, non-availability of raw material, shortage of skilled Labour, absenteeism, shortage of power fuel or supplies, seasonal nature of product etc.



Treatment of Idle capacity costs: Idle capacity costs can be treated in product costing, in the following ways:

- a. If the idle capacity cost is due to unavoidable reasons such as repairs, maintenance, changeover of job etc. a supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilized.

- b. If the idle capacity cost is due to avoidable reasons such as faulty planning, power failure etc.; the cost should be charged to costing profit and loss account.
- c. If the idle capacity cost is due to seasonal factors, then, the cost should be charged to the cost of production by inflating overhead rates.

TREATMENT OF CERTAIN ITEMS IN COSTING

- i. **Interest and financing charges:** It includes any payment in nature of interest for use of non-equity funds and incidental cost that an entity incurs in arranging those funds. Example of interest and financing charges are interest on borrowings, financing charges in respect of finance leases, cash discount allowed to customers. The term interest and financing charges, finance costs and borrowing costs are used interchangeably. **It does not include imputed costs.** Interest and financing charges shall be presented in the cost statement as a separate item of cost of sales.
- ii. **Depreciation:** Depreciation "is the diminution in the intrinsic value of an asset due to use and/or the lapse of time." Depreciation is thus the result of two factors viz., the use, and the lapse of time. We know that each fixed asset loses its intrinsic value due to their continuous use and as such the greater the use the higher is the amount of depreciation. The loss in the intrinsic value may also arise even if the asset in question is not in service.

Assignment of Depreciation:

It shall be traced to the cost object to the extent economically feasible. Where it is not directly traceable it should be assigned using either or two principles i.e. (i) Cause and Effect and (ii) Benefit received.

- iii. **Packing expenses: Cost of primary packing** necessary for protecting the product or for convenient handling, should **become a part of the production cost**. The **cost of packing to facilitate the transportation** of the product from the factory to the customer should **become a part of the distribution cost**. If the cost of special packing is at the request of the customer, the same should be charged to the specific work order or the job. The cost of fancy packing necessary to attract customers is an advertising expenditure. Hence, it is to be treated as a selling overhead.
- iv. **Fringe benefits:** These are the additional payments or facilities provided to the workers apart from their salary and direct cost-allowances like house rent, dearness and city compensatory allowances. These benefits are given in the form of overtime, extra shift duty allowance, holiday pay, pension facilities etc.
These indirect benefits stand to improve the morale, loyalty and stability of employees towards the organization. If the amount of fringe benefit is considerably large, it may be recovered as direct charge by means of a supplementary wage or Labour rate; otherwise, these may be collected as part of production overheads.

- v. **Expenses on removal and re-erection of machines:** Expenses are sometime incurred on removal and re-erection of machinery in factories. Such expenses may be incurred due to factors like change in the method of production; an addition or alteration in the factory building, change in the flow of production, etc. **All such expenses are treated as production overheads.** When amount of such expenses is large, it may be spread over a period of time. If such expenses are incurred due to faulty planning or some other abnormal factor, then they may be charged to costing Profit and Loss Account.
- vi. **Bad debts:** There is no unanimity among different authors of Cost Accounting about the treatment of bad debts. One view is that 'bad debts' should be excluded from cost. According to this view bad debts are financial losses and therefore, they should not be included in the cost of a particular job or product.
- According to another view it should form part of selling and distribution overheads, especially when they arise in the normal course of trading. Therefore, bad debts should be treated in cost accounting in the same way as any other selling and distribution cost. However extra ordinarily large bad debts should not be included in cost accounts.
- vii. **Training expenses:** Training is an essential input for industrial workers. Training expenses in fact includes wages of workers, costs incurred in running training department, loss arising from the initial lower production, extra spoilage etc. Training expenses of factory workers are treated as part of the cost of production. The training expenses of office; sales or distribution workers should be treated as office; sales or distribution overhead as the case may be. These expenses can be spread over various departments of the concern on the basis of the number of workers on roll. Training expenses would be abnormally high in the case of high Labour turnover such expenses should be excluded from costs and charged to the costing profit and loss account.
- viii. **Canteen expenses:** The subsidy provided or expenses borne by the firm in running the canteen should be regarded as a production overhead. If the canteen is meant only for factory workers therefore these expenses should be apportioned on the basis of the number of workers employed in each department. If office workers also take advantage of the canteen facility, a suitable share of the expenses should be treated as office overhead.
- ix. **Carriage and cartage expenses:** It includes the expenses incurred on the movement (inward and outwards) and transportation of materials and goods. Transportation expenses related to direct material may be included in the cost of direct material and those relating to indirect material (stores) may be treated as factory overheads. Expenses related to the transportation of finished goods may be treated as distribution overhead.
- x. **Expenses for welfare activities:** All expenses incurred on the welfare activities of employees in a company are part of general overheads. Such expenses should be apportioned between factory, office, selling and distribution overheads on the basis of number of persons involved.

- xi. Night shift allowance:** Workers in the factories, which operate during night time are paid some extra amount known as 'night shift allowance'. This extra amount is generally incurred due to the general pressure of work beyond normal capacity level and is treated as production overhead and recovered as such. If this allowance is treated as part of direct wages, the jobs/production carried at night will be costlier than jobs/production performed during the day. However, if additional expenditure on night shift is incurred to meet some specific customer order, such expenditure may be charged directly to the order concerned. If night shifts are run due to abnormal circumstances, the additional expenditure should be charged to the costing profit and loss account.
- xii. Research and Development Expenses:** The Terminology defines research expenses as "the expenses of searching for new or improved products, new application of materials, or new or improved methods." Similarly, development expenses are defined as "the expenses of the process which begins with the implementation of the decision to produce a new or improved product." If research is conducted in the methods of production, the research expenses should be charged to the production overhead; while the expenditure becomes a part of the administration overhead if research relates to administration. Similarly, market research expenses are charged to the selling and distribution overhead. Development costs incurred in connection with a particular product should be charged directly to that product. Such expenses are usually treated as "deferred revenue expenses," and recovered as a cost per unit of the product when production is fully established. General research expenses of a routine nature incurred on new or improved methods of manufacture or the improvement of the existing products should be charged to the general overhead. Even in this case, if the amount involved is substantial it may be treated as a deferred revenue expenditure, and spread over the period during which the benefit would accrue. Expenses on fundamental research, not relating to any specific product, are treated as a part of the administration overhead. Where research proves a failure, the cost associated with it should be excluded from costs and charged to the costing Profit and Loss Account.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

The following figures are extracted from the accounts of a manufacturing concern for the month of September, 20x1 –

Particulars		₹
Indirect materials:		
- Production Dept.	P1	₹ 950
- Production Dept.	P2	₹ 1,200
- Production Dept.	P3	₹ 200
- Maintenance Dept.	S1	₹ 1,500
- Stores Dept.	S2	₹ 400
Indirect wages:		
- Production Dept.	P1	₹ 900
- Production Dept.	P2	₹ 1,100
- Production Dept.	P3	₹ 300
- Maintenance Dept.	S1	₹ 1,000
- Stores Dept.	S2	₹ 650
Power and light		₹ 6,000
Insurance on assets		₹ 1,000
Rent and rates		₹ 2,800
Meal charges		₹ 3,000

Depreciation on capital value of assets is 6% per annum. From the above information prepare a primary distribution summary with the following departmental data:

PARTICULARS	PRODUCTION COST CENTRES			SERVICE COST CENTRES	
	P1	P2	P3	S1	S2
Area (sq. m.)	4,000	4,000	3,000	2,000	1,000
Capital value of assets (000)	100	120	80	60	40
Kilowatt hours	4,000	4,400	1,600	1,500	500
Number of employees	90	120	30	40	20

PROBLEM – 2

A Ltd. manufactures a number of products. It has two production departments P1 and P2 and service departments S1 and S2. The estimated overhead costs for 20x1 and interdepartmental relationship matrix are as follows:

SERVICE PROVIDED BY	SERVICE PROVIDED TO			
	P1	P2	S1	S2
S1	40%	50%	-	10%
S2	50%	30%	20%	-
Estimated overhead (₹)	₹ 7,000	₹ 6,000	₹ 18,000	₹ 8,000

You are required to calculate overhead costs for P1 and P2 using -

- Direct apportionment method;
- Step method of apportionment –
 - Apportioning S1 costs first, and
 - Apportioning S2 costs first;
- Reciprocal method of apportionment –
- Repeated distribution method,
- Simultaneous equations method, and
- Trial & Error Method.

PROBLEM – 3

A factory is having three production departments A, B and C, and two service departments Boiler-house and pump room. The boiler-house has to depend upon the pump - room for supply of water and pump room in its turn is dependent on the boiler-house for the supply of steam power for driving the pump. The expenses incurred by the production departments during a period are A – ₹ 8,00,000; B – ₹ 7,00,000; and C – ₹ 5,00,000.

The expenses for the boiler-house are ₹ 2,34,000 and the pump - room – ₹ 3,00,000.

The expenses of the boiler-house and pump- room are apportioned to the production departments on the following basis

PARTICULARS	A	B	C	B.H	P.R
Expenses of boiler-house	20%	40%	30%	-	10%
Expenses of pump-room	40%	20%	20%	20%	-

Show clearly as to how the expenses of boiler- house and pump-room would be apportioned to A, B and C departments. Use algebraically equation.

PROBLEM – 4

A manufacturing company has two production departments P1 and P2, and three service departments, time-keeping, stores and maintenance. The departmental distribution summary showed the following expenses for December, 20x1:

PARTICULARS	AMOUNT (₹)
Production department P1	₹ 24,000
Production department P2	₹ 16,000
Service Dept.-Stores	₹ 5,000
Service Dept.-Time keeping	₹ 4,000
Service Dept.-Maintenance	₹ 3,000
Total	₹ 52,000

Additional information:

PARTICULARS	PRODUCTION DEPARTMENT		SERVICE DEPARTMENT		
	P1	P2	STORES	TIME KEEPING	MAINTENANCE
No. of employees	20	15	10	8	5
No. of requisitions	12	10	-	-	3
Machine hours	2400	600	-	-	-

Apportion the service department expenses to production cost centres P1 and P2.

PROBLEM – 5

An engine manufacturing company has two production departments:

- A. Snow mobile engine and
- B. Boat engine

and two service departments:

- 1. Maintenance and
- 2. Factory office

Budgeted cost and relevant cost drivers are:

DEPARTMENT	COST
Snow mobile	₹ 6,00,000
Boat engine	₹ 17,00,000
Maintenance	₹ 2,40,000
Factory office	₹ 3,00,000

Cost drivers are as under:

DEPARTMENT	FACTORY OFFICE DEPARTMENT	MAINTENANCE DEPARTMENT
COST DRIVER	NUMBER OF EMPLOYEES	NUMBER OF WORK ORDERS
Snow mobile engine department	1080 employees	570 orders
Boat engine department	270 employees	190 orders
Factory office department	--	40 orders
Maintenance department	150 employees	--
Total	1500 employees	800 orders

Required

- Compute the Cost driver allocation percentage and then use these percentages to allocate the service department costs by using the Repeated Distribution method.
- Compute the cost driver allocation percentage and then use these percentages to allocate the service department costs by using the non-Reciprocal services method-direct method.

PROBLEM – 6

Super class Co. Ltd. has three production departments X, Y and Z and two service departments A and B.

The following estimated figures for a certain period have been made available: -

PARTICULARS	AMOUNT (₹)
Rent and Rates	₹ 10,000
Lighting and Electricity	₹ 1,200
Indirect Wages	₹ 3,000
Power	₹ 3,000
Depreciation of Machinery	₹ 20,000
Other Expenses and Sundries	₹ 20,000

Following are further details which are also available: -

PARTICULARS	TOTAL	X	Y	Z	A	B
Floor Space (Sq. mts)	10,000	2,000	2,500	3,000	2,000	500
Light Points (Nos.)	120	20	30	40	20	10
Direct wages	₹ 20,000	₹ 6,000	₹ 4,000	₹ 6,000	₹ 3,000	₹ 1,000
Horsepower of machine	300	120	60	100	20	-
Cost of Machinery (₹)	₹ 1,00,000	₹ 24,000	₹ 32,000	₹ 40,000	₹ 2,000	₹ 2,000
Working hours		4,670	3,020	3,050	-	-

The expenses of the service departments A and B are to be allocated as follows: -

PARTICULARS	X	Y	Z	A	B
A	20%	30%	40%	-	10%
B	40%	20%	30%	10%	-

You are required to calculate the overhead absorption rate per hour in respect of the three production departments.

What will be the total cost of an article with a material cost of 80 and direct labour cost of 40 which passes through X, Y and Z for 2, 3 and 4 hours respectively?

PROBLEM – 7

AC Limited is a small company that undertakes a variety of jobs for its customers.

Budgeted profit and loss statement for the year ending 31 December 20x1.

PARTICULARS	AMOUNT (₹)	AMOUNT (₹)
Sales		₹ 7,50,000
Cost:		
Direct materials	₹ 1,00,000	
Direct wages	₹ 50,000	
Prime cost	₹ 1,50,000	
Fixed production overhead	₹ 3,00,000	
Production cost	₹ 4,50,000	
Selling, Distribution and Administration cost	₹ 1,60,000	₹ 6,10,000
Profit		₹ 1,40,000
Budgeted data:		
Labour hours for the year	25,000	

Machine hours for the year	15,000	
Number of jobs for the year	300	

An enquiry has been received, and the production department has produced estimates of the prime cost involved and of the hours required to complete job A57.

PARTICULARS	AMOUNT (₹)
Direct materials	₹ 250
Direct wages	₹ 200
Prime cost	₹ 450
Labour hours required	80
Machine hours required	50

You are required to:

- A. Calculate by different methods six overhead absorption rates;
- B. Calculate cost estimates for job A57 using in turn each of the six overhead absorption rates calculated in (a).

PROBLEM – 8

ABC Ltd manufactures a single product and absorbs production overheads at a predetermined rate of ₹ 10 per machine hour.

At the end of the financial year, it has been found that actual production overheads incurred were ₹6,00,000. It included ₹ 45,000 on account of written off obsolete stores and ₹ 30,000 being the wages paid for the strike period under an award.

The production and sales data for the year are as under:

Finished goods produced: 20000 units

WIP [50% complete in all aspects]: 8,000 units

Goods sold: 18,000 units.

The actual machine hrs worked during the year was 48,000 hours. It has been found that one-third of the under absorption was due to lack of production planning and the rest were attributable to a normal increase in costs.

You are required to:

- i. Calculate the amount of under absorption of production overheads during the year.
- ii. Show the accounting treatment of under absorption of production overheads.

PROBLEM – 9

In a manufacturing unit, Overhead was recovered at a pre-determined rate of ₹ 20 per labour hour. The total Factory OH paid and the labour-hours actually worked were ₹ 45,00,000 and 2,00,000 labour-hours respectively. During this period 30,000 units were sold. At the end of the period, 5,000 units were held in stock while there was no Opening Stock of Finished Goods. Similarly, though there was no stock of uncompleted units at the beginning of the period, at the end of the period there were 10,000 uncompleted units, which may be reckoned at 50% complete.

The cost accountant was able to obtain the following other information:

1. Actual factory OH included the following items:
 - a. ₹ 1,25,000 paid to workers for a strike period under an award of the labour court.
 - b. ₹ 25,000 being a penalty paid for contravention of Central Excise Rules.
 - c. ₹ 40,000 being obsolete stores now written off.
 - d. ₹ 10,000 paid towards Consumables, relating to prior periods, now paid after settlement of a dispute.
2. ₹ 2,00,000 of Factory OH for the period was still payable and not yet accounted in the books.

On analysing the reasons, it was found that 60% of the unabsorbed OH were due to defective planning and the rest were attributable to an increase in OH costs. How would Unabsorbed OH be treated in cost accounts?

PROBLEM – 10

Your company uses an integrated accounting system and applies overheads on the basis of “pre-determined” rates. The following figures are extracted from the Trial balance as at 31st March.

PARTICULARS	AMOUNT (₹)	PARTICULARS	AMOUNT (₹)
Manufacture Overhead	₹ 4,26,544 Dr.	Work-in- Progress	₹ 1,41,480 Dr.
Manufacture Overhead applied	₹ 3,65,904 Dr.	FG stock	₹ 2,30,732 Dr.
		Cost of goods sold	₹ 8,40,588 Dr.

You are required to show the profit implications of treating under-absorption under the following methods:

- A. Write off to Profit and Loss Account;
- B. Adjustment to cost of sales and inventories of WIP and Finished goods.

PROBLEM – 11

A manufacturing company has four production departments. Overhead is absorbed to its production departments by means of department rates per direct labour hours.

In a particular year, there was a large difference between the overheads incurred and overhead absorbed.

On analysis, you get the following information:

PARTICULARS	DEPARTMENTS			
	1	2	3	4
Overhead incurred	₹ 12,320	₹ 44,385	₹ 18,180	₹ 16,720
Actual direct labour hour worked	30,800	80,700	40,400	30,400
Estimated department rate used	₹ 0.5	₹ 0.45	₹ 0.4	₹ 0.5
Total overhead absorbed	₹ 15,400	₹ 36,315	₹ 16,160	₹ 15,200
Direct labour hour contained in:				
Work- in-progress	3,000	10,400	1,900	7,200
Finished goods	4,300	8,300	4,000	2,900

You are required to:

- Calculate for each department the direct labour hour rates of overhead incurred.
- Calculate the extent to which the value of work-in-progress and finished goods be increased or decreased for each department for the year in view of the correct rate.
- What will be the impact on the total profit of the company in view of the correction in (b) above?

PROBLEM – 12

The Pipe Company manufacture two products, A and B during the first year of its operations. For purposes of product costing, an overhead rate of application of ₹ 1.70 per direct-labour hour was used, based on budgeted factory overhead of ₹ 3,40,000 and budgeted direct-labour hours of 2,00,000 as follows.

	BUDGETED OVERHEAD	BUDGETED HOURS
Department 1	₹ 2,40,000	1,00,000
Department 2	₹ 1,00,000	1,00,000
Total	₹ 3,40,000	2,00,000

The number of labour hours required to manufacture each of these products was:

	Product A	Product B
In Dept. 1	4	1
In Dept. 2	1	4
Total	5	5

At the end of the year, there was no work in process. There were, however, 2,000 and 6,000. Finished Units, respectively, of products A and B on hand. Assume that budgeted activity was attained.

- What was the effect on the Company's income of using a plant wise overhead rate instead of departmental overhead rates?
- Assume that material and labour costs per unit of Product A were ₹ 10/- and that the selling price was established by adding 40 per cent to cover profit, what selling price results from the use of departmental against plant wise overhead rates?
- Explain why departmental overhead rates were generally preferable to plant wise rates.

PROBLEM – 13

A machine shop has 8 identical Drilling Machines manned by 6 operators. The machines cannot be worked without an operator wholly engaged on it. The original cost of all these 8 machines works out to ₹ 8 lakhs. These particulars are furnished for a six month period:-

Normal available hours per month	208
Absenteeism (without pay) - hours	18
Leave (with pay) – hours	20
Normal idle time unavoidable – hours	10
Average rate of wages per day of 8 hours	₹ 20
Production Bonus estimated on Wages	15%
Value of Power consumed	₹ 8,050
Supervision and Indirect Labour	₹ 3,300
Lighting and Electricity	₹ 1,200

The following particulars are for a year:

- Repairs and maintenance including consumables 3% on the value of machines.
- Insurance ₹ 40,000.
- Depreciation 10% on original cost.
- Other Sundry works expenses ₹ 12,000.
- General Management expenses allocated ₹ 54,530.

You are required to work out a comprehensive machine hour rate for the Machine Shop.

PROBLEM – 14

Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

	(₹)
Rent for a quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

During the first month of operation the following details were taken from the job register:

Number of hours the machine was used:	Job		
	A	B	C
(a) Without the use of the computer	600	900	-
(b) With the use of the computer	400	600	1000

You are required to **COMPUTE** the machine hour rate

- For the firm as a whole for the month when the computer was used and when the computer was not used
- For the individual Jobs A, B and C

PROBLEM – 15

In an engineering company, the factory overheads are recovered on a fixed percentage basis on direct wages and the administrative overheads are absorbed on a fixed percentage basis on factory cost. The company has furnished the following data relating to two jobs undertaken by it in a period:

PARTICULARS	Job 101 (₹)	Job 102 (₹)
Direct materials	₹ 54,000	₹ 37,500
Direct wages	₹ 42,000	₹ 30,000
Selling price	₹ 1,66,650	₹ 1,28,250
Profit percentage on Total Cost	10%	20%

Required:

- COMPUTATION of percentage recovery rates of factory overheads and administrative overheads.
- CALCULATION of the amount of factory overheads, administrative overheads and profit for each of the two jobs.
- Using the above recovery rates DETERMINE the selling price of job 103. The additional data being:

Direct materials	₹ 24,000
Direct wages	₹ 20,000
Profit percentage on selling price	12-½ %

PROBLEM – 16

Job No. 198 was commenced on October 10, 20x1 and completed on November 1, 20x1. Materials used were 6,000 and labour charged directly to the job was 4,000. Other information is as follows:

Machine No. 215 used for 40 hours, the machine hour rate being ₹ 35.

Machine No. 160 used for 30 hours, the machine hour rate being ₹ 40. Six welders worked on the job for five days of 8 hours each. The Direct labour hour per welder is ₹ 20.

General expenses related to production not included for calculating either the machine hour or direct labour hour rate totalled ₹ 20,000, total direct wages for the period being ₹ 2,00,000. COMPUTE the works costs for job No. 198.

PROBLEM – 17

A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below.

DEPARTMENT	DIRECT MATERIAL (₹)	DIRECT WAGES (₹)	FACTORY OVERHEADS (₹)	DIRECT LABOUR HOURS	MACHINE HOURS
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

DEPARTMENT	DIRECT MATERIAL (₹)	DIRECT WAGES (₹)	DIRECT LABOUR HOURS	MACHINE HOURS
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

Required:

1. COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of Job No. CW 7083.
2. Suggest any suitable alternative method(s) of absorption of the factory overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by you.
3. DETERMINE the selling price of Job CW 7083 based on the overhead application rates calculated in (2) above.
4. CALCULATE the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

PROBLEM -18

A light engineering factory fabricates machine parts for customers. The factory commenced fabrication of 12 nos. Machine parts as per customers' specifications, the expenditure incurred on the job for the week ending 21st August, 20x1 is as tabulated below:

PARTICULARS	AMOUNT (₹)	AMOUNT (₹)
Direct materials (all items)		780
Direct labour (Manual) 20 hours @ ₹ 15 per hour		300
Machine facilities:		
Machine No. I: [4 hours @ ₹ 45]	180	
Machine No. II: [6 hours @ ₹ 65]	390	570
Total		1,650
Overheads @ ₹ 8 per hour on 20 manual hours		160
Total cost		₹ 1,810

The overhead rate of ₹ 8 per hour is based on 3,000 man-hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week. After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, 20x1, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

PREPARE a Cost Sheet for the job for the fabrication of 12 nos. Machine parts duly levying the supplementary rates.

PROBLEM – 19

A Ltd. manufactures two products A and B. The manufacturing division consists of two production departments P_1 and P_2 and two service departments S_1 and S_2 . Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P_1 is based on direct machine-hours, while the rate of Department P_2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

- Cost of Department S_1 to Department P_1 and P_2 equally, and
- Cost of Department S_2 to Department P_1 and P_2 in the ratio of 2:1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

PRODUCTION DEPARTMENTS		SERVICE DEPARTMENTS	
P_1	P_2	S_1	S_2
₹ 25,50,000	₹ 21,75,000	₹ 6,00,000	₹ 4,50,000

Budgeted output in units:

Product A - 50,000; B - 30,000.

Budgeted raw-material cost per unit:

Product A - 120; Product B - 150.

Budgeted time required for production per unit:

Department P_1	Product A: 1.5 machine hours
	Product B: 1.0 machine hour

	Products			
	A	B	C	D
Sales (₹)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of goods sold (₹)	20,00,000	45,00,000	21,00,000	22,50,000
Area of storage (Sq.ft.)	50,000	40,000	80,000	30,000
Number of parcels sent	1,00,000	1,50,000	75,000	1,75,000
Number of invoices sent	80,000	1,40,000	60,000	1,20,000

Selling and Distribution overheads and the basis of allocation are:

	Amount (₹)	Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Area of storage (Sq. ft.)
Depreciation	1,00,000	No. of Parcels sent
Salesmen's salaries & expenses	6,00,000	Sales Volume
Administrative wages and salaries	5,00,000	No. of invoices sent
Variable Costs:		
Packing wages & materials	Rs. 2 per parcel	
Commission	4% of sales	
Stationery	Rs. 1 per invoice	

You are required to PREPARE Costing Profit & Loss Statement, showing the percentage of profit or loss to sales for each product.

ADDITIONAL QUESTIONS FOR PRACTICE**QFP 1 (Concept Similar to Problem – 8)**

In a manufacturing unit, factory overhead was recovered at a pre-determined rate of Rs. 25 per man-day. The total factory overhead expenses incurred and the man-days actually worked were Rs. 41.50 lakhs and 1.5 lakh man-days respectively. Out of the 40,000 units produced during a period, 30,000 were sold. On analysing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and the rest were attributable to increase in overhead costs.

EXPLAIN how would unabsorbed overheads be treated in Cost Accounts?

QFP 2 (Concept Similar to Problem – 8)

In a factory, overheads of a particular department are recovered on the basis of Rs. 5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were Rs. 80,000 and 10,000 hours respectively. Of the amount of Rs. 80,000, Rs. 15,000 became payable due to an award of the Labour Court and Rs. 5,000 was in respect of expenses of the previous year booked in the current month (August). Actual production was 40,000 units, of which 30,000 units were sold. On analysing the reasons, it was found that 60% of the under-absorbed overhead was due to defective planning and the rest was attributed to normal cost increase. SHOW the treatment of over/under-absorbed overhead in the cost accounts?

QFP 3 (Concept Similar to Problem – 8)

The total overhead expenses of a factory are Rs. 4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at Rs. 1.25 per hour. The actual hours worked were 2,93,104. STATE how would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work-in-progress?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency.

QFP 4 (Concept Similar to Problem – 4)

Deccan Manufacturing Ltd., have three departments which are regarded as production departments. Service departments' costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department:

Department	Factory overhead (Rs.)	Direct labour hours	No. of employees	Area in sq.m.
Production:				
X	₹ 1,93,000	4,000	100	3,000
Y	₹ 64,000	3,000	125	1,500
Z	₹ 83,000	4,000	85	1,500
Service:				
P	₹ 45,000	1,000	10	500
Q	₹ 75,000	5,000	50	1,500
R	₹ 1,05,000	6,000	40	1,000
S	₹ 30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz. P, Q, R and S respectively on the following basis.

Department Basis

- P** Number of employees
- Q** Direct labour hours
- R** Area in square metres
- S** Direct labour hours

You are required to:

- a. PREPARE a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and
- b. CALCULATE the overhead recovery rate per direct labour hour for each of the three production departments.

QFP 5 (Concept Similar to Problem – 6)

The ABC Company has the following account balances and distribution of direct charges on 31st March.

	Total	Production Depts.		Service Depts.	
		Machine shop	Packing	Gen. Plant	Store & Maintenance
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Allocated Overheads:					
Indirect labour	₹ 14,650	₹ 4,000	₹ 3,000	₹ 2,000	₹ 5,650
Maintenance material	₹ 5,020	₹ 1,800	₹ 700	₹ 1,020	₹ 1,500

Misc. supplies	₹1,750	₹400	₹1,000	₹150	₹200
Superintendent's salary	₹4,000	—	—	₹4,000	—
Cost & payroll salary	₹10,000	—	—	₹10,000	—
Overheads to be apportioned:					
Power	₹8,000				
Rent	₹12,000				
Fuel and heat	₹6,000				
Insurance	₹1,000				
Trade License fees	₹2,000				
Depreciation	₹1,00,000				
	₹1,64,420	₹6,200	₹4,700	₹17,170	₹7,350

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space (Sq ft)	Radiator Sections	No. of Employees	Investment (Rs.)	H.P hours
Machine Shop	2,000	45	20	6,40,000	3,500
Packing	800	90	10	2,00,000	500
General Plant	400	30	3	10,000	-
Store & Maintenance	1,600	60	5	1,50,000	1,000
	4,800	225	38	10,00,000	5,000

Expenses charged to the stores and maintenance departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%; General Plant overheads is distributed on the basis of number of employees

Prepare

- An overhead distribution statements.
- Distribution of the service departments' expense to production departments.

QFP 6 (Concept Similar to Problem – 13)

A machine shop cost centre contains three machines of equal capacities. To operate these three machines nine operators are required i.e., three operators on each machine. Operators are paid Rs.20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- i. Depreciation 10% per annum on original cost of the machine. Original cost of each machine is Rs.52,000.
- ii. Maintenance and repairs per week per machine are Rs.60.
- iii. Consumable stores per week per machine are Rs.75.
- iv. Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.
- v. Apportionment to the cost centre: Rent per annum Rs.5,400, Heat and Light per annum Rs.9,720, foreman's salary per annum Rs.12,960 and other miscellaneous expenditure per annum Rs.18,000.

Required:

- i. Calculate the cost of running one machine for a four-week period.

QFP 7 (Concept Similar to Problem – 13)

A machine costing Rs. 1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be Rs. 9,00,000. Repairs during the whole life of the machine are expected to be Rs. 18,00,000 and the machine is expected to run 4,380 hours per year on the average.

Its electricity consumption is 15 units per hour, the rate per unit being Rs. 5. The machine occupies one-fourth of the area of the department and has two points out of a total of ten for lighting.

The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is Rs. 30,000 and the lighting charges amount to Rs. 8,000 per month. The foreman is paid a monthly salary of Rs. 19,200. FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are Rs. 900 per month

CHAPTER 04: ACTIVITY BASED COSTING

INTRODUCTION

As discussed in the previous chapter i.e. Overheads, in Traditional Costing System, overhead costs are grouped together under cost center and then absorbed into product costs on either of the basis such as direct Labour hours, machine hours, volume etc. In certain cases, this traditional costing system gives inaccurate cost information.

Though, it should not be assumed that all traditional absorption costing systems are not accurate enough to give adequate information for pricing purposes or other long-run management decision purposes. Some traditional systems treat overheads in a detailed way and relate them to service cost centres as well as production cost centres.

The service centre overheads are then spread over the production cost centres before absorption rates are calculated. The main cause of inaccuracy is in the calculation of the overhead rate itself, which is usually based on direct Labour hours or machine hours. These rates assume that products that take longer to make, generate more overheads and so on.

Organizations, who do not wish to know how much it costs to make a product with precise accuracy, may be happy with traditional costing system. Others, however, fix their price on cost basis and need to determine it with reasonable accuracy. The latter organizations have been greatly benefitted from the development of activity-based costing (ABC), which is considered as a modern absorption costing method, and was evolved to give more accurate product costs.

Factors prompting the development of ABC

Various factors lead to the development of ABC include:

1. Growing overhead costs because of increasingly automated production
2. Increasing market competition, which necessitated more accurate product costs.
3. Increasing product diversity to secure economies of scope & increased market share.
4. Decreasing costs of information processing because of continual improvements and increasing application of information technology.

Usefulness/Suitability of ABC

ABC is particularly needed by organizations for product costing in the following situations:

1. **High amount of overhead:** When production overheads are high and form significant costs, ABC is more useful than traditional costing system.
2. **Wide range of products:** ABC is most suitable, when, there is diversity in the product range or there are multiple products.
3. **Presence of non-volume related activities:** When non-volume related activities e.g. material

handling, inspection set-up, are present significantly and traditional system cannot be applied, ABC is a superior and better option. ABC will identify non-value-adding activities in the production process that might be a suitable focus for attention or elimination.

4. **Stiff competition:** When the organization is facing stiff competition and there is an urgent requirement to compute cost accurately and to fix the selling price according to the market situation, ABC is very useful. ABC can also facilitate in reducing cost by identifying non-value-adding activities in the production process that might be a suitable focus for attention or elimination.

MEANING AND DEFINITION

Activity Based Costing is an accounting methodology that assigns costs to activities rather than products or services. This enables resources & overhead costs to be more accurately assigned to products & services that consume them. ABC is a technique which involves identification of cost with each cost driving activity and making it as the basis for apportionment of costs over different cost objects/ jobs/ products/customers or services.

CIMA defines 'Activity Based Costing' as "An approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilise cost drivers to attach activity costs to outputs."

MEANING OF TERMS USED IN ABC

1. **Activity:** Activity, here, refers to an event that incurs cost.
2. **Cost Object:** It is an item for which cost measurement is required e.g. a product or a customer.
3. **Cost Driver:** It is a factor that causes a change in the cost of an activity. There are two categories of cost driver.

Resource Cost Driver: It is a measure of the quantity of resources consumed by an activity. It is used to assign the cost of a resource to an activity or cost pool.

Activity Cost Driver: It is a measure of the frequency and intensity of demand, placed on activities by cost objects. It is used to assign activity costs to cost objects.

4. **Cost Pool:** It represents a group of various individual cost items. It consists of costs that have same cause and effect relationship. Example machine set-up.

Examples of Cost Drivers:

Business Functions	Cost Driver
Research and Development	Number of research projects Personnel hours on a project
Design of products, services and procedures	Number of products in design Number of parts per product Number of engineering hours
Customer Service	Number of service calls
	Number of products serviced Hours spent on servicing products
Marketing	Number of advertisements Number of sales personnel Sales revenue
Distribution	Number of units distributed Number of customers

COST ALLOCATION UNDER ABC

Under activity-based cost allocation overheads are attributed to products on the activity base. Traditionally, overhead costs are grouped together under cost centre and then absorbed into product costs on some basis such as direct Labour hours. Activity based costing identifies the activities which cause cost to be incurred and searches for fundamental cost drivers of these activities. Once the activities and their cost drivers have been identified this information can be used to assign overheads to cost objects (e.g. products) which have actually caused cost to be incurred.

TRADITIONAL ABSORPTION COSTING VS ABC

Cost Allocation under Traditional and Activity Based Costing System In traditional absorption costing overheads are first related to cost centres (Production & Service Centres) and then to cost objects, i.e., products. In ABC overheads are related to activities or grouped into cost pools. Then they are related to the cost objects, e.g., products. The two processes are, therefore, very similar, but the first stage is different, as ABC uses activities instead of functional departments (cost centres).

Difference between Activity Based Costing and Traditional Absorption Costing

Activity Based Costing	Traditional Absorption Costing
1. Overheads are related to activities and grouped into activity cost pools.	1. Overheads are related to cost centres / departments.

2. Costs are related to activities and hence are more realistic.	2. Costs are related to cost centres and hence not realistic of cost behaviour.
3. Activity-wise cost drivers are determined.	3. Time (Hours) are assumed to be the only cost driver governing costs in all departments.
4. Activity-wise recovery rates are determined and there is no concept of a single overhead recovery rate.	4. Either multiple overhead recovery rates (for each department) or a single overhead recovery rate may be determined for absorbing overheads.
5. Cost are assigned to cost objects, e.g., customers, products, services, departments, etc.	5. Costs are assigned to Cost Units i.e., to products, or jobs or hours.
6. Essential activities can be simplified and unnecessary activities can be eliminated. Thus, the corresponding costs are also reduced/ minimized. Hence ABC aids cost control.	6. Cost Centres/ departments cannot be eliminated. Hence, not suitable for cost control.

LEVEL OF ACTIVITIES UNDER ABC METHODOLOGY/COST HIERARCHY

These categories are generally accepted today, but were first identified by Cooper (1990). The categories of activities help to determine the type of activity cost driver required.

The categories of activities are:

Level of Activities	Meaning	Example
Unit level activities	These are those activities for which the consumption of resources can be identified with the number of units produced.	- The use of indirect materials/consumables tends to increase in proportion to the number of units produced. - The inspection or testing of every item produced, if this was deemed necessary or, perhaps more likely, every 100th item produced.
Batch level activities	The activities such as setting up of a machine or processing a purchase order are performed each time a batch of goods is produced. The cost	- Material ordering—where an order is placed for every batch of production - Machine set-up costs—where machines need resetting between each different batch of production.

	of batch related activities varies with number of batches made, but is common (or fixed) for all units within the batch.	• Inspection of products where the first item in every batch is inspected rather than every 100th item quoted above.
Product level activity	These are the activities which are performed to support different products in product line	• Designing the product, • Producing parts specifications • Keeping technical drawings of products up to date.
Facilities level activities	These are the activities which cannot be directly attributed to individual products. These activities are necessary to sustain the manufacturing process and are common and joint to all products manufactured	• Maintenance of buildings • Plant security

STAGES IN ACTIVITY BASED COSTING (ABC)

The different stages in ABC calculations are listed below:

1. Identify the different activities within the organization:

Usually, the number of cost centres that a traditional overhead system uses is quite small, say up to fifteen. In ABC, the number of activities will be much more, say 200; the exact number will depend on how the management subdivides the organization's activities. It is possible to break the organization down into many very small activities. But if ABC is to be acceptable as practical system it is necessary to use larger groupings, say, 40 activities may be used in practice. The additional number of activities over cost centres means that ABC should be more accurate than the traditional method regardless of anything else. Some activities may be listed as follows: -

- Production schedule changes
- Customer liaison
- Purchasing
- Production process set up
- Quality control
- Material handling
- Maintenance

2. Relate the overheads to the activities, both support and primary, that caused them. This creates 'cost pools' or 'cost buckets. This will be done using resource cost drivers that reflect causality.

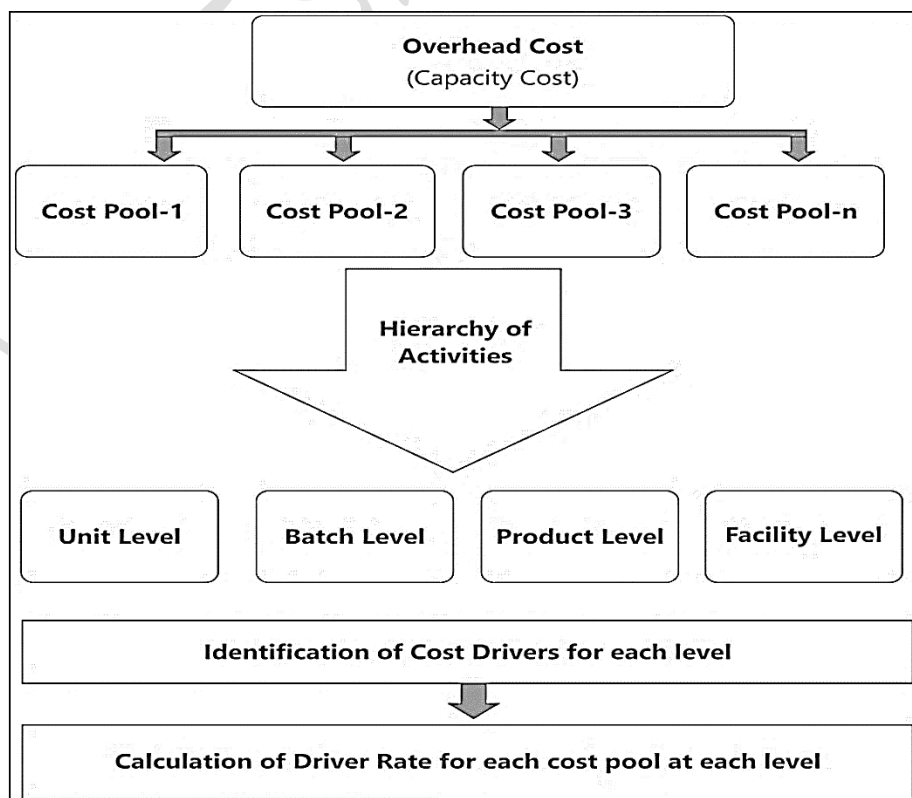
3. **Support activities are then spread across the primary activities** on some suitable base, which reflects the use of the support activity. The base is the cost driver that is the measure of how the support activities are used.
4. **Determine the activity cost drivers** that will be used to relate the overheads collected in the cost pools to the cost objects/products. This is based on the factor that drives the consumption of the activity. The question to ask is – what causes the activity to incur costs? In production scheduling, for example, the driver will probably be the number of batches ordered.
5. **Calculate activity cost driver rates for each activity**, just as an overhead absorption rate would be calculated in the traditional system.

$$\text{Activity cost driver rate} = \frac{\text{Total cost of activity}}{\text{Activity driver}}$$

The activity driver rate can be used not only to identify cost of products, as in traditional absorption costing, but it can also be used for costing other cost objects such as customers/customer segments and distribution channels. The possibility of costing objects other than products is part of the benefit of ABC. The activity cost driver rates will be multiplied by the different amounts of each activity that each product/other cost object consumes.



The process of calculating cost driver rate is illustrated in diagrammatic presentation as below:



ADVANTAGES OF ACTIVITY BASED COSTING

The main advantages of using Activity Based Costing are:

- i. More accurate costing of products/services.
- ii. Overhead allocation is done on logical basis.
- iii. It enables better pricing policies by supplying accurate cost information.
- iv. Utilizes unit cost rather than just total cost
- v. Help to identify non-value added activities which facilitates cost reduction.
- vi. It is helpful to the organizations with multiple products.
- vii. It highlights problem areas which require attention of the management.

LIMITATIONS OF ACTIVITY BASED COSTING

The main limitations using Activity Based Costing are:

- i. It is more expensive, particularly in comparison with traditional costing system.
- ii. It is not helpful to the small organizations.
- iii. It may not be applied to organizations with limited products.
- iv. Selection of the most suitable cost driver may not be easy/ may be difficult or complicated.

REQUIREMENTS IN ABC IMPLEMENTATION

A number of distinct practical stages are required in the ABC implementation which are given as below:

1. **Staff Training:** The co-operation of the workforce is critical to the successful implementation of ABC. Staff training should be done to create an awareness on the purpose of ABC.
2. **Process Specification:** Informal, but structured interviews with key members of personnel will identify the different stages of the production process, the commitment of resources to each, processing times and bottlenecks.
3. **Activity Definition:** The activities must be defined clearly in the early stage in order to manage the problems, if any, effectively. There might be overloading of information from the new data, but the same is needed in codification.
4. **Activity Driver Selection:** Cost driver for each activity shall be selected.
5. **Assigning Cost:** A single representative activity driver can be used to assign costs from the activity pools to the cost objects.

PRACTICAL APPLICATIONS OF ACTIVITY BASED COSTING**As a Decision-Making Tool**

ABC can act as a decision making tool in the following ways:

- i. ABC along with some other cost management technique can be utilized to improve performance and profitability of an organization.

- ii. Wholesale distributors can gain significant advantage in the decision- making process through implementation of ABC concepts by correlating costs to various activities. Introduction of new product or vendor can be better decided through ABC.
- iii. ABC can assist in decisions related to facility and resource expansion. Often the basis for relocation or opening of a new distribution center is based on **cost associations**. Reduction in freight or other logistic costs can offset the expense of the new facility, staff or equipment. The **ABC model** can identify the specific cost elements being targeted, providing a much clearer picture which aids in management actions.
- iv. ABC augments decision support for human resources. Since the activity (and therefore costs) can be associated to an individual, new levels of financial performance can be determined. This might be evident in the case of branch management or sales.
- v. Companies who wish to determine price based on cost plus markup basis find ABC method of costing very relevant and are able to determine competitive prices for their products.

As Activity Based Management

Meaning of Activity Based Management

The term Activity Based Management (ABM) is used to describe the cost management application of ABC. **The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Management (ABM).** ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Various analysis in Activity Based Management

The various types of analysis involved in ABM are as follows:

1. **Cost Driver Analysis:** The factors that cause activities to be performed need to be identified in order to manage activity costs. Cost driver analysis identifies the causal factors.
2. **Activity Analysis.**
 - a. **Value-Added Activities (VA):** The value-added activities are those activities which are indispensable in order to complete the process. The customers are usually willing to pay (in some way) for these services. For example, polishing furniture by a manufacturer dealing in furniture is a value added activity.
 - b. **Non-Value-Added Activities (NVA):** The NVA activity **represents work that is not valued by the external or internal customer**. NVA activities do not improve the quality or function of a product or service, but they can adversely affect costs and prices. Moving materials and machine set up for a production run are examples of NVA activities.
3. **Performance Analysis:** Performance analysis involves the **identification of appropriate measures to report the performance of activity centres** or other organizational units, consistent with each unit's goals and objectives.

Activity Based Management in Business

Activity Based Management can be used in the following ways

- i. **Cost Reduction:** ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.
- ii. **Business Process Re-engineering:** Business process re-engineering **involves examining business processes and making substantial changes to how organisation currently operates**. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.
- iii. **Benchmarking:** Benchmarking is a process of **comparing of ABC-derived activity costs of one segment of company with those of other segments**. It requires uniformity in the definition of activities and measurement of their costs.
- iv. **Performance Measurement:** Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities.

Area	Measure
Quality of purchased component	Zero defects
Quality of output	% yield
Customer awareness	Orders; number of complaints

Facilitate Activity Based Budgeting**Meaning of Activity Based Budgeting (ABB)**

Activity based budgeting **analyse the resource input or cost for each activity**. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to highlight both, in financial and non-financial terms, those activities with major discrepancies from budget for potential reduction in supply of resources. It is a planning and control system which seeks to support the objectives of continuous improvement. It means planning and controlling the expected activities of the organization to derive a cost-effective budget that meet forecast workload and agreed strategic goals. ABB is the reversing of the ABC process to produce financial plans and budgets.

Key Elements of ABB

The three key elements of activity based budgeting are as follows:-

- ♦ Type of work to be done
- ♦ Quantity of work to be done
- ♦ Cost of work to be done

Benefits of ABB

Few benefits of activity based budgeting are as follows:-

- i. Activity Based Budgeting (ABB) can enhance accuracy of financial forecasts and increasing management understanding.
- ii. When automated, ABB can rapidly and accurately produce financial plans and models based on varying levels of volume assumptions.
- iii. ABB eliminates much of the needless rework created by traditional budgeting techniques.

Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

Indirect expenses expended by a Machine shop in a factory during a period amounted to ₹ 1,00,000. The machine running time for the period is 10,000 hours. The details of the utilization of the machine time are as follows:

PRODUCT	PRODUCTION	MACHINE TIMES
A	200 units	5000 hours
B	100 units	5000 hours

Trace the overhead cost per unit to the two products using the Traditional overhead absorption system.

The company collected more details relating to the activities performed by its Machine shop to enable tracing indirect costs using the ABC system.

ACTIVITY	COST POOL	COST DRIVER	COST DRIVER CONSUMPTION	
			Product A	Product B
Machine running	₹ 60,000	Machine hours	5000 hrs	5000 hrs
Set up	₹ 15,000	Setup time	3000 hrs	2000 hrs
Inspection	₹ 25,000	Inspection time	1500 hrs	3500 hrs
Total	₹ 1,00,000			

Trace the overhead cost per unit to the two products using the ABC system.

PROBLEM – 2

Having attended a CIMA course on Activity-Based Costing (ABC) you decide on an experiment by applying the principles of ABC to the four products currently made and sold by your company. Details of the four products and relevant information are given below for one period:

PRODUCT	A	B	C	D
Output in units	120	100	80	120
Costs per unit:				
Direct materials	₹ 40	₹ 50	₹ 30	₹ 60
Direct labour	₹ 28	₹ 21	₹ 14	₹ 21
Machine hours (per unit)	4	3	2	3

The four products are similar and are usually produced in production runs of 20 units and sold in batches of 10 units.

Using a machine hour rate currently absorb the production overhead, and the total of the production overhead for the period has been analysed as follows:

PARTICULARS	AMOUNT
Machine department costs (rent, depreciation and supervision)	₹ 10,430
Setup costs	₹ 5,250
Stores receiving	₹ 3,600
Inspection/Quality control	₹ 2,100
Materials handling and dispatch	₹ 4,620
Total	₹ 26,000

You have ascertained that the 'cost drivers' to be used are as listed below for the overhead cost shown:

COST	COST DRIVER
Set up costs	Number of production runs
Stores receiving	Requisition raised
Inspection/Quality control	Number of production runs
Materials handling and dispatch	Orders executed

The number of requisitions raised on the stores was 20 for each product and the number of orders executed was 42, each order being for a batch of 10 of a product.

You are required:

- To calculate the total costs for each product if all overhead costs are absorbed on a machine hour basis;
- To calculate the total costs for each product, using activity-based costing;
- To calculate and list the unit product cost from your figures in (a) and (b) above, to show the differences and to comment briefly on any conclusions, which may be drawn which could have pricing and profit implications.

PROBLEM – 3

ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct-labour hour. The budgeted overheads and direct-labour hours for the month of December, 20x1 are ₹ 12,42,500 and 20,000 hours respectively.

The information about Company's products is as follows:

PARTICULARS	EQUIPMENT Y	EQUIPMENT Z
Budgeted Production volume	2,500 units	3,125 units
Direct Material cost	300 per unit	450 per unit
Direct labour cost		
Y : 3 hours @ 150 per hour; Z : 4 hours @ 150 per hour	450	600

ABC Ltd.'s overheads of ₹ 12,42,500 can be identified with three major activities:

Order Processing (₹ 2,10,000), machine processing (₹ 8,75,000), and product inspection (₹ 1,57,500).

These activities are driven by the number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	ORDERS PROCESSED	MACHINE HOURS WORKED	INSPECTION WORKS
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

1. Assuming use of direct-labour hours to absorb/apply overheads to production, compute the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.
2. Assuming use of activity-based costing, compute the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.
3. ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, calculate the amount of cost distortion (under-costed or over-costed) for each equipment.

PROBLEM – 4

Deepak Ltd is a Warehousing and Distribution Company, which receives products from customers, stores the products and then re- packs them for distribution as required. There are three customers for whom the services are provided – John Ltd, George Ltd and Paul Ltd. The products from all three customers are similar in nature but have varying degrees of fragility.

Basic budget information has been gathered for the year to 30 June and is shown in the following table:

CUSTOMER	PRODUCTS HANDLED (CUBIC MTRS)
John Ltd	30,000
George Ltd	45,000
Paul Ltd	25,000

PARTICULARS	COSTS
Packing materials	₹ 19,50,000
Labour :	
- Basic	₹ 3,50,000
- Overtime	₹ 30,000
Occupancy	₹ 5,00,000
Administration and Management	₹ 60,000

Note:

Packing materials are used in re-packing each cubic metre of product for John Ltd, George Ltd and Paul Ltd in the ratio 1:2:3 respectively. This ratio is linked to the relative fragility of the goods for each customer.

Additional information has been obtained in order to enable unit costs to be prepared for each of the three customers using an activity-based costing approach.

The additional information for the year to 30 June has been estimated as follows:

1. Labour and overhead costs have been identified as attributable to each of three work centres - Receipts & Inspection, Storage and Packing as follows:

PARTICULARS	COST ALLOCATION PROPORTIONS		
	RECT & INSP	STORAGE	PACKING
	%	%	%
Labour:			
- Basic	15	10	75
- Overtime	50	15	35
Occupancy	20	60	20
Administration and Management	40	10	50

2. Studies have revealed that the fragility of different goods affects the receipt and inspection time needed for the products for each customer. Storage required is related to the average size of the basic incoming product units from each customer. The re-packing of goods for distribution is related to the complexity of packaging required by each customer.

The relevant requirements per cubic metre of product for each customer have been evaluated as follows:

PARTICULARS	John Ltd	George Ltd	Paul Ltd
Receipt and inspection (minutes)	5	9	15
Storage (sq. mts)	0.3	0.3	0.2
Packing (minutes)	36	45	60

Required:

Calculate the budgeted average cost per cubic metre of packaged products for each customer in each of the following two circumstances:

- Where only the basic budget information is to be used,
- Where the additional information enables an activity-based costing approach to be applied.

PROBLEM – 5

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the current year for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹ 1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the current year:

Activity	Description of activity	Total Cost ₹	Cost-allocation base
Bottles returns	Returning of empty bottles	60,000	Direct tracing to soft drink line

Ordering	Placing of orders for purchases	7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on- going restocking	8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	15,36,000	15,36,000 items sold

Required:

- Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.
- If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity-based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

PROBLEM – 6

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

I. General Supermarket Chains

II. Drugstore Chains

III. Chemist Shops

The following data for the month of April, 20x1 in respect of RST Limited has been reported:

PARTICULARS	GENERAL SUPERMARKET CHAINS	DRUGSTORE CHAINS	CHEMIST SHOPS
Average revenue per delivery	₹ 84,975	₹ 28,875	₹ 5,445
Average cost of goods sold per delivery	₹ 82,500	₹ 27,500	₹ 4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity-based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

ACTIVITY AREA	COST DRIVER
Customer purchase order processing	Purchase orders by customers
Line-items ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to a stores	Cartons dispatched to a store per delivery
Shelf-stocking at customers store	Hours of shelf-stocking

The April, 20x1 operating costs (other than cost of goods sold) of RST Limited are ₹ 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 20x1 are as follows:

Activity Area	Total costs in April, 20x1	Total Units of Cost Allocation Base used in April, 20x1
Customer purchase order processing	₹ 2,20,000	5,500 orders
Line-item ordering	₹ 1,75,560	58,520 line items
Store delivery	₹ 1,95,250	3,905 store deliveries
Cartons dispatched to stores	₹ 2,09,000	2,09,000 cartons
Shelf-stocking at customer store	₹ 28,160	1,760 hours

Other data for April, 20x1 include the following:

PARTICULARS	GENERAL SUPERMARKET CHAINS	DRUGSTORE CHAINS	CHEMIST SHOPS
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16
Average number of hours of shelf-stocking per store delivery	3	0.6	0.1

Required:

- i. COMPUTE for April, 20x1 gross-margin percentage each of its three distribution channels and compute RST Limited's operating income.
- ii. COMPUTE the April, 20x1 rate per unit of the cost-allocation base for each of the five activity areas.
- iii. COMPUTE the operating income of each distribution channel in April, 20x1 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?
- iv. DESCRIBE four challenges one would face in assigning the total April, 20x1 operating costs of ₹ 8,27,970 to five activity areas

PROBLEM – 7

‘Humara - Apna’ bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity-based costing methods. The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost ₹	Estimation for the budget period
ATM Services:		
a. Machine Maintenance	4,00,000	All fixed, no change.
b. Rents	2,00,000	Fully fixed, no change.
c. Currency Replenishment Cos	1,00,000	Expected to double during budget period
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)

Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required:

- CALCULATE the budgeted rate for each activity.
- PREPARE the budgeted cost statement activity wise.
- COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

PROBLEM – 8

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

ACTIVITY	COST DRIVER	KILOWATT HOURS	COST
Power	Kilowatt hours	50,000 kilowatt hours	₹ 2,00,000
Quality inspections	Number of inspections	10,000 inspections	₹ 3,00,000

The company makes three products M, S and T. For the year ended March 31, 20x1, the following consumption of cost drivers was reported:

PRODUCT	KILOWATT HOURS	QUALITY INSPECTIONS
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- COMPUTE the costs allocated to each product from each activity.
- CALCULATE the cost of unused capacity for each activity.
- DISCUSS the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

ADDITIONAL QUESTIONS FOR PRACTICE**QFP 1 (Concept Similar to Problem – 2)**

ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March are as follows:

	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

The budgeted direct labour rate was Rs. 10 per hour, and the budgeted material cost was Rs. 2 per kg. Production overheads were budgeted at Rs.99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed the Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

Budgeted overheads were analysed into the following:

	₹
Material handling	29,100
Storage costs	31,200
Electricity	39,150

The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of Machine operations

Data on Cost Drivers was as follows:

	A	B	C
For complete production:			
Batches of material	10	5	15
Per unit of production:			
Number of Machine operations	6	3	2

You are requested to:

1. PREPARE a statement for management showing the unit costs and total costs of each product using the absorption costing method.
2. PREPARE a statement for management showing the product costs of each product using the ABC approach.
3. STATE what are the reasons for the different product costs under the two approaches?

QFP 2 (Concept Similar to Problem – 2)

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

- i. General Supermarket Chains
- ii. Drugstore Chains
- iii. Chemist Shops

The following data for the month of April in respect of RST Limited has been reported:

	General Supermarket Chains ₹	Drugstore Chains ₹	Chemist Shops ₹
Average revenue per delivery	84,975	28,875	5,445
Average cost of goods sold per delivery	82,500	27,500	4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity-based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

Activity Area	Cost Driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to stores	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	Hours of shelf-stocking

The April month's operating costs (other than cost of goods sold) of RST Limited are Rs. 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for the month of April are as follows:

Activity Area	Total costs ₹	Total Units of Cost Allocation Base
Customer purchase order processing	2,20,000	5,500 orders
Line-item ordering	1,75,560	58,520 - line items
Store delivery	1,95,250	3,905 store deliveries
Cartons dispatched to store	2,09,000	2,09,000 cartons
Shelf-stocking at customer store	28,160	1,760 hours

Other data for the month of April include the following:

	General Supermarket Chains	Drugstore Chains	Chemist Shops
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16
Average number of hours of shelf-stocking per store delivery	3	0.6	0.1

Required:

1. COMPUTE gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.
3. COMPUTE the rate per unit of the cost-allocation base for each of the five activity areas.
4. COMPUTE the operating income of each distribution channel using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?
5. DESCRIBE four challenges one would face in assigning the total operating costs of Rs. 8,27,970 to five activity areas.

QFP 3 (Concept Similar to Problem – 5)

Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at Rs. 90 per case and sells to retail customers at a list price of Rs. 108 per case. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
Listed Selling Price	₹108	₹108	₹108	₹108	₹108
Actual Selling Price	₹108	₹106.20	₹99	₹104.40	₹97.20
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometres travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹750 per purchase order
Customer visits	₹ 600 per customer visit
Deliveries	₹ 5.75 per delivery Km travelled
Product handling	₹ 3.75 per case sold
Expedited deliveries	₹2,250 per expedited delivery

Required:

1. COMPUTE the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.
2. STATE what insights are gained by reporting both the list selling price and the actual selling price for each customer.

QFP 4 (General sum with tricky calculation)

BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three ranges of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December are as follows:

	BABYSOFT Gold	BABYSOFT Pearl	BABYSOFT Diamond
Production of soaps (Units)	4,000	3,000	2,000

Resources per Unit:	Qty	Rate ₹	Qty	Rate ₹	Qty	Rate ₹
Essential Oils	60 ml	200 / 100ml	55 ml	300 / 100 ml	65 ml	300 / 100 ml
Cocoa Butter	20 g	200 / 100 g	20 g	200 / 100 g	20 g	200 / 100 g
Filtered Water	30 ml	15 / 100ml	30 ml	15 / 100 ml	30 ml	15 / 100 ml
Chemicals	10 g	30 / 100g	12 g	50 / 100 g	15 g	60 / 100 g
Direct Labour	30 minutes	10 / hour	40 minutes	10 / hour	60 minutes	10 / hour

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at Rs. 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system.

For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	₹	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operations per unit of production are 5, 5, and 6 for BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to

0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

1. PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.
2. PREPARE a statement showing the product costs of each product using the ABC approach. STATE what are the reasons for the different product costs under the two approaches.

CHAPTER 05: COST ACCOUNTING

SYSTEM

INTRODUCTION

Where cost and financial accounting records are integrated, the system so evolved is known as integrated or integral accounting system. In case cost and financial transactions are kept separately, the system is called Non-Integrated Accounting system or Cost Control System. While non-integrated system of accounting necessitates reconciliation between financial and cost accounts but no reconciliation is required under integrated accounting system.

NON-INTEGRATED ACCOUNTING SYSTEM

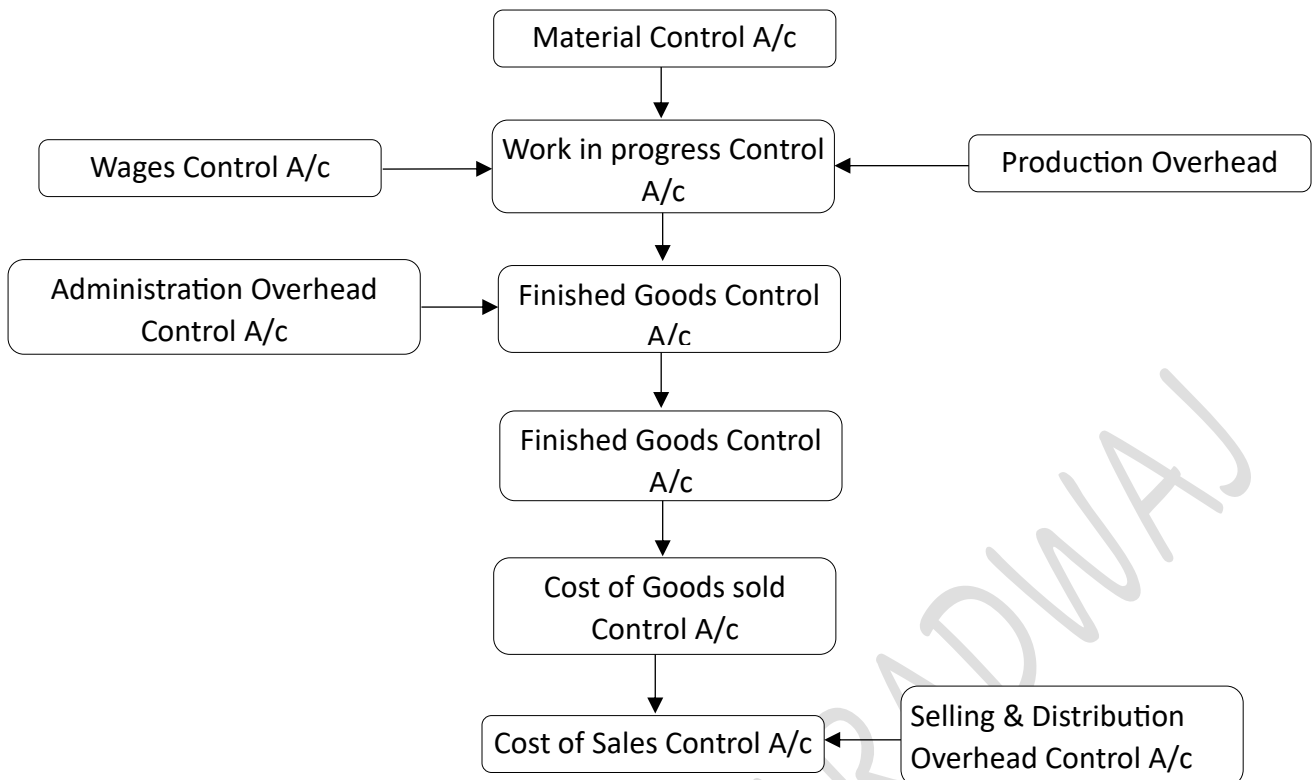
It is a system of accounting under which separate ledgers are maintained for both cost and financial accounts. This system is also known as cost ledger accounting system. Non-Integrated accounting systems contain fewer accounts as compared to financial accounting system due to the exclusion of purchases, expenses and also Balance Sheet items like fixed assets, debtors and creditors. Items of accounts which are excluded are represented by an account known as Cost ledger control account. The main accounts which are usually prepared when a separate Cost Ledger is maintained are as follows:

- 1. Cost Ledger Control Account** - This account is also known as General Ledger Adjustment Account. This account is made to complete double entry. All items of expenditure are credited to this account. Sales are debited to this account and net profit/loss from Costing Profit & Loss Account is transferred to this account. The balance in this account at the end of the particular period represents the net total of all the balances of the impersonal accounts.
- 2. Stores Ledger Control Account** – This account is debited for the purchase of material and credited for issue of materials from the stores. The balance in this account indicates the total balance of all the individual stores accounts. Abnormal losses or gains if any in this account are transferred to Costing Profit & Loss Account. Entries are made on the basis of goods received notes and stores requisitions etc.
- 3. Wages Control Account** - This account is debited with total wages paid (direct and indirect). Direct wages are further transferred to Work-in- Process Control Account and indirect wages to Production Overhead; Administration Overhead or Selling & Distribution Overhead Control Accounts, as the case may be. Wages paid for abnormal idle time are transferred to Costing Profit & Loss Account either directly or through Abnormal Loss Account.
- 4. Manufacturing/Production/Works/ Factory Overhead Control Account** - This account is debited with indirect costs of production such as indirect material, indirect employee, indirect expenses (carriage inward etc.). Overhead recovered (absorbed) is credited to this Account. The difference

between overhead incurred and overhead recovered (i.e., Under Absorption or Over Absorption of Overheads) is transferred to Overheads Adjustment Account.

5. **Work-in-Process Control Account** - This account is debited with the total cost of production, which includes—direct materials, direct employee, direct expenses, production overhead recovered, and is credited with the amount of finished goods completed and transferred. The balance in this account represents total balances of jobs/works-in-process, as shown by several job accounts.
6. **Administrative Overhead Control Account** - This account is debited with overheads incurred and credited with overhead recovered. The overhead recovered are debited to Finished Goods Control Account, if administrative overhead is related with production activities otherwise to Cost of Sales A/c.
The difference between administrative overheads incurred and recovered is transferred to Overhead Adjustment Account.
7. **Finished Goods Control Accounts** - This account is debited with the value of goods transferred from Work-in-process Control Account and administration costs recovered (if relates to production activities). This account is credited with Cost of Sales Account. The balance of this account represents the value of goods unsold at the end of the period.
8. **Selling and Distribution Overhead Control Account** - This account is debited with selling and distribution overheads incurred and credited with the selling and distribution overheads recovered. The difference between overheads incurred and recovered is transferred usually to Overhead Adjustment Account.
9. **Cost of Sales Account** - This account is debited with the cost of finished goods transferred from Finished Goods Control Account for sale, General Administrative overhead recovered, Selling and distribution overhead recovered. The balance of this account is ultimately transferred to Sales Account or Costing Profit & Loss Account.
10. **Costing Profit & Loss Account** – This account is debited with cost of sales, under-absorbed overheads and abnormal losses and is credited with sales value, over-absorbed overhead and abnormal gains. The net profit or loss in this account is transferred to Cost Ledger Control Account.
11. **Overhead Adjustment Account** - This account is to be debited for under- recovery of overhead and credited with over-recovery of overhead amount. The net balance in this account is transferred to Costing Profit & Loss Account.

Note: Sometimes, Overhead Adjustment Account is dispensed with and under/over absorbed overheads is directly transferred to Costing Profit & Loss Account from the respective overhead accounts.



INTEGRATED (OR INTEGRAL) ACCOUNTING SYSTEM

Integrated Accounts is the name given to a system of accounting, whereby **cost and financial accounts are kept in the same set of books**. Obviously, then there will be no separate sets of books for Costing and Financial records. Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, process and operation of any other identifiable activity and for carrying necessary analysis. **Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheet** as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages

The main advantages of Integrated Accounts are as follows:

- No need for Reconciliation**- The question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.
- Less efforts**- Due to use of one set of books, there is a significant saving in efforts made.
- Less time consuming**- No delay is caused in obtaining information as it is provided from books of original entry.
- Economical process**- It is economical also as it is based on the concept of "Centralization of Accounting function".

Essential pre-requisites for Integrated Accounts

The essential pre-requisites for integrated accounts include the following steps:

- The management's decision about the extent of integration of the two sets of books. Some concerns find it useful to integrate up to the stage of prime cost or factory cost while other prefers full integration of the entire accounting records.

2. A suitable coding system must be made available so as to serve the accounting purposes of financial and cost accounts.
3. An agreed routine, with regard to the treatment of provision for accruals, prepaid expenses, other adjustment necessary for preparation of interim accounts.
4. Perfect coordination should exist between the staff responsible for the financial and cost aspects of the accounts and an efficient processing of accounting documents should be ensured.

Under this system there is no need for a separate cost ledger. Of course, there will be a number of subsidiary ledgers; in addition to the useful Customers' Ledger and the Purchase Ledger, there will be: (a) Stores Ledger; (b) Stock Ledger and (c) Job Ledger.

Features of Integrated Accounting System

Following are the main points of integrated accounting:

- a. Complete analysis of cost and sales are kept.
- b. Complete details of all payments in cash are kept
- c. Complete details of all assets and liabilities are kept and this system does not use a notional account to represent all impersonal accounts

In non-integrated system, a cost ledger control account or general ledger adjustment account is used in cost ledger. But in the integrated accounting system, **general ledger adjustment account is eliminated** and detailed accounts for assets and liabilities are maintained. In other words, following accounts are used for "General Ledger Adjustment Account/ Cost Ledger Control Account" of non-integrated system:

- a. Bank account
- b. Receivables (Debtors) account
- c. Payables (Creditors) account
- d. Provision for depreciation account etc.

In integrated system, all accounts necessary for showing classification of cost will be used but **the cost ledger control account of non-integrated accounting is replaced by use of following accounts:**

- a. Bank account
- b. Receivables (Debtors) account
- c. Payables (Creditors) account
- d. Provision for depreciation account
- e. Fixed assets account
- f. Share capital account

RECONCILIATION OF COST AND FINANCIAL ACCOUNTS

When the cost and financial accounts are kept separately, it is imperative that these should be reconciled to make the cost accounts reliable. It is necessary for reconciliation of the two sets of accounts that sufficient details are available to locate the differences and the reasons for the same. It is, therefore, important that in the financial accounts, the expenses should be analysed in the same way as in the cost accounts.

The General Ledger Adjustment Account in the Cost Ledger may be studied to know the items which are included here and how differently these are presented in the financial accounts. The reconciliation of the balances of two sets of accounts is possible by preparing a Memorandum Reconciliation Account. In this account, the items charged in one set of accounts but not in the other or those charged in excess as compared to the other are identified and collected. These items of differences are either added or subtracted from the profit as shown by one of the accounts. Finally, the profits from two sets of accounts are reconciled. The procedure is similar to those which are followed for reconciling bank balance as per bank ledger with the balance as shown in bank statement.

It is important, however, to know the causes which, generally, give rise to differences in the Cost and Financial Accounts.

Causes of differences in Financial and Cost Accounts**1. Items included in Financial Accounts only-****a. Purely Financial Expenses:**

- i. Interest on loans or bank mortgages.
- ii. Expenses and discounts on issue of shares, debentures etc.
- iii. Other capital losses i.e., loss by fire not covered by insurance etc.
- iv. Losses on the sales of fixed assets and investments
- v. Income tax, donations, subscriptions
- vi. Expenses of the company's share transfer office, if any.

b. Purely Financial Income

- i. Interest received on bank deposits, loans and investments
- ii. Dividends received
- iii. Profits on the sale of fixed assets and investments
- iv. Transfer fee received.
- v. Rent receivables

2. Item included in Cost Accounts only (notional expenses):

- i. Charges in lieu of rent where premises are owned

- ii. Interest on capital at notional figure though not incurred
- iii. Salary for the proprietor at notional figure though not incurred
- iv. Notional Depreciation on the assets fully depreciated for which book value is nil.

3. Items whose treatment is different in the two sets of accounts:

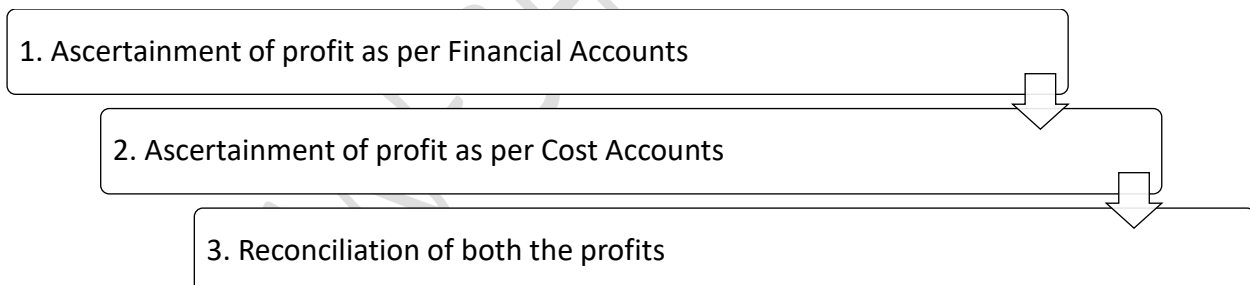
The objective of cost accounting is to provide information to management for decision making and control purposes while financial accounting conforms to external reporting requirements. Hence there are chances that certain items are treated differently in the two sets of accounts. For example, LIFO method for inventory valuation is not recommended by Accounting Standards for Financial Reporting purpose but this method may be adopted for cost accounting purpose if management feels it suitable for making any decision. Similarly cost accounting may use a different method of depreciation than what is allowed under financial accounting.

4. Varying basis of valuation

It is another factor which sometimes is responsible for the difference. It is well known that in financial accounts stock are valued either at cost or market price, whichever is lower. But in Cost Accounts, stocks are only valued at cost.

Procedure for Reconciliation

There are 3 steps involved in the procedure for reconciliation.



Circumstances where reconciliation statement can be avoided: When the Cost and Financial Accounts are integrated - there is no need to have a separate reconciliation statement between the two sets of accounts. Integration means that the same set of accounts fulfil the requirement of both i.e., Cost and Financial Accounts.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

During the month of January the following transactions took place in A Co. Ltd:

PARTICULARS	AMOUNT
(1) Material purchased:	
(a) Credit purchases	₹ 9,000
(b) Credit purchases for special job	₹ 400
(c) Cash purchases	₹ 1,000
(2) Returns to suppliers	₹ 500
(3) Direct materials issued to production	₹ 6,000
(4) Indirect materials issued	₹ 600
(5) Materials return from production to stores	₹ 100
(6) Materials transferred from Job No. 10 to Job No. 11	₹ 200

You are required to enter the transactions in the cost books.

PROBLEM – 2

Enter the following transactions in cost books:

PARTICULARS	AMOUNT	AMOUNT
Gross wages		₹ 10,000
Less: Deductions -		
Employees' State insurance	₹ 230	
Employees' provident fund	₹ 800	
Income-tax	₹ 200	₹ 1,230
Net cash		₹ 8,770

Provide employer's contribution to E.S.I. ₹ 250 and provident fund ₹ 800

The following particulars are obtained from the wages analysis book:

PARTICULARS	AMOUNT
Wages paid to direct Labour	₹ 8,000
Salaries paid to production staff	₹ 1,050
Salaries paid to administration staff	₹ 800
Salaries paid to selling and distribution staff	₹ 1,200

PROBLEM – 3

The following information is obtained from X Co., Ltd., during April, 20x1 –

PARTICULARS	AMOUNT (₹)
(1) Overhead is incurred as under -	
(a) Service supplied by creditors	5,000
(b) Petty cash expenditure for miscellaneous expenses	200
Analysis of service reveals -	
Production overhead	2,000
Administration overhead	1,000
Selling and distribution overhead	2,000
Analysis of petty cash reveals -	
Production overhead	120
Administration overhead	10
Selling and distribution overhead	70
(2) Overhead is absorbed as under -	
(a) Production overhead	1,900
(b) Administration overhead	1,050
(c) Selling and distribution overhead	2,000

Enter the above transactions in the cost books.

PROBLEM – 4

The following balances are obtained from the books of XYZ Co., Ltd., on 1.1.20x1:

PARTICULARS	Dr. (₹)	Cr. (₹)
Stores ledger control account	₹ 5,000	
Work-in-progress ledger control account	₹ 2,000	
Finished goods ledger control account	₹ 1,000	
General ledger adjustment account		₹ 8,000
TOTAL	₹ 8,000	₹ 8,000

The following information is received at the end of the year –

PARTICULARS	AMOUNT	AMOUNT
Purchase for stores		₹ 29,500
Purchase for special jobs		₹ 1,800
Returned to suppliers from stores		₹ 200
Direct wages	₹ 20,500	

Indirect factory wages	₹ 4,500	
Salaries to administration staff	₹ 3,400	
Salaries to selling and distribution staff	₹ 2,400	
Abnormal idle time	₹ 300	₹ 31,100
Direct expense		₹ 2,200
Production expenses		₹ 5,100
Administration expenses		₹ 4,100
Selling and distribution expenses		₹ 2,600
Stores and issued to production		₹ 30,500
Materials lost from stores by theft		₹ 400
Stores issued to maintenance account		₹ 1,300
Production overhead applied to production		20% on prime cost
Administration overhead applied to finished goods		₹ 7,200
Selling and distribution overhead applied to cost of sales		6% on sales value
Finished goods produced during the year		₹ 66,000
Goods sold during the period – at sales value		₹ 80,000
Goods sold during the period – at cost		₹ 69,500

You are required to record the entries in the cost ledger for the year and prepare a trial balance.

PROBLEM – 5

As on 31st March, the following balances existed in a firm's Cost Ledger:

	Dr.	Cr.
	₹	₹
Stores Ledger Control A/c	3,01,435	
Work-in-Process Control A/c	1,22,365	
Finished Stock Ledger Control A/c	2,51,945	
Manufacturing Overhead Control A/c		10,525
Cost Ledger Control A/c		6,65,220
	6,75,745	6,75,745

During the next three months the following items arose:

	₹
Finished product (at cost)	2,10,835
Manufacturing Overhead incurred	91,510
Raw Materials purchased	1,23,000

Factory Wages	50,530
Indirect Labour	21,665
Cost of Sales	1,85,890
Material issued to production	1,27,315
Sales returned at Cost	5,380
Material returned to suppliers	2,900
Manufacturing Overhead charged to production	77,200

You are required to PASS the Journal Entries; write up the accounts and schedule the balances, stating what each balance represents.

PROBLEM – 6

The following are the extracts of balances of X Co. Ltd., in its integrated ledgers on 1st January, 20x1:-

PARTICULARS	DEBIT	CREDIT
Stores Control account	₹ 36,000	
Work-in-progress account	₹ 34,000	
Finished goods account	₹ 26,000	
Cash at bank	₹ 20,000	
Creditors control account		₹ 16,000
Fixed assets account	₹ 1,10,000	
Debtors control account	₹ 24,000	
Share capital account		₹ 1,60,000
Depreciation provision account		₹ 10,000
Profit and loss account		₹ 64,000
Total	₹ 2,50,000	₹ 2,50,000

Transaction for the twelve months ended 31st December 20x1 was:

PARTICULARS	AMOUNT (₹)	REMARKS
Wages – direct paid	1,74,000	
Wages – indirect paid	10,000	
Stores purchased on credit	2,00,000	
Stores issued to repair order	4,000	
Stores issued to production	2,20,000	
Goods finished during the period at cost	4,30,000	
Goods sold at sales value (on credit)	6,00,000	

Goods sold at cost	4,40,000	
Production overhead recovered	96,000	
Production overhead	80,000	Paid for by cheque
Administration overhead	24,000	
Selling and distribution overhead	28,000	
Depreciation (works)	2,600	
Payments to suppliers	2,02,000	By cheque
Payments from customers	5,80,000	
Rates prepaid included in production overhead incurred	600	
Purchases of fixed assets	4,000	
Charitable donation	2,000	
Fines paid	1,000	
Interest on bank loan	200	
Income – tax	40,000	

You are required to write up the accounts in the integral ledger and make out a trial balance. The administration overhead is written off to profit and loss account.

PROBLEM – 7

A fire destroyed some accounting records of a company. You have been able to collect the following from the spoilt papers/records and as a result of consultation with accounting staff for the period of January, 20x1:

Incomplete Ledger Entries:

Materials Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 32,000		

Work-in-Process Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 9,200	By Finished Goods Control A/c	₹ 1,51,000

Payables (Creditors) A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
		By Balance b/d	₹ 16,400

To Balance c/d	₹ 19,200		

Manufacturing Overheads Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Bank A/c (Amount spent)	₹ 29,600		

Finished Goods Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 24,000		
		By Balance c/d	₹ 30,000

Additional Information:

1. The bank book showed that ₹ 89,200 has been paid to creditors for raw material.
2. Ending inventory of work-in-process included materials of ₹ 5,000 on which 300 direct labour hours have been booked against wages and overheads.
3. The job card showed that workers have worked for 7,000 hours. The wage rate is ₹ 10 per labour hour.
4. Overhead recovery rate was ₹4 per direct labour hour.

You are required to COMPLETE the above accounts in the cost ledger of the company.

PROBLEM – 8

The following incomplete accounts are furnished to you for the month ended 31st October, 20x2.

Stores Ledger Control Account		
1.10.20x2	To Balance	₹ 54,000
Work in Process Control Account		
1.10. 20x2	To Balance	₹ 6,000
Finished Goods Control Account		
1.10. 20x2	To Balance	₹ 75,000
Factory Overheads Control Account		
Total debits for October, 20x2		₹ 45,000
Factory Overheads Applied Account		
Cost of Goods Sold Account		
Creditors for Purchases Account		
1.10. 20x2	By Balance	₹ 30,000

Additional information:

1. The factory overheads are applied by using a budgeted rate based on direct Labour hours. The budget for overheads for 20x2 is ₹ 6,75,000 and the budget of direct Labour hours is 4,50,000.
2. The balance in the account of creditors for purchases on 31.10. 20x2 is ₹15,000 and the payments made to creditors in October, 20x2 amount to ₹ 1,05,000.
3. The finished goods inventory as on 31st October, 20x2 is ₹ 66,000.
4. The cost of goods sold during the month was ₹ 1,95,000.
5. On 31st October, 20x2 there was only one unfinished job in the factory. The cost records show that ₹ 3,000 (1,200 direct Labour hours) of direct Labour cost and ₹ 6,000 of direct material cost had been charged.
6. A total of 28,200 direct Labour hours were worked in October, 20x2. All factory workers earn same rate of pay.
7. All actual factory overheads incurred in October, 20x2 have been posted.

You are required to FIND:

- a. Materials purchased during October, 20x2.
- b. Cost of goods completed in October, 20x2.
- c. Overheads applied to production in October, 20x2.
- d. Balance of Work-in-Process Control A/c on 31st October, 20x2.
- e. Direct Materials consumed during October, 20x2.
- f. Balance of Stores Ledger Control Account on 31st October, 20x2.
- g. Over absorbed or under absorbed overheads for October, 20x2

PROBLEM – 9

M/s. H.K. Piano Company showed a net loss of ₹ 4,16,000 as per their financial accounts for the year ended 31st March. The cost accounts, however, disclosed a net loss of ₹ 3,28,000 for the same period. The following information were revealed as a result of scrutiny of the figures of both the sets of books:

		₹
i.	Factory Overheads under-recovered	6,000
ii.	Administration Overheads over-recovered	4,000
iii.	Depreciation charged in financial accounts	1,20,000
iv.	Depreciation recovered in costs	1,30,000
v.	Interest on investment not included in costs	20,000
vi.	Income-tax provided	1,20,000
vii.	Transfer fees (credit in financial books)	2,000
viii.	Stores adjustment (credit in financial books)	2,000

PREPARE a Memorandum reconciliation account.

PROBLEM – 10

The following figures are available from the financial records of ABC Manufacturing Co. Ltd. for the year ended 31st March.

	₹
Sales (20,000 units)	25,00,000
Materials	10,00,000
Wages	5,00,000
Factory Overheads	4,50,000
Administrative Overhead (production related)	2,60,000
Selling and Distribution Overheads	1,80,000
Finished goods (1,230 units)	1,50,000

	₹	₹
Work-in-Process:		
Materials	30,000	
Labour	20,000	
Factory overheads	20,000	70,000
Goodwill written off		2,00,000
Interest on loan taken		20,000

In the Costing records, factory overhead is charged at 100% of wages, administrative overhead 10% of factory cost and selling and distribution overhead at the rate of ₹ 10 per unit sold.

PREPARE a statement reconciling the profit as per cost records with the profit as per financial records.

PROBLEM – 11

Following are the figures extracted from the Cost Ledger of a manufacturing unit.

	₹
Stores:	
Opening balance	15,000
Purchases	80,000
Transfer from WIP	40,000
Issue to WIP	80,000
Issue to repairs and maintenance	10,000

Sold as a special case at cost	5,000
Shortage in the year	3,000
Work-in-Process:	
Opening inventory	30,000
Direct Labour cost charged	30,000
Overhead cost charged	1,20,000
Closing Balance	20,000
Finished Products:	
Entire output is sold at 10% profit on actual cost from Work-in- Process.	
Others:	
Wages for the period	35,000
Overhead Expenses	1,25,000

ASCERTAIN the profit or loss as per financial account and cost accounts and reconcile them.

PROBLEM – 12

The following figures have been extracted from the Financial Accounts of a manufacturing firm for the first year of its operation:

	₹
Direct Material Consumption	50,00,000
Direct Wages	30,00,000
Factory Overheads	16,00,000
General Administrative Overheads	7,00,000
Selling and Distribution Overheads	9,60,000
Bad Debts	80,000
Preliminary expenses written off	40,000
Legal Charges	10,000
Dividends Received	1,00,000
Interest received on Deposits	20,000
Sales (1,20,000 units)	1,20,00,000
Closing Stock:	
Finished Goods (4,000 units)	3,20,000
Work-in-Process	2,40,000

The cost accounts for the same period reveal that the direct material consumption was ₹56,00,000. Factory overhead is recovered at 20% on prime cost. Administration overhead is recovered at ₹6 per unit of goods sold. Selling and Distribution overheads are recovered at ₹8 per unit sold.

PREPARE the Profit and Loss Accounts both as per financial records and as per cost records. RECONCILE the profits as per the two records.

PROBLEM – 13

The following information is available from the financial books of a company having a normal production capacity of 60,000 units for the year ended 31st March, 20x1:

1. Sales ₹ 10,00,000 (50,000 units).
2. There was no opening and closing stock of finished units.
3. Direct material and direct wage costs were ₹ 5,00,000 and ₹ 2,50,000 respectively.
4. Actual factory expenses were ₹ 1,50,000 of which 60% are fixed.
5. Actual administrative expenses related to production activities were ₹ 45,000 which are completely fixed.
6. Actual selling and distribution expenses were ₹ 30,000 of which 40% are fixed.
7. Interest and dividends received ₹ 15,000.

You are required to:

- a. Find out profit as per financial books for the year ended 31st March, 20x1;
- b. PREPARE the cost sheet and ascertain the profit as per cost accounts for the year ended 31st March, 20x1 assuming that the indirect expenses are absorbed on the basis of normal production capacity; and
- c. PREPARE a statement reconciling profits shown by financial and cost books.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 4)**

A company operates on historic job cost accounting system, which is not integrated with the financial accounts. At the beginning of a month, the opening balances in cost ledger were:

	(₹ in lakhs)
Stores Ledger Control Account	80
Work-in-Process Control Account	20
Finished Goods Control Account	430
Building Construction Account	10
Cost Ledger Control Account	540

During the month, the following transactions took place:

		(₹ in lakh)
Materials	Purchased	40
	Issued to production	50
	Issued to factory maintenance	6
	Issued to building construction	4
Wages	Gross wages paid	150
	Indirect wages	40
	For building construction	10
Works Overheads	Actual amount incurred	160
	(Excluding items shown above)	
	Absorbed in building construction	20
	Under absorbed	8
Royalty paid	(Related to production)	5
Selling, Distribution and Administration overheads		25
Sales		450

At the end of the month, the stock of raw material and work-in-Process was ₹ 55 lakhs and ₹ 25 lakhs respectively. The loss arising in the raw material accounts is treated as factory overheads. The building under construction was completed during the month. Company's gross profit margin is 20% on sales.

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

QFP 2 (Concept Similar to Problem – 4)

In the absence of the Chief Accountant, you have been asked to prepare a month's cost accounts for a company which operates a batch costing system fully integrated with the financial accounts. The following relevant information is provided to you:

	₹	₹
Balances at the beginning of the month:		
Stores Ledger Control Account		25,000
Work-in-Process Control Account		20,000
Finished Goods Control Account		35,000
Prepaid Production Overheads brought forward from previous month		3,000
Transactions during the month:		
Materials Purchased		75,000
Materials Issued:		
To production	30,000	
To factory maintenance	4,000	34,000
Materials transferred between batches		5,000
Total wages paid:		
To direct workers	25,000	
To indirect workers	5,000	30,000
Direct wages charged to batches		20,000
Recorded non-productive time of direct workers		5,000
Selling and Distribution Overheads Incurred		6,000
Other Production Overheads Incurred		12,000
Sales		1,00,000
Cost of Finished Goods Sold		80,000
Cost of Goods completed and transferred into finished goods during the month		65,000
Physical value of work-in-Process at the end of the month		40,000

The production overhead absorption rate is 150% of direct wages charged to work-in-Process.

Required: PREPARE the following accounts for the month:

- Stores Ledger Control Account.
- Work-in-Process Control Account.
- Finished Goods Control Account.
- Production Overhead Control Account.
- Costing Profit and Loss Account.

QFP 3 (Concept Similar to Problem – 5)

Acme Manufacturing Co. Ltd. opens the costing records, with the balances as on 1st July as follows:

	₹	₹
Material Control A/c	1,24,000	
Work-in-Process Control A/c	62,500	
Finished Goods Control A/c	1,24,000	
Production Overhead Control A/c	8,400	
Administrative Overhead Control A/c		12,000
Selling & Distribution Overhead Control A/c	6,250	
Cost Ledger Control A/c		3,13,150
	3,25,150	3,25,150

The following are the transactions for the quarter ended 30th September:

	₹
Materials purchased	4,80,100
Materials issued to jobs	4,77,400
Materials to works maintenance	41,200
Materials to administrative office	3,400
Materials to sales department	7,200
Wages Direct	1,49,300
Wages Indirect	65,000
Transportation for Indirect Materials	8,400
Production Overheads incurred	2,42,250
Absorbed Production Overheads	3,59,100
Administrative Overheads incurred	74,000
Administrative Overheads allocated to production	52,900
Administrative Overheads allocated to sales department	14,800
Selling & Distribution overheads incurred	64,200
Selling & Distribution overheads absorbed	82,000
Finished goods produced	9,58,400
Finished goods sold	9,77,300
Sales	14,43,000

Make up the various accounts as you envisage in the Cost Ledger and PREPARE a Trial Balance as at 30th September.

QFP 4 (Concept Similar to Problem – 6)

JOURNALISE the following transactions assuming that cost and financial transactions are integrated:

	₹
Raw materials purchased	2,00,000
Direct materials issued to production	1,50,000
Wages paid (30% indirect)	1,20,000
Wages charged to production	84,000
Manufacturing expenses incurred	84,000
Manufacturing overhead charged to production	92,000
Selling and Distribution costs	20,000
Finished products (at cost)	2,00,000
Sales	2,90,000
Closing stock	Nil
Receipts from debtors	69,000
Payments to creditors	1,10,000

QFP 5 (Concept Similar to Problem – 6)

Dutta Enterprises operates an Integral system of accounting. You are required to PASS the Journal Entries for the following transactions that took place for the year ended 31st March.

(Narrations are not required.)

	₹
Raw Materials purchased (50% on Credit)	6,00,000
Materials issued to production	4,00,000
Wages paid (50% Direct)	2,00,000
Wages charged to production	1,00,000
Factory Overheads incurred	80,000
Factory Overheads charged to production	1,00,000
Selling and Distribution Overheads incurred	40,000
Finished Goods at cost	5,00,000
Sales (50% Credit)	7,50,000
Closing stock	Nil
Receipts from debtors	2,00,000
Payments to creditors	2,00,000

CHAPTER 06: JOB COSTING

MEANING OF JOB COSTING

CIMA London defines Job Costing as “the category of basic costing methods which is applicable where the work consists of separate contracts, jobs or batches, each of which is authorised by specific order or contract.” According to this method, costs are collected and accumulated according to jobs, contracts, products or work orders. Each job or unit of production is treated as a separate entity for the purpose of costing.

Principles of Job Costing

The job costing method may be regarded as the principal method of costing since the basic object and purpose of all costing is to:

- Analysis and ascertainment of cost of each unit of production
- Control and regulate cost
- Determine the profitability

Process of Job Costing

- Prepare a separate cost sheet for each job
- Disclose cost of materials issued for the job
- Employee costs incurred (on the basis of bill of material and time cards respectively)
- When job is completed, overhead charges are added for ascertaining total expenditure

Suitability of Job Costing

- When jobs are executed for different customers according to their specifications.
- when no two orders are alike and each order/job needs special treatment.
- Where the work-in-progress differs from period to period on the basis of the number of jobs in hand.

JOB COST CARD/ SHEET

Each job order is asymmetrical to other due to specific and customized requirements. To ascertain cost of a particular job, it is necessary to record all the expenditure related with a job separately. For this purpose, Job Cost card is used.

Each job order is asymmetrical to other due to specific and customized requirements. To ascertain cost of a particular job, it is necessary to record all the expenditure related with a job separately. For this purpose, Job Cost card is used. Job cost card is a cost sheet, where the quantity of materials issued, hours spent by different class of employees, amount of other expenses and share of overheads are recorded. This is helpful in knowing the total cost, profitability etc. of a job. The following is an illustrative format of Job Cost card/ sheet.

Format of Job Cost Sheet:

JOB COST SHEET					
Description: _____			Job No.: _____		
Blue Print No.: _____			Quantity: _____		
Material No.: _____			Date of delivery: _____		
Reference No.: _____			Date commenced: _____		
			Date finished: _____		
Date	Reference	Details	Material	Labour	Overhead
		Total			

Summary of costs	Estimated (Rs.)	Actual (Rs.)	For the job _____
Direct material cost			Units produced _____
Direct wages			Cost/unit _____
Production overhead			Remarks _____
PRODUCTION COST			Prepared by: _____
Administration and Selling & Distribution Overheads			Checked by: _____
TOTAL COST			
PROFIT/LOSS			
SELLING PRICE			

COLLECTION OF COSTS FOR A JOB**Collection of Materials Cost**

An essential requirement of job cost accounting is that direct materials and their cost must be traced to and identified with specific job or work order. This segregation of materials cost by jobs or work order is brought by the use of separate stores requisitions for each job or work order.

Collection of Labour Cost

All direct labour cost must be analysed according to individual jobs or work orders. Similarly, different types of indirect labour cost also must be collected and accumulated under appropriate standing order or expenses code number. The analysis of labour according to jobs or work orders is, usually, made by means of job timecards or sheets. **All direct labour is booked against specific jobs in the job time cards or sheets.** All the idle time also is booked against appropriate standing order expense code number either in the job time card for each job or on a separate idle time card for each worker (where the job time card is issued job-wise).

Collection of Overheads

Manufacturing overheads are collected under suitable standing order numbers and selling and distribution overheads against cost accounts numbers. Total overhead expenses so collected are apportioned to service and production departments on some suitable basis. The expenses of service departments are finally transferred to production departments. The total overhead of production departments is then applied to products on some realistic basis, e.g. machine hour; labour hour; percentage of direct wages; percentage of direct materials; etc.

Treatment of spoiled and defective work

Spoiled work is the quantity of production that has been totally rejected and cannot be rectified. Defective work refers to production that is not as perfect as the saleable product but is capable of being rectified and brought to the required degree of perfection provided some additional expenditure is incurred. Normally, all the manufacturing operations are not fully successful; they result in turning out a certain amount of defective work. Nonetheless, over a period of time it is possible to work out a normal rate of defectives for each manufacturing process which would represent the number of defective articles which a process shall produce in spite of due care.

Defects arise in the following circumstances:

Circumstances	Treatment
1. Where a percentage of defective work is allowed in a particular batch as it cannot be avoided.	When a normal rate of defectives has already been established, if the actual number of defectives is within the normal limit or is near thereto the cost of rectification will be charged to the whole job and spread over the entire output of the batch. If, on the other hand, the number of defective units substantially exceeds the normal, the cost of rectification of the number which exceeds the normal will be written off as a loss in the Costing Profit and Loss Account.

2. Where defect is due to bad workmanship.	In this case cost of rectification will be abnormal cost, i.e., not a legitimate element of the cost. Therefore, the cost of rectification shall be written off as a loss, unless by an arrangement, it is to be recovered as a penalty from the workman concerned. It is possible, however that the management did provide for a certain proportion of defectives on account of bad workmanship as an unavoidable feature of production. If that be the case, the cost of rectifying to the extent provided for by the management will be treated as a normal cost and charged to the batch.
3. Where defect is due to the Inspection Department wrongly accepting incoming material of poor quality.	In this case the cost of rectification will be charged to the department and will not be considered as cost of manufacture of the batch. Being an abnormal cost, it will be written off to the Costing Profit and Loss Account.

Advantages and Disadvantages of Job Costing

Some of the advantages and disadvantages of Job costing are summarized as below:

Advantages	Disadvantages
1. The details of Cost of material, Labour and overhead for all job is available to control.	1. Job Costing is laborious costly and method.
2. Profitability of each job can be derived.	2. As lot of clerical process is involved the chances of error is more.
3. It facilitates production planning.	3. This method is not suitable in inflationary condition.
4. Budgetary control and Standard Costing can be applied in job costing.	4. Previous records of costs will be meaningless if there is any change in market condition.
5. Spoilage and detective can be identified and responsibilities can be fixed accordingly.	

Difference between Job Costing and Process Costing

The main points which distinguish job costing and process costing are as below:

Job Costing	Process Costing
i. A Job is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and the product produced is homogeneous.
ii. Costs are determined for each job.	Costs are compiled on time basis i.e., for production of a given accounting period for each process or department.
iii. Each job is separate and independent of other jobs.	Products lose their individual identity as they are manufactured in a continuous flow.
iv. Each job or order has a number and costs are collected against the same job number.	The unit cost of process is an average cost for the period.
v. Costs are computed when a job is completed. The cost of a job may be determined by adding all costs against the job.	Costs are calculated at the end of the cost period. The unit cost of a process may be computed by dividing the total cost for the period by the output of the process during that period.
vi. As production is not continuous and each job may be different, so more managerial attention is required for effective control.	Process of production is usually standardized and is therefore, quite stable. Hence control here is comparatively easier.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

A shop floor supervisor of a small factory presented the following cost for Job No. 303, to determine the selling price.

PARTICULARS	PER UNIT
Materials	₹ 70
Direct wages 18 hours @ 2.50 (Dept. X - 8 Hrs; Dept. Y - 6 Hrs; Dept. Z - 4 Hrs)	₹ 45
Chargeable expenses	₹ 5
	₹ 120
Add: 33- ¹ / ₃ % for expenses cost	₹ 40
Total	₹ 160

Analysis of the Profit/Loss Account (for the year 20x1)

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
Materials used	₹ 1,50,000	Sales less returns	₹ 2,50,000
Direct wages:			
- Dept. X - 10,000			
- Dept. Y - 12,000			
- Dept. Z - 8,000	₹ 30,000		
Special stores items	₹ 4,000		
Overheads:			
Dept. X - 5,000			
Dept. Y - 9,000			
Dept. Z - 2,000	₹ 16,000		
Works cost	₹ 2,00,000		
Gross profit c/d	₹ 50,000		
	₹ 2,50,000		₹ 2,50,000
Selling expenses	₹ 20,000	Gross profit b/d	₹ 50,000
Net profit	₹ 30,000		
	₹ 50,000		₹ 50,000

It is also noted that average hourly rates for the three Departments X, Y and Z are similar.

You are required to:

- Draw up a job cost sheet.

- b. Calculate the entire revised cost using 20x1 actual figures as the basis.
- c. Add 20% to the total cost to determine the selling price.

PROBLEM – 2

In a factory following the Job Costing Method, an abstract from the work-in-progress as on 30th September was prepared as under.

JOB NO:	MATERIALS	DIRECT HOURS	LABOUR	FACTORY OVERHEAD APPLIED
115	₹ 1,325	400 Hrs	₹ 800	₹ 640
118	₹ 810	250 Hrs	₹ 500	₹ 400
120	₹ 765	300 Hrs	₹ 475	₹ 380
	₹ 2,900		₹ 1,775	₹ 1,420

Materials used in October were as follows:

Materials Requisition No.	Job No.	Cost
54	118	₹ 300
55	118	₹ 425
56	118	₹ 515
57	120	₹ 665
58	121	₹ 910
59	124	₹ 720
		₹ 3,535

A summary for Labour hours deployed during October is as under:

PARTICULARS	NUMBER OF HOURS	
	SHOP A	SHOP B
Direct Labour:		
Job no: 115	25	25
Job no: 118	90	30
Job no: 120	75	10
Job no: 121	65	-
Job no: 124	25	10
Indirect Labour:		
Waiting of material	20	10

Machine breakdown	10	5
Idle time	5	6
Overtime premium	6	5
Total	321	101

A shop credit slip was issued in October that material issued under Requisition No. 54 was returned back to stores as being not suitable. A material transfer note issued in October indicated that material issued under Requisition No. 55 for Job 118 was directed to Job 124.

The hourly rate in shop A per labour hour is 3 per hour while at shop B, it is 2 per hour. The factory overhead is applied at the same rate as in September. Job 115, 118 and 120 were completed in October.

You are asked to compute the factory cost of the completed jobs. It is the practice of the management to put a 10% on the factory cost to cover administration and selling overheads and invoice the job to the customer on a total cost plus 20% basis. What would be the invoice price of these three jobs?

PROBLEM – 3

The manufacturing cost of a work order is ₹ 1,00,000; 8% of the production against that order spoiled and the rejection is estimated to have a realisable value of ₹ 2,000 only. The normal rate of spoilage is 2%. Record this in the costing journal.

PROBLEM – 4

Ares Plumbing and Fitting Ltd. (APFL) deals in plumbing materials and also provides plumbing services to its customers. On 12th August, 20x2, APFL received a job order for a students' hostel to supply and fitting of plumbing materials. The work is to be done on the basis of specification provided by the hostel owner. Hostel will be inaugurated on 5th September, 20x2 and the work is to be completed by 3rd September, 20x2. Following are the details related with the job work:

Direct Materials

APFL uses a weighted average method for the pricing of materials issues. Opening stock of materials as on 12th August 20x2:

- 15mm GI Pipe, 12 units of (15 feet size) @ Rs. 600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ Rs. 660 each
- Other fitting materials, 60 units @ Rs. 26 each
- Stainless Steel Faucet, 6 units @ Rs. 204 each
- Valve, 8 units @ Rs. 404 each

Purchases:

On 16th August 20x2:

- 20mm GI Pipe, 30 units of (15 feet size) @ Rs. 610 each
- 10 units of Valve @ Rs. 402 each on 18th August 20x2:
- Other fitting materials, 150 units @ Rs. 28 each
- Stainless Steel Faucet, 15 units @ Rs. 209 each on 27th August 20x2:
- 15mm GI Pipe, 35 units of (15 feet size) @ Rs. 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ Rs. 660 each
- Valve, 14 units @ Rs. 424 each Issues for the hostel job:

On 12th August 20x2:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units on 17th August 20x2:
- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units on 28th August 20x2:
- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units on 30th August 20x2:
- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ Rs. 50 per hour (includes 12 hours overtime)

Helper: 192 hours @ Rs.35 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ Rs. 13 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

- i. Calculate the total cost of the job.
- ii. Calculate the price to be charged from the customer

PROBLEM – 5

From the following information of General Engineering Co. Ltd., for the month of September, 20x1 prepare job accounts and respective control accounts.

Balance as on 1st September, 20x1			
		Dr.	Cr.
Stores ledger control account		₹ 70,000	
Work-in-progress			
Job. 110	₹ 20,000		
Job. 115	₹ 30,000		
Job. 119	₹ 15,000	₹ 65,000	
General Ledger Adjustment account			₹ 1,35,000
Total		₹ 1,35,000	₹ 1,35,000

Transactions during September, 20x1 were – materials purchased ₹ 48,000. New jobs taken up during the month were 121, 122, and 123. The selling prices of jobs completed during the month were Job No. 110 ₹ 75,000; Job No. 115 ₹ 65,000 and Job No.122 ₹ 60,000.

Allocation of materials and labour utilized:

Job. No.	Material	Labour
110	₹ 2,000	₹ 10,000
115	-	₹ 15,000
119	₹ 8,000	₹ 30,000
121	₹ 10,000	₹ 25,000
122	₹ 9,000	₹ 20,000
123	₹ 7,000	₹ 6,000
Total direct	₹ 36,000	₹ 1,06,000
Total indirect	₹ 4,000	₹ 14,000
Total	₹ 40,000	₹ 1,20,000

Works overhead at 50% of labour cost of jobs. Sundry manufacturing expenses ₹ 22,000. Materials returned to stores from Job. No. 121 was ₹ 200.

CHAPTER 07: UNIT & BATCH COSTING

INTRODUCTION

So far, we have discussed in earlier chapters, the element wise cost collection, calculation and its accounting under integral and non- integral accounting systems. Now we will discuss how the cost accounting information can be presented and used according to the needs of the management. To fulfil the need of the users of the cost accounting information, different methods of costing are followed. Costing methods enable the users to have customized information of any cost object according to the need and suitability. Different methods of costing have been developed according to the needs and nature of industries. For the sake of simplicity, industries can be grouped into two basic types i.e. Industries doing job work and industries engaged in mass production of a single product or identical products.

For industry doing job work

An entity which is engaged in the execution of special orders, each order being distinguishable from each other, such a concern is thought of involved in performing job works. Jobs are worked strictly in accordance with the customer's specifications and requirements, thus, each job order is unique. Examples of job order types of production are: ship building, construction of road and bridges, manufacturing of heavy electrical machineries and tools, wood and furniture works etc. Here, each job or unit of production is treated as a separate identity for the purpose of costing. The methods of costing for ascertaining cost of each job are known as a job costing, contract costing and batch costing.

For continuous or process type of industries

The continuous or process type of industries are characterized by the continuous production of uniform products according to the standard specifications. In such a case the successive lots are generally indistinguishable as to size and form and, even if there is some variation in specifications, it is of a minor character. Examples of continuous type of industries are chemical and pharmaceutical products, paper/food products, canning, paints and varnish oil, rubber, textile etc. Here the methods of costing used for the purpose of ascertaining costs are: process costing; single output costing; operating costing etc.

UNIT COSTING

Unit costing is that method of costing where the output produced is identical and each unit of output requires identical cost. Unit costing is synonymously known as single or output costing, but these are sub-division of unit costing method. This method of costing is followed by industries which produce single output or few variants of a single output.

$$\text{Cost per unit} = \frac{\text{Total cost of production}}{\text{No. of units produced}}$$

This method of costing, therefore finds its application in industries like paper, cement, steel works, mining, breweries etc.

COST COLLECTION PROCEDURE IN UNIT COSTING

Collection of Materials Cost

Cost of materials issued for production are collected from Material Requisition notes and accumulated for a certain period or volume of activity. The cost of material so accumulated is posted in cost accounting system. Through the cost accounting system, cost sheet for the period or activity is prepared to know cost for the period element-wise and functions-wise.

Collection of Employees (Labour) Cost

All direct employee (labour) cost is collected from job time cards or sheets and accumulated for a certain period or volume of activity. The time booked or recorded in the job time and idle time cards is valued at appropriate rates and entered in the cost accounting system. Other items of indirect employee (labour) costs are collected from the payrolls books for the purpose of posting against standing order or expenses code numbers in the overhead expenses ledger.

Collection of Overheads

Overheads are collected under suitable standing orders numbers, and selling and distribution overheads against cost accounts numbers. Total overhead expenses so collected are apportioned to service and production departments on some suitable basis. The expenses of service departments are finally transferred to production departments. The total overhead of production departments is then applied to products on some realistic basis, e.g. machine hour; labour hour; percentage of direct wages; percentage of direct materials; etc.

Treatment of spoiled and defective work

Circumstances	Treatment
(1) Loss due to normal reasons	When a normal rate of defectives has already been established and actual number of defectives is within the normal limit, the cost of rectification or loss will be charged to the entire output. If, on the other hand, the number of defective units substantially exceeds the normal limits, the cost of rectification or loss beyond normal limits are written off in Costing Profit and Loss Account.
(2) Loss due to abnormal reasons	In this case cost of rectification and loss is treated as abnormal cost and the cost of rectification or loss is written off as loss in Costing Profit and Loss Account.

BATCH COSTING

Batch Costing is a type of specific order costing where articles are manufactured in predetermined lots, known as batch. Under this costing method, the cost object for cost determination is a batch for production rather output as seen in unit costing method.

A batch consists of certain number of units which are processed simultaneously to be for manufacturing operation. Under this method of manufacturing, the inputs are accumulated in the assembly line till it reaches minimum batch size. Soon after a batch size is reached, all inputs in a batch is processed for further operations. Reasons for batch manufacturing may be either technical or economical or both. For example, in pen manufacturing industry, it would be too costly to manufacture one pen of a particular design at a time to meet the demand of one customer. On the other hand, the production, of say 10,000 pens, of the same design will reduce the cost to a sizeable extent.

To initiate production process, an entity has to incur expenditures on engaging workers for production and supervision, setting-up of machine to run for production etc. These are the minimum level of expenditures which have to be incurred each time a batch is run irrespective of number of units produced.

Costing Procedure in Batch Costing

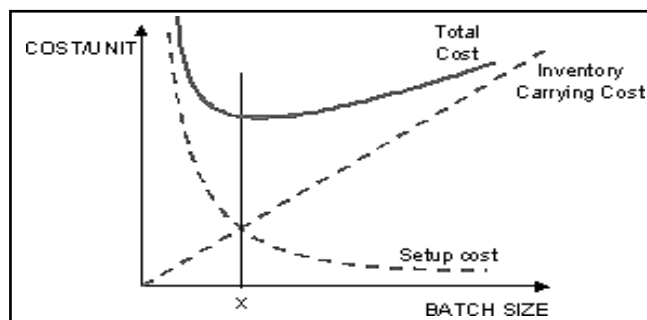
To facilitate convenient cost determination, one number is allotted for each batch. Material cost for the batch is arrived at on the basis of material requisitions for the batch and labour cost is arrived at by multiplying the time spent on the batch by direct workers as ascertained from time cards or job tickets. Overheads are absorbed on some suitable basis like machine hours, direct labour hours etc.

ECONOMIC BATCH QUANTITY (EBQ)

As the product is produced in batches or lots, the lot size chosen will be critical in achieving least cost of operation. Primarily, the total production cost under batch production comprises of two main costs, namely,

1. Machine Set Up Costs and
2. Inventory holding costs.

If the size is higher, the set up cost may decline due to lesser number of set ups required; but units in inventory will go up leading to higher holding costs. If the lot size is lower, lower inventory holding costs are accomplished but only with higher set up costs. Economic batch quantity is the size of a batch where total cost of set-up and holding costs are at minimum. This relationship is explained with the help of following diagram



As can be seen in the above diagram, costs are shown on the Y axis and Batch size or batch quantity is shown on the X axis. With the higher batch size, holding cost shows a tendency to increase whereas set-up costs show a declining trend. The point where both the cost lines intersect each other represents the lowest cost combination.

The economic batch size or Economic Batch Quantity may be determined by calculating the total cost for a series of possible batch sizes and checking which batch size gives the minimum cost. Alternatively, a formula can be derived which is similar to determination of Economic Order Quantity (EOQ). The objective here being to determine the production lot (Batch size) that optimizes on both set up and inventory holding costs formula. The mathematical formula usually used for its determination is as follows:

$$EBQ = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

DIFFERENCE BETWEEN JOB AND BATCH COSTING

S. No	Job Costing	Batch Costing
1	Method of costing used for non- standard and non- repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

The following data relate to the manufacture of a standard product during the 4-week ended 28th February 20x1:

PARTICULARS	AMOUNT
Raw Materials Consumed	₹ 4,00,000
Direct Wages	₹ 2,40,000
Machine Hours Worked	3,200 hours
Machine Hour Rate	₹ 40
Office Overheads	10% of works cost
Selling Overheads	₹ 20 per unit
Units produced and sold	10,000 at ₹ 120 each

You are required to find out the cost per unit and profit for the 4- week ended 28th February 20x1.

PROBLEM – 2

Atharva Pharma care Limited produced a uniform type of product and has a manufacturing capacity of 3,000 units per week of 48 hours from the records of the company, the following data are available relating to output and cost of 3 consecutive weeks.

Week Number	Units Manufactured	Direct Material	Direct Wage	Factory Overheads
1	1,200	₹ 9,000	₹ 3,600	₹ 31,000
2	1,600	₹ 12,000	₹ 4,800	₹ 33,000
3	1,800	₹ 13,500	₹ 5,400	₹ 34,000

Assuming that the company charges a profit of 20% on selling price, find out the selling price per unit when the weekly output is 2,000 units.

PROBLEM – 3

Arnav Confectioners (AC) owns a bakery that is used to make bakery items like pastries, cakes and muffins. AC use to bake at least 50 units of any item at a time.

A customer has given an order for 600 muffins. To process a batch of 50 muffins, the following cost would be incurred:

PARTICULARS	AMOUNT
Direct Materials	₹ 500
Direct Wages	₹ 50
Oven set-up cost	₹ 150

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads. AC requires a profit margin of 25% of sales value.

Determine the selling price for 600 muffins.

PROBLEM – 4

Monthly demand for a product	500 units
Setting-up cost per batch	₹ 60
Cost of manufacturing per unit	₹ 20
Rate of interest	10% per annum

Determine economic batch quantity. Also, calculate the Total Cost.

PROBLEM – 5

M/s. KBC Bearings Ltd. is committed to supplying 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs ₹ 1 as inventory holding cost per bearing per month and that the setup cost per run of bearing manufacture is ₹ 3,200.

1. What would be the optimum run size of bearing manufacture?
2. What would be the interval between two consecutive optimum runs?
3. Find out the minimum inventory cost?

PROBLEM – 6

XYZ Ltd. has obtained an order to supply 48000 bearings per year from a concern. On a steady basis, it is estimated that it costs Rs.0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is Rs.384.

You are required to:

1. compute the optimum run size and number of runs for bearing manufacture.
2. compute the interval between two consecutive runs.
3. find out the extra costs to be incurred, if company adopts a policy to manufacture 8000 bearings per run as compared to optimum run Size.
4. give your opinion regarding run size of bearing manufacture. Assume 365 days in a year.

PROBLEM – 7

A Company has an annual demand from a single customer for 50,000 litres of a paint product. The total demand can be made up of a range of colours to be produced in a continuous production run after which a set-up of the machinery will be required to accommodate the colour change. The total

output of each colour will be stored and then delivered to the customer as a single load immediately before production of the next colour commences.

The Setup costs are ₹ 100 per set up. The Service is supplied by an outside company as required. The Holding costs are incurred on rented storage space which costs ₹ 50 per sq. meter per annum. Each square meter can hold 250 Litres suitably stacked.

You are required to calculate

1. Calculate the total cost per year where batches may range from 4,000 to 10,000 litres in multiples of 1,000 litres and hence choose the production batch size which will minimize the cost.
2. Use the economic batch size formula to calculate the batch size which will minimise total cost.

PROBLEM – 8

Wonder Ltd. has a capacity of 1,20,000 Units per annum as its optimum capacity. The production costs are as under:

Direct Material	₹ 90 per unit
Direct Labour	₹ 60 per unit
Overheads:	
Fixed	₹ 30,00,000 per annum
Variable	₹ 100 per unit

Semi Variable Overheads: ₹ 20,00,000 per annum up to 50% capacity and an extra amount of ₹ 4,00,000 for every 25% increase in capacity or part thereof. The production is made to order and not for stocks. If the production programme of the factory is as indicated below and the management desires a profit of ₹ 20,00,000 for the year work out the average selling price at which each unit should be quoted.

First 3 months: 50% capacity and remaining 9 months: 80% capacity.

Ignore Administration, Selling and Distribution overheads.

PROBLEM – 9

Rio Limited undertakes to supply 1000 units of a component per month for the Months of January, February and March 20x1. Every month a batch order is opened against which materials and labour costs are booked at actual. Overheads are levied at a rate per labour hour. The selling price is contracted at ₹ 15 per unit.

From the following data, present the profit per unit of each batch order and the overall position of the order for the 3,000 units.

MONTH	BATCH OUTPUT	MATERIAL COST	LABOUR COST
January 20x1	1250 nos	₹ 6,250	₹ 2,500

February 20x1	1500 nos	₹ 9,000	₹ 3,000
March 20x1	1000 nos	₹ 5,000	₹ 2,000

Labour is paid at the rate of ₹ 2 per hour. The other details are:

MONTH	OVERHEADS	TOTAL LABOUR HOURS
January 20x1	₹ 12,000	4,000
February 20x1	₹ 9,000	4,500
March 20x8	₹ 15,000	5,000

PROBLEM – 10

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 8 per piece. From the following data present, CALCULATE the cost and profit per piece of each batch order and the overall position of the order for 1,200 pieces.

MONTH	BATCH OUTPUT	MATERIAL COST	DIRECT WAGES	DIRECT LABOUR
January	210	₹ 650	₹ 120	240 hrs
February	200	₹ 640	₹ 140	280 hrs
March	220	₹ 680	₹ 150	280 hrs
April	180	₹ 630	₹ 140	270 hrs
May	200	₹ 700	₹ 150	300 hrs
June	220	₹ 720	₹ 160	320 hrs

The other details are:

MONTHLY CHARGEABLE	EXPENSES	DIRECT LABOUR
January	₹ 12,000	4800 hrs
February	₹ 10,560	4400 hrs
March	₹ 12,000	5000 hrs
April	₹ 10,580	4600 hrs
May	₹ 13,000	5000 hrs
June	₹ 12,000	4800 hrs

PROBLEM – 11

X Ltd. is committed to supplying 24,000 bearings per annum to Y Ltd. on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set-up cost per run of bearing manufacture is ₹ 324.

- a. What would be the optimum run size for bearing manufacture?
- b. Assuming that the company has a policy of manufacturing 6,000 bearings per run, how much extra costs the company would be incurring as compared to the optimum run suggested in (a) above?
- c. What is the minimum inventory holding cost?

PROBLEM – 12

A customer has been ordering 90,000 special design metal columns at the rate of 18,000 columns per order during the past years. The production cost comprises ₹ 2,120 for material, ₹ 60 for labour and ₹ 20 for fixed overheads. It costs ₹ 1,500 to set up for one run of 18,000 columns and the inventory carrying cost is 5%.

- a. Find the most economic production run.
- b. Calculate the extra cost that company incur due to the processing of 18,000 columns in a batch.

CHAPTER 08: MATERIAL COST

INTRODUCTION

The general meaning of material is all commodities/ physical objects used to make the final product. It may be direct or indirect.

- i. **Direct Materials:** Materials, cost of which can be directly attributable to the end product for which it is being used, in an economically feasible way.
- ii. **Indirect Materials:** Those materials which are not directly attributable to a particular final product. Direct Materials constitute a significant part for manufacturing and production of goods. Being an input and a significant cost element, it requires adequate management attention. Cost control starts from here, and for this purpose it is necessary that the principle of 3Es (Economy, Efficiency and Effectiveness) i.e., economy in procurement, efficiency in handling and processing the material and effectiveness in producing desired output as per the standard, is also applied for this cost element.

Importance of proper recording and control of material are as follows:

- a. **Quality of final product:** The quality of output depends on the quality of inputs.
- b. **Price of the final product:** Material constitutes a significant part of any product and the cost of final product is directly related with cost of materials used to produce the product.
- c. **Production continuity:** The production firms need to ensure that production process runs smoothly and should not be paused for the want of materials. In order to avoid production interruptions, an adequate level of stock of materials should be maintained.
- d. **Cost of Stock holding and stock-out:** An entity has to incur stock holding costs in the form of interest and/or opportunity cost for the fund used, stock handling losses like evaporation, obsolescence etc. Under-stocking causes in loss of revenue due to stock-out and breach of commitment.
- e. **Wastage and other losses:** While handling and processing of materials, some wastage and loss arise. Based on the nature of material and process, these are classified as normal and abnormal for efficient utilisation and control.
- f. **Regular information about resources:** Regular and updated information on availability and utilisation of materials are necessary for the entity for timely and informed decision making.

MATERIAL CONTROL

Material, being one of the total cost elements, are also required to be controlled so that the overall cost control objective can be fulfilled.

Objectives of System of Material Control

The objectives of a system of material control are as following:

- i. **Minimising interruption in production process:** Material Control system ensures that no activity, particularly production, suffers from interruption for want of materials and stores. It should be noted that this requires constant availability of every item that may be needed in production process, howsoever, small its cost may be.
- ii. **Optimisation of Material Cost:** The overall material costs includes price, ordering costs and holding costs. Since all the materials and stores are acquired at the lowest possible price considering the required quality and other relevant factors like reliability in respect of delivery, etc., holding cost too needs to be minimized.
- iii. **Reduction in Wastages:** Material Control System has an objective of avoidance of unnecessary losses and wastages that may arise from deterioration in quality due to defective or long storage or from obsolescence. It may be noted that losses and wastages in the process of manufacture are a concern of the production department.
- iv. **Adequate Information:** The system of material control maintains proper records to ensure that reliable information is available for all items of materials and stores. This not only helps in detecting losses and pilferages but also facilitates proper production planning.
- v. **Completion of order in time:** Proper material management is very necessary for fulfilling orders of the firm. This adds to the goodwill of the firm.

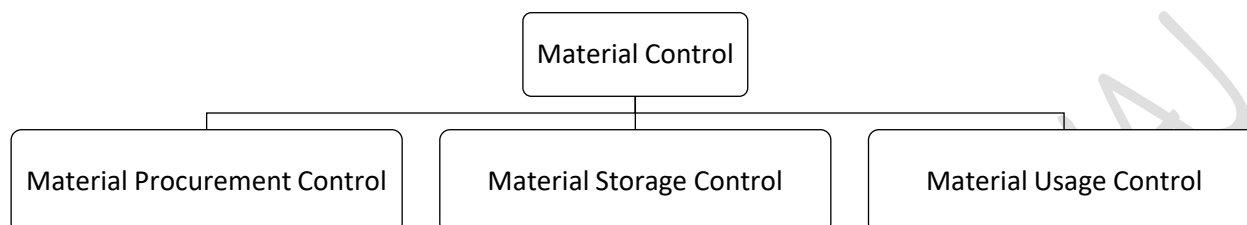
Requirements of Material Control

Material control requirements can be summarised as follows:

1. Proper co-ordination of all departments involved viz., finance, purchasing, receiving, inspection, storage, accounting and payment.
2. Determining purchase procedure to see that purchases are made, after making suitable enquiries, at the most favourable terms to the firm.
3. Use of standard forms for placing the order, noting receipt of goods, authorising issue of the materials etc.
4. Preparation of budgets concerning materials, supplies and equipment to ensure economy in purchasing and use of materials.
5. Operation of a system of internal check so that all transactions involving materials, supplies and equipment purchases are properly approved and automatically checked.
6. Storage of all materials and supplies in a well designated location with proper safeguards.
7. Operation of a system of perpetual inventory together with continuous stock checking so that it is possible to determine, at any time, the amount and the value of each kind of material in stock.
8. Operation of a system of stores control and issue so that there will be delivery of materials upon requisition to departments in the right amount at the time they are needed.

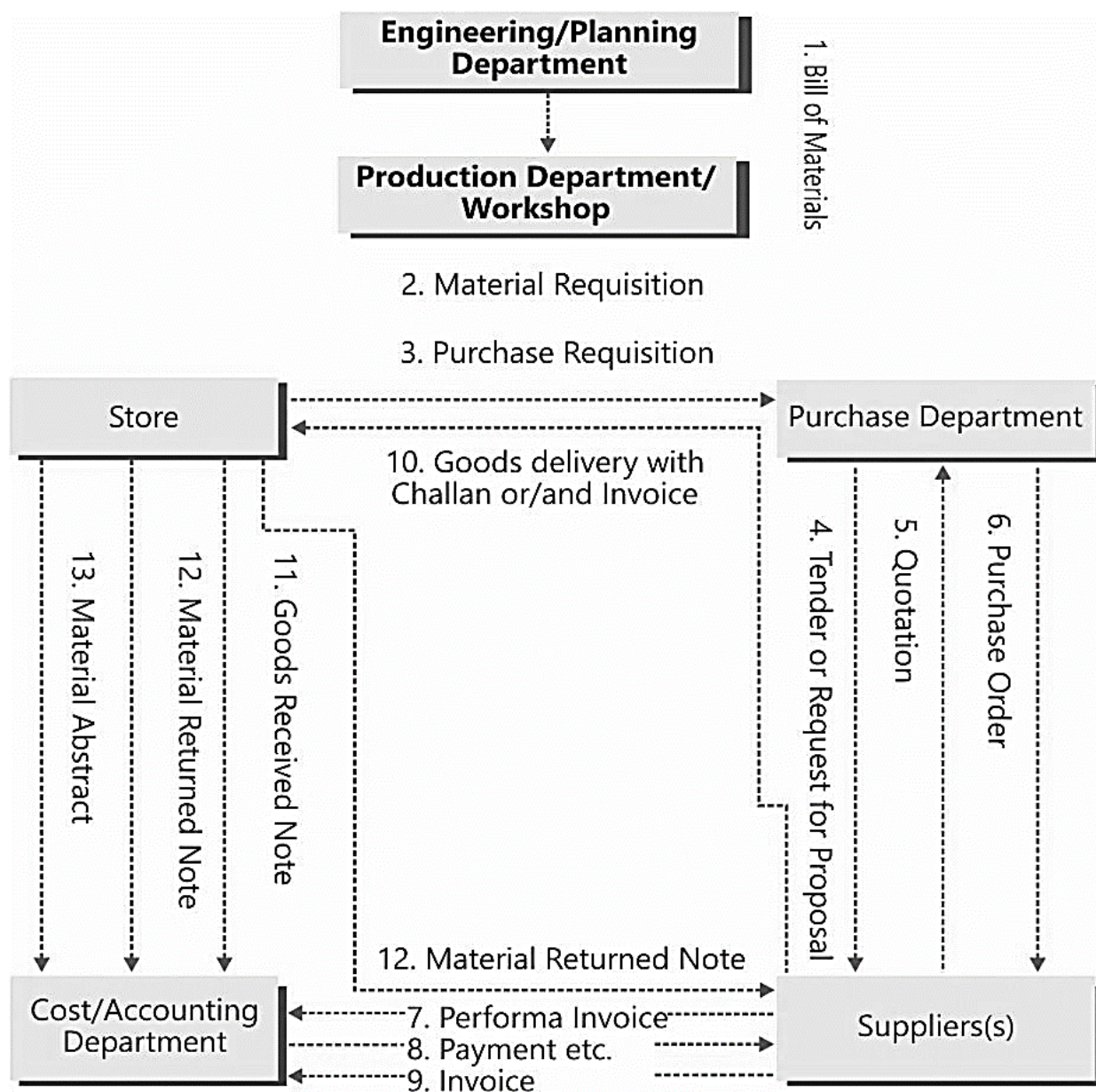
9. Development of system of controlling accounts and subsidiary records which exhibit summary and detailed material costs at the stage of material receipt and consumption.
10. Regular reports of materials purchased issue from stock, inventory balances, obsolete stock, goods returned to vendors, and spoiled or defective units are required.

Elements of Material Control



Material control involves efficient functioning of the following operations:

- Purchasing of materials
- Receiving of materials
- Inspection of materials
- Storage of materials
- Issuing materials
- Maintenance of inventory records
- Stock audit

Materials Procurement Procedure**Diagram: Material Procurement Procedure****Bill of Materials**

It is also known as Materials Specification List or Materials List. It is a detailed list specifying the standard quantities and qualities of materials and components required for producing a product or carrying out of any job. The materials specification list is prepared by the product development team commonly known as engineering or planning department in a standard form. This is shared with other concerned departments like Marketing, Production, Store, and Cost/ Accounting department.

Format and content of a Bill of Materials vary on the basis of industrial peculiarities, management information system (MIS) and accounting system in place.

Uses of Bill of Material

Marketing (Purchase) Dept.	Production Dept.	Stores Dept.	Cost/ Accounting Dept.
Materials are procured (purchased) on the basis of specifications mentioned in it.	Production is planned according to the nature, volume of the materials required to be used. Accordingly, material requisition lists are prepared.	It is used as a reference document while issuing materials to the requisitioning department.	It is used to estimate cost and profit. Any purchase, issue and usage are compared/verified against this document.

Material Requisition Note

It is also known as material requisition slip. It is a voucher of authority used to get materials issued from store. Generally, it is prepared by the production department and materials are withdrawn on the basis of material requisition list or bill of materials. If no material list has been prepared, it is desirable that the task of the preparation of material requisition notes be left to the planning department or by the department requires the materials. The note is shared with Store and Cost/ Accounting department. Format of a Material requisition note may vary on the basis of Industrial Peculiarities, Management Information System (MIS) and Accounting System in place.

Difference between Bill of Materials and Material Requisition Note

Bill of Materials	Material Requisition Note
1. It is the document prepared by the engineering or planning dept.	1. It is prepared by the production or other consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	2. It is a document asking Store-keeper to issue materials to the consuming department.
3. It often serves the purpose of a material requisition as it shows the complete schedule of materials required for a particular job i.e., it can replace material requisition.	3. It cannot replace a bill of materials.
4. It can be used for the purpose of quotations.	4. It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials drawn through material requisition.	5. It shows the material actually drawn from stores.

Purchase Requisition

This document authorises the purchase department to order for the materials specified in the note. Since the materials purchased will be used by the production departments, there should be constant co-ordination between the purchase and production departments. A purchase requisition is a form used for making a formal request to the purchasing department to purchase materials. This form is usually filled up by the store keeper for regular materials and by the departmental head for special materials (not stocked as regular items). At the beginning a complete list of materials and stores required should be drawn up, which should be reviewed periodically for any addition or deletion. On the basis of standing order, once an item is included in the standard list, it becomes the duty of the purchase department to arrange for fresh supplies before existing stocks are exhausted. Any change in the consumption pattern should be informed to the purchase department for necessary action from their end.

For control over buying of regular store materials, Inventory control system is to determine stock levels to be maintained and the number of quantities to be ordered. In respect of special materials, required for a special order or purpose, it is desirable that the concerned technical department should prepare materials specifications list specifying the quantity, size and order for the materials. Purchase requisition note may either be originated by the stores department in connection with regular materials or by the production planning or other technical departments in respect of special materials. Format of a purchase requisition note may vary on the basis of Industrial Peculiarities, Management Information System (MIS) and Accounting System in place.

Inviting Quotation/ Request for Proposal (RFP)/ Notification Inviting Tender (NIT)

Materials purchase department has to answer the following question before initiating purchasing of materials:

- i. What to purchase?
- ii. When to purchase?
- iii. How much to purchase?
- iv. From where to purchase?
- v. At what price to purchase?

i. What to purchase?

Materials are purchased as per the requisition received from the stores or user departments. In case of materials used regularly, the materials are purchased as per the standard operating procedures (SOP).

ii. When to purchase?

Materials are purchased considering the need for the materials for production and safety, however, the timing of placing the order is very important to get the materials replenished before the requirement arise and without affecting the production schedule. Supply of materials i.e., how easily the materials are available in the market, Lead time i.e., time required to get the order from supplier's place to production place, consumption pattern of materials are the important factors which affects the timing of purchase. Related to the question, later in this chapter Re-order Stock Level will be learnt. Further the concept of just-in-time (JIT), which is briefly discussed in this chapter is also associated with the question 'when' to purchase.

iii. How much to purchase?

The quantity of materials to be ordered depends on the factors like material consumption pattern, minimum order size as offered by the supplier, quantity discount, storage cost and capacity and working capital requirement etc. The concept of Economic Order Quantity (EOQ) will be discussed later in this chapter.

iv. Where to purchase?

This is the process of selecting supplier of materials to be purchased. This is a very sensitive and crucial process, though for every organization but specifically for the organizations where public money is involved i.e., public sector undertakings (PSUs). Selection process of supplier could be a grey area which attracts special attention of regulators like CVC (Central Vigilance Commission), CAG (Comptroller and Auditor General of India), Auditors and others. The question is why this is so sensitive to attract attention of watchdogs. The answer to this question is in a line from Preamble of the Constitution of India, which reads as to secure to all its citizens: "Equality of status and of opportunity". This means the supplier selection process be such transparent and fair that all suppliers are treated equal to get opportunity in participation in Tender process. The selection process starts with Enquiry/Request for Proposals (RFP)/ Notification Inviting Tender (NIT). The geographical area for an enquiry/ RFP or NIT can be local or global depending on the propriety, availability and government guidelines for materials to be purchased. The RFP or NIT can be floated offline i.e., manual process or online by publishing on website or designated electronic market places. One of the examples of electronic market place is GeM (Government e Marketplace).

Government e Marketplace (GeM): A dedicated e-market for different goods & services procured by Government Organizations / Departments / PSUs. It aims to enhance transparency, efficiency and speed in public procurement. It provides the tools of e-bidding, reverse e-auction and demand aggregation to facilitate the government users, achieve the best value for their money. The purchases through GeM by Government users have been authorized and made mandatory by Ministry of Finance.

v. At what price to purchase?

The answer to the question is discussed in the following paragraph where the Lowest bidder (also called L1 bidder) for the material is selected.

Selection of Quotation/ Proposal

After invitation of tender from the vendors, interested vendors who are fulfilling all the criteria mentioned in the tender notice send their price quotations/ proposals to the purchase department. For selecting material suppliers, the factors which the purchase department keeps in its mind are— price, quantity, quality offered, time of delivery, mode of transportation, terms of payment, reputation of supplier etc.

Preparation and Execution of Purchase Orders

Having decided on the best quotation that should be accepted, the purchase manager or concerned officer proceeds to issue the formal purchase order. It is a written request to the supplier to supply specified materials at specified rates and within a specified period

Receipt and Inspection of Materials

After execution of purchase order and advance payment (if terms of quotation so specify), necessary arrangement is made to receive the delivery of materials. After receipt of materials along with relevant documents or/ and invoice, receiving department (store dept.) arrange to inspect the materials for its conformity with purchase order.

Goods Received Note

If everything is in order and the supply is considered suitable for acceptance, the Receiving department prepares a Receiving Report or Material Inward Note or Goods Received Note. Generally, it is prepared in quadruplicate, the copies being distributed to purchase department, store or order indenting department, receiving department and accounting department.

Material Returned Note

Sometimes materials have to be returned to suppliers after these have been received in the factory. Such returns may occur before or after the preparation of the receiving report. If the return takes place before the preparation of the receiving report, such material obviously would not be included in the report and hence not shown in the stores ledgers. In that case, no adjustment in the account books would be necessary. But if the material is returned after its entry in the receiving report, a suitable document must be drawn up in support of the issue so as to exclude from the Stores of Material Account the value of the materials returned back. This document usually takes the form of a Material Returned Note or Material outward return note.

The invoice received from the supplier is sent to the accounts section to check authenticity and mathematical accuracy. The quantity and price are also checked with reference to goods received note and the purchase order respectively. The accounts section after checking its accuracy finally certifies and passes the invoice for payment.

VALUATION OF MATERIAL RECEIPTS

Treatment of items associated with purchase of materials is tabulated as below

S No.	Items	Treatment
Discounts and Subsidy		
i.	Trade Discount	Trade discount is deducted from the purchase price if it is not shown as deduction in the invoice.
ii.	Quantity Discount	Like trade discount quantity discount is also shown as deduction from the invoice. It is deducted from the purchase price if not shown as deduction.
iii.	Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
iv.	Subsidy / Grant / Incentives	Any subsidy/ grant/ incentive received from the Government or from other sources deducted from the cost of purchase.
Duties and Taxes		
v.	Road Tax/ Toll Tax	Road tax/ Toll tax, if paid by the buyer, is included with the cost of purchase.
vi.	Goods and Service Tax (GST)	Goods and Service Tax (GST) is paid on supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase.
vii.	Custom Duty	Custom duty is paid on import of goods from outside India. It is added with the purchase cost.
Penalty and Charges		
viii.	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase
ix.	Detention charges/ Fine	Detention charges/ fines imposed for non-compliance of rule or law by any statutory authority. It is an abnormal cost and not included with cost of purchase
x.	Penalty	Penalty of any type is not included with the cost of purchase

Other expenditures		
xi.	Insurance charges	Insurance charges are paid for protecting goods during transit. It is added with the cost of purchase.
xii.	Commission or brokerage paid.	Commission or brokerage paid is added with the cost of purchase.
xiii.	Freight inwards	It is added with the cost of purchase as it is directly attributable to procurement of material.
xiv.	Cost of containers	Treatment of cost of containers are as follows: • Non-returnable containers: The cost of containers is added with the cost of purchase of materials. • Returnable Containers: If the containers are returned and their costs are refunded, then cost of containers should not be considered in the cost of purchase. • If the amount of refund on returning the container is less than the amount paid, then, only the short fall is added with the cost of purchase.
xv.	Shortage	Shortage in materials is treated as follows: Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. Shortage due to abnormal reasons: Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.

MATERIAL STORAGE & RECORDS

Proper storing of materials is of primary importance. It is not enough only to purchase material of the required quality. If the purchased material subsequently deteriorates in quality because of bad storage, the loss is even more than what might arise from purchase of bad quality of materials. Apart from preservation of quality, the store-keeper also ensures safe custody of the material. It should be the function of store-keeper that the right quantity of materials always should be available in stock.

Duties of Store Keeper

These can be briefly set out as follows:

- i. **General control over store:** Store keeper should keep control over all activities in Stores department. He should check the quantities as mentioned in Goods received note and with the purchased materials forwarded by the receiving department and to arrange for the storage in appropriate places.
- ii. **Safe custody of materials:** Store keeper should ensure that all the materials are stored in a safe condition and environment required to preserve the quality of the materials.
- iii. **Maintaining records:** Store keeper should maintain proper record of quantity received, issued, balance in hand and transferred to/ from other stores.
- iv. **Initiate purchase requisition:** Store keeper should initiate purchase requisitions for the replacement of stock of all regular stores items whenever the stock level of any item of store approaches the re-order level fixed.
- v. **Maintaining adequate level of stock:** Store keeper should maintain adequate level of stock at all time. He/ she should take all the necessary action so that production could not be interrupted due to lack of stock. Further he/ she should take immediate action for stoppage of further purchasing when the stock level approaches the maximum limit. He also needs to reserve a particular material for a specific job when so required
- vi. **Issue of materials:** Store keeper should issue materials only against the material requisition slip approved by the appropriate authority. He/ she should also refer to bill of materials while issuing materials to requisitioning department.
- vii. **Stock verification and reconciliation:** Store keeper should verify the book balances with the actual physical stock at frequent intervals by way of internal control and check the any irregular or abnormal issues, pilferage, etc.

Store Records

The record of stores may be maintained in three forms:

1. Bin Cards
2. Stock Control Cards
3. Store Ledger

Bin Cards

It is a quantitative record of inventory which shows the quantity of inventory available in a particular bin. Bin refers to a box/ container/ space where materials are kept. Card is placed with each of the bin (space) to record the details of material like receipt, issue and return. It is maintained by store department.

Advantages

1. There would be fewer chances of mistakes being made as entries are made at the same time as goods received or issued by the person actually handling the materials.
2. Control over stock can be more effective, as comparison of the actual quantity in hand at any time with the book balance is possible.
3. Identification of the different items of materials is facilitated by reference to the Bin Card, the bin or storage receptacle.

Disadvantages

1. Store records are dispersed over a wide area.
2. The cards are liable to be smeared with dirt and grease because of proximity to material and also because of handling materials.
3. People handling materials are not ordinarily suitable for the clerical work involved in writing Bin Cards.

Stock Control Cards

It is also a quantitative record of inventory maintained by stores department for every item of material. In other words, it is a record which shows the overall inventory position in store. Recording includes receipt, issue, return, in hand and order given.

Advantages

1. Records are kept in a more compact manner so that reference to them is facilitated.
2. Records can be kept in a neat and clean way by men solely engaged in clerical work so that a division of workers between record keeping and actual material handling is possible.
3. As the records are at one place, it is possible to get an overall idea of the stock position without the necessity of going round the stores.

Disadvantages

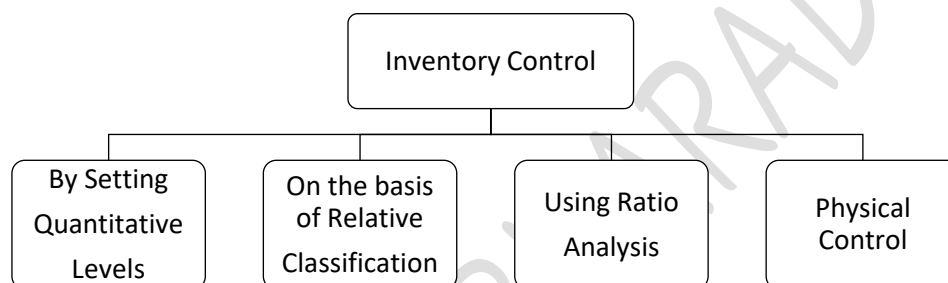
1. On the spot comparison of the physical stock of an item with its book balance is not facilitated.
2. Physical identification of materials in stock may not be as easy as in the case of bin cards, as the Stock Control Cards are housed in cabinets or trays.

Stores Ledger

A Stores Ledger is maintained to record both quantity and cost of materials received, issued and those in stock. It is a subsidiary ledger to the main cost ledger; it is maintained by the Cost/ Accounts Department. The source documents for posting the ledger are Goods received notes, Materials requisition notes etc.

Difference between Bin Card & Stores Ledger

Bin Card	Stores Ledger
It is maintained by the storekeeper in the store.	It is maintained in cost accounting department.
It contains only quantitative details of material received, issued and returned to stores.	It contains information quantity both in and value.
Entries are made when transaction takes place.	It is always posted after the transaction.
Each transaction is individually posted.	Transactions may be summarized and then posted.
Inter-department transfers do not appear in Bin Card.	Material transfers from one job to another job are recorded for costing purposes.

INVENTORY CONTROL**Inventory Control- By Setting Quantitative Levels**

Re-order Stock Level	•When to Order
Re-order Quantity/ EOQ	•How Much to Order
Maximum Stock Level	•Upto How much to stock
Minimum Stock Level	•Atleast How much to stock
Average Stock Level	•Stock normally kept
Danger Stock Level	•Kept for emergency requirement
Buffer Stock	•To meet sudden demand

Re-order Stock Level (ROL) This level lies between minimum and the maximum levels in such a way that before the material ordered is received into the stores, there is sufficient quantity in hand to cover both normal and abnormal consumption situations. In other words, it is the level at which fresh order should be placed for replenishment of stock.

It is calculated as:

$$\text{ROL} = \text{Maximum Consumption} \times \text{Maximum Re-order Period}$$

Maximum Consumption = The maximum rate of material consumption in production activity

Maximum Re-order period = The maximum time to get order from supplier to the stores

This can also be calculated alternatively as below:

$$\text{ROL} = \text{Minimum Stock Level} + (\text{Average Rate of Consumption} \times \text{Average Re-order period})$$

Minimum Stock Level	Minimum Stock level that must be maintained all the time.
Average Rate of Consumption	Average rate of material consumption in production activity. It is also known as normal consumption/ usage
Average Re-order period	Average time to get an order from supplier to the stores. It is also known as normal period.

(Re-order period is also known as Lead time)

Re-Order Quantity: Re-order quantity is the quantity of materials for which purchase requisition is made by the store department. While setting the quantity to be re-ordered, consideration is given to the maintenance of minimum level of stock, re-order level, minimum delivery time and the most important the cost. Hence, **the quantity should be where, the total of carrying cost and ordering cost is at minimum.** For this purpose, an economic order quantity should be calculated.

Economic Order Quantity (EOQ): The size of an order for which total of ordering and carrying cost are minimum.

Ordering Cost: Ordering costs are the costs which are associated with the purchase or order of materials such as cost to invite quotations, documentation works like preparation of purchase orders, employee cost directly attributable to the procurement of material, transportation and inspection cost etc.

Carrying Cost: Carrying costs are the costs for holding/ carrying of inventories in store such as the cost of fund invested in inventories, cost of storage, insurance cost, obsolescence etc.

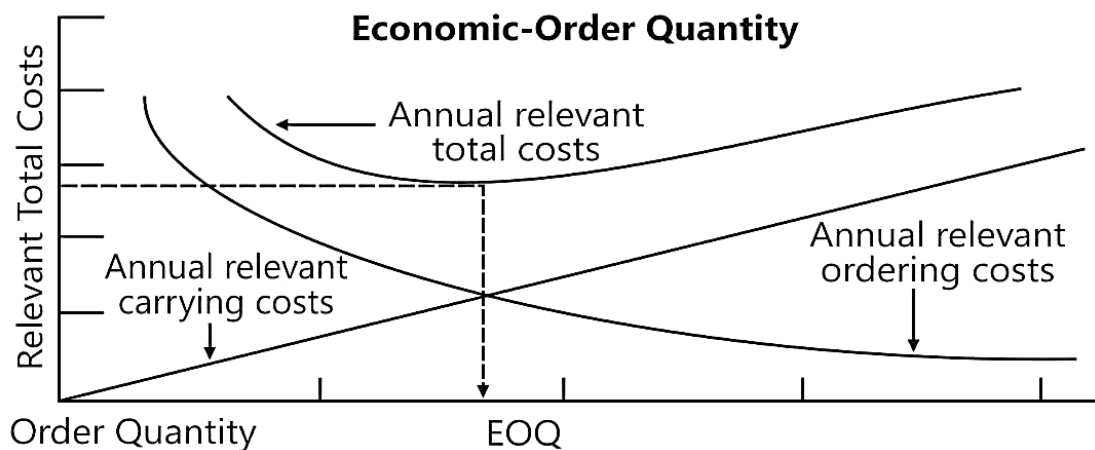
The Economic Order Quantity (EOQ) is calculated as below:

$$\text{EOQ} = \sqrt{\frac{2 \times \text{Annual Requirement (A)} \times \text{Cost per order (O)}}{\text{Carrying Cost per unit per annum (C)}}$$

- **Annual Requirement (A)** - It represents demand for raw material or Input for a year.
- **Cost per Order (O)** - It represents cost of placing an order for purchase.
- **Carrying Cost (C)** – It represents cost of carrying average inventory on annual basis.

Assumptions underlying E.O.Q: The calculation of economic order of material to be purchased is subject to the following assumptions:

1. Ordering cost per order and carrying cost per unit per annum are known and they are fixed.
2. Anticipated usage of material in units is known.
3. Cost per unit of the material is constant and is known as well.
4. The quantity of material ordered is received immediately



Minimum Stock Level: It is lowest level of material stock, which must be maintained in hand at all times, so that there is no stoppage of production due to non-availability of inventory.

It is calculated as below:

$$\text{Minimum Stock Level} = \text{Re-order Stock Level} - (\text{Average Consumption Rate} \times \text{Average Re-order Period})$$

Maximum Stock Level: It is the highest level of quantity for any material which can be held in stock at any time. Any quantity beyond this level cause extra amount of expenditure due to engagement of fund, cost of storage, obsolescence etc.

It can be calculated as below:

$$\text{Maximum Stock Level} = \text{Re-order Level} + \text{Re-order Quantity} - (\text{Minimum Consumption Rate} \times \text{Minimum Re-order Period})$$

Here, Re-order Quantity may be EOQ

Average Inventory Level: This is the quantity of material that is normally held in stock over a period. It is also known as normal stock level.

It can be calculated as below:

$$\text{Average Stock Level} = \text{Minimum Stock Level} + 1/2 \text{ Re-order Quantity}$$

Alternatively, it can be calculated as below:

$$\text{Average Stock Level} = \frac{\text{Maximum Stock Level} + \text{Minimum Stock Level}}{2}$$

Danger level: It is the level at which normal issues of the raw material inventory are stopped and emergency issues are only made.

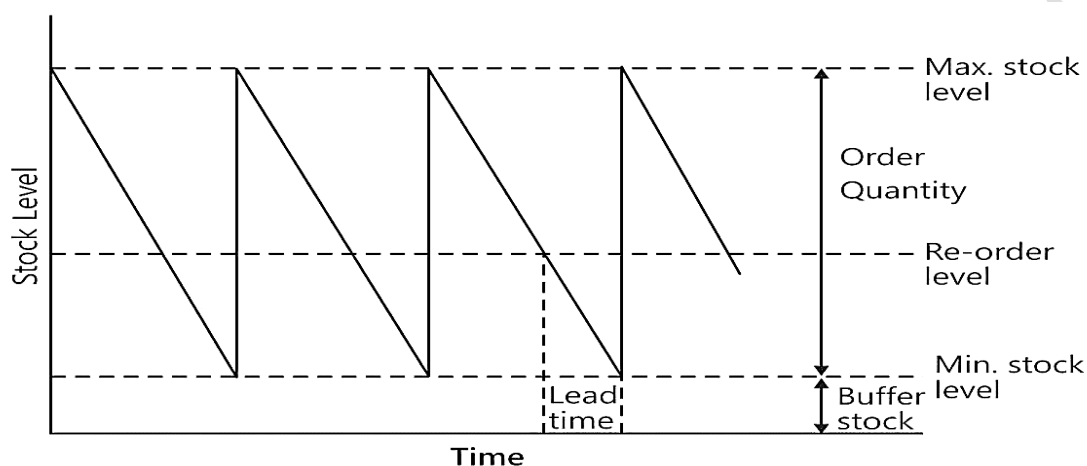
It can be calculated as below:

$$\text{Danger Level} = \text{Average Consumption}^* \times \text{Lead time for emergency purchase}$$

*Some time minimum consumption is also used.

Buffer Stock: Some quantity of stock may be kept for **contingency** to be used in case of sudden order, such stock is known as buffer stock.

All the above stock levels can be understood with the help of the following diagram:



When the materials are purchased, the level keeps rising. It may reach maximum level if the rate of issuance is less. As the materials are consumed, the stock level starts declining. At re-order level, reorder quantity is ordered and fresh supplies are normally received when stocks reach minimum level. The time interval between re-order level, when the fresh order is placed, and the time of actual receipt of materials is known as lead time.

Inventory Stock-Out

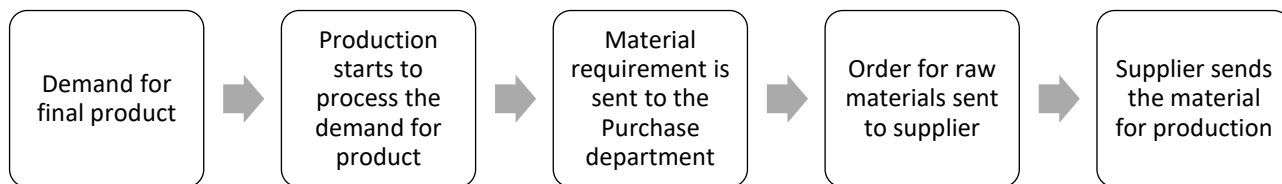
Stock out is said to be occurred when an inventory item could not be supplied due to insufficient stock in the store. The stock-out situation costs to the entity not only in financial terms but in non-financial terms also. Due to stock out an entity not only loses overheads costs and profit but reputation (goodwill) also due to non-fulfilment of commitment. Though it may not be a monetary loss in short term but in long term it could be a reason for financial loss.

While deciding on the level of inventory, a trade-off between the stock out cost and carrying cost is made so that overall inventory cost can be minimized.

Just In Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have zero inventories in stores. According to this approach material should only be purchased when it is actually required for production. It is also known as 'Demand pull' or 'Pull through' system of production.

This can be understood with the help of the following diagram:



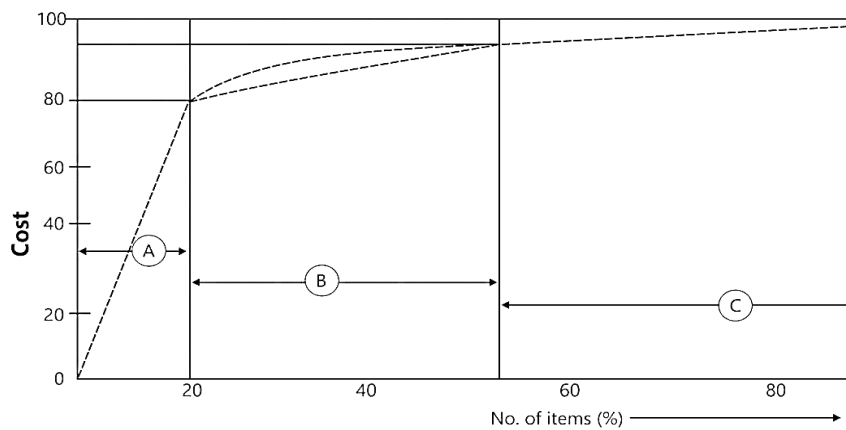
Inventory Control- On the basis of Relative Classification

ABC Analysis	• On the basis of value and frequency of inventory
Fast, Slow and Non Moving (FSN)	• On the basis of inventory turnover
Vital, Essential and Desirable (VED)	• On the basis of importance of inventory
High, Medium and Low (HML)	• On the basis of price of an item of inventory

ABC Analysis

This system exercises discriminating control over different items of inventory on the basis of the investment involved. Usually the items are classified into three categories according to their relative importance, namely, their value and frequency of replenishment during a period.

- i. **'A' Category:** This category of items consists of only a small percentage i.e., about 10% of the total items handled by the stores but require heavy investment about 70% of inventory value, because of their **high prices or heavy requirement** or both. Items under this category can be controlled effectively by using a regular system which ensures neither over-stocking nor shortage of materials for production. Such a system plans its total material requirements by making budgets. The stocks of materials are controlled by fixing certain levels like maximum level, minimum level and re-order level.
- ii. **'B' Category:** This category of items is relatively less important; they may be 20% of the total items of material handled by stores. The percentage of investment required is about 20% of the total investment in inventories. In the case of these items, as the sum involved is **moderate**, the same degree of control as applied in 'A' category of items is not warranted. The orders for the items, belonging to this category may be placed after reviewing their situation periodically.
- iii. **'C' Category:** This category of items does not require much investment; it may be about 10% of total inventory value but they are nearly 70% of the total items handled by store. For these categories of items, there is no need of exercising constant control. Orders for items in this group may be placed either after six months or once in a year, after ascertaining consumption requirements. In this case the objective is to economies on ordering and handling costs.



Advantages of ABC analysis: The advantages of ABC analysis are the following:

- i. **Continuity in production:** It ensures that, without there being any danger of interruption of production for want of materials or stores, minimum investment will be made in inventories of stocks of materials or stocks to be carried.
- ii. **Lower cost:** The cost of placing orders, receiving goods and maintaining stocks is minimized specially if the system is coupled with the determination of proper economic order quantities.
- iii. **Less attention required:** Management time is saved since attention need to be paid only to some of the items rather than all the items, as would be the case if the ABC system was not in operation.
- iv. **Systematic working:** With the introduction of the ABC system, much of the work connected with purchases can be systematized on a routine basis, to be handled by subordinate staff.

Fast Moving, Slow Moving and Non-Moving (FSN) Inventory: It is also known as FNS (Fast, Normal and Slow moving) classification of inventory analysis. Under this system, inventories are controlled by classifying them **on the basis of frequency of usage**. The classification of items into these three categories depends on the nature and managerial discretion. A threshold range on the basis of inventory turnover is decided and classified accordingly.

- i. **Fast Moving-** This category of items is placed nearer to store issue point and the stock is reviewed frequently for making of fresh orders.
- ii. **Slow Moving-** This category of items is stored little far and stock is reviewed periodically for any obsolescence, and may be shifted to Non-moving category.
- iii. **Non-Moving-** This category of items is kept for disposal. This category of items is reported to the management and an appropriate provision for loss may be created.

Some of the reasons for slow moving and non-moving inventories are stated below:

- i. Failure of production management to communicate the updated requirement to the stores management
- ii. Technological upgradation in terms of new machine requiring new kind of material or existing material becoming obsolete.
- iii. Lack of periodic review of inventories.

By careful observation, timely identification and adoption of inventory management techniques such as maintenance of minimum level or just in time approach, one can manage slow moving and non-moving inventories. We may calculate inventory turnover ratio and present the reports of comparison of actual and standards with variations, if any to the management.

Vital, Essential and Desirable (VED): Under this system of inventory analysis, inventories are classified on the basis of its criticality for the production function and final product. Generally, this classification is done for spare parts which are used for production.

- i. **Vital-** Items are classified as vital when its unavailability can interrupt the production process and cause a production loss. Items under this category are strictly controlled by setting re-order level.
- ii. **Essential-** Items under this category are essential but not vital. The unavailability may cause sub standardization and loss of efficiency in production process. Items under this category are reviewed periodically and get the second priority.
- iii. **Desirable-** Items under this category are optional in nature, unavailability does not cause any production or efficiency loss.

For instance, in hospital administration, stock of medicines and essential chemicals are categorized as VED or FSN inventory. In case of life saving, rare and critical drugs, they are being categorized as vital inventory. They are the ones whose unavailability can interrupt smooth service. Those inventories which are optional or substitutes, not leading to loss in efficiency would be categorized as desirable inventories. FNS categorization helps the store keepers in hospitals to keep a check on medicines whose expiry date is close and needs to be disposed off at the earliest. The quantity of slow-moving drugs are maintained accordingly.

High Cost, Medium Cost, Low Cost (HML) Inventory: Under this system, inventory is classified on the basis of the cost of an individual item, unlike ABC analysis where inventories are classified on the basis of overall value of inventory. A range of cost is used to classify the inventory items into the three categories. High-Cost inventories are given more priority for control, whereas Medium-cost and Low-cost items are comparatively given lesser priority.

Using Ratio Analysis

Input-Output Ratio

Input-output ratio is the ratio of the quantity of input of material to production and the standard material content of the actual output.

Inventory Turnover Ratio

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Material Consumed during the period}}{\text{Cost of Average stock held during the period}}$$

Average stock = $1/2$ (opening stock + closing stock)

$$\text{Average no. of days of Inventory holding} = \frac{365 \text{ days} / 12 \text{ months}}{\text{Inventory Turnover ratio}}$$

Physical Control

Two Bin System: Under this system, each bin is divided into two parts –

- smaller part to stock the quantity equal to the minimum stock or even the re-ordering level, and
- The other part to keep the remaining quantity.

Issues are made out of the larger part; but as soon as it becomes necessary to use quantity out of the smaller part of the bin, fresh order is placed. “Two Bin System” is supplemental to the record of respective quantities on the bin card and the stores ledger card.

Establishment of system of budgets: To control investment in the inventories, it is necessary to know in advance about the inventories requirement during a specific period (usually a year). The exact quantity of various types of inventories and the time when they would be required can be known by studying carefully production plans and production schedules. Based on this, inventories requirement budget can be prepared. Such a budget will discourage the unnecessary investment in inventories.

Perpetual inventory records and continuous stock verification: Perpetual inventory represents a system of records maintained by the stores department. **It, in fact, comprises of Bin Cards and Stores Ledger.**

The success of perpetual inventory depends upon the following:

- a. The Stores Ledger showing quantities and amount of each item.
- b. Stock Control cards (or Bin Cards).
- c. Reconciling the quantity balances shown by (a) & (b) above.
- d. Checking the physical balances of a number of items every day systematically and by rotation.
- e. Explaining promptly the causes of discrepancies, if any, between physical balances and the book figures.
- f. Making corrective entries wherever required after step (e) and
- g. Removing the causes of the discrepancies referred to in step (e)

Advantages of perpetual inventory: The main advantages of perpetual inventory are as follows:

1. Physical stocks can be counted and book balances adjusted as and when desired without waiting for the entire stock-taking to be done.
2. Quick compilation of Profit and Loss Account (for interim period) due to prompt availability of stock figures.
3. Discrepancies are easily located and thus corrective action can be promptly taken to avoid their recurrence.
4. A systematic review of the perpetual inventory reveals the existence of surplus, dormant, obsolete and slow-moving materials, so that remedial measures may be taken in time.

5. Fixation of the various stock levels and checking of actual balances in hand with these levels assist the store keeper in maintaining stocks within limits and in initiating purchase requisitions for correct quantity at the appropriate time.

Continuous Stock Verification: The checking of physical inventory is an essential feature of every sound system of material control. The system of continuous stock-taking consists of **physical verification of items of inventory**. The stock verification may be done by internal audit department but are independent of the store and production staff. Stock verification is done at appropriate interval of time without prior notice. The element of surprise is essential for effective control of the system.

Disadvantages of Annual/ Periodic Stock Taking: Annual stock-taking, however, has certain inherent shortcomings which tend to detract from the usefulness of such physical verification. For instance, since all the items have to be covered in a given number of days, either the production department has to be shut down during those days to enable thorough checking of stock or else the verification must be of limited character.

On the contrary, continuous stock taking is holding more advantages. Some of them are discussed below:

Advantages of continuous stock-taking:

1. Closure of normal functioning is not necessary.
2. Stock discrepancies are likely to be brought to the notice and corrected much earlier than under the annual stock-taking system.
3. The system generally has a sobering influence on the stores staff because of the element of surprise present therein.
4. The movement of stores items can be watched more closely by the stores auditor so that chances of obsolescence buying are reduced.
5. Final Accounts can be ready quickly. Interim accounts are possible quite conveniently.

MATERIAL ISSUE PROCEDURE

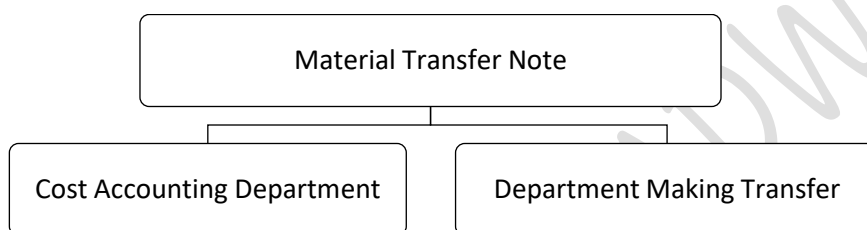
Issue of material must not be made except under properly authorized requisition slip. Usually, it is the foreman of a department who has the authority to draw materials from the store. Issue of material must be made on the basis of first in first out, that is, out of the earliest lot in hand. If care is not exercised in this regard, quality of earliest lot of material may deteriorate for having been kept for a long period.

Issue against Material Requisition Note

It is the voucher of the authority as regards to the issue of materials for use in the factory or in any of its departments. After receipt of material requisition slip, store keeper ensures that requisition is properly authorized and requisitioned quantity is within the quantity specified in bill of materials.

Transfer of Material

The surplus material arising on a job or other units of production may sometime be unsuitable for transfer to store because of its bulk, heavy weight, brittleness or some other reason. It may, however, be possible to find some alternative use for such materials by transferring them to some other job instead of returning them to the store. It must be stressed that generally transfer of material from one job to another is irregular, if not improper; in so far, it is not conducive to correct allocation and control of material, cost of jobs or other units of production. It is only in the circumstances envisaged above, that such direct transfer should be made. At the time of material transfer, a material transfer note should be made in duplicate. The disposition of the copies of this note being are as follows:



No copy is required for the store, as no entry in the stores records would be called for. The Cost Accounting Department would use its copy for the purpose of making the necessary entries in the cost ledger accounts for the jobs affected.

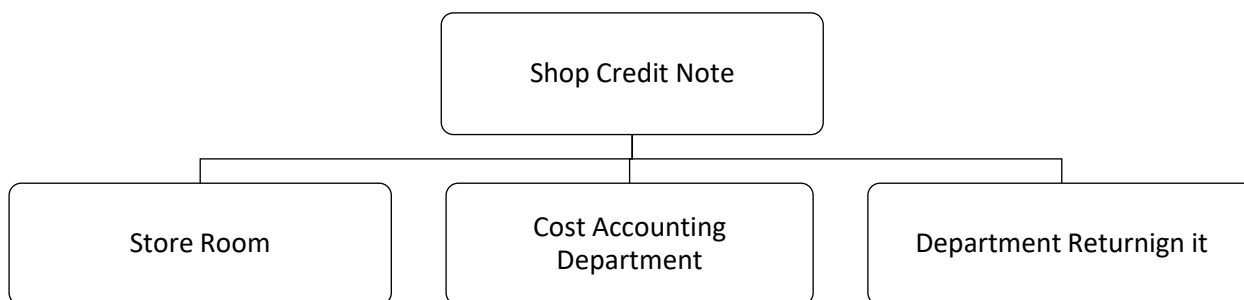
Format of a material requisition note may vary on the basis of industrial peculiarities, management information system (MIS) and accounting system in place.

Return of Material

Sometimes, it is not possible before hand to make any precise estimate of the material requirements or units of production. Besides, at times, due to some technical issues or other difficulties, it is not practicable to measure the exact quantity of material required by a department. In either case, material may have to be issued from stores in bulk, often in excess of the actual quantity required. Where such a condition exists, it is of the utmost importance from the point of view of materials control that any surplus material left over on the completion of a job should be promptly hand over to the storekeeper for safe and proper custody.

Unless this is done, the surplus material may be misappropriated or misap- plied to some purpose, other than that for which it was intended. The material cost of the job against which the excess material was originally drawn in that case, would be overstated, unless the job is given credit for the surplus arising thereon.

The surplus material, when it is returned to the storeroom, should be accompanied by a document known as a Shop Credit Note or alternatively as a Stores Debit Note. This document should be made out; by the department returning the surplus material and it should be in triplicate to be used as follows:



VALUATION OF MATERIAL ISSUES

Cost Price Methods

i. Specific Price Method

This method is useful, especially when materials are purchased for a specific job or work order, as such materials are issued subsequently to that specific job or work order at the price at which they were purchased.

Advantages and Disadvantages

Advantages	Disadvantages
The cost of materials issued for production purposes to specific jobs represent actual and correct costs.	This method is difficult to operate, specially when purchases and issues are numerous.
This method is best suited for non-standard and specific products.	

ii. First-in First-out (FIFO) Method

It is a method of pricing the issues of materials, in the order in which they are purchased. In other words, the materials are issued in the order in which they arrive in the store or the items longest in stock are issued first. Thus, each issue of material only recovers the purchase price which does not reflect the current market price. This method is considered **suitable in times of falling price** because the material cost charged to production will be high while the replacement cost of materials will be low. But, in the case of rising prices, if this method is adopted, the charge to production will be low as compared to the replacement cost of materials. Consequently, it would be difficult to purchase the same volume of material (as in the current period) in future without having additional capital resources.

Advantages and disadvantages

Advantages	Disadvantages
It is simple to understand and easy to operate.	If the prices fluctuate frequently, this method may lead to clerical error.

Material cost charged to production represents actual cost with which the cost of production should have been charged.	Since each issue of material to production is related to a specific purchase price, the costs charged to the same job are likely to show a variation from period to period.
In the case of falling prices, the use of this method gives better results.	In the case of rising prices, the real profits of the concern being low, while the profits in the books will appear high. This may lead to inability of the firm to meet the materials purchase demand at the current market price.
Closing stock of material will be represented very closely at current market price.	

iii. Last-in-First-out (LIFO) Method

It is a method of pricing the issues of materials on the basis of assumption that the items of the last batch (lot) purchased are the first to be issued. Therefore, under this method the prices of the last batch (lot) are used for pricing the issues, until it is exhausted, and so on. If however, the quantity of issue is more than the quantity of the latest lot, then earlier (lot) and its price will also be taken into consideration. **During inflationary period or period of rising prices, the use of LIFO would help** to ensure that the cost of production determined on the above basis is approximately the current one. This method is also useful specially when there is a feeling that due to the use of FIFO or average methods, the profits shown and tax paid are too high.

Advantages and Disadvantages

Advantages	Disadvantages
The cost of materials issued will be either nearer to and or will reflect the current market price. Thus, the cost of goods produced will be related to the trend of the market price of materials. Such a trend in price of materials enables the matching of cost of production with current sales revenues.	Calculation under LIFO system becomes complicated and cumbersome when frequent purchases are made at highly fluctuating rates.
The use of the method during the period of rising prices does not reflect undue high profit in the income statement as it was under the first-in-first-out or average	Costs of different similar batches of production carried on at the same time may differ a great deal.

method. In fact, the profit shown here is relatively lower because the cost of production takes into account the rising trend of material prices.	
In the case of falling prices profit tends to rise due to lower material cost, yet the finished products appear to be more competitive and are at market price.	In time of falling prices, there will be need for writing off stock value considerably to stick to the principle of stock valuation, i.e., the cost or the market price whichever is lower.
Over a period, the use of LIFO helps to iron out the fluctuations in profits.	This method of valuation of material is not acceptable to the income tax authorities.
In the period of inflation LIFO will tend to show the correct profit and thus avoid paying undue taxes to some extent.	

iv. Base Stock Method

Minimum quantity of stock under this method is always held at a fixed price as reserve in the stock, to meet the state of emergency, if it arises. This minimum stock is known as base stock and is valued at a price at which the first lot of materials is received and remains unaffected by subsequent price fluctuations. This method of valuing inventory is different from other methods of valuing issues, as the base stock of materials are valued at the original cost, whereas, materials other than the base are valued using other methods like FIFO, LIFO etc. This method is not an independent method as it uses FIFO or LIFO. Advantages and disadvantages of this method depend upon the use of the other method viz., FIFO or LIFO.

Average Price Methods

Simple Average Price Method Under this method, materials issued are valued at average price, which is calculated by dividing the total of rates at which different lot of materials are purchased by total number of lots. In this method quantity purchased in each lot is ignored. However, the price of stock of that lot which is completely sold out is not considered for taking average price

Advantages and Disadvantages:

Advantages	Disadvantages
This method is simple to use for an entity which orders materials in a lot of standard quantity, as only price per lot is taken to calculate average price	This method does not provide right stock valuation when standard quantity for purchase in a lot is not specified.

In a stable price environment, this method gives a price which approximates to the current market price.	When price of materials fluctuates and the entity chooses to customize the order quantity, the price under this method may differ substantially from the current market price.

Weighted Average Price Method: Unlike Simple Average Price method, this method gives due weightage to quantities also. Under this method, issue price is calculated by dividing sum of products of price and quantity by total number quantities.

Advantages and Disadvantages:

Advantages	Disadvantages
It smoothenes the price fluctuations, if at all it is there, due to material purchases.	Material cost does not represent actual cost price and therefore, a different profit or loss will arise out of such a pricing method.
Issue prices need not be calculated for each issue unless new lot of materials is received.	It may be difficult to compute, since every time lot is received, it would require re-computation of issue prices.

Market Price Methods

Replacement Price Method

Replacement price is defined as the price at which it is possible to purchase an item, identical to that which is being replaced or revalued. Under this method, materials issued are valued at the replacement cost of the items. This method is useful to determine true cost of production and to value material issues in periods of rising prices, because the cost of material considered in cost of production would be able to replace the materials at the increased price.

Realisable Price Method

Realisable price means a price at which the material to be issued can be sold in the market. This price may be more or may be less than the cost price at which it was originally purchased. Like replacement price method, the stores ledger would show profit or loss in this method too.

Notional Price Methods

Standard Price Method:

Under this method, **materials are priced at some predetermined rate or standard price** irrespective of the actual purchase cost of the materials. Standard cost is usually fixed after taking into consideration the following factors:

- i. Current prices,

- ii. Anticipated market trends, and
- iii. Discount available and transport charges etc.

Standard prices are fixed for each material and the requisitions are priced at the standard price. This method is useful for controlling material cost and determining the efficiency of purchase department. In the case of highly fluctuating prices of materials, it is difficult to fix their standard cost on long-term basis.

Advantages	Disadvantages
The use of the standard price method simplifies the task of valuing issues of materials.	The use of standard price does not reflect the market price and thus results in a different or incorrect profit or loss.
It facilitates the control of material cost and the task of judging the efficiency of purchase department.	The fixation of standard price becomes difficult when prices fluctuate frequently
It reduces the clerical work.	

Inflated Price Method:

In case material suffers loss in weight due to natural or climatic factors, e.g., evaporation, the issue price of the material is inflated to cover up the losses.

Re-use Price Method:

When materials are rejected and returned to the stores or a processed material is put to some other use, other than for the purpose it is meant, then such materials are priced at a rate quite different from the price paid for them originally. There is no final procedure for valuing use of material.

VALUATION OF RETURNS & SHORTAGES

Valuation of Materials Returned to the Vendor

Generally, materials are checked for quality, before dispatching to the store; and if any issues arise such as not meeting the quality requirements or any specification or are considered unfit for production due to any reason, due notice is made and materials are returned to the vendor. However, even if any substandard quality is noticed, before or after reaching the store, such materials can also be returned to the vendor.

The price of the materials to be returned to the vendor should include its invoice price plus freight, receiving and handling charges etc. Strictly speaking, the materials returned to the vendor should be returned at the stores ledger price and not at invoice price. But in practice, only invoice price is considered and the gap between the invoice price and stores ledger price is charged as overhead. In stores ledger, the defective or sub-standard materials are shown in the issue column at the rate shown in the ledger, and the difference between issue price and invoice cost is debited to an inventory adjustment account.

Valuation of Materials Returned to Stores

When materials requisitioned for a specific job or work-in progress are found to be in excess of the requirement or are unsuitable for the purpose, they are returned to the stores. There are two ways of treating such returns.

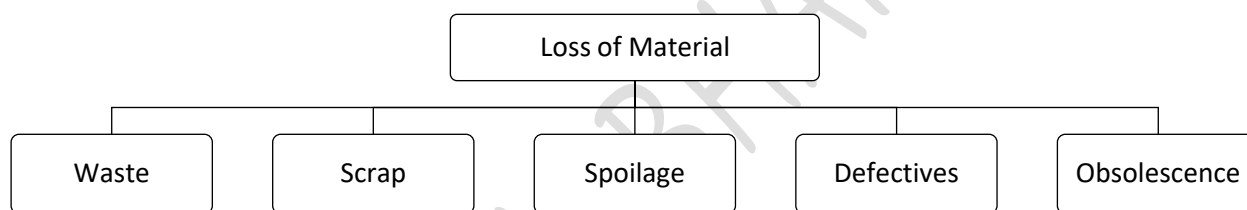
1. Such returns are entered in the receipt column at the price at which they were originally issued, and the materials are kept in suspense account, to be issued at the same price, against the next requisition.
2. Include the materials in stock, as if they were fresh purchases at the original issue price.

Valuation of Shortages during Physical Verification

Materials found short during physical verification should be entered in the issue column and valued at the rate as per the method adopted, i.e., FIFO or any other.

TREATMENT OF NORMAL AND ABNORMAL LOSS OF MATERIALS

Loss of materials during handling, storage, process may occur any of the following forms:



Waste

The portion of raw material which is lost during storage or production and discarded. The waste may or may not have any value.

Treatment of Waste:

Normal- Cost of normal waste is absorbed by good production units.

Abnormal- The cost of abnormal loss is transferred to Costing Profit and loss account.

Scrap

The materials which are discarded and disposed-off without further treatment. Generally, scrap has either no value or insignificant value. Sometimes, it may be reintroduced into the process as raw material.

Treatment of Scrap:

Normal- The cost of scrap is borne by good units and income arises on account of realisable value is deducted from the cost.

Abnormal- The scrap account should be charged with full cost. The credit is given to the job or process concerned. The profit or loss in the scrap account, on realisation, will be transferred to the Costing Profit and Loss Account.

Spoilage

It is the term used for materials which are badly damaged in manufacturing operations, and they cannot be rectified economically and hence taken out of the process to be disposed off in some manner without further processing.

Treatment of Spoilage:

Normal - Normal spoilage (i.e., which is inherent in the operation) costs are included in costs, either by charging the loss due to spoilage to the production order or by charging it to the production overhead so that it is spread over all the products. Any value realised from spoilage is credited to production order or production overhead account, as the case may be.

Abnormal-The cost of abnormal spoilage (i.e., arising out of causes not inherent in manufacturing process) is charged to the Costing Profit and Loss Account. When spoiled work is the result of rigid specification, the cost of spoiled work is absorbed by good production while the cost of disposal is charged to production overhead.

Defectives:

It signifies those units or portions of production which do not meet the quality standards. Defectives arise due to sub-standard materials, bad-supervision, bad-planning, poor workmanship, inadequate-equipment and careless inspection. The defectives which can be re-made as per the quality standard by using additional materials are known as reworks. Reworks include repairs, reconditioning and refurbishing. Defectives which cannot be brought up to the quality standards are known as rejects. The rejects may either be disposed-off or re-cycled for production process.

Treatment of Defectives:

Normal- An amount equal to the cost less realisable value on sale of defectives are charged to material cost of good production.

Abnormal- Material cost of abnormal defectives are not included in material cost but treated as loss after giving credit to the realisable value of such defectives. The material cost of abnormal loss is transferred to costing profit and loss account. Reclamation of loss from defective units. In the case of articles that have been spoiled, it is necessary to take steps to reclaim as much of the loss as possible.

For this purpose

- i. All defective units should be sent to a place fixed for the purpose;
- ii. These should be dismantled;
- iii. Goods and serviceable parts should be separated and taken back into the stock;
- iv. Parts which can be made serviceable by further work should be separated and sent to the workshop for the purpose and taken into stock after the defects have been removed; and
- v. Parts which cannot be made serviceable should be collected in one place for being melted or sold off

Difference between Waste and Scrap

Waste	Scrap
1. It is connected with raw material or inputs to the production process.	1. It is the loss connected with the output
2. Waste of materials may be visible or invisible.	2. Scraps are generally identifiable and has physical substance.
3. Generally, waste has recoverable value. no	3. Scraps are termed as by-products and has small recoverable value.

Difference between Scrap and Defectives

Scrap	Defectives
1. It is the loss connected with the output	1. This type of loss is connected with the output as well as the input.
2. Scraps are not intended but cannot be eliminated due to the nature of material or process itself.	2. Defectives also are not intended but can be eliminated through a proper control system.
3. Generally, scraps are not used or rectified.	3. Defectives can be used after rectification.
4. Scraps have insignificant recoverable value.	4. Defectives are sold at a lower value from that of the good one.

Distinction between Spoilage and Defectives

The difference between spoilage and defectives is that while spoilage cannot be repaired or reconditioned, defectives can be rectified and transferred, either back to the standard production or to the seconds.

The problem of accounting for defective work is in relation to the costs of rectification or rework.

Obsolescence:

Obsolescence is defined as “the loss in the intrinsic value of an asset due to its supersession”. In simple words, obsolescence refers to the loss in the value of an asset due to technological advancements.

Treatment - Materials may become obsolete under any of the following circumstances:

- i. where it is a spare part or a component of a machinery that is used in manufacturing and is now obsolete;
- ii. where it is used in the manufacturing of a product which has now become obsolete;

Where the material itself is replaced by another material due to either improved quality or fall in price. In all the three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to dispose it off at the best available price. The loss arising out of obsolete materials is an abnormal loss and it does not form part of the cost of manufacture.

CONSUMPTION OF MATERIALS

Any product that is manufactured in a firm entail's consumption of resources like material, Labour etc. The management for planning and control must know the cost of using these resources in manufacturing process. The consumption of materials takes place when it is used in the manufacturing of the product. It is important to note that the amount of materials consumed in a period by a cost object need not be equal to the amount of material available with the concern. For example, during any period, the total of raw material stock available for use in production may not be equal to the amount of materials actually consumed and assigned to the cost object of the production. The difference between the material available and material consumed represents the surplus stock or stock of material at the end of the period.

Identification of Materials

For the identification of consumption of materials with products of cost centres the followings points should be noted:

1. It is required that the concern should follow coding system for all materials, so that each material is identified by unique code number.
2. It is required that each product of a cost centre should be given a unique code number so that the direct material issued for production of particular product of a cost centre can be collected against the code number of that product.

However, it may not be possible to allocate all materials directly to individual product of a cost centre e.g. maintenance materials, inspection and testing materials etc. The consumption of these materials are collected for cost centre and then charged to individual product by adopting suitable overhead absorption rate of cost centre.

$$\text{Overhead absorption rate of cost centre} = \frac{\text{Cost for cost centre}}{\text{Base relating to cost centre}}$$

3. Each issue of materials should be recorded. One way of doing this is to use a material requisition note. This note shows the details of materials issued for the product of cost centre or the cost centre which is to be charged with cost of materials.
4. A material return note is required for recording the excess materials returned to the store. This note is required to ensure that original product of cost centre is credited with the cost of material which was not used and that the stock records are updated.
5. A material transfer note is required for recording the transfer of materials from one product of cost centre to other or from one cost centre to other cost centre.
6. The cost of materials issued would be determined according to stock valuation method used.

Monitoring Consumption of Materials

For monitoring consumption of materials, a storekeeper should periodically analyse the various material requisitions, material return notes and material transfer notes. Based on this analysis, a **material abstracts or material issue analysis sheet is prepared**, which shows at a glance the value of material consumed in manufacturing each product. This statement is also useful for ascertaining the cost of material issued for each product.

Format of Material Abstract

Week Ending.....

Material requisition or Transfer Note or Returned Note No.	Amount (Rs.)	Product Nos.						Total for Product	Overheads (Indirect Material charged) (Rs.)
		101	102	103	104	105	106		
		(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)		
	—	—	—	—	—	—	—	—	—
Total									

The material abstract statement serves a useful purpose. It, in fact, shows the amount of material to be debited to various products & overheads. The total amount of stores debited to various products & overheads should be the same as the total value of stores issued in any period.

Basis for Consumption Entries in Financial Accounts

Every manufacturing organization assigns material costs to the products for two purposes.

Firstly, for external financial accounting requirements, in order to allocate the material costs incurred during the period between cost of goods produced and inventories; **secondly to provide useful information for managerial decision-making** requirements. In order to meet external financial accounting requirements, it may not be necessary to accurately trace material costs to individual products. Some products costs may be overstated and others may be understated. But this may not matter for financial accounting purposes, as long as total of individual materials costs transactions are recorded i.e., transactions between cost centre within the firm are recorded in a manner that facilitates analysis of costs for assigning them to cost units. The consumption entries in financial accounts are made on the basis of total cost of purchases of materials after adjustment for opening and closing stock of materials.

Following equation is applicable here:

Consumption of Materials = Opening Stock of materials + Purchases – Closing Stock of materials

The stock of materials is taken at cost or net realizable value, whichever is less.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

At WHAT price per unit would Part No. A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	₹
200 units Part No. A 32 @ Rs. 5	1,000.00
Less: 20% discount	(200.00)
	800.00
Add: GST @ 12%	96.00
	896.00
Add: Packing charges (5 non-returnable boxes)	50.00
	946.00

- I. A 2 per cent cash discount will be given if payment is made in 30 days.
- II. Documents substantiating payment of GST are enclosed for claiming Input credit.

PROBLEM – 2

From the following information calculate ordering cost and holding cost:

Estimated Annual material consumption	1,20,000 units	Ordering cost per order	100
Order quantity or order size	10,000 units	Holding cost per unit per annum	6

Also, state whether the above ordering quantity is the optimum ordering quantity. Also, calculate the relevant total cost at EOQ.

PROBLEM – 3

COMPUTE E.O.Q. and the total variable cost for the following:

Annual Demand	5,000 units
Unit price	Rs. 20.00
Order cost	Rs. 16.00
Storage rate	2% per annum
Interest rate	12% per annum
Obsolescence rate	6% per annum

DETERMINE the total cost that would result for the items if a new price of Rs. 12.80 is used.

PROBLEM – 4

The annual carrying cost of material 'X' is 3.6 per unit and its total carrying cost is ₹9,000 per annum. What would be the Economic order quantity for material 'X', if there is no safety stock of material X?

PROBLEM – 5

The Gardener is deciding on the economic order quantity for two brands of lawn fertilizer: Super Grow and Nature's own. The following information is collected:

PARTICULARS	FERTILIZERS	
	SUPER GROW	NATURE'S OWN
Annual Demand	2,000 bags	1,280 bags
Relevant ordering cost per purchase order	₹ 1,200	₹ 1,400
Annual relevant carrying cost per bag	₹ 480	₹ 560

Required:

- Compute EOQ for super Grow and Nature's own.
- For the EOQ, what is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's Own?
- For the EOQ, compute the number of deliveries per year for Super Grow and Nature's Own.

PROBLEM – 6

From the details given below, CALCULATE:

- Re-ordering level
- Maximum level
- Minimum level
- Danger level.

Re-ordering quantity is to be calculated on the basis of following information: Cost of placing a purchase order is Rs. 20. Number of units to be purchased during the year is 5,000 Purchase price per unit inclusive of transportation cost is Rs. 50 Annual cost of storage per units is Rs. 5.

Details of lead time: Average- 10 days, Maximum- 15 days, Minimum- 5 days.

For emergency purchases- 4 days.

Rate of consumption: Average: 15 units per day,

Maximum: 20 units per day.

PROBLEM – 7

Mohit Enterprises manufactures a special product "ZED". The following particulars were collected for the year

- Monthly demand of ZED – 1,000 units.

- b. Cost of placing an order 100.
- c. Annual carrying cost per unit ₹15.
- d. Normal usage 50 units per week.
- e. Minimum usage 25 units per week.
- f. Maximum usage 75 units per week.
- g. Re-order period 4 to 6 weeks.

Compute from the above:

1	Re-order Quantity
2	Re-order Level
3	Minimum Level
4	Maximum Levels
5	Average Stock Level

PROBLEM – 8

A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2022-23:

- i. Annual demand of Alpha 8,000 units
- ii. Cost of placing an order Rs. 200 per order
- iii. Cost per unit of Alpha Rs. 400
- iv. Carrying cost p.a. 20%

The company has been offered a quantity discount of 4 % on the purchase of 'Alpha' provided the order size is 4,000 components at a time.

Required:

- i. COMPUTE the economic order quantity
- ii. STATE whether the quantity discount offer can be accepted.

PROBLEM – 9

A firm is using an EOQ system of inventory replenishment for one of its purchased items, which has a known annual demand of 48,000 units with a near-uniform rate of consumption. The cost of placing an order is ₹ 250. The cost of the item is ₹ 5 per unit. The firm uses an inventory carrying rate of 30% p.a.

- Find the optimum order quantity and the number of orders per year.
- If the lead time is 10 days and a year is taken as 300 days find the re-order point.
- If for administrative reasons the firm wishes to place orders only once in three months how much extra cost will the firm incur on this policy?

PROBLEM – 10

A Company uses three raw materials A, B and C for a particular product for which the following data apply:

Raw Material	Usage per unit of Product (Kgs.)	Re-order quantity (Kgs.)	Price per Kg.	Delivery period (in weeks)			Re-order level (Kgs)	Minimum level (Kgs.)
				Minimum	Average	Maximum		
A	10	10,000	10	1	2	3	8,000	?
B	4	5,000	30	3	4	5	4,750	?
C	6	10,000	15	2	3	4	?	2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product.

COMPUTE the following quantities:

- Minimum stock of A,
- Maximum stock of B,
- Re-order level of C,
- Average stock level of A.

PROBLEM – 11

M/s Tyro tubes trades in four-wheeler tyres and tubes. It stocks a sufficient quantity of tyres for almost every vehicle. In year-end 20x1-x2, the report of sales manager revealed that M/s Tyro tubes experienced stock-out of tyres.

The stock-out data is as follows:

Stock-out of Tyers	No. of times of Stock Out
100	2
80	5
50	10
20	20
10	30
0	33

M/s Tyro tubes loses ₹ 150 per unit due to stock-out and spends ₹ 50 per unit on carrying of inventory. DETERMINE optimum safest stock level.

PROBLEM – 12

From the following particulars with respect to a particular item of materials of a manufacturing company, calculate the best quantity to order:

Ordering quantities (Tone's)	Price per Tone
Less than 250	₹ 6.00
250 but less than 800	₹ 5.90
800 but less than 2,000	₹ 5.80
2,000 but less than 4,000	₹ 5.70
4,000 and above	₹ 5.60

The annual demand for the material is 4,000 tonnes.

Stock holding costs are 20% of material cost p.a. The delivery cost per order is ₹ 6.00.

PROBLEM – 13

X Ltd. uses 50 containers of acid per annum at their plant. It has been calculated that a purchase order costs ₹ 10 to process and that the cost of stockholding is ₹ 1 per container per annum.

Suppliers of acid offer quantity discounts as laid out below:

Number of Containers	01 - 09	10 - 49	50 - 99	100 & above
Discount per unit	Nil	₹ 0.50	₹ 1.00	₹ 1.60

Compute EOQ in the above situation.

PROBLEM – 14

The following is a summary of the receipts and issues of materials in a factory during a month:

Date	Particulars
1	Opening balance 500 units at ₹ 25 per unit
3	Issue 70 units
4	Issue 100 units
8	Issue 80 units
13	Received 200 units @ ₹ 24.50 per unit
14	Returned to store 15 units @ ₹ 24 per unit
16	Issue 180 units
20	Received 240 units @ ₹ 24.75 per unit.
24	Issue 304 units

25	Received 320 units @ ₹ 24.50 per unit.
26	Issue 112 units
27	Returned to store 12 units @ ₹ 24.50 per unit
28	Received 100 units at ₹ 25 per unit

Work out on the basis of 'FIFO' and 'LIFO' the value of closing stock. It was revealed that on 15th there was a shortage of 5 units and on 27th of 8 units.

PROBLEM – 15

Prepare a statement showing the pricing of issues, on the basis of

- Simple Average Method and
- Weighted Average Method

from the following information pertaining to material 'X'.

Date	Particulars
1	Purchased 100 units @ ₹ 10.00 each.
2	Purchased 200 units @ ₹ 10.20 each
5	Issued 250 units to Job A vide MR No. 1
7	Purchased 300 units @ ₹ 10.50 each
10	Purchased 200 units @ ₹ 10.80 each
13	Issued 200 units to Job B vide MR No. 2
18	Issued 200 units to Job C vide MR No. 3
20	Purchased 100 units @ ₹ 11.00 each.
25	Issued 150 units to Job D vide MR No. 4

PROBLEM – 16

Imbrios India Ltd. is recently incorporated start-up company back in the year 2019. It is engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation, design, research and development of products and services. One of its embedded products is LogMax, a system on module (SoM) Carrier board for industrial use. It is a small, flexible and embedded computer designed as per industry specifications.

In the beginning of the month of September 2022, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues, receipts, returns of Store Department handling Micro-controller, a component used in the designated assembling process have been extracted for the month of September, 2022:

Sep. 1	Opening stock of 6,000 units @ Rs. 285 per unit
Sep. 8	Issued 4875 units to mechanical division vide material requisition no. Mech 009/22

Sep. 9	Received 17,500 units @ Rs. 276 per unit vide purchase order no. 159/22
Sep. 10	Issued 12,000 units to technical division vide material requisition no. Tech 012/22
Sep. 12	Returned to stores 2375 units by technical division against material requisition no. Tech 012/22.
Sep. 15	Received 9,000 units @ Rs. 288 per units vide purchase order no. 160/ 2222
Sep. 17	Returned to supplier 700 units out of quantity received vide purchase order no. 160/22.
Sep. 20	Issued 9,500 units to technical division vide material requisition no. Tech 165/22

On 25th September, 2022, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later, he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September, 2022, found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manager. He, further, reported loss of 300 units due to rusting of the components.

From the above information you are required to prepare the Stock Ledger account using 'Weighted Average' method of valuing the issues.

PROBLEM – 17

The following transactions in respect of material Y occurred during the six months ended 30th September, 2022:

Month	Purchase (units)	Price per unit (Rs.)	Issued Units
April	200	25	Nil
May	300	24	250
June	425	26	300
July	475	23	550
August	500	25	800
September	600	20	400

Required:

- The Chief Accountant argues that the value of closing stock remains the same no matter which method of pricing of material issues is used. Do you agree? Why or why not? EXPLAIN. Detailed stores ledgers are not required.
- STATE when and why would you recommend the LIFO method of pricing material issues?

PROBLEM – 18

After inviting tenders, two quotations are received as follows:

Supplier A - ₹ 4.40 per unit

Supplier B - ₹ 4.20 per unit + ₹ 4,000

You are required to

- Calculate the order quantity for which the purchase price per unit will be the same.
- Select the Supplier if the Purchase Department wishes to place an order for 15,000 units.

PROBLEM – 19

From the following details, DRAW a plan of ABC selective control:

Item	Units	Unit cost (Rs.)
1	7,000	5.00
2	24,000	3.00
3	1,500	10.00
4	600	22.00
5	38,000	1.50
6	40,000	0.50
7	60,000	0.20
8	3,000	3.50
9	300	8.00
10	29,000	0.40
11	11,500	7.10
12	4,100	6.20

PROBLEM – 20

From the following data for the year ended 31st March, 20x2, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them.

Particulars	Material A	Material B
Opening stock 01.04.20x1	₹ 10,000	₹ 9,000
Purchase during the year	₹ 52,000	₹ 27,000
Closing stock 31.03.20x2	₹ 6,000	₹ 11,000

PROBLEM – 21

The particulars relating to the import of Sealing Ring made by AB & Co., during December, 20x1 are given below:

- a. Sealing Ring – 1,000 pieces invoiced @ \$ 2.00 C.I.F., Bombay Port.
- b. Customs duty was paid @ 100% on Invoice Value (which was converted to Indian currency by adopting an exchange rate of ₹ 17.20 per).
- c. Clearing charges - ₹ 1,800 for the entire consignment, and
- d. Freight charges - ₹ 1,400 for transporting the consignment from Bombay Port to factory premises.

It was found on inspection that 100 pieces of the above material were broken and, therefore, rejected. There is no scrap value for the rejected part. No refund for the broken material would be admissible as per the terms of the contract. The Management decided to treat 60 pieces as normal loss and the rest 40 pieces as abnormal loss. Assume 700 pieces were consumed and 200 pieces were kept in closing stock.

Calculate:

- a. Total cost of material, and
- b. Unit cost of material issued to production.

Also, state briefly how the value of 100 pieces rejected in inspection will be treated in costs.

PROBLEM – 22

In a certain month, 6,000 kgs of raw material A costing ₹ 150 per kg were processed through Unit No. 3 for the manufacture of solvent X. The total operating cost of Unit No. 3 for the month was ₹12,00,000. Out of the output, 10% was unusable and was disposed of at ₹ 25 per kg. Prepare an account for the month's operation Unit No. 3 assuming that spoilage was:

- i. Part of the normal production process;
- ii. An abnormal loss due to poor quality material.

Additional information: Out of 5400 kgs, 5000 kgs were sold.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 1)**

An invoice in respect of a consignment of chemicals A and B provides the following information:

	₹
Chemical A: 10,000 kgs. at Rs. 10 per kg.	1,00,000
Chemical B: 8,000 kgs. at Rs. 13 per kg.	1,04,000
Basic custom duty @ 10% (Credit is not allowed)	20,400
Railway freight	3,840
Total cost	2,28,240

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages. You are required to COMPUTE the rate per kg. of each chemical, assuming a provision of 2% for further deterioration.

QFP 2 (Concept Similar to Problem – 2)

CALCULATE the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum: 10,000 kg.

Order placing cost per order: Rs. 50

Cost per kg. of raw materials: Rs.2 Storage costs: 8% on average inventory

QFP 3 (Concept Similar to Problem – 6)

Two components, A and B are used as follows:

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

CALCULATE for each component

- Re-ordering level,
- Minimum level,
- Maximum level,
- Average stock level.

QFP 4 (Concept Similar to Problem – 18)

A factory uses 4,000 varieties of inventory. In terms of inventory holding and inventory usage, the following information is compiled:

No. of varieties of inventory	%	% value of inventory holding (average)	% of inventory usage (in end-product)
3,875	96.875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	100.00	100	100

CLASSIFY the items of inventory as per ABC analysis with reasons.

QFP 5 (Concept Similar to Problem – 19)

The following data are available in respect of material X for the year ended 31st March, 2023.

	(₹)
Opening stock	90,000
Purchases during the year	2,70,000
Closing stock	1,10,000

CALCULATE:

- Inventory turnover ratio, and
- The number of days for which the average inventory is held.

QFP 6 (Concept Similar to Problem – 13)

The following information is provided by Sunrise Industries for the fortnight of April, 2023:

Material Exe:

Stock on 1-4-2023 100 units at Rs. 5 per unit.

Purchases

5-4-2023, 300 units at Rs. 6

8-4-2023, 500 units at Rs. 7

12-4-2023, 600 units at Rs. 8

Issues

6-4-2023, 250 units

10-4-2023, 400 units

14-4-2023, 500 units

Required:

- CALCULATE using FIFO and LIFO methods of pricing issues:
 - the value of materials consumed during the period

b. the value of stock of materials on 15-4-2023.

B. EXPLAIN why the figures in (a) and (b) in part A of this question are different under the two methods of pricing of material issues used. You need not draw up the Stores Ledgers.

QFP 7 (Concept Similar to Problem – 8)

Anil & Company buys its annual requirement of 36,000 units in 6 instalments. Each unit costs Rs. 1 and the ordering cost is Rs.25. The inventory carrying cost is estimated at 20% of unit value. FIND the total annual cost of the existing inventory policy. CALCULATE, how much money can be saved by Economic Order Quantity?

QFP 8 (Concept Similar to Problem – 12)

EXE Limited has received an offer of quantity discounts on its order of materials as under:

Price per ton (Rs.)	Ton (Nos.)
1,200	Less than 500
1,180	500 and less than 1,000
1,160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above.

The annual requirement for the material is 5,000 tons. The ordering cost per order is Rs. 1,200 and the stock holding cost is estimated at 20% of material cost per annum.

You are required to

- COMPUTE the most economical purchase level.
- WHAT will be your answer to the above question if there are no discounts offered and the price per ton is Rs. 1,500?

QFP 9 (Concept Similar to Problem – 9)

G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs. 20. For every finished product, one unit of component is required. The ordering cost is Rs. 120 per order and the holding cost is 10% p.a.

You are required to CALCULATE:

- Economic order quantity.
- If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?
- What is the minimum carrying cost, the company has to incur?

QFP 10 (Concept Similar to Problem – 16)

The following information is extracted from the Stores Ledger:

Material X

Opening Stock Nil

Purchases:

Jan. 1 100 @ Rs. 1 per unit

Jan. 20 100 @ Rs. 2 per unit

Issues:

Jan. 22 60 for Job W 16

Jan. 23 60 for Job W 17

Complete the receipts and issues valuation by adopting the First-In-First-Out, Last-In-First-Out and the Weighted Average Method. TABULATE the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid and discuss from different points of view which method you would prefer.

CHAPTER 09: EMPLOYEE COST AND

DIRECT EXPENSES

INTRODUCTION

To manufacture a product or to make provision for service, the role of human exertion inevitable. The term used for human resources may include workers, employees, labourers, staffs etc. employee cost is wider term which includes wages, salary, bonus, incentives etc. paid to an employee and charged to a cost object as labour cost. In a nutshell, **employee cost is wider term which includes wages, salary, bonus, incentives etc. paid to an employee and charged to a cost object as labour cost.**

Unlike other costs, employee costs are influenced by human behavior. Due to this peculiarity, divergence in employee compensation is observed across the different industries. Wages are determined on both quantitative and qualitative factors like volume of work, skills required etc. Hence, it is necessary that employees should be monitored, measured, and compensated appropriately to achieve economy in cost, efficiency in performance and effectiveness in desired output.

EMPLOYEE (LABOUR) COST

Employee (Labour) Cost: Benefits paid or payable to the employees of an entity, whether permanent, or temporary for the services rendered by them. Employee cost includes payments made in cash or kind. Employee cost includes the following:

- i. Wages and salary;
- ii. Allowances and incentives;
- iii. Payment for overtimes;
- iv. Employer's contribution to Provident fund and other welfare funds;
- v. Other benefits (leave with pay, free or subsidised food, leave travel concession etc.) etc.

Classification of Employee (Labour) Cost: Employee cost are broadly classified as direct and indirect employee cost.

i. Direct Employee (Labour) Cost

Benefits paid or payable to the employees which can be attributed to a cost object in an economically feasible manner. This can be easily identified and allocated to an activity, contract, cost centre, customer, process, product etc.

ii. Indirect Employee (Labour) Cost

Benefits paid or payable to the employees, which cannot be directly attributable to a particular cost object in an economically feasible manner.

Distinction between Direct and Indirect Employee Cost

Direct employee cost	Indirect employee cost
1. It is the cost incurred in payment of employees who are directly engaged in the production process.	1. Cost incurred for payment of employees who are not directly engaged in the production process.
2. Direct employee cost can be easily identified and allocated to cost unit.	2. Indirect employee cost is apportioned on some appropriate basis.
3. Direct employee cost varies with the volume of production and has positive relationship with the volume.	3. Indirect employee cost may not vary with the volume of production.

EMPLOYEE (LABOUR) COST CONTROL

Employee costs are associated with human beings. To control employee costs one has to understand human behaviour. Employee cost control means control over the cost incurred on employees. The aim should be to keep the wages per unit of output as low as possible.

The aim should be to keep the wages per unit of output as low as possible. This can only be achieved by giving employees appropriate compensation to encourage efficiency so that optimum output can be achieved in effective manner.

A well-motivated team of employees can bring about wonders. Each concern should, therefore, constantly strive to raise the productivity of employee. The efforts for the control of employee costs should begin from the very beginning. There has to be a concerted effort by all the concerned departments.

Department	Functions
1. Personnel Department	i. On receipt of employee requisition from the various departments it searches for the required skills and qualification. ii. It ensures that the persons recruited possess the requisite qualification and skills required for the job. iii. Arranges proper training for the newly recruited employees and workshops for existing employees. iv. Maintains all personal and job related records of the employees. v. Evaluation of performance from time to time
2. Engineering and Work Study Department	i. Prepares plans and specifications for each job. ii. Providing training and guidance to the employees. iii. Supervises production activities. iv. Conducts time and motion studies.

	v. Undertakes job analysis. vi. Conducts job evaluation.
3. Time-keeping Department	i. Concerned with the maintenance of attendance records i.e. time keeping and ii. Time spent by an employee on various jobs i.e. time booking etc.
4. Payroll Department	i. The preparation of payroll of the employees. ii. It disburses salary and wage payments.
5. Cost Accounting Department	i. Accumulation and classification of employee costs. ii. Analysis and allocation of costs to various cost centres or cost objects

Important Factors for the Control of Employee Cost

To exercise an effective control over the employee costs, the essential requisite is efficient utilization of employee and allied factors. The main points which need consideration for controlling employee costs are the following:

- i.** Assessment of manpower requirements.
- ii.** Control over time-keeping and time-booking.
- iii.** Time & Motion Study.
- iv.** Control over idle time and overtime.
- v.** Control over employee turnover.
- vi.** Wage and Incentive systems.
- vii.** Job Evaluation and Merit Rating.
- viii.** Employee productivity.

Collection of Employee Costs

The task of collecting employee costs is performed by the Cost Accounting Department which record separately wages paid to direct and indirect employee. It is the duty of this department to ascertain the effective wages paid per hour in each department and to analyse the total payment of wages of each department into:

- i.** The amount included in the direct cost of goods produced or jobs completed;
 - ii.** The amount treated as indirect employee cost and thus included in overheads; and
 - iii.** The amount treated as the cost of idle time and hence loss.
 - iv.** The amount treated as abnormal loss/ gain and to be transferred to profit and loss account.
- Through this process costs of various jobs are ascertained. Naturally, in this the proper recording of time spent by the employees is essential.

ATTENDANCE & PAYROLL PROCEDURES**Attendance Procedure / Time-keeping**

It refers to correct recording of the employees' attendance time. Students may note the difference between "time keeping" and "time booking". The latter refers to break up of time on various jobs while the former implies a record of total time spent by the employees in a factory.

Objectives of Time-keeping: Correct recording of employees' attendance time is of utmost importance where payment is made on the basis of time worked.

Where payment is made by results viz; straight piece work, it would still be necessary to correctly record attendance for the purpose of ensuring that proper discipline and adequate rate of production are maintained. The objectives of time-keeping are as follows:

- i. For the preparation of payrolls.
- ii. For calculating overtime.
- iii. For ascertaining and controlling employee cost.
- iv. For ascertaining idle time.
- v. For disciplinary purposes.
- vi. For overhead distribution.

Methods of Time-keeping

There are various methods of time-keeping, which may be categorized into manual and mechanical methods. The choice of a particular method depends upon the requirements and policy of an entity; but whichever method is followed, it should make a correct record of the time by incurring minimum possible expenditure and it should minimise the risk of fraudulent payments of wages. The examples of time keeping methods are follows:

Manual Methods

- a. **Attendance Register Method-** Under this method, an attendance register is kept to **record the arrival and departure time of an employee**. This method is simple and expensive and is suitable for small organisations. However, this method may lead to dishonest practice of time manipulation by way of recording wrong time and back date entry in collusion with time keeper.
- b. **Metal Disc / Token Method-** This method of time recording is very old and is almost obsolete in practice. Under this method, each employee is allotted a metal disc or a token with a hole bearing his identification number. The token is kept or handed to the time keeper who records the token number in his register. Like attendance register method, this method also has some disadvantages like error in recording, proxy attendance etc.

Mechanical/ Automated Methods

- a. **Punch Card Attendance-** Under this method, each employee is provided a card for marking attendance. **A punch card contains data related with the employee in digital form.** In punch card attendance system, an employee needs to either insert or wave his card to a card reader which then ensures whether the correct person is logging in and/or out. This system does not require to employ any time keeper and minimises the risk of recording error and time manipulation.

b. Bio-Metric Attendance system- Under bio-metric attendance system **attendance is marked by recognizing an employee on the basis of physical and behavioural traits.** An employee's unique identity like finger print, face and retina image etc. are kept in a database which is matched at the time of marking of attendance before the attendance device for this purpose. Bio-metric attendance system includes fingerprint recognition system, face recognition system, Time and attendance tracking technology etc. This system reduces the risk of time manipulation and proxy attendance. However, it may not be suitable for small organisations due to cost associated with set-up and maintenance.

Requisites of a Good Time-Keeping System: A good time-keeping system should have following requisites:

1. System of time-keeping should be such which should not allow proxy for another employee under any circumstances.
2. There should also be a provision of recording of time of piece employees so that regular attendance and discipline may be maintained. This is necessary to maintain uniformity of flow of production.
3. Time of arrival as well as time of departure of employees should be recorded so that total time of employees may be recorded and wages may be calculated accordingly.
4. As far as possible, method of recording of time should be mechanical so that chances of disputes regarding time may not arise between employees and the time-keeper.
5. Late-comers should record late arrivals. Any relaxation by the time-keeper in this regard will encourage indiscipline.
6. The system should be simple, smooth and quick. Unnecessary queuing for marking attendance should be avoided.
7. The system should be reviewed and maintained periodically to prevent any error.

Time-Booking

Time keeping just records the time spent by an employee in the premises for production but it does not show how much time a person spent on a particular job. **Time booking refers to a method wherein each activity of an employee is recorded.** This data recorded is further used for measure the time spent on a particular job for costing, measurement of efficiency, fixation of responsibility etc.

Time booking for costing: The time spent on a particular job or activity is used to compute the cost of the job or activity.

Time booking to measure efficiency: The efficiency of the employees is measured by comparing the actual time taken by an employee with the standard time that should have been taken.

Time booking for fixation of responsibility: The time booked data is used to analyse the variance in time taken by an employee on a particular job or process with respect to standard time to see the reasons for the variance. The reasons for variance is further classified as controllable and

uncontrollable. The controllable reasons are those which can be avoided by due care and efficiency. On the other hand, uncontrollable reasons cannot be avoided under the normal circumstances. Employees or any other concerned person or departments are made accountable for variance under controllable reasons.

For the collection of all such data, a separate record, generally known as Time (or Job) card, is kept. The time (or job) card can be of two types:

- **One containing analysis of time with reference to each job:** A separate job card is employed in respect of a job undertaken; where a job involves several operations, a separate entry is made in respect of each operation.

Thus, the job card would record the total time spent on a particular job or operation. If a number of people are engaged on the same job or operation, the time of all those employees would be booked on the same card.

One advantage of this method is that it provides complete data on the employee content of job or operation collectively so that the computation of employee cost is greatly facilitated.

But this method has drawbacks as well. Since an employee's job timing is scattered over a number of job cards the time spent on all these jobs and idle time must be abstracted periodically for finding each employee's total time spent on different jobs and the time for which he remained idle during the period. The total of these two times (job and idle) must obviously equal his total attendance time, as shown by his attendance record.

- **The other with reference to each employee:** In this case, it would greatly facilitate reconciliation of the employee's job time with his attendance time recorded.

Under this system, a separate card would be used for each employee for each day or for each week and the time which he spends on different jobs (and also any idle time) would be recorded in the same card so that the card would have a complete history on it as to how his time had been spent during the period.

The format of job or time may vary industry to industry and according to the accounting system into used.

PAYROLL PROCEDURE

Steps included in this process are as under:

1. **Time and Attendance details:** A detailed sheet of number of days or hours worked by each employee (in case of time-based payment) and units or percentage of work (in case of piece rate) as reflected by the time keeping methods are sent to the payroll department by the time keeping department. Further, payroll department with the help of time booking records calculate any further incentives such as overtime payment, bonus to be paid to the employees.
2. **List of employees and other details:** A list of employees on roll and the rate at which they will be paid is sent by the personnel/ HR department. Payroll department should ensure that no unauthorised or bogus employee is paid.

- 3. Computation of wages and other incentives:** Payroll department based on the details provided by the time keeping department and personnel department calculate wages/ salary to be paid to the employees. Payroll department prepares pay slip for all employees authorized by the personnel department and forward the same to the cost/ accounting department for further deductions and payment.
- 4. Payment to the employees:** Cost/ accounting department deduct all statutory deduction such as employee's contribution to provident fund and employee state insurance (ESI) scheme, TDS on salary etc. After all deductions wages/ salary is paid to the employees.
- 5. Deposit of all statutory liabilities:** All statutory deduction made from wages/ salary of the employees along with employer's contributions such as provident fund and employee state insurance scheme are paid to the respective statutory bodies.

The followings are generally deducted from the payroll

Type of deductions	Description
Statutory Deductions	
1. Provident fund	Employee's contribution to the Provident fund is deducted from the salary/ wages of the concerned employee.
2. Employee State Insurance Scheme (ESI)	Employee's contribution to the ESI is deducted from the salary/ wages.
3. Tax Deduction at Source (TDS)	Employer is obliged to deduct tax at source if it will be paying to the employee net salary exceeding maximum exemption limit, in equal monthly instalments to the income tax department.
4. Professional Tax	Professional tax is a state level tax imposed for carrying on business, profession or service.
Other Deductions	
1. Voluntary contribution to Provident fund	If any employee so desires may contribute over and above the contribution payable by the employer.
2. Contribution to any benevolent fund.	An employee may contribute to any benevolent fund voluntarily by putting a request to the payroll department.
3. Loan deductions	Instalments of any loan taken by the employee.
4. Other advances and dues	Other advances like festival advance and unadjusted advances taken.

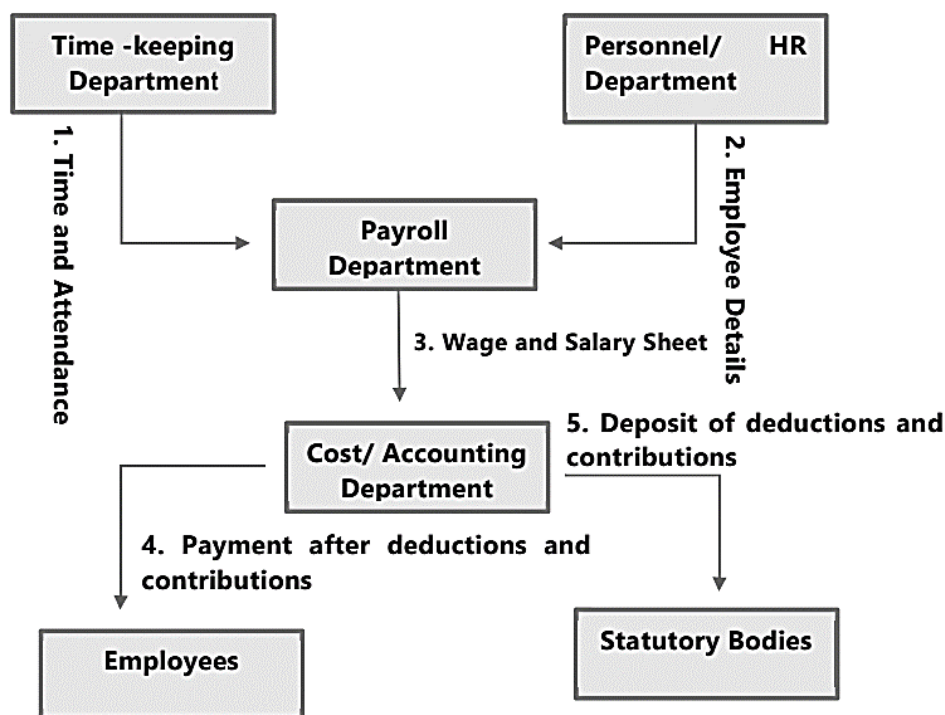


Diagram: Payroll Procedures

IDLE TIME

The time during which no production is carried-out because the worker remains idle but are paid.

Normal idle time: It is the time which cannot be avoided or reduced in the normal course of business.

Normal idle time:

It is the time which cannot be avoided or reduced in the normal course of business.

Causes	Treatment
1. The time lost between factory gate and the place of work,	It is treated as a part of cost of production. Thus, in the case of direct workers an allowance for normal idle time is considered setting of standard hours or standard rate.
2. The interval between one job and another,	
3. The setting up time for the machine,	In case of indirect workers, normal idle time is considered for the computation of overhead rate.
4. Normal rest time, break for lunch etc.	

Abnormal idle time

Apart from normal idle time, there may be factors which give rise to abnormal idle time.

Causes	Treatment
1. Idle time may also arise due to abnormal factors like lack of coordination	Abnormal idle time cost is not included as a part of production cost and is shown as a separate item in the Costing Profit and Loss Account.
2. Power failure, Breakdown of machines	

3. Non-availability of raw materials, strikes, lockouts, poor supervision, fire, flood etc. 4. The causes for abnormal idle time should be further analysed into controllable and uncontrollable. i. Controllable abnormal idle time refers to that time which could have been put to productive use had the management been more alert and efficient. All such time which could have been avoided is controllable idle time. ii. Uncontrollable abnormal idle time refers to time lost due to abnormal causes, over which management does not have any control e.g., breakdown of machines, flood etc. may be characterised as uncontrollable idle time.	The cost of abnormal idle time should be further categorised into controllable and uncontrollable. For each category, the break-up of cost due to various factors should be separately shown. This would help the management in fixing responsibility for controlling idle time. Management should aim at eliminating controllable idle time and on a long-term basis reducing even the normal idle time. This would require a detailed analysis of the causes leading to such idle time.

OVERTIME

Work done beyond normal working hours is known as 'overtime work'. Overtime payment is the amount of wages paid for working beyond normal working hours. Overtime payment consist of two elements- (i) Normal wages for overtime work and (ii) Premium payment for overtime work.

Overtime Payment = Wages paid for overtime at normal rate + Premium (extra) payment for overtime work

Overtime premium

The rate for overtime work is higher than the normal time rate; usually it is at double the normal rates. The extra amount so paid over the normal rate is called overtime premium. Rate and conditions for overtime premium may either be fixed by an entity itself or it may be required by any statute in force. Occasional overtime is a healthy sign as it indicates that the firm has the optimum capacity and that the capacity is being fully utilised. But persistent overtime is rather a bad sign because it may indicate either (a) that the firm needs larger capacity in men and machines, or (b) that men have got into the habit of postponing their ordinary work towards the evening so that they can earn extra money in the form of overtime wages.

Causes of Overtime and Treatment of Overtime premium in cost accounting

Causes	Treatment
1. The customer may agree to bear the entire charge of overtime because of urgency of work.	1. If overtime is resorted to at the desire of the customer, then overtime premium may be charged to the job directly.

2. Overtime may be called for to make up any shortfall in production due to some unexpected development.	2. If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
3. Overtime work may be necessary to make up a shortfall in production due to some fault of management.	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 work may be resorted to, to secure an out-turn in excess of the normal output to take advantage of an expanding market or of rising demand	4. Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.

LABOUR UTILISATION

For identifying utilization of labour a statement is prepared (generally weekly) for each department / cost centre. This statement should show the actual time paid for, the standard time (including normal idle time) allowed for production and the abnormal idle time analysed for causes thereof.

Identification of Utilisation of labours with Cost Centres

For the identification of utilisation of labour with the cost centre, a wage analysis sheet is prepared. Wage analysis sheet is a statement in which total wages paid are analysed according to cost centre, jobs, work orders etc. The data for analysis is provided by wage sheet, time card, piece work cards and job cards.

The preparation of such sheet serves the following purposes:

- i. It analyse the labour time into direct and indirect labour by cost centres, jobs, work orders.
- ii. It provides details of direct labour cost comprises of wages, overtime to be charged as production cost of cost centre, jobs or work orders.
- iii. It provides information for treatment of indirect labour cost as overhead expenses.

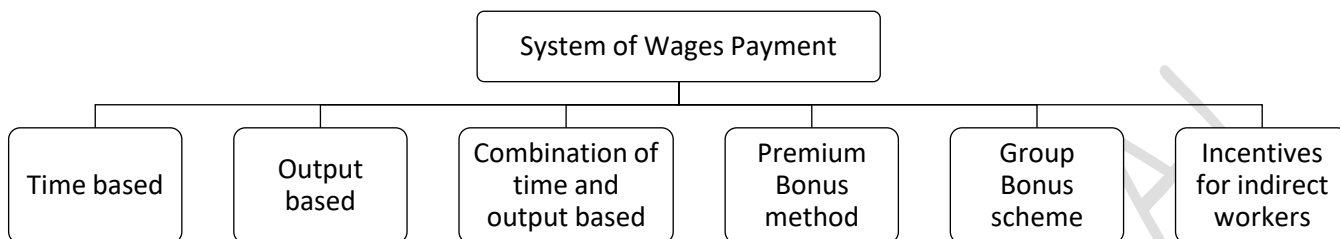
Identification of labour hours with work order or batches or capital job

For identification of labour hours with work order or batches or capital jobs or overhead work orders the following points are to be noted:

- i. The direct labour hours can be identified with the particular work order or batches or capital job or overhead work orders on the basis of details recorded on source document such as time sheet or job cards.

- ii. The indirect labour hours cannot be directly identified with the particular work order or batches or capital jobs or overhead work orders. Therefore, they are traced to cost centre and then assigned to work order or batches or capital jobs or overhead work orders by using overhead absorption rate.

SYSTEMS OF WAGE PAYMENT AND INCENTIVES



Time Based (Time Rate System)

Straight Time Rate System: Under this system, the workers are paid on time basis i.e., hour, day, week, or month. The amount of wages due to a worker are arrived at by multiplying the time worked (including normal idle period) by rate for the time. Wages under time rate system is calculated as under:

$$\text{Wages} = \text{Time Worked (Hours/ Days/ Months)} \times \text{Rate for the time}$$

Output Based (Piece Rate System)

Straight Piece Rate System Under this system, each operation, job or unit of production is termed a piece. A rate of payment, known as the piece rate or piece work rate is fixed for each piece. The wages of the worker depend upon his output and rate of each unit of output; it is in fact independent of the time taken by him. The wages paid to a worker are calculated as:

$$\text{Wages} = \text{Number of units produced} \times \text{Rate per unit}$$

Premium Bonus Method

- i. **Halsey Premium Plan** Under Halsey premium plan a standard time is fixed for each job or process. If there is no saving on this standard time allowance, the worker is paid only his day rate. He gets his time rate even if he exceeds the standard time limit, since his day rate is guaranteed.

$$\text{Wages} = \text{Time taken} \times \text{Time rate} + 50\% \text{ of time saved} \times \text{Time rate}$$

- ii. **Rowan Premium Plan** According to this system a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved.

Under Rowan System the bonus is that proportion of the time wages as time saved bears to the standard time.

$$\text{Time taken} \times \text{Rate per hour} + \frac{\text{Timesaved}}{\text{Timeallowed}} \times \text{Time taken} \times \text{Rate per hour}$$

Advantages and Disadvantages of Halsey Premium Plan

Advantages	Disadvantages
1. Time rate is guaranteed while there is opportunity for increasing earnings by increasing production.	1. Incentive is not so strong as with piece rate system. In fact the harder the worker works, the lesser he gets per piece.
2. The system is equitable in as much as the employer gets a direct return for his efforts in improving production methods and providing better equipment.	2. The sharing principle may not be liked by employees.

Advantages and Disadvantages of Rowan Premium Plan

Advantages	Disadvantages
1. It is claimed to be a fool-proof system in as much as a worker can never double his earnings even if there is bad rate setting.	1. The system is a bit complicated
2. It is admirably suitable for encouraging moderately efficient workers as it provides a better return for moderate efficiency than under the Halsey Plan.	2. The incentive is weak at a high production level where the time saved is more than 50% of the time allowed.
3. The sharing principle appeals to the employer as being equitable.	3. The sharing principle is not generally welcomed by employees.

ABSORPTION OF WAGES**Elements of Wages**

In common parlance, the term 'wages' represents monetary payment which an employee receives at regular intervals for the services rendered. Strictly speaking, however, from the point of view of the employer and the cost to the industry, wages should be taken to include also non-monetary benefits which an employee receives by virtue of employment. Such non-monetary benefits may include:

- i. Medical facilities;
- ii. Educational and training facilities;
- iii. Recreational and sports facilities;
- iv. Housing and social welfare; and
- v. Cost of subsidised canteen and co-operative societies.

Such benefits are generally given in an industrial establishment. In some cases, the provision of benefits is compulsory. Therefore, while computing the wage cost per worker, the monetary value of such non-monetary benefits should also be taken into account.

The monetary part of a worker's remuneration includes the basic wages, dearness allowance, overtime wages, other special allowance, if any, production bonus, employer's contribution to the provident fund, Employees State Insurance scheme premium, contribution to pension fund, leave pay, etc.

The **basic wage** is the payment for work done, measured in terms of hours attended or the units produced, as the case may be. The basic wage rate is not normally altered unless there is a fundamental change in the working conditions or methods of manufacture.

Dearness allowance is an allowance provided to cover the increase in cost of living from one period to another. This allowance is calculated either as percentage of the basic wage or as a fixed amount for the days worked. In either case, the percentage or the fixed amount is subject to revision whenever the cost of living index or consumer price Index rises or falls by a certain figure as agreed to by the employer with the Employee union. When permanent rise in the cost of living index occurs, a part of the dearness allowance is often absorbed in the basic wage.

Overtime allowance is an allowance paid for the extra hours worked at the rates laid down in the Factories Act. In certain industries, where special allowance for the working conditions, tool maintenance, etc., are paid they are also considered as part of wages.

Production Bonus is an incentive payment made to workers for efficiency that results in production above the standard. There are different methods of computing incentives. Under the Payment of Bonus Act, a worker is entitled to compulsory bonus of 8.33% wages earned in the relevant year or Rs.100 (whichever is greater). The bonus may be upto 20% of wages depending upon the quantum of profits calculated as per the Act.

Component of Wages Cost or Wages for Costing Purposes

In addition to wages (including allowances, such as D.A.) that are paid to workers, a firm may have to spend on many other items (such as premium to the ESI or provident fund or bonus).

Further, the worker does not spend all the time for which he is paid on productive work.

This is because he is entitled to weekly holiday and various type of leave. There is also a certain amount of unavoidable idle time. The question is to what extent such additional payment or cost in respect of Employee can be charged directly to unit of cost as part of direct Employee cost? Of course, in the case of indirect Employee, all such payments as also the wages paid to them, must be treated as part of overheads.

But in the case of direct workers, two alternatives are possible. The additional charges may be treated as overheads. Alternatively, the wage rates being charged to job may be computed by including such payments; automatically then, such payments will be charged to the work done along with wages of the worker. (It should be remembered that such wage rate will be only for costing purposes and not for payment to workers). The total of wages and additional payment should be divided by effective hours of work to get such wage rates for costing purposes.

Night Shift Allowance

In some cases, workers get extra payment if they work at night. Since the extra payment is not for any particular job, therefore such a payment should be treated as part of overheads.

Absorption Rates of Employee Cost

Employee cost as stated above include monetary compensation and non-monetary benefits to workers.

Monetary benefits include, basic wages, D.A., overtime pay, incentive or production bonus contribution to employee provident fund, House Rent Allowance, Holiday and vacation pay etc.

The non-monetary benefits include medical facilities, subsidized canteen services, subsidized housing, education and training facilities.

Accounting of monetary and non-monetary benefits to indirect workers does not pose any problems because the total of monetary and non-monetary benefits are treated as overhead and absorbed on the basis of rate per direct employee hour, if overheads are predominantly employee oriented.

For direct workers, the ideal method is to charge jobs or units produced by supplying per hour rate calculated as below:

$$\text{Rate per hour} = \frac{\text{Total estimated monetary benefits and cost of non-monetary benefits}}{\text{Budgeted direct employee hour - Normal idle time}}$$

Another alternative method is to treat the monetary benefits other than basic wages and dearness allowance as well as cost of non-monetary benefits as overheads.

EFFICIENCY RATING PROCEDURES

Efficiency is usually related with performance and may be computed by comparing the time taken with the standard time allotted to perform the given job/task.

If the time taken by a worker on a job equals or less than the standard time, then he is rated efficient.

In case he takes more time than the standard time he is rated as inefficient.

$$\text{Efficiency in \%} = \frac{\text{Time allowed as per standard}}{\text{Time Taken}} \times 100$$

For efficiency rating of employees the following procedures may be followed:

1. **Determining standard time/performance standards:** The first step is to determine the standard time taken by a worker for performing a particular job/task. The standard time can be determined by using Time & Motion study or Work study techniques. While determining the standard time for a job/task a heterogeneous group of workers is taken and contingency allowances are added for determining standard time.
2. **Measuring Actual Performance of workers:** For computing efficiency rating it is necessary to develop a procedure for recording the actual performance of workers. The system developed should record the output of each worker along with the time taken by him.
3. **Computation of efficiency rating:** The efficiency rating of each worker can be computed by using the above mentioned Formula.

Need for Efficiency Rating

1. As discussed earlier when a firm follows a system of payment by results, the payment has a direct relationship with the output given by a worker. The firm for making payment to worker is required to ascertain his efficiency level.
2. The efficiency rating also helps the management in preparing employee requirement budget or for preparing manpower requirements.

Employee Productivity

Productivity is generally determined by the input/output ratio. In case of employees, it is calculated as below:

$$\frac{\text{Standard time for doing actual work}}{\text{Actual time taken}}$$

Employee productivity is used for measuring the efficiency of individual workers. It is an index of efficiency in the utilization of human resources, materials, capital, power and all kinds of services and facilities.

It is measured by the output in relation to input. Productivity can be improved by reducing the input for a certain quantity or value of output or by increasing the output from the same given quantity or value of input.

Factors for increasing Employee Productivity: The important factors which must be taken into consideration for increasing employee productivity are as follows:

1. Employing only those workers who possess the right type of skill.
2. Placing a right type of person to a right job.
3. Training young and old workers by providing them the right types of opportunities.
4. Taking appropriate measures to avoid the situation of excess or shortage of employees.

5. Carrying out work study for fixation of wages and for the simplification and standardisation of work.

EMPLOYEE (LABOUR) TURNOVER

Employee turnover or labour turnover in an organisation is the rate of change in the composition of employee force during a specified period measured against a suitable index. The standard of usual employee turnover in the industry or locality or the employee turnover rate for a past period may be taken as the index or norm against which actual turnover rate is compared.

There are three methods of calculating Employee turnover which are given below:

- i. **Replacement Method** This method takes into consideration actual replacement of employees irrespective of number of persons leaving the organisation. Employee Turnover under this method is calculated as under:

$$\frac{\text{Number of employees replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

New employees appointed on account of expansion plan of the organisation are not included in number of replacements.

- ii. **Separation Method** In this method employee turnover is measured by dividing the total number of employees separated during the period by the average total number of employees on payroll during the same period. Employee Turnover under this method is calculated as under:

$$\frac{\text{Number of employees separated during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

- iii. **Flux Method** This method takes both the number of replacements as well as the number of separations during the period into account for calculation of employee turnover. Employee Turnover under this method is calculated as under:

$$\frac{\left[\frac{\text{Number of employees separated}}{\text{seperated}} + \frac{\text{Number of employees replaced during the period}}{\text{replaced during the period}} \right]}{\text{Average number of employees during the period on roll}} \times 100$$

Employee turnover due to new recruitment: Generally, employees recruited on account of expansion of an organisation, are not considered for calculation of employee turnover. But it is considered that the newly recruited employees are also responsible for changes in the composition or work force.

$$\frac{\text{No. of Separations} + \text{No. of Replacements} + \text{No. of New joinings}}{\text{Average No. of employees during the Period on roll}}$$

Or

$$\frac{\text{No. of Separations} + \text{No. of Accessions}}{\text{Average No. of employees during the Period on roll}}$$

Average number of employees during the period is calculated as follows:

$$\frac{\text{No. of employees at Beginning} + \text{No. of employees at end of the period}}{2}$$

Equivalent Employee (Labour) Turnover rate:

$$\frac{\text{Employee Turnover Rate for the Period}}{\text{Number of days in the period}} \times 365$$

Causes of Employee (Labour) Turnover

The reasons for employee turnover in an organization can be classified under the following three heads:

- a. Personal Causes;
 - b. Unavoidable Causes; and
 - c. Avoidable Causes.
- a. Personal causes: All the personal reasons which induce or compel an employee to leave his job; such causes include the following:
 - i. Change of jobs for betterment.
 - ii. Premature retirement due to ill health or old age.
 - iii. Domestic problems and family responsibilities.
 - iv. Discontent over the jobs and working environment.

In all the above cases the employee leaves the organisation at his will and, therefore, it is difficult to suggest any possible remedy in the first three cases.

But the last one can be overcome by creating conditions leading to a healthy working environment. For this, officers should play a positive role and make sure that their subordinates work under healthy working conditions.

- b. Unavoidable Causes: Unavoidable causes are those under which it becomes obligatory on the part of management to ask one or more of their employees to leave the organisation; such causes are summed up as listed below:
 - i. Seasonal nature of the business;
 - ii. Shortage of raw material, power, slack market for the product etc.;
 - iii. Change in the plant location;
 - iv. Disability, making a worker unfit for work;
 - v. Disciplinary measures;
- c. Avoidable Causes: Avoidable causes are those which require the attention of management on a continuous basis so as to keep employee turnover ratio as low as possible. The main causes under this case are indicated below:

- i. Dissatisfaction with job, remuneration, hours of work, working conditions, etc.,
- ii. Strained relationship with management, supervisors or fellow workers;
- iii. Lack of training facilities and promotional avenues;
- iv. Lack of recreational and medical facilities;
- v. Low wages and allowances.

Proper and timely management action can reduce the employee turnover appreciably so far as avoidable causes are concerned.

Effects of Employee (Labour) Turnover

High employee turnover increases the cost of production in the following ways:

- i. Even flow of production is disturbed;
- ii. Efficiency of new workers is low; productivity of new but experienced workers is low in the beginning;
- iii. There is increased cost of training and induction;
- iv. New workers cause increased breakage of tools, wastage of materials, etc.
- v. Cost of recruitment and training increases.

Cost of Employees (Labour) Turnover: Two types of costs which are associated with employee turnover are:

- a. **Preventive Costs:** The cost incurred to prevent employee turnover or keep it as lowest as possible. Cost incurred for prevention of employee turnover includes the following:
 - i. Cost of medical benefit provided to the employees;
 - ii. Cost incurred on employees' welfare like pension etc.
 - iii. Cost on other benefits with an objective to retain employees.
- b. **Replacement Costs:** These are the costs which arise due to employee turnover. If employees leave soon after they acquire the necessary training and experience of good work, additional costs will have to be incurred on new workers, i.e., cost of recruitment, training and induction, abnormal breakage and scrap and extra wages and overheads due to the inefficiency of new workers. It is obvious that a company will incur very high replacement costs if the rate of employee turnover is high. Similarly, only adequate preventive costs can keep Employee turnover at a low level. Each company must, therefore, work out the optimum level of Employee turnover keeping in view its personnel policies and the behaviour of replacement cost and preventive costs at various levels of Employee turnover rates.

DIRECT EXPENSES**Direct Expenses**

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

- i. Royalty paid/ payable for production or provision of service;
- ii. Hire charges paid for hiring specific equipment;
- iii. Cost for product/ service specific design or drawing;
- iv. Cost of product/ service specific software;
- v. Other expenses which are directly related with the production of goods or provision of service.

The above list of expenses is not exhaustive, any other expenses which are directly attributable to the production or service are also included as direct expenses.

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs.

In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses form part of the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one- time payment, the cost is amortised over the estimated production volume or benefit derived.

If the expenses incurred are of insignificant amount i.e. not material, it can be treated as part of overheads.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

A worker is paid ₹ 10,000 per month and a dearness allowance of ₹ 2,000 p.m. Worker contribution to provident fund is @ 10% and the employer also contributes the same amount as the employee. The Employees State Insurance Corporation premium is 6.5% of wages of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as a bonus each year.

The numbers of working days in a year are 300 of 8 hours each. Out of these, the worker is entitled to 15 days leave on full pay. CALCULATE the wage rate per hour for costing purposes.

PROBLEM – 2

During one week the workman X manufactured 200 articles. He receives a wage for a guaranteed 44-hour week at the rate of ₹ 15 per hour. The estimated time to produce one article is 15 minutes and under the incentive scheme, the time allowed is increased by 20%. Calculate his gross wages under each of the following methods of remuneration:

1. Time rate.
2. Piecework with a guaranteed weekly wage.
3. Rowan premium bonus.
4. Halsey premium bonus, 50% to the workman.

PROBLEM – 3

Two workmen, 'A' and 'B', produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to the Rowan system, while 'B' is paid a bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'A' takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is ₹ 5 per man-hour actually worked. The factory cost for the product for 'A' is ₹ 3,490 and for 'B' it is ₹ 3,600.

Required:

- a. COMPUTE the normal rate of wages
- b. COMPUTE the cost of materials cost,
- c. PREPARE a statement comparing the factory cost of the products as made by the two workmen.

PROBLEM – 4

Wage negotiations are going on with the recognised employees' union, and the management wants you as an executive of the company to formulate an incentive scheme with a view to increasing productivity.

The case of three typical workers A, B and C who produce respectively 180, 120 and 100 units of the company's product in a normal day of 8 hours is taken up for study.

Assuming that day wages would be guaranteed at ₹ 75 per hour and the piece rate would be based on a standard hourly output of 10 units, CALCULATE the earnings of each of the three workers and the employee cost per 100 pieces under

(i) Day wages, (ii) Piece rate, (iii) Halsey scheme, and (iv) The Rowan scheme

Also, CALCULATE under the above schemes the average cost of labour for the company to produce 100 pieces.

PROBLEM – 5

- a. Bonus paid under the Halsey Plan with a bonus at 50% for the time saved equals the bonus paid under the Rowan System. When will this statement hold good? (Your answer should contain the proof).
- b. The time allowed for a job is 8 hours. The hourly rate is ₹ 8.
PREPARE a statement showing:
- The bonus earned
 - The total earnings of employee and
 - Hourly earnings.

Under the Halsey System with 50% bonus for time saved and Rowan System for each hour saved progressively.

PROBLEM – 6

A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of ₹ 30 per hour. The standard time per unit for a particular product is 4 hours. Mr P, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹ 37.50 on the manufacture of that particular product.

STATE what could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50 %)?

PROBLEM – 7

Mr A. is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme - of wage payment for increasing the Employee productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as a sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of the assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

Hourly rate of wages (guaranteed)	₹ 40
Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours
No. of working days in the month	25 days
No. of working hours per day for each worker	8 working hours
Actual production during the month	1,250 units

Required:

1. CALCULATE effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.
2. CALCULATE the savings to Mr A in terms of direct labour cost per piece under the schemes.

PROBLEM – 8

A worker, whose day-work wages is ₹ 2.50 an hour, received a production bonus under the Rowan Scheme. He carried out the following work in a 48-hour week:

Job 1 - 1,500 items at 4 hours per 1,000

Job 2 - 1,800 items at 3 hours per 1,000

Job 3 - 9,000 items at 6 hours per 1,000

Job 4 - 1,500 items for which no "standard time" was fixed and it was arranged that the worker would be paid a bonus of 25 per cent. The actual time on the job was 4 hours.

Job 5 - 2,000 items at 8 hours per 1,000, each item was estimated to be half-finished.

Job No. 2 was carried out on a machine running at 90 per cent efficiency and an extra allowance of 1/9th of standard time was given to compensate the worker.

4 hours were lost due to a power cut. Calculate the earnings of the workers, clearly stating your assumptions for the treatment given by you for the hours lost due to power cuts.

PROBLEM – 9

The standard hours of job X is 100 hours. The job can be completed by A in 60 hours, B in 70 hours or C in 95 hours.

The bonus system applicable to the job is as follows:

	Percentage of Time saved to Time allowed			Bonus
Saving	Up to		10%	10% of time saved
From	11%	To	20%	15% of time saved
From	21%	To	40%	20% of time saved
From	41%	To	100%	25% of time saved

The rate of pay is ₹ 10/hour. Calculate the total earnings of each worker and also the rate of earnings per hr.

PROBLEM – 10

Twenty-five men work in a group. If the weekly production of the group exceeds 200 pieces per hour (which is the standard) each man gets a bonus in addition to his time wages.

Bonus regulation - Each man's share should be one-half of the percentage in excess of the standard production. Each man is paid this percentage of a wage rate of ₹ 12 per hour. There is no relationship between the individual workman's hourly rate and the bonus rate.

The following is one week's record:

	Hours worked	Production
Monday	190	44,200
Tuesday	210	47,300
Wednesday	195	45,200
Thursday	215	47,600
Friday	200	46,900
Saturday	190	44,800
Total	1,200	2,76,000

Compute:

1. The rate and amount of bonus for the week.
2. Total earning of X, who worked 45 hours during the week and was paid ₹ 10 per hour basic, and that of Y, who worked 48 hours and was paid ₹ 11 per basic.

PROBLEM – 11

A company uses an old method of machining. The estimates of operating details for a year are as under:

Number of parts to be manufactured and sold	30,000
Raw materials required per part	10 kg @ ₹ 2 per kg.
Average Wage Rate per worker	₹ 40 per day of 8 hours
Average Labour Efficiency	60%
Standard Time required to manufacture one part	2 hrs.
Overhead Rate	₹ 10 per clock hour
Material Handling Expenses	2% of Value of Materials

The company has a suggestion box scheme and an award equivalent to three months savings in labour cost is passed on to the employee whose suggestion is accepted. In response to this scheme, a suggestion has been received from an employee to use a special Jig in the manufacture of the aforesaid part. The cost of the Jig which has a life of one year is ₹ 3,000 and the use of the Jig will reduce the standard time by 12 minutes.

You are required to:

- Determine the amount of award payable to the employee.
- Prepare a comparative statement of costs before and after implementation of the suggested scheme.

PROBLEM – 12

A factory having the latest sophisticated machines wants to introduce an incentive scheme for its workers, keeping in view the following:

- The entire gains of improved production should not go to the workers.
- In the name of speed, quality should not suffer.
- The rate setting department being newly established are liable to commit mistakes.

You are required to PREPARE a suitable incentive scheme and DEMONSTRATE by an illustrative numerical example how your scheme answers to all the requirements of the management.

PROBLEM – 13

A company's basic wages rate is ₹ 12 per hour and its overtime rates are –

Evenings: Time and one-third.

Weekends: Double time.

During the previous year the following hours were worked:

Normal time	22,000 clock hours
Time plus one-third	2,000 clock hours
Double time	1,000 clock hours

The following times have been worked on these jobs:

	Job A Clock hrs.	Job B Clock hrs.	Job C Clock hrs.
Normal time	300	500	400
Evening time	30	60	105
Weekend overtime	10	5	30

You are required to calculate the labour cost chargeable to each job in each of the following circumstances:

- Where overtime is worked regularly throughout the year as company policy due to labour shortage.
- Where overtime is worked irregularly to meet the spasmodic production requirements.
- Where overtime is worked specifically at the customer's request to expedite delivery.
- Where overtime is due to abnormal reasons.

PROBLEM – 14

CALCULATE the earnings of A and B from the following particulars for a month and allocate the employee cost to each job X Y and Z.

PARTICULARS	A	B
Basic Wages	₹ 10,000	₹ 16,000
Dearness Allowance	50%	50%
Contribution to provident Fund (on basic wages)	8%	8%
Contribution to Employee's State insurance (on basic wages)	2%	2%
Overtime (Hours)	10	-

The normal working hours for the month are 200. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to State Insurance and Provident Fund are at equal rates with employees' contributions. The two workers were employed on jobs X, Y and Z in the following proportions:

JOBS	X	Y	Z
Worker A	40%	30%	30%
Worker B	50%	20%	30%

Overtime was done on job Y.

PROBLEM – 15

It is seen from the job card for repair of the customer's equipment that a total of 154 labour hours have been put in as detailed below:

	Worker 'A' paid at 200 per day of 8 hours	Worker 'B' paid at 100 per day of 8 hours	Worker 'C' paid at 300 per day of 8 hours
Monday (hours)	10.5	8.0	10.5
Tuesday (hours)	8.0	8.0	8.0
Wednesday (hours)	10.5	8.0	10.5
Thursday (hours)	9.5	8.0	9.5
Friday (hours)	10.5	8.0	10.5
Saturday (hours)	-	8.0	8.0
Total (hours)	49.0	48.0	57.0

In terms of an award in employee conciliation, the workers are to be paid dearness allowance on the basis of cost-of-living index figures relating to each month which works out @ ₹ 968 for the relevant month. The dearness allowances is payable to all workers irrespective of wages rate if they are present or are on leave with wages on all working days.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 4 hours on Saturdays, the workers are however paid full wages for Saturday (8 hours for 4 hours worked).

Overtime is paid twice of ordinary wage rate if a worker works for more than nine hours in a day or forty-eight hours in a week. Excluding holidays, the total number of hours works out to 176 in the relevant month. The company's contribution to Provident Fund and Employees State Insurance Premium are absorbed into overheads.

CALCULATE the wages payable to each worker.

PROBLEM – 16

The management of BR Ltd is worried about their increasing employee turnover in the factory and before analysing the causes and taking remedial steps; it wants to have an idea of the profit foregone as a result of employee turnover in the last year.

Last year sales amounted to ₹ 83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

The costs incurred consequent on employee turnover revealed, on analysis, the following:

Settlement cost due to leaving	₹ 43,820
Recruitment costs	₹ 26,740
Selection costs	₹ 12,750
Training costs	₹ 30,490

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, FIND the profit foregone last year on account of employee turnover.

PROBLEM – 17

From the following data of Big-One Ltd, calculate labour turnover.

- Number of workers on the payroll at the beginning of the month: 1800.
- Number of workers on the payroll at the end of the month: 2200
- During the month, 20 workers left, 80 workers were discharged and 500 workers were recruited. Of these, 60 workers were recruited in the vacancies of those separated, while the rest were engaged due to expansion.

PROBLEM – 18

The Accountant of Y Ltd. has computed employee turnover rates for the quarter ended 31st March, 20x1 as 10%, 5% and 3% respectively under Flux method, Replacement method and Separation method.

If the number of workers replaced during that quarter is 30, FIND OUT the number of workers for the quarter.

- Recruited and joined and
- Left and discharged and
- Equivalent employee turnover rates for the year.

PROBLEM – 19

The normal working hours in a factory are 8 hours per day. An idle time of 1 hour is considered normal due to rest, lunch etc. compute the cost of idle time its treatment in the following circumstance.

- Ram, a production worker worked for 7 hours and was paid ₹ 120/- for the full day. Ram spent 3 hrs in job A and 4 hrs job B. Also calculate the Labour cost chargeable to both the jobs.
- Raju, an indirect worker, was paid ₹ 20/- as his daily wage.
- Dev, a production worker clocked 6 hours but was paid his full day's wages ₹ 120/-. Due to breakdown of machinery, he could not work for 1 hour during the day. Dev spent 3 hrs in job A and 3 hrs in job B. Also calculate the Labour cost chargeable to both the jobs.

PROBLEM - 20

In a factory working six days in a week and eight hours each day, a worker is paid at the rate of Rs. 100 per day basic plus D.A. @ 120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week, his card showed that his time was chargeable to

Job X	15 hrs.
Job Y	12 hrs.
Job Z	3 hrs.

The time not booked was wasted while waiting for a job. In Cost Accounting, STATE how would you allocate the wages of the workers for the week?

PROBLEM – 21

Aditya Ltd. is an engineering manufacturing company producing job order on the basis of specification given by the customers. During the last the month it has completed three job works namely A, B and C. The following are the items of expenditures which are incurred apart from direct materials and direct employee cost:

- i. Office and administration cost- Rs. 3,00,000.
- ii. Product blueprint cost for job A – Rs. 1,40,000
- iii. Hire charges paid for machinery used for job work B- Rs. 40,000
- iv. Salary to office attendants- Rs. 50,000
- v. One time license fee paid for software used to make computerized graphics for job C- Rs.50,000.
- vi. Salary paid to marketing manager- Rs. 1,20,000. Required:

CALCULATE direct expenses attributable to each job.

PROBLEM – 22

The following expenditures were incurred in Aditya Ltd. For the month of March 20x3:

		₹
i.	Paid for power & fuel	4,80,200
ii.	Wages paid to factory workers	8,44,000
iii.	Bill paid to job workers	9,66,000
iv.	Royalty paid for production	8,400
v.	Fee paid to technician hired for the job	96,000
vi.	Administrative overheads	76,000
vii.	Commission paid to sales staffs	1,26,000

You are required to CALCULATE direct expenses for the month.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 1)**

'X' an employee of ABC Co. gets the following emoluments and benefits:

a. Basic pay	Rs. 10,000 p.m.
b. Dearness allowance	Rs. 2,000 p.m.
c. Bonus	20% of salary and D.A.
d. Other allowances	Rs. 2,500 p.m.
e. Employer's contribution to P.F.	10% of salary and D.A.

'X' works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as normal idle time. You are required to COMPUTE the effective hourly cost of employee 'X'.

QFP 2 (Concept Similar to Problem – 1)

CALCULATE the Employee hour rate of a worker X from the following data:

Basic pay Rs. 10,000 p.m.

D.A. Rs. 3,000 p.m.

Fringe benefits Rs. 1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

QFP 3 (Concept Similar to Problem – 12)

In a factory, the basic wage rate is Rs.100 per hour and overtime rates are as follows:

Before and after normal working hours	175% of basic wage rate
Sundays and holidays	225% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'Z'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours.
Sundays and holidays	25 hours.
Total	1,125 hours

You are required to CALCULATE the labour cost chargeable to job 'Z' and overhead in each of the following instances:

- a. Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
- b. Where overtime is worked irregularly to meet the requirements of production.
- c. Where overtime is worked at the request of the customer to expedite the job.

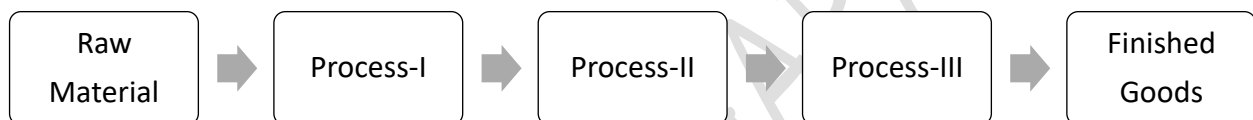
CHAPTER 10: PROCESS & OPERATION

COSTING

MEANING OF PROCESS COSTING

Process Costing is a method of costing used in industries where the material has to pass through two or more processes for being converted into a final product. It is defined as “a method of Cost Accounting whereby costs are charged to processes or operations and averaged over units produced”. A separate account for each process is opened and all expenditure pertaining to a process is charged to that process account. Such type of costing method is useful in the manufacturing of products like steel, paper, medicines, soaps, chemicals, rubber, vegetable oil, paints, varnish etc. where the production process is continuous and the output of one process becomes the input of the following process till completion.

This can be understood with the help of the following diagram:



Basic Features

Industries, where process costing can be applied, have normally one or more of the following features:

1. Each plant or factory is divided into a number of processes, cost centres or departments, and each such division is a stage of production or a process.
2. Manufacturing activity is carried on continuously by means of one or more process run sequentially, selectively or simultaneously.
3. The output of one process becomes the input of another process.
4. The end product usually is of like units not distinguishable from one another.
5. It is not possible to trace the identity of any particular lot of output to any lot of input materials. For example, in the sugar industry, it is impossible to trace any lot of sugar bags to a particular lot of sugarcane fed or vice versa.
6. Production of a product may give rise to Joint and/or By-Products.

COSTING PROCEDURE IN PROCESS COSTING

The Cost of each process comprises the cost of:

- i. Materials
- ii. Employee Cost (Labour)
- iii. Direct expenses, and
- iv. Overheads of production.

Materials - Materials and supplies which are required for each process are drawn against Material Requisitions Notes from the stores. Each process for which the materials are used, are debited with the cost of materials consumed on the basis of the information received from the Cost Accounting department.

Employee Cost (Labour) - Each process account should be debited with the Labour cost or wages paid to Labour for carrying out the processing activities. Sometimes the wages paid are apportioned over the different processes after selecting appropriate basis.

Direct expenses - Each process account should be debited with direct expenses like depreciation, repairs, maintenance, insurance etc. associated with it.

Production Overheads- Expenses like rent, power expenses, lighting bills, gas and water bills etc. are known as production overheads. These expenses cannot be allocated to a process. The suitable way out to recover them is to apportion them over different processes by using suitable basis. Usually, these expenses are estimated in advance and the processes debited with these expenses on a pre-determined basis.

TREATMENT OF NORMAL, ABNORMAL LOSS AND ABNORMAL GAIN

Normal Process Loss

It is also known as normal wastage. It is defined as the loss of material which is inherent in the nature of work. Such a loss can be reasonably anticipated from the nature of the material, nature of operation, the experience and technical data. It is unavoidable because of nature of the material or the process. It also includes units withdrawn from the process for test or sampling.

Treatment in Cost Accounts

The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realized by the sale of normal process loss units should be credited to the process account.

Abnormal Process Loss

It is also known as abnormal wastage. It is defined as the loss in excess of the pre-determined loss (Normal process loss). This type of loss may occur due to the carelessness of workers, a bad plant design or operation, sabotage etc. Such a loss cannot obviously be estimated in advance. But it can be kept under control by taking suitable measures.

Treatment in Cost Accounts

The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Abnormal Process Gain/ Yield

Sometimes, loss under a process is less than the anticipated normal figure. In other words, the actual production exceeds the expected figures. Under such a situation the difference between actual and expected loss or actual and expected production is known as abnormal gain or yield. So, abnormal gain may be defined as an unexpected gain in production under the normal conditions. This arises due to over- estimation of process loss, improvements in work efficiency of workers, use on better technology in production etc.

Treatment in Cost Accounts

The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

VALUATION OF WORK-IN-PROCESS

In the case of process type of industries, it is possible to determine the average cost per unit by dividing the total cost incurred during a given period of time by the total number of units produced during the same period. But this is hardly the case in most of the process type industries where manufacturing is a continuous activity. The reason is that the cost incurred in such industries represents the cost of work carried on opening work-in-process, closing work-in-process and completed units. Thus, to ascertain the cost of each completed unit, it is necessary to ascertain the cost of work-in-process in the beginning and at the end of the process.

The valuation of work-in-process presents a good deal of difficulty because it has units under different stages of completion from those in which work has just begun to those which are only a step short of completion. Work-in-process can be valued on actual basis, i.e., materials used on the unfinished units and the actual amount of Labour expenses involved. However, the degree of accuracy in such a case cannot be satisfactory. An alternative method is based on converting partly finished units into equivalent finished units.

Equivalent Units

Equivalent units or equivalent production units, means converting the incomplete production units into their equivalent completed units. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, Labour and overheads. It is important that the estimate of percentage of completion should be as accurate as possible. The formula for computing equivalent completed units is:

$$\text{Equivalent completed units} = \left(\frac{\text{Actual number of units in the process of manufacture}}{\text{the process of manufacture}} \right) \times \left(\frac{\text{Percentage of Work completed}}{\text{Work completed}} \right)$$

STEPS IN PROCESS COSTING

For each production process, a Production Cost Report is prepared at the end of each accounting period. The objective of preparing the report is to know physical units and equivalent units in process, element wise cost of goods produced and transferred, goods in process (work-in-process), units lost due to abnormal reasons i.e. abnormal loss etc. To prepare the report, the following steps are generally followed:

Step-1: Analysis of physical flow of production units

The first step is to determine and analyze the number of physical units in the form of inputs (introduced fresh or transferred from previous process, beginning work-in-process) and outputs (completed and work-in-process).

Step-2: Calculation of equivalent units for each cost elements

The second step is to calculate equivalent units of production for each cost element i.e. for material, Labour and overheads. It is calculated by taking the extent of work done in respect of each element

Step-3: Determination of total cost for each cost element

Total cost for each cost element is collected and accumulated for the period. The process of cost collection has already been discussed above.

Step-4: Computation of cost per equivalent unit for each cost element

In this step, the cost per equivalent unit for each cost element is calculated. The total cost as calculated in Step-3 is divided by the equivalent units as determined in Step-2.

Step-5: Assignment of total costs to units completed and ending WIP

In this step, the total cost for units completed, units transferred to next process, ending work in process, abnormal loss etc. are calculated and posted in the process account and production cost report.

PROCESS COSTING METHODS

Mainly two methods for valuation of work-in-process are followed:

- i. **First – in – First Out (FIFO) method.**
- ii. **Weighted Average (Average) method**

First-in-first-out (FIFO) method

Under this method the units completed and transferred are taken from both opening work-in-process (WIP) and freshly introduced materials/inputs. The cost to complete the opening WIP and other completed units are calculated separately. The cost of opening WIP is added to cost incurred on completing the incomplete (WIP) units into complete one. The total cost of units completed and

transferred is calculated by adding opening WIP cost to cost on freshly introduced inputs. In this method the closing stock of work in process is valued at current cost.

Weighted Average (Average) Method:

Under this method, the cost of opening work-in-process and cost of the current period are aggregated and the aggregate cost is divided by output in terms of completed units. The equivalent production in this case consists of work-load already contained in opening work-in-process and work-load of current period.

The main difference between FIFO method and average method is that units of opening work in process and their cost are taken in full under average method while under FIFO method only the remaining work done now is considered.

INTER-PROCESS PROFITS

To control cost and to measure performance, different processes within an organization are designated as separate profit centers. In this type of organizational structure, the output of one process is transferred to the next process not at cost but at market value or cost plus a percentage of profit. The difference between cost and the transfer price is known as inter-process profits.

The advantages and disadvantages of using inter-process profit, in the case of process type industries are as follows:

Advantages:

1. Comparison between the cost of output and its market price at the stage of completion is facilitated.
2. Each process is made to stand by itself as to the profitability.

Disadvantages:

1. The use of inter-process profits involves complication.
2. The system shows profits which are not realized because of stock not sold out.

OPERATION COSTING

This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. Which means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batchwise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

For example, a company is manufacturing two grades of products, Product- Deluxe and Product-Regular. Both the products pass through a similar production process but require different quality and quantities of raw materials. The cost of raw material is accumulated on the basis of job or batches or units of two variants of products. But the costs for the conversion activities need not to be identified with the product variants as both the Products requires similar activities for conversion. Hence, conversion activity costs are accumulated on the basis of departments or processes only. Example of industries are ready made garments, Shoe making, jewelry etc.

QUESTIONS FOR CLASSROOMDISCUSSION**PROBLEM – 1**

Product A is produced after three distinct processes. The following information is obtained from the accounts of a period: -

ITEMS	PROCESS			Total
	I	II	III	
Direct material	₹ 1,800	₹ 300	₹ 100	₹ 2,200
Direct wages	₹ 100	₹ 200	₹ 100	₹ 400
Direct expenses	₹ 300	-	₹ 200	₹ 500

Production overhead incurred is 800 and is covered @ 200% of direct wages. Production during the period was 100 kg.; there were no opening or closing stocks. Prepare process cost accounts assuming there is no process loss.

PROBLEM – 2

Product B is obtained after it passes through three distinct processes. The following information is obtained from the accounts for the week ending May 12, 20x1:

ITEMS	PROCESS			TOTAL
	I	II	III	
Direct material	₹ 2,600	₹ 1,980	₹ 2,962	₹ 7,542
Direct wages	₹ 2,000	₹ 3,000	₹ 4,000	₹ 9,000
Production overhead				₹ 9,000

1,000 units @ ₹ 3 each were introduced to process I.

There was no stock of materials or work-in-process at the beginning or end of the period. The output of each process passes direct to the next process and finally to finished stores. Production overhead is recovered on 100% of direct wages.

The following additional data are obtained:

UNIT	Output during the week	Percentage of normal loss to input	Value of scrap per unit
Process I	950 units	5%	2
Process II	840 units	10%	4
Process III	750 units	15%	5

Prepare process cost accounts and abnormal gain or loss accounts.

PROBLEM – 3

In Process I, 1,000 units were introduced during January and 200 units, 40% complete in all respects remained as closing work-in-progress at the end of the month. Compute the equivalent production and obtain the cost of closing work-in-progress if the total process cost during the period were ₹1,760.

PROBLEM – 4

In Process I Opening work-in-progress in February 20x1 was 200 units 40% complete. 1,050 units were introduced during the period, 1,100 completed units were transferred in Process II and 150 units remained as closing work-in-progress 70% complete.

Compute equivalent production and apportion the total process costs of ₹ 2,250 to production and work-in-progress inventories under the FIFO method.

NOTE: The cost of Opening work-in-progress b/f is ₹ 500/-

PROBLEM – 5

In process A, there was an opening work-in-progress of 100 units 40% complete and closing work-in-progress was 1,100 units 70% complete. Units introduced during the month of January were 11,000 units and completed units transferred to process B were 8,600 units. The normal loss was 10% of production. Compute equivalent production & apportion the total process costs of ₹ 29,190 to production, abnormal loss and work-in-progress.

Note: Cost of Opening WIP b/f is ₹ 1,000/-

PROBLEM – 6

The following data are available in respect to Process I for February 20x1: -

Opening work-in-progress	900 units at ₹ 4,500
Degree of Completion	Materials 100%, Labour 60%, Overhead 60%
Input of materials	9,100 units ₹ 27,300
Direct wages	₹ 8,200
Production overhead	16,400
Units scrapped	1,200 units
Degree of Completion	Material 100%, Labour & Overhead 70%
Closing work-in- progress	1,000 units
Degree of Completion	Materials 100%, Labour 80%, Overhead 80%
Units transferred to next process	7,800 units

Normal process loss is 10% of total input (opening stock plus units put in). The scrap value is ₹ 3 per unit.

You are required to

- Compute equivalent production;
- Cost per equivalent unit for each element and cost of abnormal losses, closing work-in-progress and units transferred to next process; and
- Prepare process accounts.

PROBLEM – 7

From the following information for May 20x1, prepare the process cost accounts for Process III:-

Opening stock in process	500 units at	₹ 7,200
Transfer from Process II	21,300 units	₹ 1,65,400
Direct materials added in Process III		₹ 80,360
Direct wages		₹ 39,620
Production overhead		₹ 19,810
Units scrapped during the period		1,100 units
Transferred to Process IV		18900 units
Closing stock		1,800 units

Degree of completion: -

PARTICULARS	OPENING STOCK	CLOSING STOCK	SCRAP
Material	70%	80%	100%
Labour	50%	60%	80%
Overhead	50%	60%	80%

There was a normal loss of 5% of production and units scrapped were sold at ₹ 3 each.

PROBLEM – 8

From the following information during a period prepare process cost accounts for Process III.

Opening WIP in Process III	800 units at	₹ 10,300
Transfer from process II	21200 units at	₹ 1,64,600
Transferred to Process IV	19200 units	
Closing WIP of process III	2000 units	
Units scrapped	800 units	
Direct material added in Process III	79,040	
Direct wages	₹ 39,040	
Production overhead	19,520	

Degree of completion:

PARTICULARS	OPENING STOCK	CLOSING STOCK	SCRAP
Material	80%	70%	100%
Labour	60%	50%	70%
Overhead	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 3 per unit.

PROBLEM – 9

From the following information during a period prepare process cost account for Process I by Average method:

Opening WIP:	20,000 units	
	Material	₹ 4,500
	Wages	₹ 1,300
	Overhead	₹ 800
Units introduced:	80,000 units	
	Material	₹ 18,500
	Wages	₹ 9,200
	Overhead	₹ 6,200

During the period 60,000 units were completed and transferred to Process II.

Closing WIP:	40,000 units	Degree completion
	Materials	100%
	Wages and overhead	25%

PROBLEM – 10

In a manufacturing unit, raw material passes through four processes I, II, III and IV and the output of each process is the input of the subsequent process. The loss in the four processes I, II, III, and IV are respectively 25%, 20%, 20% and 16 2/3% of the input. If the end product at the end of process IV is 40,000 kg., what is the quantity of raw material required to be fed at the beginning of Process I and the cost of same at ₹ 5 per kg.?

Find out also the effect of increase or decrease in the material cost of the end product for variation of every rupee in the cost of the raw material.

PROBLEM – 11

A Ltd. produces product 'AXE' which passes through two processes before it is completed and transferred to finished stock. The following data relate to October 20x1:

Particulars	Process- I	Process - II	Finished Stock
Opening stock	₹ 7,500	₹ 9,000	₹ 22,500
Direct materials	₹ 15,000	₹ 15,750	--
Direct wages	₹ 11,200	₹ 11,250	--
Factory overheads	₹ 10,500	₹ 4,500	--
Closing stock	₹ 3,700	₹ 4,500	₹ 11,250
Inter-process profit included in opening stock	--	₹ 1,500	₹ 8,250

Output of Process- I is transferred to Process- II at 25% profit on the transfer price.

Output of Process- II is transferred to finished stock at 20% profit on the transfer price. Stock in processes is valued at prime cost. Finished stock is valued at the price at which it is received from process II. Sales during the period are ₹ 1,40,000.

PREPARE Process cost accounts and finished goods account showing the profit element at each stage.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 2)**

RST Limited processes Product Z through two distinct processes – Process- I and Process- II.

On completion, it is transferred to finished stock. From the following information for the current year, PREPARE Process- I, Process- II and Finished Stock A/c:

Particulars	Process- I	Process- II
Raw materials used	7,500 units	--
Raw materials cost per unit	Rs. 60	--
Transfer to next process/finished stock	7,050 units	6,525 units
Normal loss (on inputs)	5%	10%
Direct wages	Rs. 1,35,750	Rs. 1,29,250
Direct Expenses	60% of Direct wages	65% of Direct wages
Manufacturing overheads	20% of Direct wages	15% of Direct wages
Realizable value of scrap per unit	Rs. 12.50	Rs. 37.50

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work-in-process.

QFP 2 (Concept Similar to Problem – 3)

An English willow company who manufactures cricket bat buys wood as its direct material. The Forming department processes the cricket bats and the cricket bats are then transferred to the Finishing department where stickers are applied. The Forming department began manufacturing 10,000 initial bats during the month of December for the first time and their cost is as follows:

Direct material: Rs. 33,000

Conversion costs: Rs. 17,000

Total Rs. 50,000

A total of 8,000 cricket bats were completed and transferred to the Finishing department, the rest 2,000 were still in the Forming process at the end of the month. All of the forming departments direct material were placed, but, on average, only 25% of the conversion costs was applied to the ending work in progress inventory.

CALCULATE:

- Equivalent units of production for each cost.
- The Conversion cost per Equivalent units.
- Cost of closing work in process (WIP) and finished products.

QFP 3 (Concept Similar to Problem – 6)

Hill manufacturing Ltd uses process costing to manufacture Water density sensors for hydro sector. The following information pertains to operations for the month of May.

Particulars	Units
Beginning WIP, May 1	16,000
Started in production during May	1,00,000
Completed production during May	92,000
Ending work in progress, May 31	24,000

The beginning work in progress was 60% complete for materials and 20% complete for conversion costs. The ending inventory was 90% complete for material and 40% complete for conversion costs. Costs pertaining to the month of May are as follows:

Beginning inventory costs are material Rs.27,670, direct Labour Rs.30,120 and factory overhead Rs. 12,720.

Cost incurred during May are material used, Rs. 4,79,000, direct Labour Rs.1,82,880, factory overheads Rs. 3,91,160.

CALCULATE:

- Using the FIFO method, the equivalent units of production for material.
- Cost per equivalent unit for conversion cost.

QFP 4 (Concept Similar to Problem – 6)

A company produces a component, which passes through two processes. During the month of April, materials for 40,000 components were put into Process I of which 30,000 were completed and transferred to Process II. Those not transferred to Process II were 100% complete as to materials cost and 50% complete as to Labour and overheads cost. The Process I costs incurred were as follows:

Direct material Rs.15,000

Direct wages Rs.18,000

Factory overheads Rs.12,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

No further process material costs occur after introduction at the first process until the end of the second process, when protective packing is applied to the completed components. The process and packing costs incurred at the end of the Process II were:

Packing materials Rs.4,000

Direct wages Rs.3,500

Factory overheads Rs.4,500

Required:

- i. PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.
- ii. PREPARE Statement of Equivalent Production, Cost per unit and Process II A/c.

QFP 5 (Concept Similar to Problem – 8)

Following information is available regarding Process-I for the month of February:

Production Record:	
Units in process as on 1 st February (All materials used, 25% complete for Labour and overhead)	4,000
New units introduced	16,000
Units completed	14,000
Units in process as on 28 th February (All materials used, 33-1/3% complete for Labour and overhead)	6,000
Cost Records:	
Work-in-process as on 1 st February	(Rs.)
Materials	6,000
Labour	1,000
Overhead	1,000
	8,000
Cost during the month:	
Materials	25,600
Labour	15,000
Overhead	15,000
	55,600

Presuming that average method of inventory is used, PREPARE:

- i. Statement of equivalent production.
- ii. Statement showing cost for each element.
- iii. Statement of apportionment of cost.
- iv. Process cost account for Process-I.

QFP 6 (Concept Similar to Problem – 8)

Following details are related to the work done in Process-I by XYZ Company during the month of March:

	(Rs.)
Opening work-in process (2,000 units)	
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process-I (38,000 units)	14,80,000
Direct Labour	3,59,000
Overheads	10,77,000
Units scrapped: 3,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%
Closing work-in process: 2,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%

Units finished and transferred to Process-II: 35,000 units

Normal Loss:

5% of total input including opening work-in-process. Scrapped units fetch Rs. 20 per piece.

You are required to PREPARE using average method:

- Statement of equivalent production
- Statement of cost
- Statement of distribution cost, and
- Process-I Account, Normal Loss Account and Abnormal Loss Account.

QFP 7 (Concept Similar to Problem – 9)

'Healthy Sweets' is engaged in the manufacturing of jaggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks.

The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and

dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice.

Following information regarding Process – I has been obtained from the manufacturing department of Healthy Sweets for the month of January:

	(Rs.)
Opening work-in process (4,500litre)	
Sugarcane	50,000
Labour	15,000
Overheads	45,000
Sugarcane introduced for juice extraction (1,00,000 kg)	5,00,000
Direct Labour	2,00,000
Overheads	6,00,000
Abnormal Loss: 1,000 kg	
Degree of completion:	
Sugarcane	100%
Labour and overheads	80%
Closing work-in process: 9,000litre	
Degree of completion:	
Sugarcane	100%
Labour and overheads	80%

Extracted juice transferred for filtering and boiling: 39,500litre(Consider mass of 1litre of juice equivalent to 1 kg)

You are required to PREPARE using average method:

- i. Statement of equivalent production,
- ii. Statement of cost,
- iii. Statement of distribution cost, and
- iv. Process-I Account.

CHAPTER 11: JOINT PRODUCTS AND BY PRODUCTS

MEANING OF JOINT PRODUCTS AND BY PRODUCTS

Agricultural product industries, chemical process industries, sugar industries, and extractive industries are some of the industries where two or more products of equal or unequal importance are produced either simultaneously or in the course of processing operation of a main product. In all such industries, the management is faced with the problems such as, valuation of inventory, pricing of product and income determination, problem of taking decision in matters of further processing of by-products and/or joint products after a certain stage etc. In fact, the various problems relate to

- i. apportionment of common costs incurred for various products and
- ii. aspects other than mere apportionment of costs incurred upto the point of separation.

Before taking up the above problems, we first define the various necessary concepts.

Joint Products

Joint products represent “two or more products separated in the course of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a major product”.

By-Products

These are defined as “products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be considered at the time of severance from the main product.” So in a nutshell By product is a product which is recovered incidentally from the material used in the manufacture of main or desired products, such a by-product having either a net realisable value or a usable value which is relatively insignificant in comparison with the saleable value of the main or desired products. By-product may be further processed to increase their realisable value. Thus by-products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product.

Split of Point

This is a point in a production process where joint products emerging from the process gets separately identifiable. Split of Point has its importance in the joint product costing as joint cost incurred up to this point only and needs to be borne jointly by the products emerging from the

common process. Any cost incurred after Split of Point is a product specific cost and to be borne by the product concerned.

Distinction between Joint-Product and By-Product

The main points of distinction as apparent from the definitions of Joint Products and By-Products are:

- a. Joint products are of equal importance whereas by-products are of small economic value.
- b. Joint products are produced simultaneously but the by-products are produced incidentally in addition to the main products.

Co-Products

Joint products and co-products are used synonymously in common parlance, but strictly speaking a distinction can be made between two. Co-products may be defined as two or more products which are contemporary but do not emerge necessarily from the same material in the same process.

APPORTIONMENT OF JOINT COSTS

Joint costs are the expenditures incurred up to the point of separation i.e. split-off point. Joint Cost is the resources spent by a manufacturer/producer for producing more than one product from processing a common input. These costs include raw material, Labour, power, fuel, depreciation and overhead costs towards the production of the joint products. Joint costs are the expenditures incurred up to the point of separation i.e. split-off point. Joint Cost is the resources spent by a manufacturer / producer for producing more than one product from processing a common input. These costs include raw material, Labour, power, fuel, depreciation and overhead costs towards the production of the joint products. The main problem faced in the case of joint products / by-products is the apportionment of this joint costs to joint products / or by products. For costs incurred after the split off point there is no problem, as these costs can be directly allocated to individual joint products or by-products.

METHODS OF APPORTIONMENT OF JOINT COST TO JOINT PRODUCTS

As the relations between materials, processes and joint products are complex and unobservable, there is no way to determine the cost of the different production factors used in the processes for the production of each of the joint products. Therefore, the costs incurred in the manufacture of each of the joint products cannot be correctly identified. It can only be apportioned to the joint products by using some rational methods.

The commonly used methods for apportioning total process costs up to the point of separation over the joint products are as follows:

- i. Physical Units Method
- ii. Net Realizable Value at split-off point
- iii. Using Technical Estimates

Physical Unit Method

In other words, the basis used for apportioning jointcost over the joint products is the physical volume the joint products at the point of separation. Any loss arises during the joint production process is alsoapportioned over the products on the same basis. In situation where physical units are different, the joint products must be converted to a common unitof measurement. In case, the same cannot be converted to a common unitof measurement, this method cannot be applied. This method has advantage as relative sales value serves as a proxy for relative benefit received by each product from the joint cost. When selling prices for all products exist at split off, the sales value at split off method is the preferred technique. It is a relatively simple technique that depends on a common basis for cost allocation – revenues. The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Net Realizable Value at Split-off Point Method:

To arrive at the sales value at the split-off point, following are deducted from the sales value of joint products at final stage i.e. after processing:

- i. directly attributable Selling and distribution expenses like freight, royalty, commission, etc.
- ii. Post split- off processing cost.

Using Technical Estimates

This method uses technical estimates to apportion the joint costs over the joint products. This method is used when the result obtained by the above methods does not match with the resources consumed by joint products or the realisable value of the joint products are not readily available.

Other Methods

Market value at the point of separation

This method is used for the apportionment of joint costs to joint products upto the split off point. It is difficult to apply this method if the market value of the products at the point of separation is not available. It is a useful method when the realisable value of joint products at split-off (point of separation) is known and where further processing costs are incurred disproportionately. To determine the apportionment of joint costs over joint products, a factor known as multiplying factor is determined. This multiplying factor on multiplication with the sales values of each joint product gives rise to the proportion of joint cost. The use of this method is unfair where further processing

costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing. The net realizable value method which is discussed as above overcomes the shortcoming of this method.

$$\text{Multiply in factor} = \text{Joint Cost} \div \text{Total sales revenue}$$

Average Unit Cost Method

Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained.

$$\text{Average unit cost} = \text{Total process cost (upto the point of separation)} \div \text{Total units of joint product produced.}$$

This is a simple method. The effect of application of this method is that all joint products will have uniform cost per unit.

Contribution Margin Method

According to this method, joint costs are segregated into two parts - variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. In case the products are further processed after the point of separation, then all variable cost incurred be added to the variable costs determined earlier. In this way total variable cost is arrived which is deducted from their respective sales values to ascertain their contribution. The fixed costs are then apportioned over the joint products on the basis of the contribution ratios.

Summary of different types of method of apportioning joint costs that can be used under certain circumstances:

Physical Unit Method	When sale price of all the products is uniform
Net Realisable Value (NRV) at Split-off Point Method	When the realisable value of joint products at split-off is not known.
Technical Estimates	When the result obtained by Net Realisable Value (NRV) at Split-off Point Method does not match with the resources consumed by joint products.
Market value at the point of separation	Where further processing costs are incurred disproportionately.
Market value after further processing	Where further processing costs after the point of separation are proportionate and all the joint products are subject to further processing.
Average Unit Cost Method	When units produced have same unit.

METHODS OF APPORTIONMENT OF JOINT COST TO BY PRODUCTS**Net Realisable Value method**

The realisation on the disposal of the by-product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses in a sugar factory goes to reduce the cost of sugar produced in the factory. When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realized from the sale of the by-product and only the net realizations should be deducted from the total cost of production to arrive at the cost of production of the main product. Separate accounts should be maintained for collecting additional expenses incurred on:

- A. further processing of the by-product, and
- B. selling, distribution and administration expenses attributable to the by-product.

Standard cost in Technical Estimates

By-products may be valued at standard costs. The standard may be determined by averaging costs recorded in the past and making technical estimates of the number of units of original raw material going into the main product and the number forming the by-product or by adopting some other consistent basis. This method may be adopted where the by-product is not saleable in the condition in which it emerges or comparative prices of similar products are not available.

Comparative price

Under this method, the value of the by-product is ascertained with reference to the price of a similar or an alternative material. Suppose in a large automobile plant, a blast furnace not only produces the steel required for the car bodies but also produces gas which is utilised in the factory. This gas can be valued at the price which would have been paid to a gas company if the factory were to buy it from outside sources.

Re-use basis

In some cases, the by-product may be of such a nature that it can be reprocessed in the same process as part of the input of the process. In that case the value put on the by-product should be same as that of the materials introduced into the process. If, however, the by-product can be put into an earlier process only, the value should be the same as for the materials introduced into the process.

TREATMENT OF BY-PRODUCT COST IN COST ACCOUNTING

By-product cost can be dealt in cost accounting in the following ways:

When they are of small total value

When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

When the by-products are of considerable total value

Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

Where they require further processing

In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products. If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (a). In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (b).

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details and the Selling price of the joint products are given in the table below. Apportion the joint cost on the basis of Physical units and prepare a product wise profitability statement. Also, comment on the effectiveness of the Physical unit's method as a method of joint cost apportionment.

PRODUCTS	UNITS PRODUCED	SELLING PRICE
A	30,000	₹ 7.50
B	20,000	₹ 25.00
C	50,000	₹ 3.00

PROBLEM – 2

FIND OUT the cost of joint products A, B and C using average unit cost method from the following data:

Pre-separation Joint Cost ₹60,000

Production data:

Products	Units produced
A	500
B	200
C	300
	1000

PROBLEM – 3

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details, the selling price and further processing cost of the joint products are given in the table below.

PRODUCT S	UNITS PRODUCED	SELLING PRICE AT SPLIT OFF	SELLING PRICE AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	30,000	₹ 7.5	₹ 10	₹ 30,000
B	20,000	₹ 25	₹ 30	₹ 80,000
C	50,000	₹ 3	₹ 5	₹ 50,000

Apportion the joint cost on the basis of the following methods and also calculate the gross margin % under each of the methods.

- Sales value at split of point method

- Final sales value method [sales value after further processing]
- Net Realisable value method.

PROBLEM – 4

From a joint process, two joint products emerge, namely A and B. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000.

The output, units sold and the selling price of the joint products are given in the table below.

PRODUCTS	PRODUCTION (UNITS)	SALES (UNITS)	SP
A	30,000	20,000	₹ 10
B	20,000	10,000	₹ 5

Apportion the joint cost on sales value basis.

PROBLEM – 5

From the following information apportion marginal cost and fixed cost on a suitable basis and obtain profit/loss for each of the joint products –

Sales: A 100 kg @ ₹ 60 per kg and B 120 kg @ ₹ 30 per kg.

Total cost: Marginal cost ₹ 4,400 and Fixed cost ₹ 3,900.

PROBLEM – 6

A factory produces three products from joint process namely Joint products A & B and by-product C. Joint cost incurred in the joint process is ₹ 5,25,000.

Other details are as follows:

A	30,000 kg
B	20,000 kg
C	5,000 kg

The by-product is further processed at a cost of ₹ 5,000 and sold for ₹ 6 per kg. Apportion the joint cost on the basis of physical units.

PROBLEM – 7

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 20x2 were Rs.33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000

Sales prices:			
At the split-off	200		
After further processing	300	350	100
Costs to process after split-off	6,00,000	6,00,000	6,00,000

Other information is as follows:

Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value.

PROBLEM – 8

A company manufactures two types of industrial sealant by passing materials through two consecutive processes. The results of operating the two processes during the previous month are shown below:

Process I:		
Costs incurred:		
Materials 7,000 kg at ₹ 0.50 per kg	₹ 3,500	
Labour and overheads	₹ 4,340	
Output (kg):		
Transferred to process 2		6,430
Defective production		570
Process II:		
Cost incurred:		
Labour and overheads	₹ 12,129	
Output (kg):		
Type E sealant		2,000
Type F sealant		4,000
By-product		430

It is considered normal for 10% of the total input in Process I to be defective and all defective output is sold as scrap at ₹ 0.40 per kg. Losses are not expected in Process II.

There was no work in process at the beginning or end of the month and no opening stocks of sealants.

Sales of the month's output from Process II were:

Type E sealant	1,100 kg
Type F sealant	3,200 kg
By-product	430 kg

The remainder of the output from Process II was in stock at the end of the month.

The selling prices of the products are:

Type E sealant ₹ 7 per kg and Type F sealant ₹ 2.50 per kg.

No additional costs are incurred on either of the two main products after the second process. The by-product is sold for ₹ 1.80 per kg after being sterilized, at a cost of ₹ 0.30 per kg, in a subsequent process. The operating costs of process II are reduced by the net income receivable from sales of the by-product.

Required:

1. Calculate, for the previous month, the cost of the output transferred from Process I into Process II and the net cost or saving arising from any abnormal losses or gains in Process I.
2. Calculate the value of the closing stock of each sealant and the profit earned by each sealant during the previous month using the following methods of apportioning costs to joint products:
 - i. According to the weight of output,
 - ii. According to the market value of output.

Problem – 9

From a joint process, two products A and B emerge. The joint cost incurred in the joint process is ₹ 1,00,000. Other details are as follows:

PRODUCTS	UNITS	SP AT SPLIT OFF	SP AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	50,000	₹ 10	₹ 12	₹ 1,50,000
B	50,000	₹ 10	₹ 15	₹ 1,50,000

Advise the stage of production at which the joint products should be sold.

PROBLEM – 10

Inorganic Chemicals purchases salt and processes it into more refined products such as Caustic Soda, Chlorine and PVC. In the month of July, Inorganic Chemicals purchased Salt for ₹ 40,000. Conversion cost of ₹ 60,000 were incurred up to the split off point, at which time two sealable products were produced. Chlorine can be further processed into PVC.

The July production and sales information is as follows:

	Production (in tonne)	Sales Quantity (in tonne)	Selling price per tonne (₹)
Caustic Soda	1,200	1,200	50
Chlorine	800	—	—
PVC	500	500	200

All 800 tonnes of Chlorine were further processed, at an incremental cost of ₹ 20,000 to yield 500 tonnes of PVC. There was no beginning or ending inventories of Caustic Soda, Chlorine or PVC in July. There is active market for Chlorine. Inorganic Chemicals could have sold all its July production of Chlorine at ₹ 75 per tonne.

Required:

1. SHOW how joint cost of ₹1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods:
 - a. sales value at split-off point;
 - b. physical unit method, and
 - c. estimated net realisable value.
2. Lifetime Swimming Pool Products offers to purchase 800 tonnes of Chlorine in August at ₹ 75 per tonne. This sale of Chlorine would mean that no PVC would be produced in August. EXPLAIN how the acceptance of this offer for the month of August would affect operating income?

PROBLEM – 11

Sun-moon Ltd. produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	2,00,000	17	25
B	30,000	13	17
C	25,000	8	12
D	20,000	10	-
E	75,000	14	20

Raw material costs ₹35,90,000 and other manufacturing expenses cost ₹ 5,47,000 in the manufacturing process which are absorbed on the productson the basis of their 'Net realizable value'. The further processing costs of A,B, C and E are ₹ 12,50,000; ₹ 1,50,000; ₹ 50,000 and ₹ 1,50,000 respectively. Fixed costs are ₹ 4,73,000.

You are required to PREPARE the following in respect of the coming year:

1. Statement showing income forecast of the company assuming that none of its products are to be further processed.
2. Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.
3. Can you suggest any other production plan whereby the company can maximise its profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 1)**

A coke manufacturing company produces the following products by using 5,000 tonnes of coal @ ₹1,100 per tonne into a common process.

Coke	3,500 tonnes
Tar	1200 tonnes
Sulphate of ammonia	52 tonnes
Benzol	48 tonnes

PREPARE a statement apportioning the joint cost amongst the products on the basis of the physical unit method.

QFP 2 (Concept Similar to Problem – 6)

Smile company produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the month, company incurred joint production costs of ₹ 10,00,000/- The main products are not marketable at the split off point and thus have to be processed further.

Particulars	Product-A	Product-B	By product
Monthly output in kg.	60,000	1,20,000	50,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹2,00,000	₹3,00,000	

FIND OUT the amount of joint product cost that Smile company would allocate to the product-B by using the physical volume method to allocate joint production costs?

QFP 3 (Concept Similar to Problem – 9)

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January production and sales information is as follows:

Products	Production (in Kiloliter/tonne)	Sales Quantity(in Kiloliter/tonne)	Selling priceper Litre/Kg (₹)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kiloliter of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in the month of January.

Required:

- SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realizable Value method.
- 'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself?

QFP 4 (Concept Similar to Problem – 9)

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for a particular month:

Cost incurred up to separation point: ₹ 10,000

Output (in Litre)	Product X100 ₹	Product Y70 ₹	Product Z80 ₹
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre: After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

- Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.
- Advise the management whether, on purely financial consideration, the three products are to be processed further or not.

QFP 5 (Concept Similar to Problem – 10)

OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the split-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹ 40,000 which is apportioned on the basis of Sales Value at split-off point. Other details are as follows:

Product	Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

CHAPTER 12: MARGINAL COSTING

INTRODUCTION

As discussed in the first chapter 'Introduction to Cost and Management Accounting', the cost and management accounting system by provision of information, enables management to take various decisions. Marginal Costing is a technique of cost and management accounting which is used to analyses relationship between cost, volume and profit. In order to appreciate the concept of marginal costing, it is necessary to study the definition of marginal costing and certain other terms associated with this technique.

The important terms have been defined as follows:

Marginal Cost: Marginal cost as understood in economics is the incremental cost of production for producing one additional unit of product. As we understood, variable costs have direct relationship with volume of output and fixed costs remains constant irrespective of volume of production. Hence, marginal cost is measured by the total variable cost attributable to one additional unit. For example, the total cost of producing 10 units and 11 units of a product is ₹10,000 and ₹10,500 respectively. The marginal cost for 11th unit i.e. 1 unit extra from 10 units is ₹500. Marginal cost can precisely be the sum of prime cost and variable overhead.

Marginal Costing: It is a costing system where products or services and inventories are valued at variable costs only. It does not take consideration of fixed costs. This system of costing is also known as direct costing as only direct costs forms the part of product and inventory cost. Costs are classified on the basis of behaviour of cost (i.e. fixed and variable) rather functions as done in absorption costing method.

Direct Costing: Direct costing and Marginal Costing is used synonymously at various places. But the relation of costs with respect to activity level must be understood. Some costs are variable at batch level but fixed for unit level whereas others are variable at production line level but fixed for batches and units.

Differential and Incremental Cost: Differential cost is difference between the costs of two different production levels. It is a relative representation of costs for two different levels that results in the increase or decrease in cost. Incremental cost, on the other hand, is the increase in the costs due to change in the volume or process of production activities. Incremental costs are sometime compared with marginal cost but in reality, there is a thin line difference between the two. Marginal cost is the change in the total cost due to production of one extra unit while incremental cost can be both for increase in one unit or in total volume. In the Example 2 above, ₹ 1,220 is the incremental cost of producing one extra unit but not marginal cost for producing one extra unit.

CHARACTERISTICS OF MARGINAL COSTING

The technique of marginal costing is based on the distinction between product costs and period costs. Only the variable costs are treated as the costs of the products while the fixed costs are treated as period costs which will be incurred during the period regardless of the volume of output. The main characteristics of marginal costing are as follows:

1. **All elements of cost are classified into fixed and variable components.** Semi-variable costs are also analyzed into fixed and variable elements.
2. The marginal or **variable costs** (as direct material, direct Labour and variable factory overheads) **are treated as the cost of product.**
3. Under marginal costing, **the value of finished goods and work-in-progress is also comprised only of marginal costs.** Variable selling and distribution are excluded for valuing these inventories. Fixed costs are not considered for valuation of closing stock of finished goods and closing WIP.
4. **Fixed costs are treated as period costs** and are charged to profit and loss account for the period for which they are incurred.
5. Prices are determined with reference to marginal costs and contribution margin.
6. Profitability of departments and products is determined with reference to their contribution margin.

FACTS ABOUT MARGINAL COSTING

Some of the facts about marginal costing are depicted below:

Not a distinct method

Marginal costing is not a distinct method of costing like job costing, process costing, operating costing, etc., but a special technique used for managerial decision making. Marginal costing is used to provide a basis for the interpretation of cost data to measure the profitability of different products, processes and cost centres in the course of decision making. It can, therefore, be used in conjunction with the different methods of costing such as job costing, process costing, etc., or even with other techniques such as standard costing or budgetary control.

Cost Ascertainment

In marginal costing, cost ascertainment is made on the basis of the nature of cost. It gives consideration to behaviors of costs. In other words, the technique has developed from a particular conception and expression of the nature and behaviors of costs and their effect upon the profitability of an undertaking.

Decision Making:

According to traditional or total cost method, as opposed to marginal costing, the classification of costs is based on functional basis. Under this method the total cost is the sum total of the cost of direct material, direct Labour, direct expenses, manufacturing overheads, administration overheads, selling and distribution overheads. In this system, other things being equal, the total cost per unit will

remain constant only when the level of output or mixture is the same from period to period. Since these factors are continually fluctuating, the actual total cost will vary from one period to another. Thus, it is possible for the costing department to say one day that an item cost ₹20 and the next day it costs ₹18. This situation arises because of changes in volume of output and the peculiar behavior of fixed expenses included in the total cost. Such fluctuating manufacturing activity, and consequently the variations in the total cost from period to period or even from day to day, poses a serious problem to the management in taking sound decisions. Hence, the application of marginal costing has been given wide recognition in the field of decision making.

DETERMINATION OF COST AND PROFIT UNDER MARGINAL COSTING

	Amount (₹)	Amount (₹)
Revenue (A)		xxx
Product Cost:		
• Direct Materials	xxx	
• Direct employee (Labour)	xxx	
• Direct expenses	xxx	
• Variable manufacturing overheads	xxx	
Product (Inventoriable) Costs:	xxx	xxx
(B) Product Contribution Margin {A – B}		xxx
• Variable Administration overheads	xxx	
• Variable Selling & Distribution overheads	xxx	xxx
Contribution Margin: (C)		xxx
Period Cost: (D)		
Fixed Manufacturing expenses	xxx	
Fixed non-manufacturing expenses	xxx	xxx
Profit/ (loss) {C – D}		xxx

i. Product (Inventoriable) Costs

In the case of merchandise inventory, these are the costs which are associated with the purchase and sale of goods. In the production scenario, **such costs are associated with the acquisition and conversion of materials and all other manufacturing inputs into finished product for sale.** Hence, under marginal costing, variable manufacturing costs constitute inventoriable or product costs.

Finished goods are measured at product cost. Work-in-process (WIP) inventories are also measured at product cost on the basis of percentage of completion (Please refer Process & Operation costing chapter)

ii. Contribution

Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.

$$\text{Contribution (C)} = \text{Sales Revenue (S)} - \text{Total Variable Cost (V)}$$

It is obtained by subtracting variable costs from sales revenue. It can also be defined as excess of sales revenue over the variable costs. The contribution concept is based on the theory that the profit and fixed expenses of a business is a 'joint cost' which cannot be equitably apportioned to different segments of the business. In view of this difficulty the contribution serves as a measure of efficiency of operations of various segments of the business.

iii. Period Cost

These are the **costs, which are not assigned to the products but are charged as expenses against the revenue of the period in which they are incurred.** All fixed costs either manufacturing or non-manufacturing are recognized as period costs in marginal costing.

ABSORPTION COSTING

Absorption Costing is the practice of charging all costs, both variable and fixed to operations, processes or product.

In absorption costing the classification of expenses is based on functional basis whereas in marginal costing it is based on the nature of expenses. In absorption costing, the fixed expenses are distributed over products on absorption costing basis that is, based on a pre-determined level of output. Since fixed expenses are constant, such a method of recovery will lead to over or under-recovery of expenses depending on the actual output being greater or lesser than the estimate used for recovery. This difficulty will not arise in marginal costing because the contribution is used as a fund for meeting fixed expenses.

ADVANTAGES AND LIMITATIONS OF MARGINAL COSTING

Advantages

- 1. Simplified Pricing Policy:** The marginal cost remains constant per unit of output whereas the fixed cost remains constant in total. Since marginal cost per unit is constant from period to period within a short span of time, firm decisions on pricing policy can be taken. If fixed cost is included, the unit cost will change from day to day depending upon the volume of output. This will make decision making task difficult.
- 2. Proper recovery of Overheads:** Overheads are recovered in costing on the basis of pre-determined rates. If fixed overheads are included on the basis of pre-determined rates, there will be under-recovery of overheads if production is less or if overheads are more. There will be over-recovery of overheads if production is more than the budget or actual expenses are less than the estimate. This creates the problem of treatment of such under or over-recovery of overheads. Marginal costing avoids such under or over recovery of overheads.

3. **Shows Realistic Profit:** Advocates of marginal costing argues that under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.
4. **How much to produce:** Marginal costing helps in the preparation of break- even analysis which shows the effect of increasing or decreasing production activity on the profitability of the company.
5. **More control over expenditure:** Segregation of expenses as fixed and variable helps the management to exercise control over expenditure. The management can compare the actual variable expenses with the budgeted variable expenses and take corrective action through analysis of variances.
6. **Helps in Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.
7. **Short term profit planning:** It helps in short term profit planning by B.E.P charts.

Limitations

1. **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed. For example, various amenities provided to workers may have no relation either to volume of production or time factor.
2. **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.
3. **Scope for Low Profitability:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.
4. **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in- progress. In order to show the correct position, fixed overheads have to be included in work-in- progress.
5. **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static throughout is not correct. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. The variable costs do not remain constant per unit of output. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.
6. **Marginal costing ignores time factor and investment:** The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true

cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

7. Understating of W-I-P: Under marginal costing stocks and work in progress are understated.

COST-VOLUME-PROFIT (CVP) ANALYSIS

Meaning

It is a managerial tool showing the relationship between various ingredients of profit planning viz., cost, selling price and volume of activity. As the name suggests, cost volume profit (CVP) analysis is **the analysis of three variables, cost, volume and profit**. Such an analysis explores the relationship between costs, revenue, activity levels and the resulting profit. It aims at measuring variations in cost and volume.

Assumptions

- 1. Changes in the levels of revenues and costs arise only because of changes in the number of product (or service) units produced and sold** – for example, the number of television sets produced and sold by Sony Corporation or the number of packages delivered by Overnight Express. The number of output units is the only revenue driver and the only cost driver.
Just as a cost driver is any factor that affects costs, a revenue driver is a variable, such as volume, that causally affects revenues.
- 2. Total costs can be separated into two components;** a fixed component that does not vary with output level and a variable component that changes with respect to output level. Furthermore, variable costs include both direct variable costs and indirect variable costs of a product. Similarly, fixed costs include both direct fixed costs and indirect fixed costs of a product
- 3. When represented graphically, the behaviours of total revenues and total costs are linear** (meaning they can be represented as a straight line) in relation to output level within a relevant range (and time period).
- 4. Selling price, variable cost per unit, and total fixed costs (within a relevant range and time period) are known and constant.**
- 5. The analysis either covers a single product or assumes that the proportion of different products when multiple products are sold will remain constant** as the level of total units sold changes.
- 6. All revenues and costs can be added, subtracted, and compared without taking into account the time value of money.** (Refer to the FM study material for a clear understanding of time value of money).

Importance

It provides the information about the following matters:

- 1. The behavior of cost in relation to volume.**
- 2. Volume of production or sales, where the business will break-even.**

3. Sensitivity of profits due to variation in output.
4. Amount of profit for a projected sales volume.
5. Quantity of production and sales for a target profit level.

Impact of various changes on profit:

An understanding of CVP analysis is extremely useful to management in budgeting and profit planning. It elucidates the impact of the following on the net profit:

1. Changes in selling prices,
2. Changes in volume of sales,
3. Changes in variable cost,
4. Changes in fixed cost.

Marginal Cost Equation

The contribution theory explains the relationship between the variable cost and selling price. It tells us that selling price minus variable cost of the units sold is the contribution towards fixed expenses and profit. If the contribution is equal to fixed expenses, there will be no profit or loss and if it is less than fixed expenses, loss is incurred. Since the variable cost varies in direct proportion to output, therefore if the firm does not produce any unit, the loss will be there to the extent of fixed expenses.

These points can be described with the help of following marginal cost equation:

$$\text{Marginal Cost Equation} = S - V = C = F \pm P$$

Where,

S = Sales value, V = Variable cost, C = Contribution,

F = Fixed Cost,

Marginal Cost Statement

	(₹)
Sales	XXXX
Less: Variable Cost	XXXX
Contribution	XXXX
Less: Fixed Cost	XXXX
Profit	XXXX

Contribution to Sales Ratio (Profit Volume Ratio or P/V Ratio)

This ratio shows the **proportion of sales available to cover fixed costs and profit**. Contribution represents the sales revenue after deducting variable costs. This ratio is usually expressed in percentage.

$$P/V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 \text{ or, } P/V \text{ Ratio} = \frac{\text{Change in contribution / Profit}}{\text{Change in sales}} \times 100$$

A higher contribution to sales ratio implies that the rate of growth of contribution is faster than that of sales. This is because, once the breakeven point is reached, profits shall grow at a faster rate when compared to a product with a lesser contribution to sales ratio.

By transposition, we have derived the following equations:

i. $C = S \times P/V \text{ ratio}$

ii. $S = \frac{C}{P/V \text{ ratio}}$

Break-Even Analysis

Break-even analysis is a generally used method to study the CVP analysis. This technique can be explained in two ways:

- (i) In narrow sense it is concerned with computing the break-even point. At this point of production level and sales there will be no profit and loss i.e. total cost is equal to total sales revenue.
- (ii) In broad sense this technique is used to determine the possible profit/loss at any given level of production or sales.

METHODS OF BREAK-EVEN ANALYSIS

Break even analysis may be conducted by the following two methods:

- A. Algebraic computations
- B. Graphic presentations

ALGEBRAIC CALCULATIONS**Break-even Point**

The word contribution has been given its name because of the fact that it literally contributes towards the recovery of fixed costs and the making of profits. The contribution grows along with the sales revenue till the time it just covers the fixed cost. This is the point where neither profits nor losses have been made is known as a break- even point. This implies that in order to break even the amount of contribution generated should be exactly equal to the fixed costs incurred. Hence, if we know how much contribution is generated from each unit sold, we shall have sufficient information for computing the number of units to be sold in order to break even. Mathematically,

$$\text{Break - even point in units} = \frac{\text{Fixed costs}}{\text{Contribution per unit}}$$

Cash Break-even Point

When break-even point is calculated only with those fixed costs which are payable in cash, such a break-even point is known as cash break-even point. This means that depreciation and other non-cash fixed costs are excluded from the fixed costs in computing cash break-even point.

Multi-Product Break-Even Analysis

In a multi-product environment, where more than one product is manufactured by using a common fixed cost, the break-even point formula needs some adjustments. The contribution is calculated by taking weights for the products. The weights may be of sales mix quantity or sales mix values. The calculation of Multi-Product Break-even analysis can be understood with the help of the following example.

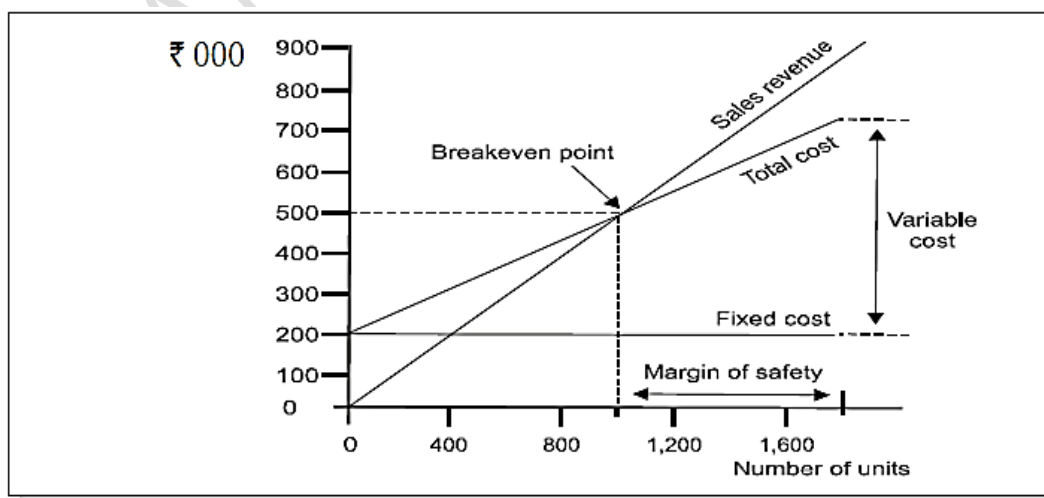
GRAPHICAL PRESENTATION OF BREAK-EVEN CHART

Break-even Chart

A breakeven chart records costs and revenues on the vertical axis and the level of activity on the horizontal axis. The making of the breakeven chart would require you to select appropriate axes. Subsequently, you will need to mark costs/revenues on the Y axis whereas the level of activity shall be traced on the X axis. Lines representing (i) Fixed costs (horizontal line at ₹ 2,00,000 for ABC Ltd), (ii) Total costs at maximum level of activity (joined to the Y-axis where the Fixed cost of ₹ 2,00,000 is marked) and (iii) Revenue at maximum level of activity (joined to the origin) shall be drawn next.

The breakeven point is that point where the sales revenue line intersects the total cost line. Other measures like the margin of safety and profit can also be measured from the chart.

The breakeven chart for ABC Ltd (Example-3) is drawn below.

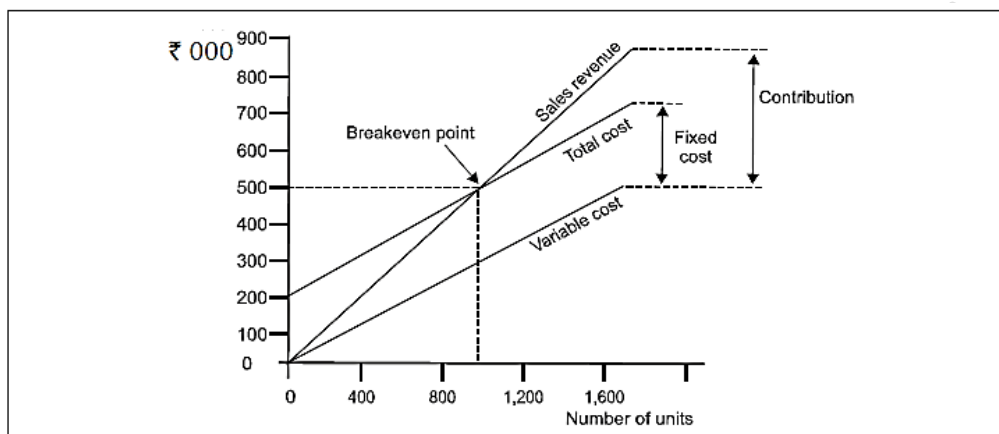


Contribution Breakeven Chart

It is not possible to use a breakeven chart as described above to measure contribution. This is one of its major limitations especially so because contribution analysis is literally the backbone of marginal

costing. To overcome such a limitation, accountants frequently resort to the making of a contribution breakeven chart which is based on the same principles as a conventional breakeven chart except for that it shows the variable cost line instead of the fixed cost line. Lines for Total cost and Sales revenue remain the same. The breakeven point and profit can be read off in the same way as with a conventional chart. However, it is also possible to read the contribution for any level of activity.

Using the same example of ABC Ltd as for the conventional chart, the total variable cost for an output of 1,700 units is $1,700 \times ₹300 = ₹5,10,000$. This point can be joined to the origin since the variable cost is nil at zero activity.

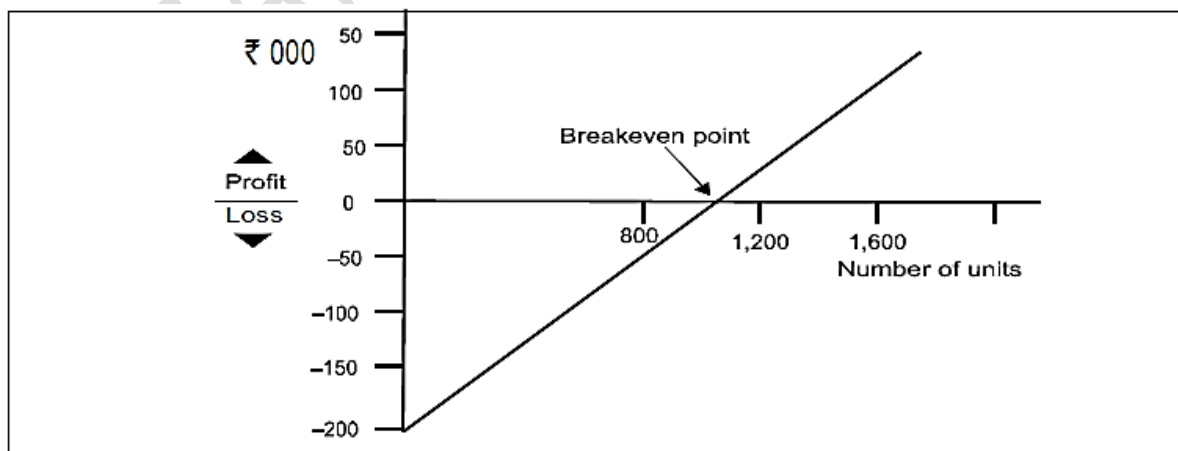


The contribution can be read as the difference between the sales revenue line and the variable cost line.

Profit-Volume Chart

This is also very similar to a breakeven chart. In this chart the vertical axis represents profits and losses, and the horizontal axis is drawn at zero profit or loss.

In this chart each level of activity is taken into account and profits marked accordingly. The breakeven point is where this line intersects the horizontal axis. A profit-volume graph for our example (ABC Ltd) will be as follows,



The loss at a nil activity level is equal to ₹ 2,00,000, i.e. the amount of fixed costs. The second point used to draw the line could be the calculated breakeven point or the calculated profit for sales of 1,700 units.

Advantages of the profit-volume chart

The biggest advantage of the profit-volume chart is its capability of depicting clearly the effect on profit and breakeven point of any changes in the variables.

LIMITATIONS OF BREAK-EVEN ANALYSIS

The limitations of the practical applicability of breakeven analysis and breakeven charts stem mostly from the assumptions underlying CVP which have been mentioned above. Assumptions like costs behaving in a linear fashion or sales revenue remain constant at different sales levels or the stocks shall remain constant period after period are unrealistic. Similarly, the assumption that the only factor which influences costs is the 'activity level achieved' is erroneous because other factors like inflation also have a bearing on costs.

MARGIN OF SAFETY

The margin of safety can be defined as **the difference between the expected level of sale and the breakeven sales**. The larger the margin of safety, the higher is the chances of making profits.

The Margin of Safety can also be calculated by identifying the difference between the projected sales and breakeven sales in units multiplied by the contribution per unit. This is possible because, at the breakeven point all the fixed costs are recovered and any further contribution goes into the making of profits. It also can be calculated as:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

VARIATIONS OF BASIC MARGINAL COST EQUATION AND OTHER FORMULAE

i)	Sales – Variable cost = Fixed cost ± Profit/ Loss By multiplying and dividing L.H.S. by S
ii)	$\frac{S(S - V)}{S} = F + P$
iii)	$S \times \text{P/V Ratio} = F + P$ or Contribution $\left(\because \text{P/V Ratio} = \frac{S - V}{S} \right)$
iv)	$\text{BES} \times \text{P/V Ratio} = F$ ($\because$ at BEP profit is zero)
v)	$\text{BES} = \frac{\text{Fixed cost}}{\text{P/V ratio}}$
vi)	$\text{P/V ratio} = \frac{\text{Fixed cost}}{\text{BES}}$
vii)	$S \times \text{P/V Ratio} = \text{Contribution}$ (Refer to iii)
viii)	$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}}$
ix)	$(\text{BES} + \text{MS}) \times \text{P/V Ratio} = \text{Contribution}$ (Total sales = BES + MS)

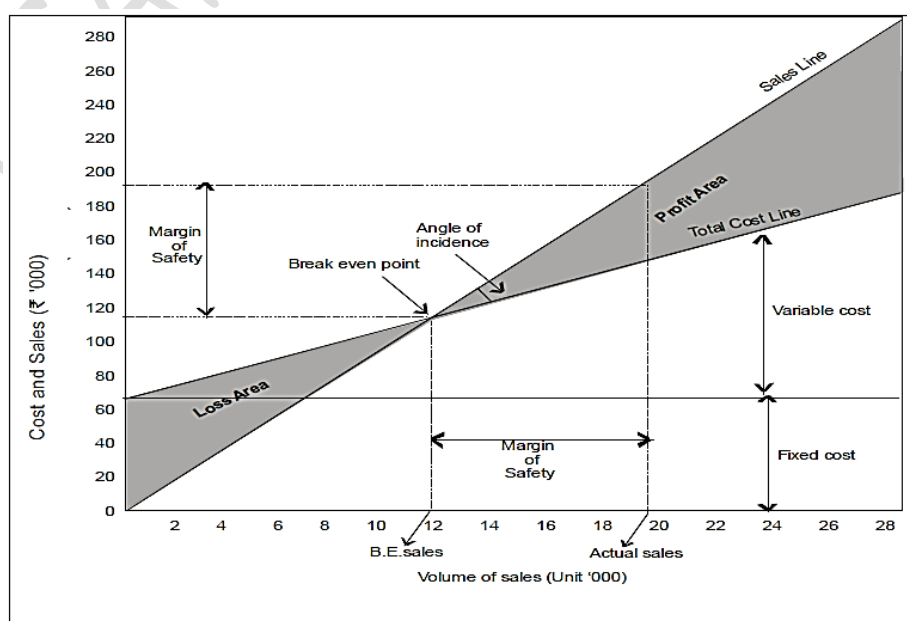
x)	$(BES \times P/V \text{ Ratio}) + (MS \times P/V \text{ Ratio}) = F + P$ By deducting $(BES \times P/V \text{ Ratio})$ from L.H.S. and F from R.H.S. in (x) above, we get:
xi)	$M.S. \times P/V \text{ Ratio} = P$
xii)	$P/V \text{ Ratio} = \frac{\text{Change in profit}}{\text{Change in Sales}}$
xiii)	$P/V \text{ Ratio} = \frac{\text{Change in contribution}}{\text{Change in Sales}}$
xiv)	$\text{Profitability} = \frac{\text{Contribution}}{\text{Key factor}}$
xv)	$\text{Margin of Safety} = \text{Total Sales} - BES \text{ or } \frac{\text{Profit}}{P/V \text{ ratio}}$
xvi)	$BES = \text{Total Sales} - MS$ $\text{Margin of Safety Ratio} = \frac{\text{Total sales} - BES}{\text{Total Sales}}$

ANGLE OF INCIDENCE

This angle is formed by the intersection of sales line and total cost line at the break- even point. **This angle shows the rate at which profit is earned once the break- even point is reached.**

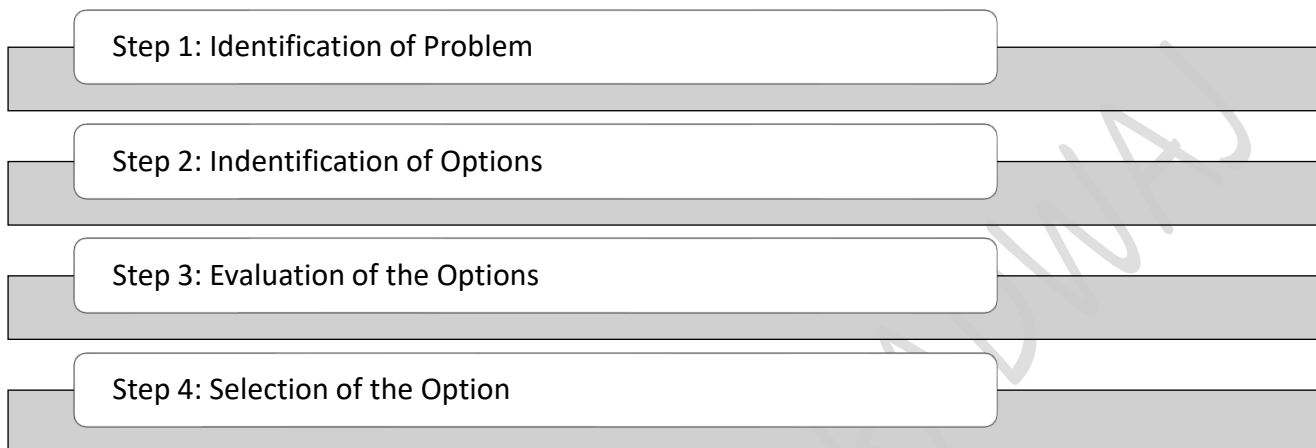
The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favourable position.

The shaded area in the graph given below is representing the angle of incidence. The angle above and below the break-even point shows the rate of earning profitability (loss). Wider angle denotes higher rate of earnings and vice-versa.



APPLICATION OF CVP ANALYSIS IN DECISION MAKING

As discussed, earlier CVP analysis is used as an evaluation tool for managerial decisions. In this chapter we will discuss the use of CVP Analysis for short term decision making. Before going into illustration, let us discuss the decision-making framework.

Framework for Decision Making**Step-1: Identification of Problem**

Every organisation has its own objectives, and goals are set to achieve these objectives. To reach at the goal, actions are to be taken. For example, if an organisation wants to be a cost leader in the industry it operates in, it has to achieve 3Es in its all activities. 3Es means economy in inputs, efficiency in process and operations and effectiveness in output. An entity that exists for profit may identify few areas (problem areas) which if worked on can add to the profit or wealth maximisation. For example, Arnav Ltd. a manufacturer of Steel products, has identified that it can be leader in the industry if it can produce steel products at lower cost than its rival. Here the goal should be (problem area) low-cost production.

Step- 2: Identification of Options

After identification of problem(s), the next step is identification of options to achieve the goal (to answer the problem). All possible options need to be explored. In the above example, the Arnav Ltd. may have the following options for low-cost production:

1. Purchase of inputs from specialised market- Local vs Import
2. Make the input in its own factory- Make or Buy
3. Bulk purchase to avail discount offer- How much to purchase
4. Make in-house- Make vs Outsource
5. Bulk processing- How much to produce
6. Using efficient machine for manufacturing- Old machine vs New machine
7. Optimisation of key resources- Product mix decisions etc.

Step- 3: Evaluation of the Options

After identification of options, each option is to be evaluated against the objective criteria. An entity with objective of making profit may evaluate options on the basis of financial measures like impact of profit or loss, market share, overall impact on profitability, return on investment etc. Non-financial factors like customer satisfaction, impact on existing market/ customer, ethics of decision are also evaluated.

This step is a very important and may be grouped into two tasks

- i. Identification of Cost and Benefits of each option
- ii. Estimation of amount of each option

Step-4: Selection of option:

After evaluation of the options, the best option is selected and implemented.

Principles for Identification of Cost and Benefits for Measurement

The cost and benefit of an option is identified for measurement if it passes the principles of Controllability and Relevance.

- i. **Controllability:** Those cost and benefits which arise due to choice of an option. In other words, benefits received, and cost incurred are directly related with the choice of the option. Thus, the costs and benefits which are controllable are considered for measurement for making decision.
- ii. **Relevance:** The costs which are controllable need to be relevant for decision making. This means all controllable costs are not relevant for decision making unless it differs under the two options. Thus, **a cost is treated is relevant only if**
 1. it is a future cost
 2. it differs under two options under consideration.

For Example, Arnav Ltd. wants to manufacture 1,000 additional units of Product X. It is considering either to manufacture in its own factory or to outsource to job worker in this example cost of raw materials to manufacture additional 1,000 units is controllable as it arises due to management's decision to make additional units. But it is not relevant for making choice between manufacturing in-house and outsource to job workers, as under the both options, the raw materials cost would be same.

Hence, for decision making purpose only those cost and benefits are identified for measurement which are both Controllable and Relevant.

Below is an analysis of few costs for its relevance

Cost	Relevance	Reason
i. Historical Cost	Irrelevant	The cost has already been incurred and do not affect the decision. Example: Book value of machinery etc.
ii. Sunk Cost	Irrelevant	The cost which are already paid either for goods or services availed or to be availed. Example: Raw material purchased and held in store without having replacement cost, Cost of drawing, blueprint etc.

iii. Committed Cost	Irrelevant	The committed costs are the pre-agreed cost which cannot be revoked under the normal circumstances. This is also a sunk cost. Examples: Cost of materials as per rate agreement, Salary cost to employees etc.
iv. Opportunity Cost	Relevant	The opportunity cost is represented by the forgone potential benefit from the best rejected course of action. Had the option under consideration not chosen, the benefit would come to the organization.
v. Notional or Imputed Cost	Relevant	Notional costs are relevant for the decision making only if company is actually forgoing benefits by employing its resources to alternative course of action. For example, notional interest on internally generated fund is treated as relevant notional cost only if company could earn interest from it.
vi. Shut-down Cost	Relevant	When an organization suspends its manufacturing operations, certain fixed expenses can be avoided and certain extra fixed expenses may be incurred depending upon the nature of the industry. By closing down the manufacturing, the organization will save variable cost of production as well as some discretionary fixed costs. This particular discretionary cost is known as shut-down cost.

Principles of Estimation of Costs and Benefits

After identification of the costs and benefits, it is now required to be quantified i.e., the cost and benefit should be measured and estimated. The estimation is done by following the two principles as discussed below:

- i. **Variability:** Variability means by how much a cost or benefit increased or decreased due to the choice of the option. Variable costs are the cost which differs under the different volume or activities. On the other hand, fixed costs remain same irrespective of volume and activities.
- ii. **Traceability:** Traceability of cost means degree of relationship between the cost and the choice of the option. Direct costs are directly assigned to the option on the other hand indirect costs need to be apportioned to the option on some reasonable basis.

For Example, Arnav Ltd. wants to manufacture 1,000 units of Product X. It is considering to manufacture the same in its own factory. To manufacture in its own factory, it requires 1,000 hours of employees and a specialised machine. In this example, employee cost for labour of 1,000 hours is variable cost for in-house manufacturing and it is directly traceable. Cost of machinery is also direct cost but so far as traceability of the machinery cost is concerned it is direct cost for 1,000 units as a whole but indirect cost for a unit.

Hence, the cost and benefits of an option is measured at directly traceable and variable costs.

Short-term Decision-Making using concepts of CVP Analysis

Management uses marginal costing and CVP concepts for making various decisions. In this chapter we will learn how the concepts of marginal costing and CVP is applied for analysis of identified options for short-term decision making. Generally, short-term decisions are related with temporary gaps between demand and supply for available resources. The areas of short term decision may be classified into two broad categories:

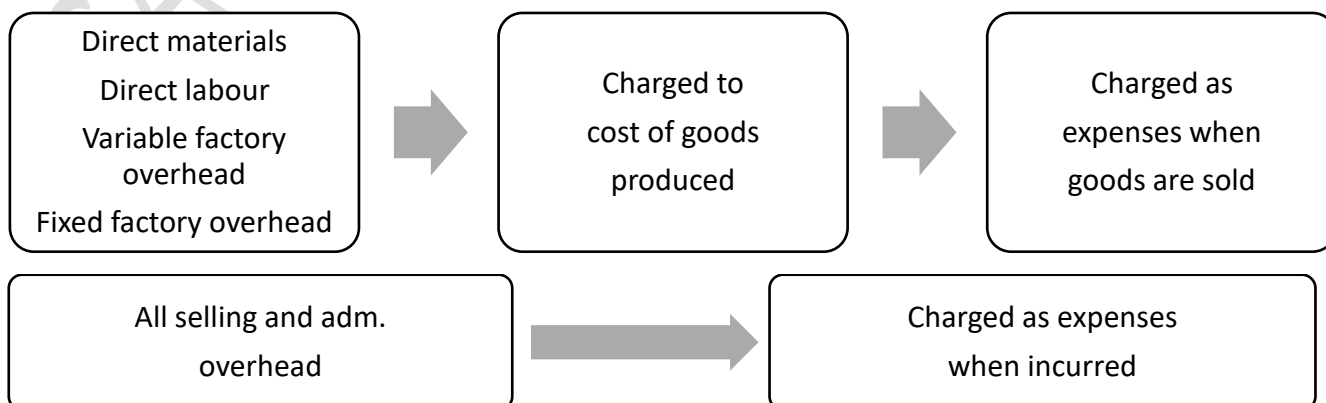
- i. Decisions related with excess supply, such as:
 - a. Processing of Special Order
 - b. Determination of price for stimulating demand
 - c. Local vs Export sale
 - d. Determination of minimum price for price quotations
 - e. Shut-down or continue decision etc.
- ii. Decisions related with excess demand, such as:
 - a. Make or Buy/ In-house-processing vs Outsourcing
 - b. Product mix decision under resource constraints (limiting factors)
 - c. Sales mix decisions
 - d. Sale or further processing etc.

What is a Limiting Factor?

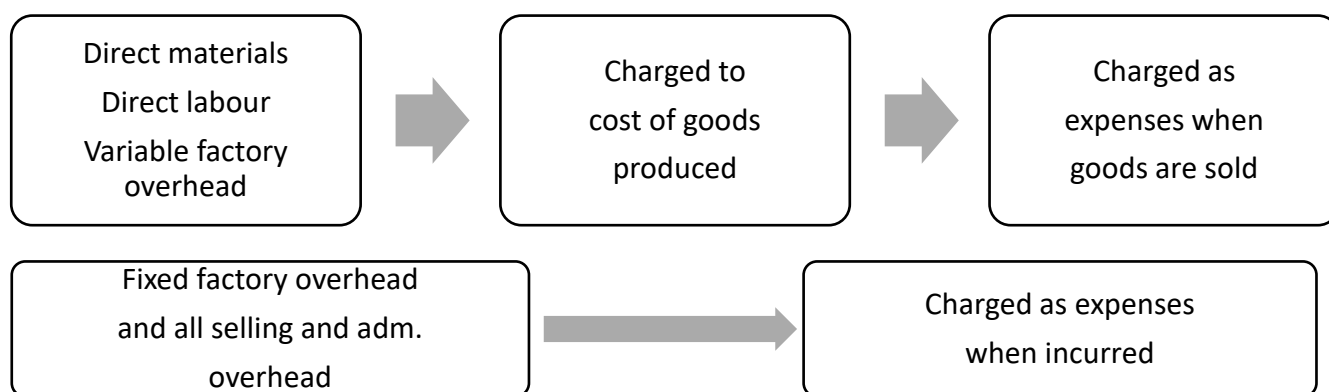
Limiting factor is anything which limits the activity of an entity. The factor is a key to determine the level of sale and production, thus it is also known as Key factor. From the supply side the limiting factor may either be Men (employees), Materials (raw material or supplies), Machine (capacity), or Money (availability of fund or budget) and from demand side it may be demand for the product, other factors like nature of product, regulatory and environmental requirement etc. The management, while making decisions, has objective to optimize the key resources up to maximum possible extent.

DISTINCTION BETWEEN MARGINAL AND ABSORPTION COSTING

The distinctions in these two techniques are illustrated by the following diagrams:



Absorption Costing Approach



Marginal Costing Approach

Main Points of distinction between Marginal Costing and Absorption Costing

	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Difference in Profit under Marginal and Absorption costing

The above two approaches will compute the different profit because of the difference in the stock valuation. This difference is explained as follows in different circumstances.

1. No opening and closing stock: In this case, profit / loss under absorption and marginal costing will

be equal.

2. **When opening stock is equal to closing stock:** In this case, profit / loss under two approaches will be equal provided the fixed cost element in both the stocks is same amount.
3. **When closing stock is more than opening stock:** In other words, when production during a period is more than sales, then **profit as per absorption approach will be more** than that by marginal approach. The reason behind this difference is that a part of fixed overhead included in closing stock value is carried forward to next accounting period.
4. **When opening stock is more than the closing stock:** In other words, when production is less than the sales, **profit shown by marginal costing will be more** than that shown by absorption costing. This is because a part of fixed cost from the preceding period is added to the current year's cost of goods sold in the form of opening stock.

The presentation of information to management under the two costing techniques is as under:

Income Statement (Absorption costing)

	(₹)
Sales	<u>XXXXX</u>
Production Costs:	
Direct material consumed	XXXXX
Direct labour cost	XXXXX
Variable manufacturing overhead Fixed manufacturing overhead Cost	XXXXX
of Production	<u>XXXXX</u>
Add: Opening stock of finished goods	XXXXX
(Value at cost of previous period's production)	
	<u>XXXXX</u>
Less: Closing stock of finished goods	XXXXX
(Value at production cost of current period)	XXXXX
Cost of Goods Sold	XXXXX
Add: (or less) Under (or over) absorption of fixed Manufacturing overhead	XXXXX
Add: Administration costs	XXXXX
Selling and distribution costs	<u>XXXXX</u>
Total Cost	XXXXX
Profit (Sales – Total cost)	XXXXX

Income Statement (Marginal costing)

	(₹)
Sales	XXXXX
<u>Variable manufacturing costs:</u>	
– Direct material consumed	XXXXX
– Direct labour	XXXXX
– Variable manufacturing overhead	XXXXX
Cost of Goods Produced	XXXXX
Add: Opening stock of finished goods (Value at cost of previous period)	XXXXX
Less: Closing stock of finished goods (Value at current variable cost)	
Cost of Goods Sold	XXXXX
Add: Variable administration, selling and dist. overhead	XXXXX
Total Variable Cost	XXXXX
Add: Selling and distribution costs	
Contribution (Sales – Total variable costs)	XXXXX
Less: Fixed costs (Production, admin., selling and dist.)	XXXXX
Net Profit	XXXXX

It is evident from the above that under marginal costing technique the contributions of various products are pooled together and the fixed overheads are met out of such total contribution. The total contribution is also known as gross margin. The contribution minus fixed expenses yields net profit. In absorption costing technique cost includes fixed overheads as well.

QUESTIONS FOR CLASSROOMDISCUSSION**PROBLEM – 1**

A company producing a single article sells it at ₹ 10 each. The marginal cost of production is ₹ 6 each and the fixed cost is ₹ 400 per annum.

Calculate

- The P/V ratio;
- The break-even sales;
- The sales to earn at profit ₹ 5,000;
- Profit at sales ₹ 3,000;
- New break-even point if the Sale price is reduced by 10%.
- MOS when the profit earned is ₹ 200 and PVR – 40%.

PROBLEM – 2

Fill in the blanks for each of the following independent situations:

SITUATIONS	AYE	BYE	CEE
Selling price per unit	(a)	₹ 50	₹ 20
Variable cost as % of selling price	60	(c)	75
No. of units sold	10,000	4,000	(e)
Marginal contribution	20,000	80,000	(f)
Fixed costs	₹ 12,000	(d)	₹ 1,20,000
Profit or loss	(b)	₹ 20,000	₹ 30,000

PROBLEM – 3

The company estimates that next year it will earn a profit of ₹ 50,000. The budgeted fixed cost is ₹ 2,50,000 and the sales is ₹ 9,93,000. Find out the breakeven point for the company.

PROBLEM – 4

From the following particulars, find out the selling price per unit if BEP is to be brought down by 1800 units.

Particulars	Amount
Variable cost per unit	₹ 75
Fixed expenses	₹ 2,70,000
Selling price per unit	₹ 100

PROBLEM – 5

1. If margin safety is ₹ 2,40,000 (40% of sales) and PVR is 30%, calculate (a) BES (b) amount of Profit on sales of 9,00,000.
2. X Ltd. has earned a Contribution of 2,00,000 and a Net Profit of ₹ 1,50,000 on sales of ₹ 8,00,000. What is its margin of safety?
3. The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Compute the capacity sales when the fixed costs are ₹ 90,000. Also, compute profit at 75% of the capacity sales.
4. PV ratio of X Ltd. is 50% and the margin of safety is 40%. Calculate the net profit when sales is ₹ 1,00,000.
5. Ascertain profit when sales is ₹ 2,00,000, fixed cost is ₹ 40,000 and BEP is ₹ 1,60,000.
6. Ascertain sales when the fixed cost is ₹ 20,000, profit is ₹ 10,000 and BES is ₹ 40,000.
7. If BEP is 40% and the net profit ratio is 12%, find out the contribution sales ratio.

PROBLEM – 6

A company had incurred fixed expenses of ₹ 4,50,000, with sales of ₹ 15,00,000 and earned a profit of ₹ 3,00,000 during the first half year. In the second half, it suffered a loss of ₹ 1,50,000.

CALCULATE

- i. The profit-volume ratio, break-even point and margin of safety for the first half year.
- ii. Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.
- iii. The break-even point and margin of safety for the whole year.

PROBLEM – 7

An analysis of Chaitanya Ltd gives the following information:

Cost element	Variable cost (% sales)	Fixed cost
Direct material	32.8	-
Direct labour	28.4	-
Factory OH	12.6	₹1,89,900
Distribution OH	4.1	₹ 58,400
General administration OH	1.1	₹ 66,700

A budgeted sale is ₹ 1,85,0000. You are required to determine:

1. Break-even sales volume
2. Profit at budgeted sales volume
3. Profit if the actual sales decrease by 10%

PROBLEM – 8

You are given the following data for the current financial year of Rio Co. Ltd:

Variable cost	60,000	60%
Fixed cost	30,000	30%
Net profit	10,000	10%
Sales	1,00,000	100%

FIND OUT (a) Break-even point, (b) P/V ratio, and (c) Margin of safety. Also DRAW a break-even chart showing contribution and profit.

PROBLEM – 9

PREPARE a profit graph for products A, B and C and find break-even point from the following data:

Products	A	B	C	Total
Sales (₹)	7,500	7,500	3,750	18,750
Variable cost (₹)	1,500	5,250	4,500	11,250
Fixed cost (₹)	---	---	---	5,000

PROBLEM – 10

MNP Ltd sold 2,75,000 units of its product at ₹ 37.50 per unit. Variable costs are ₹ 17.50 per unit (manufacturing costs of ₹ 14 and selling cost ₹ 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amounting to ₹ 35,00,000 (including depreciation of ₹ 15,00,000). There is no beginning or ending inventories.

Required:

COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

PROBLEM – 11

Company	Variable Cost per unit	Fixed cost
P	9	₹ 60,000
Q	5	₹ 90,000

At what sale range is P more profitable than Q and vice versa? Assume that both the products have the same selling price.

PROBLEM – 12

The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

Particulars	Manual	Semi-Automatic	Fully-Automatic
Monthly fixed costs:			
Occupancy	₹ 15,000	₹ 15,000	₹ 15,000

Maintenance contract	-	₹ 5,000	₹ 10,000
Equipment lease	-	₹ 25,000	₹ 1,00,000
Unit variable costs (per report):			
Supplies	₹ 40	₹ 80	₹ 20
Labour	₹200 (5hrs x ₹ 40)	₹60 (1hrs x ₹ 60)	₹20 (0.25hrs x ₹ 80)

Required:

- CALCULATE cost indifference points. Interpret your results.
- If the present caseload is 600 cases and it is expected to go up to 850 cases in the near future, SELECT most appropriate on cost considerations?

PROBLEM – 13

Two businesses AB Ltd and CD Ltd. sell the same type of product in the same type of market. Their budgeted Profit and Loss Accounts for the year ending 20x1 are as follows:

	A.B. Ltd.		C.D. Ltd.	
Sales		₹ 1,50,000		₹ 1,50,000
Less:				
Variable costs	₹ 1,20,000		₹ 1,00,000	
Fixed costs	₹ 15,000	₹ 1,35,000	₹ 35,000	₹ 1,35,000
Net profit budgeted		₹ 15,000		₹ 15,000

You are required to:

- Calculating the break-even point of each business;
- Calculate the sales volume at which each of the businesses will earn ₹ 5,000 profit; and
- State which business is likely to earn greater profits in conditions of:
 - Heavy demand for the product;
 - Low demand for the product.

PROBLEM – 14

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Particulars	Amount
Sales	₹ 5,00,000
Direct Materials	₹ 2,50,000

Direct Labour	₹ 1,00,000
Variable Overheads	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required:

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

PROBLEM – 15

You are given the following data:

	Sales	Profit
Year 2021-22	₹1,20,000	8,000
Year 20x2-23	₹1,40,000	13,000

FIND OUT

1. P/V ratio,
2. B.E. Point,
3. Profit when sales are ₹ 1,80,000,
4. Sales required earn a profit of ₹ 12,000,
5. Margin of safety in year 20x2-20x3.

PROBLEM – 16

A company has three factories situated in the north, east and south with its Head Office in Mumbai. The management has received the following summary report on the operations of each factory for a period:

	Sales		Profit	
	Actual	Over/(Under) Budget	Actual	Over/(Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE for each factory and for the company as a whole for the period:

- i. The fixed cost
- ii. Break even sales

PROBLEM – 17

Good luck Ltd has prepared the following estimate for the year 20x1-x2.

Sales	15,000 units
Fixed expenses	₹ 34,000
Sales value	₹ 1,50,000
Variable cost	₹ 6 per unit

You are required to;

- Find the PVR, BEP and MOS
- Calculate the revised PVR, BEP and MOS in each of the following cases
 - i. Decrease of 10% in selling price
 - ii. Increase of 10% variable cost
 - iii. Increase of sales volume by 2,000 units.
 - iv. Increase of ₹6,000 in fixed cost.

PROBLEM – 18

A company has a P/V ratio of 40 % COMPUTE by what percentage must sales be increased to offset: 20% reduction in selling price?

PROBLEM – 19

PQR Ltd. has furnished the following data for the two years:

Particulars	20x1	20x2
Sales	₹ 8,00,000	?
Profit/Volume Ratio (P/V ratio)	50%	37.50%
Margin of Safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 20x2 due to the restructuring process.

The company could maintain its sales quantity level of 20x1 in 20x2 by reducing the selling price.

You are required to CALCULATE the following:

- i. Sales for 20x2 in Value.
- ii. Fixed cost for 20x2 in Value,
- iii. Break-even sales for 20x2 in Value.

PROBLEM – 20

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Particulars	Amount
Sales	₹ 5,00,000
Direct Materials	₹ 2,50,000
Direct Labour	₹ 1,00,000
Variable Overheads	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required:

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

PROBLEM – 21

The following set of information is presented to you by your client AB Ltd producing two products X and Y.

Particulars	X	Y
Direct materials	₹ 20	₹ 18
Direct wages	₹ 6	₹ 4

- Fixed expenses during the period are expected to be ₹ 1,600.
- Variable expenses are allocated to the products at the rate of 100% of direct wages.
- Selling price per unit X: ₹ 40 and Y: ₹ 30.
- Proposed sales mix:
 - i. 100 units of X and 200 units of Y
 - ii. 150 units of X and 150 units of Y
 - iii. 200 units of X and 100 units of Y

As a cost accountant, you are required to present to the management the following:

- a. The total contribution and profit from each of the above sales mix.
- b. The proposed sales mix to earn of profit of ₹ 300 and ₹ 600 with the total sales of X and Y being 300 units.

- c. Calculate BEP when the sales mix is 2:1
- d. Recalculate BEP when sales mix is 1:2

PROBLEM – 22

Aravind Ltd. manufactures and sells four products under the brand names A, B, C, & D. the following details are provided in respect of the products.

PRODUCT	A	B	C	D
% in Sales Value	30	40	20	10
% of Variable cost to selling price	60	70	80	30

The total budgetary sales (100%) are ₹ 10,00,000 p.m. fixed costs are ₹ 2,50,000 p.m. The Company's new sales manager Aravind has suggested a change in sales mix keeping the total sales at ₹ 10,00,000 per month. His suggestion is as under:

Product	A	B	C	D
% in sales Value	25	40	30	5

- Calculate the break-even point for the company, under the existing sales mix.
- Compute the effect of implementing the suggested change in the sales mix.
- Explain the reasons for the effect of change in sales mix despite total sales and fixed cost being the same.

PROBLEM – 23

A, B and C are three similar plants under the same management who want them to be merged for better operation. The details are as under:-

Plant	A	B	C
Capacity Operated %	100	70	50
	(in lakhs)	(in lakhs)	(in lakhs)
Turnover	₹ 300	₹ 280	₹ 150
Variable Cost	₹ 200	₹ 210	₹ 75
Fixed Costs	₹ 70	₹ 50	₹ 62

Find out:

- a. The capacity of the merged plant for break-even
- b. The profit at 75% capacity of the merged plant.
- c. The turnover from the merged plant to give a profit of ₹28 lakhs.

PROBLEM – 24

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

Particulars	X	Y	Z
Selling Price (₹/unit)	₹ 10	₹ 12	₹ 12
Variable Costs (₹/unit)	₹ 6	₹ 9	₹ 7
Market Demand (units)	3,000	2,000	1,000
Production Capacity (units)	2,000	3,000	900
Fixed Costs (₹)	₹ 30,000		

Required:

COMPUTE the opportunity costs for each of the products.

PROBLEM – 25

The following particulars are extracted from the records company:-

Particulars	Product A	Product B
	Per Unit	Per Unit
Sales	₹ 100	₹ 120
Consumption of Material	2 Kg.	3 Kg.
Material Cost	₹ 10	₹ 15
Direct wages cost	₹ 15	₹ 10
Direct expenses	₹ 5	₹ 6
Machine Hours used	3	2
Overhead expenses :		
- Fixed	₹ 5	₹ 10
- Variable	₹ 15	₹ 20

Direct wages per hour is ₹ 5.

- a. Comment on the profitability of each product (both use the same raw material) when
 - i. Raw material is in short supply;
 - ii. Production capacity (in terms of machine-hours) is the limiting factor.
- b. Assuming Raw material as the key factor availability of which is 10,000 Kg. and the maximum sales potential of each product being 3,500 units, find out the product mix which will yield the maximum profit.

PROBLEM – 26

X Ltd. supplies spare parts to an aircraft company Y Ltd. The production capacity of X Ltd. facilitates the production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different spare parts A and B

Particulars	Part A	Part B
Per unit		
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine P	0.6 h	0.25 h
Machine Time: Machine Q	0.5 h	0.55 h
Target Price (₹)	₹ 145	₹ 115

Total hours available:

Machine P: 4,000 hours

Machine Q: 4,500 hours

Alloy available is 13,000 kgs. @ ₹ 12.50 per kg.

Variable overheads per machine hours:

Machine P: ₹ 80

Machine Q: ₹ 100

Required:

- IDENTIFY the spare part which will optimize contribution at the offered price.
- If Y Ltd. reduces the target price by 10% and offers ₹ 60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

PROBLEM –27

A paint manufacturing company manufactures 2,00,000 medium-sized tins of “Spray Lac Paints” per annum when working at normal capacity. It incurs the following costs of manufacturing per unit:

Particulars	(₹)
Direct Material	7.8
Direct Labour	2.1
Variable overheads	2.5
Fixed overheads	4
Product Cost per unit	16.4

The selling price is ₹ 21 per and variable selling and administrative expenses are 60 paise per tin. During the next quarter, only 10,000 units can be produced and sold. Management plans to shut down the plant estimating that the fixed manufacturing cost can be reduced to ₹ 74,000 for the quarter. When the plant is operating, the fixed overheads are incurred at a uniform rate throughout the year. Additional costs of plant shutdown for the quarter are estimated at ₹ 14,000.

REQUIRED:

- a. Express your opinion, as to whether the plant should be shut down during the quarter, and
- b. Calculate the shutdown point for the quarter in terms of number of tins.

PROBLEM –28

Mr. X has ₹ 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are ₹ 80,000 per year.

Show COMPUTATIONS to answer the following questions:

- i. What sales volume must be obtained to break even?
- ii. What sales volume must be obtained to get 15 per cent return on investment?
- iii. Mr. X estimates that even if he closed the doors of his business, he would incur ₹ 25,000 as expenses per year. At what sales would he be better off by locking his business up?

PROBLEM –29

From the following data compute the profit under (a) Marginal costing, and (b) Absorption costing and reconcile the difference in profit.

	₹ Per unit
Selling price	₹ 8
Variable cost	₹ 4
Fixed cost	₹ 2

The normal volume of production is 26,000 units per quarter.

The opening and closing stocks consisting of both finished goods and equivalent units of work-in-progress are as follows:-

Particulars	Qr. I	Qr. II	Qr. III	Qr. IV	Total
Op. stock	-	-	6,000	2,000	-
Production	26,000	30,000	24,000	30,000	1,10,000
Sales	26,000	24,000	28,000	32,000	1,10,000
Closing stock	-	6,000	2,000	-	-

PROBLEM – 30

Wonder Ltd, manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	50%	100%
Sales and production (units)	400	800
Sales	₹ 8,00,000	₹16,00,000
Production costs:		
Variable	₹ 3,20,000	₹ 6,40,000
Fixed	₹ 1,60,000	₹ 1,60,000
Selling and distribution costs:		
Variable	₹ 1,60,000	₹ 3,20,000
Fixed	₹ 2,40,000	₹ 2,40,000

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year. In the first quarter, 220 units were produced and 160 units were sold.

Required:

- COMPUTE the fixed production costs absorbed by ZEST if absorption costing is used.
- CALCULATE the under/over-recovery of overheads during the period.
- CALCULATE the profit using absorption costing.
- CALCULATE the profit using marginal costing.

PROBLEM – 31

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

- On 1st April, 20x3, the company has an opening stock of 20,000 packets whose variable cost is ₹180 per packet.
- In 20x2-20x3, production was ₹ 1,20,000 packets and the expected production in 20x3-20x4 is 1,50,000 packets. Expected sales for 20x3-20x4 is 1,60,000 packets
- In 20x2-20x3, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 20x3-20x4. The variable cost is expected to increase by 25%. Selling price for 20x3-20x4 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 20x3-20x4.

ADDITIONAL QUESTIONS FOR PRACTICE**QFP 1 (Concept Similar to Problem – 1 to 6)**

You are given the following particulars

- i. Fixed cost ₹ 1,50,000
- ii. Variable cost ₹ 15 per unit
- iii. Selling price is ₹ 30 per unit

CALCULATE:

- a. Break-even point
- b. Sales to earn a profit of ₹ 20,000

QFP 2 (Concept Similar to Problem – 1 to 6)

A company earned a profit of ₹ 30,000 during the year. If the marginal cost and selling price of the product are ₹ 8 and ₹ 10 per unit respectively, FIND OUT the amount of margin of safety.

QFP 3 (Concept Similar to Problem – 1 to 6)

A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹ 5 lakhs.

CALCULATE the following:

- i. Break-even sales
- ii. Total sales
- iii. Total variable cost
- iv. Current profit
- v. New 'margin of safety' if the sales volume is increased by 7 ½ %.

QFP 4 (Concept Similar to Problem – 1 to 6)

You are required to

	(₹)
(i) DETERMINE profit, when sales	2,00,000
Fixed Cost	40,000
BEP	1,60,000
(ii) DETERMINE sales, when fixed cost	20,000
Profit	10,000
BEP	40,000

QFP 5 (Concept Similar to Problem – 1 to 6)

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

- i. If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%
- ii. For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹ 10 per unit. The total fixed costs are estimated at ₹ 6,66,600. The sales mix values of X : Y would be 7 : 3. DETERMINE at what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

QFP 6 (Concept Similar to Problem – 8)

- a. You are given the following data for the coming year for a factory.

Budgeted output 8,00,000 units

Fixed expenses Rs. 40,00,000

Variable expenses per unit Rs. 100

Selling price per unit Rs. 200

DRAW a break-even chart showing the break-even point.

- b. If price is reduced to Rs. 180, what will be the new break-even point?

QFP 7 (Concept Similar to Problem – 15)

A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. CALCULATE break-even point both in terms of Value as well as in units.

QFP 8 (Concept Similar to Problem – 17)

By noting “P/V will increase or P/V will decrease or P/V will not change”, as the case may be, STATE how the following independent situations will affect the P/V ratio:

- i. An increase in the physical sales volume;
- ii. An increase in the fixed cost;
- iii. A decrease in the variable cost per unit;
- iv. A decrease in the contribution margin;
- v. An increase in selling price per unit;
- vi. A decrease in the fixed cost;
- vii. A 10% increase in both selling price and variable cost per unit;
- viii. A 10% increase in the selling price per unit and 10% decrease in the physical sales volume;
- ix. A 50% increase in the variable cost per unit and 50% decrease in the fixed cost.
- x. An increase in the angle of incidence.

QFP 9 (Concept Similar to Problem – 20)

A single product company sells its product at ₹ 60 per unit. In 20x1-20x2, the company operated at a margin of safety of 40%. The fixed costs amounted to ₹ 3,60,000 and the variable cost ratio to sales was 80%.

In 20x2-20x3, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

- FIND the selling price required to be fixed in 20x2-23 to earn the same P/V ratio as in 20x1-20x2.
- Assuming the same selling price of ₹ 60 per unit in 20x2-20x3, FIND the number of units required to be produced and sold to earn the same profit as in 20x1-20x2.

QFP 10 (Concept Similar to Problem – 20)

An automobile manufacturing company produces different models of Car The budget in respect of model 007 for the month of March is as under:

Budgeted Output			40,000 Units
		₹ In lakhs	₹ In lakhs
Net Realisation			2,10,000
Variable Costs:			
Materials		79,200	
Labour		15,600	
Direct expenses		37,200	1,32,000
Specific Fixed Costs		27,000	
Allocated Fixed Costs		33,750	60,750
	Total Costs		1,92,750
	Profit		17,250
	Sales		2,10,000

CALCULATE:

- Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.
- Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit.

QFP 11 (Concept Similar to Problem – 22)

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

- If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%

- ii. For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹ 10 per unit. The total fixed costs are estimated at ₹ 6,66,600. The sales mix values of X : Y would be 7 : 3. DETERMINE at what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

QFP 12 (Concept Similar to Problem – 22)

A company has made a profit of ₹ 50,000 during the year. If the selling price and marginal cost of the product are ₹ 15 and ₹ 12 per unit respectively, FIND OUT the amount of margin of safety.

QFP 13 (Concept Similar to Problem – 22)

Prisha Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	A	B	C
Sales Mix	40%	35%	25%
Selling Price	₹ 300	₹ 400	₹ 200
Variable Cost	₹ 150	₹ 200	₹ 120
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 60,00,000		

The company has currently under discussion, a proposal to discontinue the manufacture of Product C and replace it with Product E, when the following results are anticipated:

	Products		
	A	B	E
Sales Mix	45%	30%	25%
Selling Price	₹ 300	₹ 400	₹ 300
Variable Cost	₹ 150	₹ 200	₹ 150
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 64,00,000		

Required:

- CALCULATE the total contribution to sales ratio and present break-even sales at existing sales mix.
- CALCULATE the total contribution to sales ratio and present break-even sales at proposed sales mix.
- STATE whether the proposed sales mix is accepted or not?

QFP 14 (General calculation)

An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

	Total annual costs	Percent of Total Annual Cost which is variable
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary. You are required to

- COMPUTE the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.
- CALCULATE the break-even point in rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

QFP 15 (Concept Similar to Problem – 29)

XYZ Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilisation is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. The fixed costs are ₹3,60,000 per year. Variable selling costs are ₹ 3 per unit and fixed selling costs are ₹2,70,000 per year. The unit selling price is ₹ 20.

In the year just ended on 31st March, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 31st March was 20,000 units. The actual variable production costs for the year were ₹ 35,000 higher than the standard.

- CALCULATE the profit for the year
 - by absorption costing method and
 - by marginal costing method.
- EXPLAIN the difference in the profits.

CHAPTER 13: STANDARD COSTING

INTRODUCTION

Cost control is one of the objectives of cost management. Management of an organisation setups predetermined cost to compare the actual cost with the predetermined cost. Predetermined costs are standard costs used for cost control and performance evaluation. Standard costing is a method of cost and management accounting which starts with setting of standards and ends with reporting of variances to management for taking corrective actions. The Official Terminology of CIMA, London defines standard costing as “Control technique that reports variances by comparing actual costs to pre-set standards so facilitating action through management by exception.”

In this chapter we will learn how standards are set for each cost component i.e. material, labour and overheads of a cost object.

What Is A Standard Or Standard Cost?

Standard cost is defined in the CIMA Official Terminology as “the planned unit cost of the product, component or service produced in a period. The standard cost may be determined on a number of bases. The main use of standard costs is in performance measurement, control, stock valuation and in the establishment of selling prices.” From the above definition Standard costs can be said as

- Planned cost
- Determined on a base or number of bases.

Why Standard Costing is Needed?

Standards or Standard costs are established to evaluate performance of a responsibility centre. Apart from performance evaluation and cost control, standard costs are also used to value inventory where actual figures are not reliably available and to determine selling prices particularly while preparing quotations.

Standard costing system is widely accepted as it serves different needs of an organisation. The standard costing is preferred for the following reasons:

- Prediction of future cost for decision making:** Standard costs are set after taking all present conditions and future possibilities into consideration. Hence, standard cost is future cost for the purpose of cost estimation and profitability from a proposed project/ order/ activity.
- Provide target to be achieved:** Standard costs are the target cost which should not be crossed by the responsibility centres. Performance of a responsibility centre is continuously monitored and measured against the set standards. Any variance from the standard is noted and reported for appropriate action.

- c. **Used in budgeting and performance evaluation:** Standard costs are used to set budgets and based on these budgets managerial performance is evaluated. This is of two benefits, one managers of a responsibility centre will not compromise with the quality to fulfill the budgeted quantity and second, variances can be traced with the responsible department or person.
- d. **Interim profit measurement and inventory valuation:** Actual profit can only be known after the closure of the accounts. But an organisation may need to prepare profitability statement for interim periods for managerial reporting and decision making. To arrive at profit figure, standard costs are deducted from the revenue.

TYPES OF STANDARDS

Types of standards are as below:

- i. **Ideal Standards:** These represent the level of performance attainable when prices for material and labour are most favourable, when the highest output is achieved with the best equipment and layout and when the maximum efficiency in utilisation of resources results in maximum output with minimum cost.
These types of standards are criticised on three grounds:
 - a. Since such standards would be unattainable, no one would take these seriously.
 - b. The variances disclosed would be variances from the ideal standards. These would not, therefore, indicate the extent to which they could have been reasonably and practically avoided.
 - c. There would be no logical method of disposing of these variances.
- ii. **Normal Standards:** These are standards that may be achieved under normal operating conditions. The normal activity has been defined as "the number of standard hours which will produce at normal efficiency sufficient good to meet the average sales demand over a term of years".
These standards are, however, difficult to set because they require a degree of forecasting. The variances thrown out under this system are deviations from normal efficiency, normal sales volume, or normal production volume.
If the actual performance is found to be abnormal, large variances may result and necessitate revision of standards.
- iii. **Basic or Bogey Standards:** These standards are used only when they are likely to remain constant or unaltered over a long period. According to this standard, a base year is chosen for comparison purposes in the same way as statisticians use price indices. Since basic standards do not represent what should be attained in the present period, current standards should also be prepared if basic standards are used. Basic standards are, however, well suited to businesses having a small range of products and long production runs. Basic standards are set, on a long-term basis and are seldom revised. When basic standards are in use, variances are not calculated. Instead, the actual cost is expressed as a percentage of basic cost. The current cost is also similarly expressed and the two percentages are compared to find out how much the actual cost

has deviated from the current standard. The percentages are next compared with those of the previous period to establish the trend of actual and current standard from basic cost.

- iv. Current Standards: These standards reflect the management's anticipation of what actual costs will be for the current period.** These are the costs which the business will incur if the anticipated prices are paid for the goods and services and the usage corresponds to that believed to be necessary to produce the planned output.

The variances arising from expected standards represent the degree of efficiency in usage of the factors of production, variation in prices paid for materials and services and difference in the volume of production.

THE PROCESS OF STANDARD COSTING

The process of standard cost is as below:

- i. Setting of Standards:** The first step is to set standards which are to be achieved, the process of standard setting is explained below.
- ii. Ascertainment of actual costs:** Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.
- iii. Comparison of actual cost with standard cost:** Actual costs are compared with the standards costs and variances are determined.
- iv. Investigate the reasons for variances:** Variances arise are investigated for further action. Based on this, performance is evaluated and appropriate actions are taken.
- v. Disposition of variances:** Variances arise are disposed-off by transferring it to the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

SETTING-UP OF STANDARD COST

Standard cost is set on the basis of management's estimation. Cost is estimated on the basis of technical specification provided by the engineering department or other expert such as production engineer. Generally, while setting standards, consideration is given to historical data, current production plan and expected conditions of future. For the sake of detailed analysis and control, standard cost is set for each element of cost i.e. material, labour, variable overheads and fixed overheads. Standard are also set for the sales quantity and sales value; this is generally known as budgeted sales.

Standards are set in both quantity (units or hours) and in cost (price or rate). It is thus measure in quantities, hours and value of the factors of production.

Standard costs are divided into three main cost components, such as

- a. Direct Material Cost**
- b. Direct Employee (Labour) Cost and**
- c. Overheads**

Standards are set in both physical and monetary terms for each cost components. Details are as follows:

Physical Standards

Physical standards refer to expression of standards in units or hours. At this stage standard quantity and standard hours are determined for a particular product or service. The purpose of setting standards is to secure economies in scale of production and to set selling price for quotation purpose. In manufacturing organisations, the task of setting physical standards is assigned to the industrial engineering department. While setting standards consideration is given to :

- Company's operating plan i.e. budgets
- Final output to be produced
- Material specification, in both quantity and quality provided by the engineering department.
- Proportion of material to be used in case of multiple inputs.
- Method of production i.e. fully automated, semi-automated or manual.
- Skill set of workers and availability of workers.
- Working conditions and internal factors.
- External factors (such as Labour Law, Factories Act, Govt. policy etc.).

PROCEDURE OF SETTING MATERIAL QUANTITY STANDARDS

The following procedure is usually followed for setting material quantity standards.

- Standardisation of products:** At this phase, products to be produced are decided based on production plan and customer's order.
Generally following questions are answered at this stage: (i) What to be produced? (ii) Which type to be produced and (iii) How much to be produced?
- Product study:** Product to be produced is analysed and studied for developments and production. Product study is carried out by the engineering department or product consultants. At this phase answers to the following questions are satisfied: (i) How can it be produced? (ii) What are the pre-requisites? (iii) Which type of materials to be used? (iv) How products can be accepted in the market? etc.
- Preparation of specification list:** After the product study a list of material is prepared. It specifies types (quality) and quantity of materials to be used, substitute of the materials, quantity and proportion of materials to be used, process to be followed, pre-requisites and condition required etc. While preparing specification list consideration to expected amount of wastage is given. It must be customised to adopt changes in the product.
- Test runs:** Sample or test runs under specified conditions are carried out and sample products are tested for the desired quality and quantity. Any deviation from the specification is noted down and specification list is updated.

PROCEDURE OF SETTING LABOUR TIME STANDARDS

The following are the steps involved in setting labour standards:

- a. **Standardisation** of product and product study is carried out as explained above.
- b. **Labour specification:** Types of labour and labour time is specified. Labour time specification is based on past records and it takes into account normal wastage of time.
- c. **Standardisation of methods:** Selection of proper machines to use proper sequence and method of operations.
- d. **Manufacturing layout:** A plan of operation for each product listing the operations to be performed is prepared.
- e. **Time and motion study:** It is conducted for selecting the best way of completing the job or motions to be performed by workers and the standard time which an average worker will take for each job. This also takes into account the learning efficiency and learning effect.
- f. **Training and trial:** Workers are trained to do the work and time spent at the time of trial run is noted down.

PROCEDURE OF SETTING OVERHEADS TIME/ QUANTITY STANDARDS

Variable overhead time/ quantity is estimated based on specification made by the engineering departments. Variable overheads may either be based on direct material quantity or labour hour. Generally, it is based on labour time worked.

Fixed overhead time is based on budgeted production volume.

PROBLEMS FACED WHILE SETTING PHYSICAL STANDARDS

The problems involved while setting physical standards will vary from industry to industry and may be illustrated as under:

- a. A situation may arise where the company is introducing the manufacture of a new line of product. In such case, it may be necessary to employ workers who have no experience in the job. This creates a problem of setting standard time because it is necessary to make adjustment for the inexperience of workers.
- b. Changes in technology may necessitate installation of sophisticated machines. When such machines are installed, the precise estimation of output and standard of efficiency achievable will pose a problem until after a long time when the working conditions are settled. Thus, setting standards for these machines and estimating the standard costs will need considerable amount of work.
- c. Often manufacturers prefer to product diversification to improve profitability. One of the most important problems that arise with the proposed change in product is re-setting of production facilities. For example, when an old copper part is to be changed into one made of bronze to suit the new product, special care has to be taken to order new tools which in turn, pose the problem of setting up of standard time in respect of the new tools.

- d. Standards of material specifications are established and if the materials are not available as per specifications, the standards may not be achievable.
- e. Very often the cost accountant is confronted with the problem of choosing the type of standards to be adopted. For example, the industrial engineer has furnished the standard time for all direct labour operations as under:
 1. Standard time attainable by the best operations is 2 hours per unit of product including allowances for personal fatigue and delay.
 2. Attainable good performance for the average trained operator is 2.10 hours per unit of product.
 3. Average past performance is 2.60 hours per unit.

The problem is, should direct labour standard hour be based on maximum efficiency or attainable good performance or average past performance? If costs are to represent maximum efficiency, the unit cost used in selling price will relatively be low but a high debit variance may arise if the standard efficiency is not achieved.

If, however, the standard cost is based on attainable good performance, the variances may tend to be nil. If efficiency is to be gauged, maximum efficiency standard will reflect the off standard performance, thereby enabling the departmental head to exercise control.

Similar problems as those mentioned above, may also arise in setting of waste standards. For example, the question may arise as to whether only absolutely unavoidable wastage should be provided or the past average level of wastage may be provided. This will again have different impact on the standard cost of production.

Price or Rate Standards

Broadly, the price or rate standards can be set on either of the following bases:

- a. Actual average or mean price expected to prevail during the coming period, say one year; or
- b. Normal prices expected to prevail during a cycle of seasons which may be of a number of years.

PROCEDURES OF SETTING MATERIAL PRICE STANDARDS

Material prices are not altogether within the control of the manufacturer; but the purchasing department, on being apprised of production quantities required, should be able, from its knowledge of current market conditions and trends, to state with reasonable accuracy price for the constituent items. The standards for prices of materials should be based on the following factors, if price fluctuations are small and are not serious.

- a. Stock of materials on hand and the prices at which they are held;
- b. The prices at which orders for future deliveries of materials (agreement entered into) have already been placed,
- c. Minimum support price fixed by the appropriate authority and
- d. Anticipated fluctuation in price levels

In case there are unsystematic fluctuations in the market price, it may be difficult to determine standard costs of materials; fluctuations in the market price may be of different sorts; prices may be different from month to month, from one season to another or from one year to another. There may be a secular trend which, on the whole, is pushing price upwards or downwards. The nature of difficulties encountered in fixing standard costs of materials will naturally be different in each case. In addition, the purchasing policy of the company and the objective to be achieved (from cost accounting) will make a difference.

The difficulty in determining the standard cost of material in such a situation can be resolved as follows:

- a. In case prices fluctuate from month to month, the average of prices of a year corrected for the known secular changes and any other expected change can very well serve as the standard price for the next year.
- b. If the fluctuations are seasonal, but the whole year's requirements are purchased at one time, the weighted average of the likely prices to be paid should be treated as the standard price. But, if buying is also spread over the whole year, the weighted average of the prices for the whole year should be the standard price.
- c. If prices fluctuate from one year to another, a careful estimate of the price likely to prevail next year, based on a statistical study, should be adopted as the standard price.

PROCEDURES OF SETTING WAGE RATE STANDARD

The type of labour required for performing a specific job would be the most important factor for deciding the rate of wage to be paid to workers. Standard wage rate for skilled and unskilled workers are set based on the following basis:

- i. Time taken by the workers to complete a unit of production.
- ii. Time or piece rate prevailing in the industry. It can be known from the peers.
- iii. Wage agreement entered into between the management and workers' union.
- iv. Law prevailing in the area of operation, law like Payment of minimum wages Act, Payment of bonus Act etc.

PROCEDURES OF SETTING OVERHEAD EXPENSE STANDARDS

In computing the overhead expense standards, consideration should be given to the level of output and the budgeted expenses. A budgeted output is fixed considering practical manufacturing capacity and anticipated sales demand. Expenditures can be budgeted under different heads for the level of output chosen. These expenditures are classified as fixed and variable. Thus, the overhead expense standards are set by computing the optimum level of output for a production departments followed by budgets for fixed and variable overheads. If production is seasonal or it fluctuates during the year, a flexible budget may be prepared to facilitate comparison between the set target and actual expenditure for the period.

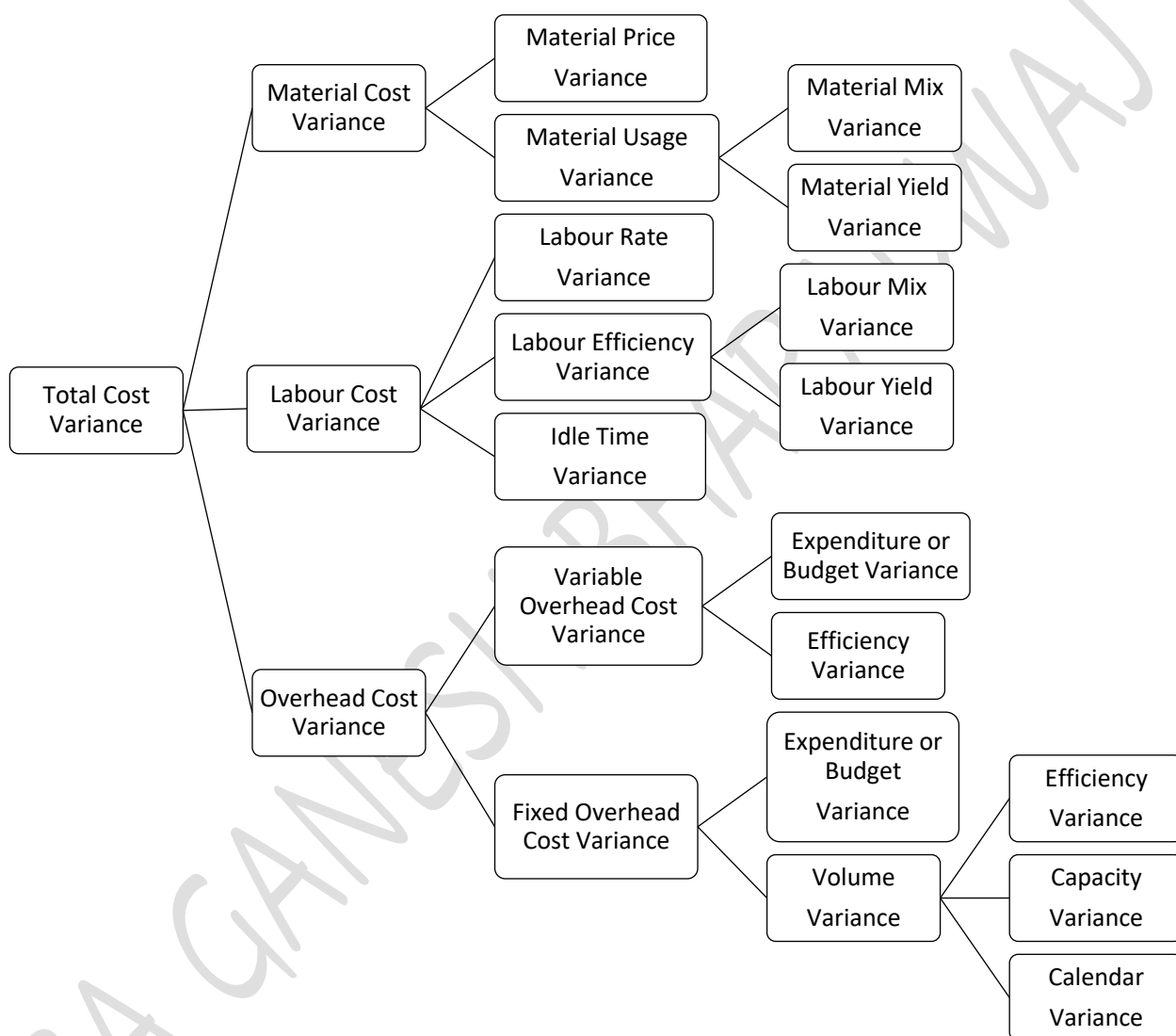
TYPES OF VARIANCES

Controllable and un-controllable variances: For effective cost control it is necessary to investigate into the reasons for cost variances and to take corrective actions. For this purpose variances are classified as controllable and uncontrollable variances. **Controllable variances are those which can be controlled under the normal operating conditions** if a responsibility centre takes preventive measures and acts prudently. **Uncontrollable variances are those which occurs due to conditions which are beyond the control** of a responsibility centre and cannot be controlled even though all preventive measures are in place. Responsibility centres are answerable for all adverse variances which could have been controlled. Controllability is a subjective matter and varies from situation to situation. If the uncontrollable variances are of significant nature and are persistent, the standard may need revision.

Favourable and Adverse variance: **Favourable variances are those which are profitable for the company and adverse variances are those which causes loss to the company.** While computing cost variances favourable variance means actual cost is less than standard cost. On the other hand, adverse variance means actual cost is exceeding standard cost. The situation will be reversed for sales variance. Favourable variances mean actual is more than budgeted and adverse when actual is less than budgeted. Favourable variance in short denoted by capital 'F' and adverse variances by capital 'A'. Students may note that signs of favourable and adverse variance may or may not match exactly with mathematical signs i.e. (+) or (-).

CLASSIFICATION OF VARIANCES

Variances are broadly classified into two parts namely Revenue variance and Cost variance. At Revenue side variances is calculated by comparing actual sales from budgeted (standard) sales. On the other hand, Cost side reflects variances in cost components. Cost variance classification is shown below with the help of a structured diagram.



COMPUTATION OF VARIANCES

As discussed earlier variances are classified into two parts. Here we will start from cost side and discuss all cost components one by one with the help of appropriate example and illustrations.

Material Cost Variance

Material cost variance is the **difference between standard cost of materials used and the actual cost of materials**. Mathematically it is written as.

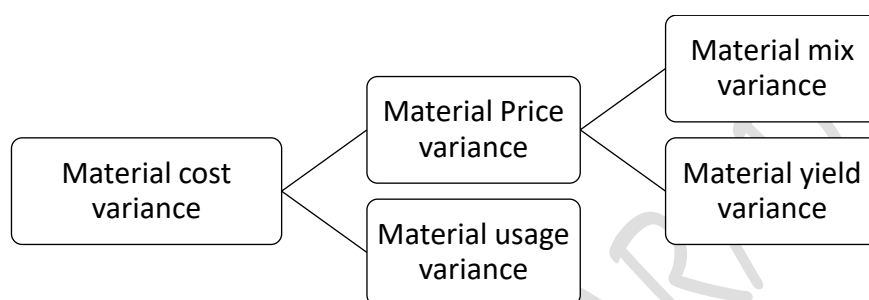
$$\text{Material Cost Variance} = [\text{Standard Cost} - \text{Actual Cost}]$$

Or

$$[(\text{Std. Quantity} \times \text{Std. Price}) - (\text{Actual Quantity} \times \text{Actual Price})]$$

(The difference between the **Standard Material Cost** of the actual production volume and the **Actual Cost of Material**)

Reasons for variance: Material cost variance arises mainly because of either difference in material price from the standard price or difference in material consumption from standard consumption or both the reasons. Analysis of material cost variance is done dividing it into two parts namely Material Price variance and Material Usage variance.



Material Price Variance

It measures variance arises in the material cost due to **difference in actual material purchase price from standard material price**. Mathematically it is written as:

$$\text{Material Price Variance} = [\text{Standard Cost of Actual Quantity}^* - \text{Actual Cost}]$$

Or

$$\text{Actual Quantity (AQ)} \times \{\text{Std. Price (SP)} - \text{Actual Price (A)}\}$$

Or

$$[(\text{SP} \times \text{AQ}) - (\text{AP} \times \text{AQ})]$$

(The difference between the **Standard Price** and **Actual Price** for the **Actual Quantity Purchased**)

*Here actual quantity means actual quantity of material **purchased**. If in the question material purchase is not given, it is taken as equal to material consumed.

Explanation: Material price variance can also be calculated taking material used as actual quantity instead of material purchased. This method is also correct but does not serve the purpose of variance computation. Material price variance may arise from variety of reasons out of which some may be controllable and some may be beyond the control of the purchase department. If price variance arises due to inefficiency of purchase department or any other reason within the control of the company, then it is very important to report variance as early as possible and this can be done by taking purchase quantity as actual quantity for price variance computation.

Responsibility for Material Price Variance: Generally, purchase department purchases materials from the market. Purchase department is expected to perform its function very prudently so that company never suffers loss due to its inefficiency. Purchase department is held responsible for adverse price variance arises due to the factors controllable by the department.

Material Usage Variance

It measures variance in material cost due to usage/ consumption of materials. It is computed as below:

$$\text{Material Usage Variance} = [\text{Standard Cost of Standard Quantity for Actual Production} - \text{Standard Cost of Actual Quantity*}]$$

Or

$$\text{Std. Price (SP)} \times \{\text{Std. Quantity (SQ)} - \text{Actual Quantity (AQ)}\}$$

Or

$$[(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{SP})]$$

(The difference between the **Standard Quantity** specified for actual production and the **Actual Quantity** used, at **Standard Price**)

*Here actual quantity means actual quantity of material used.

Responsibility for material usage variance: Material usage is the responsibility of production department and it is held responsible for adverse usage variance.

Reasons for variance: Actual material consumption may differ from the standard quantity either due to difference in proportion used from standard proportion or due to difference in actual yield from standard yield.

Material usage variance is divided into two parts (a) Material usage mix variance and (b) Material yield variance.

Material Mix Variance

Variance in material consumption may arise due to **difference in proportion actually used from the standard mix/ proportion**. It only arises when two or more inputs are used to produce a product. Mathematically,

$$\text{Material Mix Variance} = [\text{Standard Cost of Actual Quantity in Standard Proportion} - \text{Standard Cost of Actual Quantity}]$$

Or

$$\text{Std. Price (SP)} \times \{\text{Revised Std. Quantity (RSQ)} - \text{Actual Quantity (AQ)}\}$$

Or

$$[(\text{RSQ} \times \text{SP}) - (\text{AQ} \times \text{SP})]$$

(The difference between the **Actual Quantity in standard proportion** and **Actual Quantity in actual proportion**, at Standard Price)

Material Yield Variance (Material Sub-usage Variance)

Variance in material consumption which arises due to yield or productivity of the inputs. It may arise due to use of sub- standard quality of materials, inefficiency of workers or due to wrong processing.

Material Yield Variance = [Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity in standard proportion]

Or

$$\text{Std. Price (SP)} \times \{\text{Std. Quantity (SQ)} - \text{Revised Standard Quantity (RSQ)}\}$$

Or

$$[(\text{SQ} \times \text{SP}) - (\text{RSQ} \times \text{SP})]$$

(The difference between the **Standard Quantity specified for actual production** and **Actual Quantity in standard proportion**, at Standard Purchase Price)

Verification of the formulae:

Material Cost Variance = Material Usage Variance + Material Price Variance* Or, Material Cost Variance = (Material Mix Variance + Material Revised usage Variance) + Material price variance

*If material purchased quantity and material consumed quantity is same

Meaning of the terms used in the formulae:

Term	Meaning
Standard Quantity (SQ)	Quantity of inputs to be used to produce actual output .
Actual Quantity (AQ)	Quantity of inputs actually used to produce actual output .
Revised Standard Quantity (RSQ)	If Actual total quantity of inputs were used in standard proportion.

Labour Cost Variance

Amount paid to employees for their labour is generally known as employee or labour cost. In this chapter labour cost is used to denote employees cost. Labour (employee) cost variance is **the difference between actual labour cost and standard cost**. Mathematically it can be written as:

Labour Cost Variance = [Standard Cost – Actual Cost]

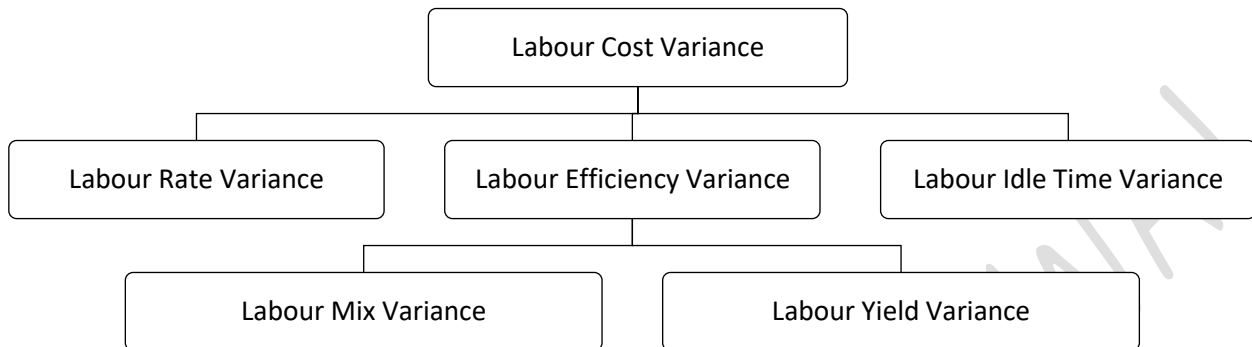
Or

$$[(\text{SH} \times \text{SR}) - (\text{AH}^* \times \text{AR})]$$

(The difference between the Standard Labour Cost and the Actual Labour Cost incurred for the production achieved)

* Actual hours paid.

Reasons for variance: Difference in labour cost arises either due to difference in the actual labour rate from the standard rate or difference in numbers of hours worked from standard hours. Labour cost variance can be divided into three parts namely (i) Labour Rate Variance (ii) Labour Efficiency Variance and (iii) Labour Idle time Variance.



Labour Rate Variance:

Labour rate variance arises due to **difference in actual rate paid from standard rate**. It is very similar to material price variance. It is calculated as below:

$$\text{Labour Rate Variance} = [\text{Standard Cost of Actual Time} - \text{Actual Cost}]$$

Or

$$\text{Actual Hours (AH*)} \times \{\text{Std. Rate (SR)} - \text{Actual Rate (AR)}\}$$

Or

$$[(\text{SR} \times \text{AH*}) - (\text{AR} \times \text{AH*})]$$

(The difference between the **Standard Rate** per hour and **Actual Rate** per hour for the **Actual Hours** paid)

* Actual hours paid.

Responsibility for labour rate variance: Generally labour rates are influenced by the external factors which are beyond the control of the organisation. However, personnel manager is responsible for labour rate negotiation.

Labour Efficiency Variance:

Labour efficiency variance arises due to deviation in the working hours from the standard working hours.

$$\text{Labour Efficiency Variance} = [\text{Standard Cost of Standard Time for Actual Production} - \text{Standard Cost of Actual Time}]$$

Or

$$\text{Std. Rate (SR)} \times \{\text{Std. Hours (SH)} - \text{Actual Hours (AH*)}\}$$

Or

$$[(SH \times SR) - (AH \times SR)]$$

(The difference between the **Standard Hours** specified for actual production and Actual Hours worked at Standard Rate).

Actual Hours worked

Responsibility for labour efficiency variance: Efficiency variance may arise due to ability of the workers, inappropriate team of workers, inefficiency of production manager or foreman etc. However, production manager or foreman can be held responsible for the adverse variance which otherwise can be controlled.

Labour efficiency variance is further divided into the following variances:

- a. Labour Mix Variance or Gang variance
- b. Labour Yield Variance (or Labour Revised-efficiency Variance)

Labour Mix Variance:

Labour efficiency variance which arises due to change in the mix or combination of different skill set i.e. number of skilled workers, semi-skilled workers and un-skilled workers. Mathematically,

Labour Mix Variance Or Gang Variance = [Standard Cost of Actual Time Worked in Standard Proportion – Standard Cost of Actual Time Worked]

Or

$$\text{Std. Rate (SR)} \times \{\text{Revised Std. Hours (RSH)} - \text{Actual Hours Worked (AH)}\}$$

Or

$$[(RSH \times SR) - (AH \times SR)]$$

(The difference between the **Actual Hours** worked in standard proportion and **Actual Hours** worked in actual proportion, at **Standard Rate**).

Actual Hours worked

Labour Yield Variance:

Labour efficiency variance which arises due to productivity of workers.

Labour Yield Variance Or Sub-Efficiency Variance = [Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time Worked in Standard Proportion]

Or

$$\text{Std. Rate (SR)} \times \{\text{Std. Hours (SH)} - \text{Revised Std. Hours (RSH)}\}$$

Or

$$[(SH \times SR) - (RSH \times SR)]$$

(The difference between the **Standard Hours** specified for actual production and **Actual Hours** worked in standard proportion, at Standard Rate).

Idle Time Variance:

It is calculated for the idle hours. It is difference between paid and worked hours. It is calculated as below:

$$\text{Labour Idle Time Variance} = [\text{Standard Rate per Hour} \times \text{Actual Idle Hours}]$$

Or

$$\text{Std. Rate (SR)} \{ \text{Actual Hours Paid} - \text{Actual Hours Worked} \}$$

Or

$$[(\text{AH} \times \text{SR}) - (\text{AH}\# \times \text{SR})]$$

(The difference between the **Actual Hours paid** and **Actual Hours worked** at Standard Rate)

* Actual hours paid; # Actual Hours worked

Verification of formulae:

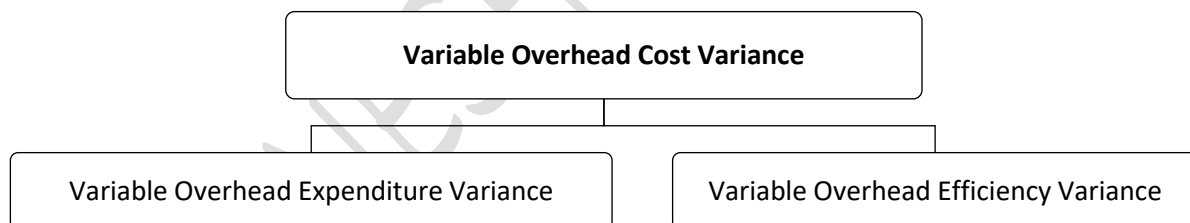
Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance (if hours paid and hours worked is same)

Or

Labour Cost Variance = Labour Rate Variance + Idle Time Variance + Labour Efficiency Variance

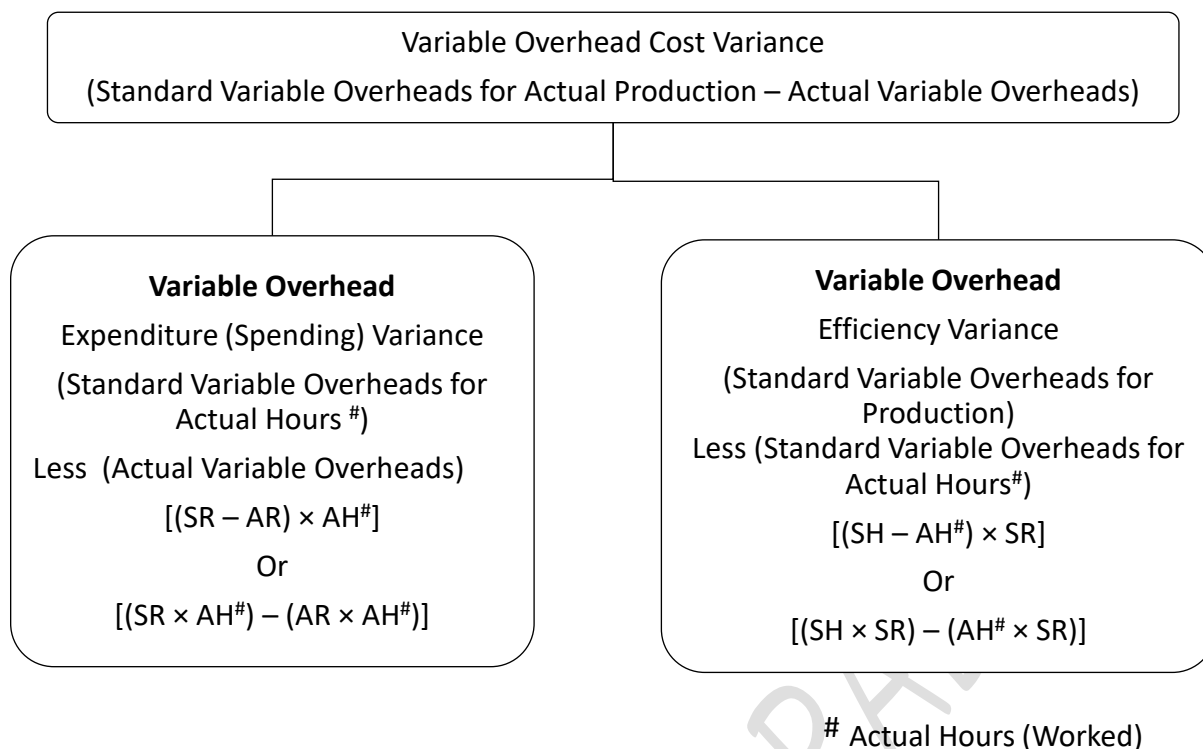
Or

Labour Efficiency Variance = Labour Mix Variance + Labour Yield Variance

Variable Overhead Cost Variance

Variable overheads consist of expenses other than direct material and direct labour which vary with the level of production. If variable overhead consist of indirect materials, then in this case it varies with the direct material used. On the other hand, if variable overhead is depending on number of hours worked then in this case it will vary with labour hour or machine hours. If nothing is mentioned specifically then we take labour hour as basis. Variable overhead cost variance calculation is similar to labour cost variance.

Variable overhead cost variance is divided into two parts (i) Variable Overhead Expenditure Variance and (ii) Variable Overhead Efficiency Variance.



Meaning of the terms used in the formulae:

Term	Meaning
Standard Hours (SH)	Hours required producing actual <u>output</u> .
Actual Hours (AH)	Actual Hours taken to produce actual <u>output</u> .
Revised Standard Hours (RSH)	If actual labour hours worked were worked by standard mix (combination) of labour.
Actual Yield (AY)	Actual Hours worked
Standard Yield (SY)	Actual hours if labour worked in standard ratio
Standard Labour Cost (SLC)	Standard labour cost for actual output

Fixed Overhead Cost Variance

The recovery of the fixed components of the estimated overheads depends upon capacity utilization. In case a company produces less than the projected utilization it shall not be able to recover all the budgeted fixed overheads. This unrecovered portion is known as production volume variance. The other variance is because of variations in actual spending when compared with both estimated fixed and estimated variable overheads. Such a variance is known as Overhead expenses variance. The following detailed discussion shall help you have a clear understanding of these two variances.

- 1. Production Volume Variance:** The term fixed overheads implies that the element of cost does not vary directly in proportion to the output. In other words, fixed overheads do not change within a given range of activity.

However, the unit cost changes even though the fixed overheads are constant in total within the given range of output. So, higher the level of activity, the lower will be the unit cost or vice versa. **The management is, therefore, faced with a costing difficulty because it requires a representative rate for charging fixed overheads irrespective of changes in volume of output.**

- 2. Overhead Expenses Variance:** As discussed above, the Production Volume Variance analyses the unrecovered fixed overheads. Apart from this, there can be variations in the actual spending of both fixed and variable overheads when compared to what was established as a standard. Such variations can be accounted for by analyzing an overhead expenses variance.

The analysis of overhead variances is different from that of material and labour variances. As overhead is the aggregate of indirect materials, indirect labour and indirect expenses, this variance is considered to be a difficult part of variance analysis. It is important to understand that overhead variance is nothing but under or over-absorption of overhead.

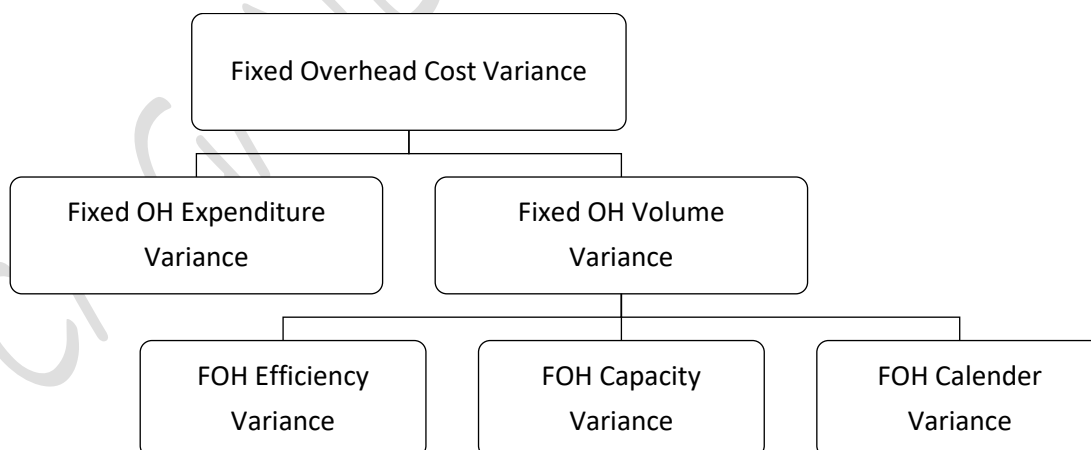
Fixed Overhead Cost Variance: Fixed overhead cost variance is the **difference between actual fixed overhead and absorbed fixed overhead**. Fixed overhead variance is divided into two parts (A) Fixed Overhead Expenditure Variance and (B) Fixed Overhead Volume Variance.

A. Fixed Overhead Expenditure Variance: This is the difference between the actual fixed overhead incurred and budgeted fixed overhead.

B. Fixed Overhead Volume Variance: Variance in fixed overhead which arises due to the volume of production is called fixed overhead volume variance.

Fixed overhead volume variance is further divided into the three variances:

- a. Efficiency Variance
- b. Capacity Variance and
- c. Calendar Variance



Mathematically these can be written as follows:

Fixed Overhead Cost Variance (Absorbed Fixed Overheads) Less (Actual Fixed Overheads) $(SH \times SR) - (AH \times AR)$

Fixed Overhead Expenditure Variance (Budgeted Fixed Overheads) Less (Actual Fixed Overheads) Or $(BH \times SR) - (AH \times AR)$		Fixed Overhead Volume Variance (Absorbed Fixed Overheads) Less (Budgeted Fixed Overheads) Or $(SH \times SR) - (BH \times SR)$	
Fixed Overhead Capacity Variance	Fixed Overhead Calendar Variance	Fixed Overhead Efficiency Variance	
$SR (AH - BH)$ Or $(AH \times SR) - (BH \times SR)$	Std. Fixed Overhead rate per day (Actual no. of Working days – Budgeted Working days)	$SR (SH - AH)$ Or $(SH \times SR) - (AH \times SR)$	

- a. **Fixed Overhead Efficiency Variance:** This is the difference between fixed overhead absorbed and standard fixed overhead.
- b. **Fixed Overhead Capacity Variance:** This is the difference between standard fixed overhead and budgeted overhead.
- c. **Fixed Overhead Calendar Variance:** This variance arises due to difference in number of actual working days and the standard working days.

Note: When calendar variance is computed, there will be a modification in the capacity variance. In that case revised capacity variance will be calculated and the formula is:

Revised Capacity Variance = (Actual hours – Revised budgeted hours) × Std. fixed rate per hour

Verification of formulae:

F.O. Cost Variance = F.O. Expenditure Variance + F.O. Volume Variance

F.O. Volume Variance = Efficiency Variance + Capacity Variance + Calendar Variance

Basic terms used in the computation of overhead variance

Standard overhead rate (per hour) = $\frac{\text{Budgeted Overhead}}{\text{Budgeted hours}}$

Or

Standard overhead rate (per unit) = $\frac{\text{Budgeted Overhead}}{\text{Budgeted output in units}}$

Note: Separate overhead rates will be computed for fixed and variable overheads.

Basic calculations before the computation of overhead variances:

The following basic calculation should be made before computing variances.

i. When overhead rate per hour is used:

a. Standard hours for actual output (SHAO)

$$\text{SHAO} = \frac{\text{BudgetedHours}}{\text{BudgetedOutput}} \times \text{ActualOutput}$$

b. Absorbed (or Recovered) overhead = Std. hours for actual output × Std. overhead rate per hour

c. Standard overhead = Actual hours × Std. overhead rate per hour

d. Budgeted overhead = Budgeted hours × Std. overhead rate per hour

e. Actual overhead = Actual hours × Actual overhead rate per hour

ii. When overhead rate per unit is used

a. Standard output for actual hours (SOAH)

$$\text{SOAH} = \frac{\text{BudgetedHours}}{\text{BudgetedOutput}} \times \text{ActualOutput}$$

b. Absorbed overhead = Actual output × Std. overhead rate per unit

c. Standard overhead = Std. output for actual time × Std. overheadrate per unit

d. Budgeted overhead = Budgeted output × Std. overhead rate per unit

e. Actual overhead = Actual output × Actual overhead rate per unit

f. Overhead cost variance = Absorbed overhead – Actual overhead

g. OCV = (Std. hours for actual output × Std. overheadrate) – Actual overhead

ADVANTAGES AND CRITICISM OF STANDARD COSTING**Advantages of Standard Costing**

Following are the advantages of standard costing.

- i. **It serves as a basis for measuring operating performance and cost control.** It is possible by setting standards, proper classification and determination of variances. It serves as a signal for prompt corrective action. It helps to report exceptional variances i.e. the only matters which are not proceeding according to plan are reported. This enables the managers to concentrate on essential matters only.
- ii. **It aids price fixing.** Standard costing can be used to predict costs. Although actual cost may vary from day to day, standard costs will remain stable over a period of time and, where demand for a product is elastic, this information can be used as a basis for fixing the selling price.
- iii. **Introduction of standard costing facilitates evaluation of jobs and introduction of incentives.** Job values can be determined by the use of evaluation and scale of wages fixed according to the

responsibility involved in each job.

- iv. Standard costing **facilitates the estimation of the cost of new products** with greater accuracy.
- v. It serves as a **basis for inventory valuation**. Standard costs are used for inventory valuation. A further advantage of this procedure is that material stock can be recorded in terms of quantities only.
- vi. Standard costing is also **used for the measurement of profit**. The question of correct approach of calculating profit is very much related to methods of stock valuation and absorption of fixed overheads. Standard costing eliminates any variations in profit due to changes in stock values from one period to another thus provides a basis for the measurement of profit.
- vii. Standard costing is **used in planning, budgeting and decision making**. Standard costs being the pre-determined costs, are particularly useful in planning and budgeting.
- viii. Standard costing is **used in standardisation of products, operations and processes**, it improves the overall production efficiency and reduces costs.
- ix. It provides objectives and targets to be achieved by each level of management and defines the responsibilities of departmental managers. Thus, the system **serves as an incentive to the departmental head to achieve the targets set by the company**.
- x. Standard costing sets a uniform basis for comparison of all elements of costs. Since care is taken in setting standards, the standards become unchanging units of comparison. The standard hour may be used as a basic unit to compare dissimilar products or processes.
- xi. The maximum use of working capital, plant facilities and current assets is assured because wastage of materials and loss due to idle time are closely controlled.

Criticism of Standard Costing

The following are some of the criticism which may be leveled against the standard costing system. The arguments have been suitably answered as stated against each by advocates of the standard costing and hence they do not invalidate the usefulness of the system to business enterprises.

- i. **Variation in price:** One of the chief problem faced in the operation of the standard costing system is the precise estimation of likely prices or rate to be paid. The variability of prices is so great that even actual prices are not necessarily adequately representative of cost. But the use of sophisticated forecasting techniques should be able to cover the price fluctuation to some extent. Besides this, the system provides for isolating uncontrollable variances arising from variations to be dealt with separately.
- ii. **Varying levels of output:** If the standard level of output set for pre-determination of standard costs is not achieved, the standard costs are said to be not realised. However, the statement that the capacity utilisation cannot be precisely estimated for absorption of overheads may be true only in some industries of jobbing type. In vast majority of industries, use of forecasting

techniques, market research, etc., help to estimate the output with reasonable accuracy and thus the variation is unlikely to be very large. Prime cost will not be affected by such variation and, moreover, variance analysis helps to measure the effects of idle time.

- iii. **Changing standard of technology:** In case of industries that have frequent technological changes affecting the conditions of production, standard costing may not be suitable. This criticism does not affect the system of standard costing. Cost reduction and cost control is a cardinal feature of standard costing because standards once set do not always remain stable. They have to be revised.
- iv. **Attitude of technical people:** Technical people are accustomed to think of standards as physical standards and, therefore, they will be misled by standard costs. Since technical people can be educated to adopt themselves to the system through orientation courses, it is not an insurmountable difficulty.
- v. **Mix of products:** Standard costing presupposes a pre-determined combination of products both in variety and quantity. The mixture of materials used to manufacture the products may vary in the long run but since standard costs are set normally for a short period, such changes can be taken care of by revision of standards.
- vi. **Level of Performance:** Standards may be either too strict or too liberal because they may be based on (a) theoretical maximum efficiency, (b) attainable good performance or (c) average past performance. To overcome this difficulty, the management should give thought to the selection of a suitable type of standard. The type of standard most effective in the control of costs is one which represents an attainable level of good performance.
- vii. **Standard costs cannot possibly reflect the true value in exchange.** If previous historical costs are amended roughly to arrive at estimates for ad hoc purposes, they are not standard costs in the strict sense of the term and hence they cannot also reflect true value in exchange. In arriving at standard costs, however, the economic and technical factors, internal and external, are brought together and analysed to arrive at quantities and prices which reflect optimum operations. The resulting costs, therefore, become realistic measures of the sacrifices involved.
- viii. **Fixation of standards may be costly:** It may require high order of skill and competency. Small concerns, therefore, feel difficulty in the operation of such system.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

Manufacturing Concern furnishes the following information:

Standard:	
Material for 70 kg finished products	100 kg
Price of material	₹ 1 per kg
Actual:	
Output	2,10,000 kg
Material used	2,80,000 kg
Cost of Materials	₹ 2,52,000

CALCULATE:

- Material usage variance
- Material price variance
- Material cost variance.

PROBLEM – 2

The standard cost of a chemical mixture is as follows:

40% material A at ₹ 20 per kg 60% material B at ₹ 30 per kg.

A standard loss of 10% of input is expected in production.

The cost records for a period showed the following usage:

90 kg material A at a cost of ₹ 18 per kg 110 kg material B at a cost of ₹ 34 per kg

The quantity produced was 182 kg of good product.

CALCULATE all material variances.

PROBLEM – 3

ABC Ltd. produces an article by lending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials:

Material	Standard mix	Standard price (Rs. per kg)
A	40%	4
B	60%	3

The standard loss in processing is 15%. During April, the company produced 1,700 kgs. of finished output. The position of stock and purchases for the month of April are as under:

Material	Stock on 01.04.20x1	Stock on 30.04.20x1	Purchased during April 2021	
	(Kg.)	(Kg.)	(Kg.)	(Rs.)
A	35	5	800	3,400
B	40	50	1,200	3,000

Opening stock of material is valued at standard price. CALCULATE the following variances:

- Material price variance
- Material usage variance
- Material yield variance
Material mix variance
- Total Material cost variance

PROBLEM – 4

The standard and actual figures of a firm are as under:

Standard time for the job	1,000 hours
Standard rate per hour	₹ 50
Actual time taken	900 hours
Actual wages paid	₹ 36,000

CALCULATE variances.

PROBLEM – 5

The standard output of product 'EXE' is 25 units per hour in manufacturing department of a company employing 100 workers. The standard wage rate per labour hour is Rs.6.

In a 42 hours week, the department produced 1,040 units of 'EXE' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were Rs.6.20, Rs.6 and Rs.5.70 respectively to 10, 30 and 60 of the workers.

CALCULATE relevant labour variances.

PROBLEM – 6

Labour type	Std hrs per unit	Std rate	Act hrs	Act rate
Un Skilled	2 hrs	₹ 10	22,000 hrs	₹ 11
Skilled	1 hr	₹ 20	8,000 hrs	₹ 22

Workers produced 11000 units. Find out Labour variances.

PROBLEM – 7

NPX Ltd. uses standard costing system for the manufacturing of its product X. The following is the budget data given in relation to labour hours for the manufacture of 1 unit of Product X:

Labour	Hours	Rate
Skilled	2	₹ 6
Semi-Skilled	3	₹ 4
Un- Skilled	5	₹ 3
Total	10	

In the month of January, 20x1, a total of 10,000 units were produced following are the details:

Labour	Hours	Rate	Amount
Skilled	18,000	₹ 7	₹ 1,26,000
Semi-Skilled	33,000	₹ 3.5	₹ 1,15,500
Un-Skilled	58,000	₹ 4	₹ 2,32,000
Total	1,09,000		₹ 4,73,500

Actual Idle hours (abnormal) during the month:

Skilled	500
Semi- Skilled	700
Unskilled	800
Total	2,000

CALCULATE:

1. Labour Variances.
2. Also, show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ ₹ 5.5 per hour and balance were paid @ ₹ 7 per hour.

PROBLEM – 8

The following standards have been set to manufacture a product:

Direct Material:	(Rs.)
2 units of A @ Rs.4 per unit	8.00
3 units of B @ Rs.3 per unit	9.00
15 units of C @ Rs.1 per unit	<u>15.00</u>
	32.00
Direct Labour: 3 hours @ Rs.8 per hour	<u>24.00</u>
Total standard prime cost	<u>56.00</u>

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:

12,500 units of A at Rs.4.40 per unit 18,000 units of B at Rs.2.80 per unit 88,500 units of C at Rs.1.20 per unit.

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at Rs.12 per hour while for the remaining, the wages were paid at standard rate.

CALCULATE

- i. Materials price variance & Usage variance
- ii. Labour rate & Efficiency variances.

PROBLEM – 9

From the following information of G Ltd.,

CALCULATE

- i. Variable Overhead Cost Variance;
- ii. Variable Overhead Expenditure Variance and
- iii. Variable Overhead Efficiency Variance:

Budgeted production	6,000 units
Budgeted variable overhead	₹ 1,20,000
Standard time for one unit of output	2 hours
Actual production	5,900 units
Actual overhead incurred	₹ 1,22,000
Actual hours worked	11,600 hours

PROBLEM – 10

The cost detail of J&G Ltd. for the month of September, 20x1 is as follows:

Particulars	Budgeted	Actual
Fixed overhead	₹ 15,00,000	₹ 15,60,000
Units of production	7,500	7,800
Standard time for one unit	2 hours	-
Actual hours worked	-	16,000 hours

Required:

CALCULATE

- i. Fixed Overhead Cost Variance
- ii. Fixed Overhead Expenditure Variance
- iii. Fixed Overhead Volume Variance

- iv. Fixed Overhead Efficiency Variance and
- v. Fixed Overhead Capacity Variance.

PROBLEM – 11

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budgeted at Rs.1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

In April 2021, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were Rs.1,42,000.

COMPUTE the following Fixed Overhead variance:

1. Efficiency variance
2. Capacity variance
3. Calendar variance
4. Expenditure variance
5. Volume variance
6. Total Fixed overhead variance

PROBLEM – 12

A Manufacturing Concern has provided the following information related to Fixed Overheads:-

Particulars	Standard	Actual
Output in a month	5,000 units	4,800 units
Working Days in a month	25 days	23 days
Fixed Overheads (FOH)	₹ 5,00,000	₹ 4,90,000

Compute: (a) FOH Variance, (b) FOH Expenditure Variance, (c) FOH Volume Variance, (d) FOH Efficiency Variance.

PROBLEM – 13

The following information was obtained from the records of a manufacturing unit using standard costing system.

Particulars	Standard	Actual
Production	4,000 units	3,800 units
Working days	20	21
Machine hours	8,000 hours	7,800 hours
Fixed Overhead	₹ 4,00,000	₹ 3,90,000
Variable Overhead	₹ 1,20,000	₹ 1,20,000

You are required to CALCULATE the following overhead variances:

- a) Variable overhead variances
- b) Fixed overhead variances

PROBLEM – 14

The overhead expense budget for a factory producing to a capacity of 200 units per month is as follows:

Description of overhead	Fixed cost per unit in Rs.	Variable cost per unit in Rs.	Total cost per unit in Rs.
Power and fuel	1,000	500	1,500
Repair and maintenance	500	250	750
Printing and stationary	500	250	750
Other overheads	1,000	500	1,500
	Rs.3,000	Rs.1,500	4,500

The factory has actually produced only 100 units in a particular month. Details of overheads actually incurred have been provided by the accounts department and areas follows:

Description of overhead	Actual cost
Power and fuel	Rs.4,00,000
Repair and maintenance	Rs.2,00,000
Printing and stationary	Rs.1,75,000
Other overheads	Rs.3,75,000

You are required to CALCULATE the Overhead volume variance and the overhead expense variances.

PROBLEM – 15

GAP Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. Following are the details.

Budgeted data:

Material	Qty	Price	(Rs.)	Amount (Rs.)
A	60	20		1200
B	<u>40</u>	30		<u>1200</u>
Inputs	100			2400
Normal loss	<u>20</u>			
Output	<u>80</u>			<u>2400</u>
Actual data:				
Actual output	80 units.			

Material	Qty	Price	(Rs.)	Amount (Rs.)
A	70	?		?
B	?	30		?

Material Price Variance (A) Rs.105 A Material cost variance Rs.275A

You are required to CALCULATE:

- Actual Price of material A
- Actual Quantity of material B
- Material Price Variance
- Material Usage Variance
- Material Mix Variance
- Material Sub Usage Variance

PROBLEM – 16

Following data is extracted from the books of XYZ Ltd. for the month of January:

Estimation

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	800	?	--
Material-B	600	30.00	18,000
			--

Normal loss was expected to be 10% of total input materials.

Actuals- 1480 kg of output produced.

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

Other Information-

Material Cost Variance = Rs.3,625 (F) Material Price Variance = Rs.175 (F)

You are required to CALCULATE:

- Standard Price of Material-A;
- Actual Quantity of Material-B;
- Actual Price of Material-A;
- Revised standard quantity of Material-A and Material-B; and
- Material Mix Variance.

PROBLEM – 17

Paras Synthetics uses Standard costing system in the manufacturing of its product 'Star 95 Mask'.

The details are as follows;

Particulars	Amt
Direct Material 0.50 Meter @ ₹ 60 per meter	₹ 30
Direct Labour 1 hour @ ₹ 20 per hour	₹ 20
Variable overhead 1 hour @ ₹ 10 per hour	₹ 10
Total	₹ 60

During the month of August, 20x1 10,000 units of 'Star 95 Mask' were manufactured.

Details are as follows:

Direct material consumed 5700 meters @ ₹ 58 per meter

Direct labour Hours ? @ ? ₹ 2,24,400

Variable overhead incurred ₹ 1,12,200

Variable overhead efficiency variance is 2,000 A. Variable overheads are based on Direct Labour Hours.

You are required to calculate the missing data and all the relevant Variances.

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 1)**

The standard and actual figures of product 'Z' are as under:

Standard Actual

Material quantity 50 units 45 units

Material price per unit Rs.1.00 Rs.0.80

CALCULATE material cost variances.

QFP 2 (Concept Similar to Problem – 2)

For making 10 kg. of CEMCO, the standard material requirements is:

Material	Quantity	Rate per kg. (Rs.)
A	8 kg	6
B	4 kg	4

During April, 1,000 kg of CEMCO were produced. The actual consumption of materials is as under:

Material	Quantity (Kg.)	Rate per kg. (Rs.)
A	750	7
B	500	5

CALCULATE (A) Material Cost Variance; (b) Material Price Variance; (c) Material usage Variance.

QFP 3 (Concept Similar to Problem – 2)

The standard mix to produce one unit of a product is as follows:

Material X	60 units @ Rs.15 per unit	900
Material Y	80 units @ Rs.20 per unit	1,600
Material Z	<u>100 units</u> @ Rs.25 per unit	<u>2,500</u>
	<u>240 units</u>	<u>5,000</u>

During the month of April, 10 units were actually produced and consumption was as follows:

Material X	640 units @ Rs.17.50 per unit	11,200
Material Y	950 units @ Rs.18.00 per unit	17,100
Material Z	<u>870 units</u> @ Rs.27.50 per unit	<u>23,925</u>
	<u>2,460 units</u>	<u>52,225</u>

CALCULATE all material variances.

QFP 4 (Concept Similar to Problem – 2)

J.K. Ltd. manufactures NXE by mixing three raw materials. For every batch of 100 kg. of NXE, 125 kg. of raw materials are used. In the month of April, 60 batches were prepared to produce an output of 5,600 kg. of NXE. The standard and actual particulars for the month of April, are as follows:

Raw Materials	Standard		Actual		Quantity of Raw Materials Purchased (Kg.)
	Mix	Price per kg.	Mix	Price per Kg.	
	(%)	(Rs.)	(%)	(Rs.)	
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1,200

You are required to CALCULATE:

- i. Material Price variance
- ii. Material Usage Variance

QFP 5 (Concept Similar to Problem – 6)

The standard labour employment and the actual labour engaged in a week for a job are as under:

	Skilled workers	Semi-skilled workers	Unskilled workers
Standard no. of workers in the gang	32	12	6
Actual no. of workers employed	28	18	4
Standard wage rate per hour	3	2	1
Actual wage rate per hour	4	3	2

During the 40 hours working week, the gang produced 1,800 standard labour hours of work.

CALCULATE:

- i. Labour Cost Variance
- ii. Labour Rate Variance
- iii. Labour Mix Variance
- iv. Labour Efficiency Variance
- v. Labour Yield Variance

QFP 6 (Concept Similar to Problem – 8)

The following information is available from the cost records of Novell & Co. for the month of March 20x1:

Materials purchased	20,000 units @ Rs.88,000
Materials consumed	19,000 units
Actual wages paid for 4,950 hrs.	Rs.24,750
Units produced	1,800 units
Standard rates and pieces are:	
Direct material	Rs.4 per unit
Standard output	10 number for one unit
Direct labour rate	Rs.4.00 per hour
Standard requirement	2.5 hours per unit

You are required to CALCULATE relevant material and labour variance for the month.

QFP 7 (Concept Similar to Problem – 9)

The following data for Pijee Ltd. is given:

	Budget	Actual
Production (in units)	400	360
Man hours to produce above	8,000	7,000
Variable overheads (in Rs.)	10,000	9,150

CALCULATE relevant Variable overhead variances.

QFP 8 (Concept Similar to Problem – 10)

Following information is available from the records of a factory:

	Budget	Actual
Fixed overhead for the month of June	Rs.10,000	Rs.12,000
Production in June (units)	2,000	2,100
Standard time per unit (hours)	10	–
Actual hours worked in June	–	21,000

CALCULATE:

- Fixed overhead cost variance,

- ii. Expenditure variance,
- iii. Volume variance.

QFP 9 (Concept Similar to Problem – 10)

S.V. Ltd. has furnished the following data:

	Budget	Actual (for the month of July)
No. of working days	25	27
Production in units	20,000	22,000
Fixed overheads	Rs.30,000	Rs.31,000

Budgeted fixed overhead rate is Rs.1.00 per hour. In July, the actual hours worked were 31,500.

CALCULATE the following variances:

- i. Expenditure variance.
- ii. Volume variance.
- iii. Total overhead variance.

QFP 10 (Concept Similar to Problem – 11)

The following data has been collected from the cost records of a unit for computing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budgeted man-hours per day	6,000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	Rs.1,50,000
Actual number of working days	27
Actual man-hours per day	6,300
Actual output per man-hour (in-units)	0.9
Actual fixed overhead incurred	Rs.1,56,000

CALCULATE fixed overhead variances:

- i. Expenditure Variance
- ii. Volume Variance,
- iii. Fixed Cost Variance.

QFP 11 (Concept Similar to Problem – 13)

XYZ Ltd. has furnished you the following information for the month of August:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed overhead	Rs.45,000	50,000
Variable overhead	Rs.60,000	68,000
Working days	25	26

CALCULATE overhead variances.

QFP 12 (Concept Similar to Problem – 14)

XYZ Company has established the following standards for factory overheads.

Variable overhead per unit:	Rs.10/-
Fixed overheads per month	Rs.1,00,000

Capacity of the plant 20,000 units per month. The actual data for the month are as follows:

Actual overheads incurred	Rs.3,00,000
Actual output (units)	15,000 units

Required:

CALCULATE overhead variances viz:

- Production volume variance
- Overhead expense variance

QFP 13 (Concept Similar to Problem – 15)

One kilogram of product K requires two chemicals A and B. The following were the details of product K for the month of June 20x3:

- Standard mix for chemical A is 50% and chemical B is 50%.
- Standard price kilogram of chemical A is Rs.12 and chemical B is Rs.15.
- Actual input of chemical B is 70 kilograms.
- Actual price per kilogram of chemical A is Rs.15
- Standard normal loss is 10% of total input
- Total Material cost variance is Rs.650 adverse.
- Total Material yield variance is Rs.135 adverse.

You are required to CALCULATE:

- Total Material mix variance

- ii. Total Material usage variance
- iii. Total Material price variance
- iv. Actual loss of actual input
- v. Actual input of chemical A
- vi. Actual price per kg. of chemical B

CHAPTER 14: BUDGET AND BUDGETARY

CONTROL

INTRODUCTION

An organization has its long-term objectives to achieve. The objectives are broken down into achievable goals and targets. When these goals and targets are translated into business plans, it is necessary to express the plans into quantifiable terms to make it achievable. Budget is a commonly used business language that expresses the business plans in quantifiable terms. When the targets are monitored and compared with the actual results with the objective to narrow down the deviations, make participants responsible and implement the preventive and corrective actions, is known as budgetary control.

Meaning of Budget and Budgeting

Budget: A budget is an instrument of management used as an aid in the planning, programming and control of business activity. The Chartered Institute of Management Accountants (CIMA), UK defines budget as “A financial and/or quantitative statement, prepared and approved prior to a defined period of time of the policy to be pursued during that period for the purpose of attaining a given objective. It may include income, expenditure and employment of capital” The budget is a blue-print of the projected plan of action expressed in quantitative terms for a specified period of time.

Budget and Forecast There is some similarity between the budget and forecast as both relate to a defined period of time. A forecast is an assessment of probable future events. Budget is a financial/quantitative plan of a business enterprise to be pursued over a period of time. Therefore, at the planning stage it is necessary to forecast a probable course of action for the business. Budget is a commitment or a target which the management seeks to attain on the basis of the forecasts made. Forecasts are made regarding sales, production cost and financial requirements of the business. A forecast denotes some degree of flexibility while a budget denotes a definite target.

Budgeting: Budgeting is the process of designing, implementing and operating of budget. The main emphasis in budgeting process is the provision of resources to support plans which are being implemented. It is a means of coordinating the combined intelligence of an entire organisation into a plan of action based on past performance and governed by rational judgment of factors that will influence the course of business in the future.

ESSENTIAL CHARACTERISTICS OF BUDGET

The main characteristics of budget are as follows:

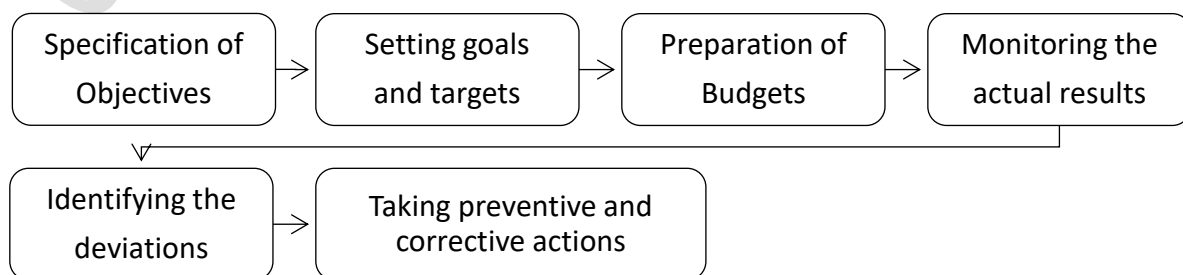
1. A budget is concerned for a definite future period.

2. A budget is a written document.
3. A budget is a detailed plan of all the economic activities of a business.
4. All the departments of a business unit should co-operate for the preparation of a business budget.
5. Budget is a means to achieve business objectives and it is not an end in itself.
6. Budget needs to be updated, corrected and controlled every time circumstances change. Therefore, it is a continuous process.
7. Budget helps in planning, coordination and control.
8. Different types of budgets are prepared by industries according to business requirements.
9. A budget acts as a business barometer.
10. Budget is usually prepared in the light of past experiences.
11. Budget is a constant endeavor of the Management.

ESSENTIAL STEPS FOR PREPARING BUDGET

Essential steps for preparing a budget are as follows:

1. Organizational structure must be clearly defined and responsibility should be assigned to identifiable units within the organization.
2. Setting of clear objectives and reasonable targets. Objectives should be in consonance with the long-term plan of the organization.
3. Objectives and responsibility should be clearly stated and communicated to the management or person responsible.
4. Budgets are prepared for the future periods based on expected course of actions.
5. Budgets are updated for the events that were not kept into the mind while establishing budgets. Hence, budgets should be flexible enough for mid-term revision.
6. The entire organization must be committed to the preparation and implementing budgeting.
7. Budgets should be quantifiable and master budget should be broken down into various functional budgets.
8. Budgets should be monitored periodically. Variances of the actual outcomes should be compared with the actuals and variances analyzed and responsibility should be fixed.
9. Budgetary performance needs to be linked effectively to the reward system.



OBJECTIVES OF BUDGETING**Planning**

Planning is the beginning of any activity. Planning establishes the objectives of the firm and decides the course of action to achieve it. It is concerned with formulating short-term and long-term plans to achieve a particular end. Planning is a statement of what should be done, how it should be done and when it should be done. The process of preparing budget begins with the establishment of specific targets of performance and is followed by devising plans to achieve such desired goals. These targets include both the overall business targets as well as the specific targets for the individual units within the business. Establishing specific targets for future operations is part of the planning function of management, while executing actions to meet the goals is the directing function of management. It may be explained as

- Budget is prepared in synchronization with the overall objectives of the organization, keeping mission and corporate strategy into account. Individual plans at unit level should be in consonance with organizational plan.
- Budget reflects plans. Therefore, planning should precede the preparation of budget.
- Budgeted plans are quantified and responsibility is assigned to the persons who are responsible for execution of plan.
- Communication of business objectives through budget has helped many a company to reduce expenses during business recession.
- Planning not only motivates employees to attain goals but also improves overall decision making. During the planning phase of the budget process, all viewpoints are considered, options identified, and cost reduction opportunities assessed. This process may reveal opportunities or threats that were not known prior to the budget planning process.

Directing and Coordinating

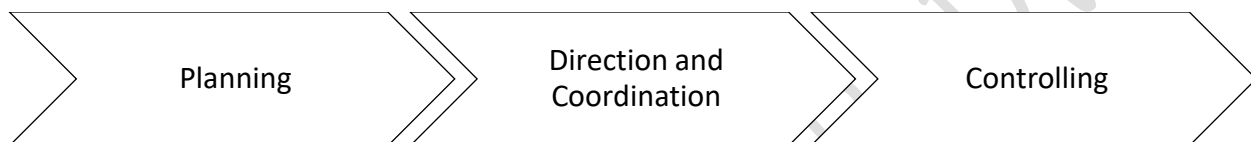
- Once the budget plans are in place, these can be used to direct and coordinate operations in order to achieve the stated targets.
- A business, however, is much more complex and requires more formal direction and coordination.
- The budget offers an important tool to direct and coordinate business activities and units to achieve stated targets of performance.
- The budgetary units in an organisation are called responsibility centre. Each responsibility center is led by a manager who has the authority over and responsibility for the unit's performance.
- Objectives of each responsibility centre and degree of performance expected from them are separately communicated.

Controlling

- Control is the process of monitoring, measuring, evaluating and correcting actual results to ensure that a firm's goals and plans are achieved. Control is achieved through the process of feedback.

- As time passes, **the actual performance of an operation can be compared against the planned targets. This provides prompt feedback to employees about their performance.** If necessary, employees can use such feedback to fine-tune their activities in the future.
- Feedback received in the form of budget report from the responsibility centre is helpful to know the performance of the concerned unit.
- Any unforeseen changes into the conditions which were prevailing at the time of preparing budget are taken into account and budgets are revised to show true performance.
- Comparing actual results to the plan helps prevent unplanned expenditures. The budget helps employees to regulate their spending priorities.

The main objective of Budgeting is to help in achieving the overall objective of the organization.



BUDGETARY CONTROL

CIMA has defined the terms 'budgetary control' as the establishment of budgets relating to the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action, the objective of that policy or to provide a basis for its revision. It is the system of management control and accounting in which all the operations are forecasted and planned in advance to the extent possible and the actual results compared with the forecasted and planned results.

Budgetary Control Involves

1. Establishment of budgets
2. Continuous comparison of actuals with budgets for achievement of targets.
3. Revision of budgets after considering the changes in the circumstances.
4. Fixation of the responsibility for failure to achieve the budget targets.

Objectives Of Budgetary Control System

1. **Portraying with precision the overall aims of the business** and determining targets of performance for each section or department of the business.
2. **Laying down the responsibilities** of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged. Budgetary control is one of the few ways in which an objective assessment of executives or department is possible.
3. **Providing a basis for the comparison** of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures.

This naturally helps in adopting corrective measures.

4. **Ensuring optimum use of available resources** to maximise profit or production, subject to the limiting factor. Since budgets cannot be properly drawn up without considering all aspects, usually there is good co-ordination when a system of budgetary control operates.
5. **Co-ordinating various activities** of the business, and centralising control and yet enabling management to decentralise responsibility and delegate authority in the overall interest of the business.
6. **Engendering a spirit of careful forethought**, assessment of what is possible and an attempt at it. It leads to dynamism without being reckless. Of course, much depends on the objectives of the firm and the dynamism of its management.
7. **Providing a basis for revision** of current and future policies.
8. **Drawing up long range plans** with a fair measure of accuracy.
9. **Providing a yardstick** against which actual results can be compared.

Steps for establishing Budgetary Control

The following steps are necessary for establishing a good budgetary control system:

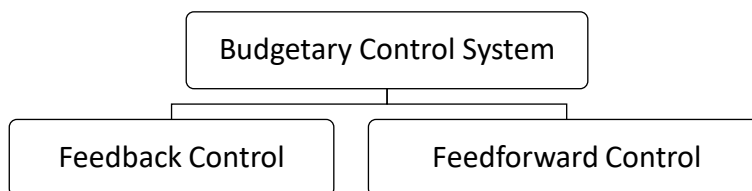
1. **Determining the objectives to be achieved**, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. **Determining the activities that should be undertaken** for the achievement of the objectives.
3. **Drawing up a plan or a scheme** of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. **Laying out a system of comparison** of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. **Ensuring that corrective action will be taken** where the plan has not been achieved and, if that is not possible, for the revision of the plan.

In brief, it is a system to assist management in the allocation of responsibility and authority, to provide it with aid for making, estimating and planning for the future and to facilitate the analysis of the variation between estimated and actual performance.

In order to ensure effective functioning of budgetary control, it is necessary that the firm should develop a proper basis of measurement or standards with which to evaluate the efficiency of operations, i.e., the firm should have in operation, a system of standard costing.

The organisation should be so integrated that all lines of authority and responsibility are properly defined. This is essential since the system of budgetary control postulates separation of functions and division of responsibilities and thus requires that the organisation shall be planned in such a manner that everyone, from the Managing Director down to the Shop Foreman, will have his duties properly defined.

Feedback and Feed forward Control



Feedback Control: The feedback system of budgetary control, the actual results for the budgeted period are collected and compared with the budgeted figures. The exercise of variance identification is done after the completion of the budget period. The variances are reported and based on the report corrective actions are taken, responsibility is fixed and based on experience, modification in future targets is implemented. As the name suggests, it is an Ex-post Corrective control system of budget. This system of budgetary control is common in organizations where Management Information System (MIS) is not so robust and where data is obtained only after the finalization of books of account. Though this type of control system is less expensive to maintain but has limitations. Organization has to remain on looser side in today's age of data warfare.

Feedforward Control: This is the opposite of feedback control system of budgetary control. It is Ex-Ante Preventive control mechanism of budgetary control. The budgets are set at the inception of the budgeted period and the actual results are continuously monitored and compared. The targets are kept realistic as far as possible and the targets are reviewed and reset if necessary. This budgetary control system requires a robust MIS supported by integrated ERP system enabling an entity to get data as and when desired basis. This system is very expensive and beneficial for the organisations where the business environment is dynamic and information has important role in getting edge in competition and today's data warfare.

Budget Committee and Budget Officer

The budget committee is a group of representatives of various functions in an organisation. As all functions are inter-related and as any change in one's target will have its impact on that of the other, it is necessary to discuss the targets so that a mutually agreed programme is finally decided. This is called coordination in budget-making. It is a powerful force in knitting together various activities of the business and enforcing real control over operations.

The Chief Executive is ultimately responsible for the budget programme but it will be better if the large part of the supervisory responsibility is delegated to an official designated as Budget Officer. The budget Officer should have knowledge of the technical side of the business and should report to the president or CEO of the business entity.

The responsibility for successfully introducing and implementing Budgetary Control System rests with the Budget Committee acting through the Budget Officer. The Budget Committee would be composed of all functional heads and a member from the Board to preside over and guide the deliberations.

The main responsibilities of the Budget Committee/Budget Officer are to:

- 1. Assist in the preparation of the separate budget for various departments** by coordinating the work of the accounts department, which is normally responsible to compile the budgets—with the relevant functional departments like Sales, Production, Plant maintenance etc.;
- 2. Forward the budget to the individual departments heads who are responsible** to implement the budget. The Budget Officer should guide them in overcoming any practical difficulties, in its working;
- 3. Prepare the periodical budget reports** for circulation to the individuals concerned;
- 4. Follow-up action** to be taken on the budget reports;
- 5. Prepare an overall budget working report** for discussion at the Budget Committee meetings and to ensure follow-up on the lines of action suggested by the Committee;
- 6. Prepare periodical reports** for the Board meeting. Comparing budgeted Profit and Loss Account and the Balance Sheet with the actual results attained.

It is necessary that every budget should be thoroughly discussed with the functional heads before it is finalized.

It is the duty of the Budget Officer to see that the periodical budget reports are supplied to the recipients at regular intervals so as to enable them to take remedial action.

The efficiency of the Budget Officer, and through him of the Budget Committee, will be judged more by the smooth working of the system and the agreement between the actual figures and the budgeted figures.

Budgets provides basis for giving an incentive for better performance; It is up to the Budget Officer to see that attention of the different functional heads is drawn to the deviations so as to face the challenge in a successful manner.

Advantages of Budgetary Control System

Points	Description
1. Efficiency	The use of budgetary control system enables the management of a business entity to conduct its business activities in an efficient manner.
2. Control on expenditure	It is a powerful instrument used by business entity for the control of their expenditure. It provides a yardstick for measuring and evaluating the performance of individuals and their departments.
3. Finding deviations	Budget reveals the deviations of the actual from the budgeted figures after making a comparison and communicating the deviation to management.

4. Effective utilization of resources	Effective utilization of various resources like— men, material, machinery and money—is made possible, as the production is planned after taking these into account.
5. Revision of plans	Budget helps in the review of current trends and framing of future policies.
6. Implementation of Standard Costing system	Budget creates suitable conditions for the implementation of standard costing system in a business organization.
7. Cost Consciousness	Budgetary control system encourages cost consciousness and maximum utilization of available resources.
8. Credit Rating	Management which has developed a well-ordered budget plans and which operate accordingly, receive greater favor from credit agencies.

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralized organization, each unit has its own objective and these units enjoy some degree of discretion. In this type of organization structure, coordination among different units is required. The success of the budgetary control depends upon willing co- operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organization structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.

5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organization is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Components of Budgetary Control System

- 1. Physical budgets:** Those budgets which contain information in quantitative terms such as the physical units of sales, production etc. This may include quantity of sales, quantity of production, inventories, and manpower budgets are physical budgets.
- 2. Cost budgets:** Budgets which provides cost information in respect of manufacturing, administration, selling and distribution, etc. for example, manufacturing costs, selling costs, administration cost, and research and development cost budgets are cost budgets.
- 3. Profit budgets:** A budget which enables the ascertainment of profit. For example, sales budget, profit and loss budget, etc.
- 4. Financial budgets:** A budget which facilitates in ascertaining the financial position of a concern, for example, cash budgets, capital expenditure budget, budgeted balance sheet etc.

BUDGETS AND MOTIVATION

When pursuing some target, the end result of achieving the goal should be motivating one. Motivation is a factor which works like fuel to get hope lighted and ignites the aspirations. Therefore, motivation is the driving force which converts the efforts into results and thus the long-term objectives of the any person whether it would be an individual or a corporate.

The same principle of motivation also applies to a business entity to achieve its objectives in the course of pursuing its mission. Budget is a planning exercise which quantifies the desired results into targets. The budget targets are communicated to the executives at different levels and they are asked to strive to get the targets achieved. But the whole exercise is not so simple as it seems in script, implementation in practicality has bumpy rides. The behavioral aspect of human being comes into character, and it is not so difficult to guess why an executive put his/ her best efforts to achieve the communicated targets. There must be something motivating in achieving the targets, therefore, a budgeting process should have the following consideration to make it motivating one:

Performance measurement: The budget, at first be communicated to all executives so that everybody must be informed the desired performance expected from each of them. Secondly, the achievement of targets should have consideration in measurement and evaluation of performance an executive at individual level and at departmental level. Rewards such as promotion, increment, Performance related pay (Pay), bonus may be appropriate motivation factors.

Achievable Targets: While setting targets, the practical aspects such as availability of resources and realism of figures must be considered. The targets should be balance one, it neither be very easy nor too tough, means it should be realistic one. An unrealistic target has reverse impact and may be demotivate the executives.

Optimum utilization of resources: A budget targets which is easily achievable may under utilize the resources such as potential skills of executives. Pressure sometime forcing to explore innovative ways to get things done. Thus, to keep motivation alive, a balanced approach should be applied for optimum utilization of resources up to its effort zone, though beyond the comfort zone.

Involvement in budgeting process: The budgets which involves the executives from all department can capture the requirement of all the users. The participative budgeting motivates the executives and give them a sense of ownership. Involvement at planning stage of budget can take care of the requirements of the executives and force them accept the targets. However, involvement at every stage of budgeting process may distort the objective of budget and lands nowhere, thus, a balance approach may be followed.

PREPARATION OF BUDGETS

- 1. Defining business or organizational objectives:** A budget is a plan for the achievement of certain organizational objectives. It is therefore desirable that these objectives are defined precisely. The organizational objectives should be written down; the areas of control demarcated; and items of revenue and expenditure to be covered by the budget clearly stated. This will give a clear understanding of the plan and its scope to all those who must cooperate to make it successful.
- 2. Identification of the key budget factor:** There are usually one or two key budget factors (sometimes there may be more than two) which set a limit to the total activity. For instance, in India sometimes non-availability of power does not allow production to increase in spite of heavy demand. Similarly, lack of demand may limit production. Such a factor is known as key factor. For proper budgeting, it must be identified and its influence on production on sales estimated properly while preparing the budget.
- 3. Appointment of controller/officer:** Formulation of a budget usually requires service of a whole time senior executive; He must be assisted in this work by a Budget Committee, consisting of all the heads of departments along with the Managing Director as the Chairman. The Budget Controller/Officer is responsible for coordinating and development of budget programs and preparing the manual of instruction, known as Budget manual.

- 4. Budget Manual:** The budget manual is a booklet specifying the objectives of an organization in relation to its strategy. The budget is made to decide how much an organization would earn and spend and in what manner. In the budget, the organization sets its priorities too.

CIMA, London, defines budget manual as, "A document which sets out the responsibilities of the persons engaged in, the routine of, and the forms and records required for, budgetary control". Effective budgetary planning relies on the provision of adequate information to the individuals involved in the planning process. Many of these information needs are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.

Contents of a Budget Manual

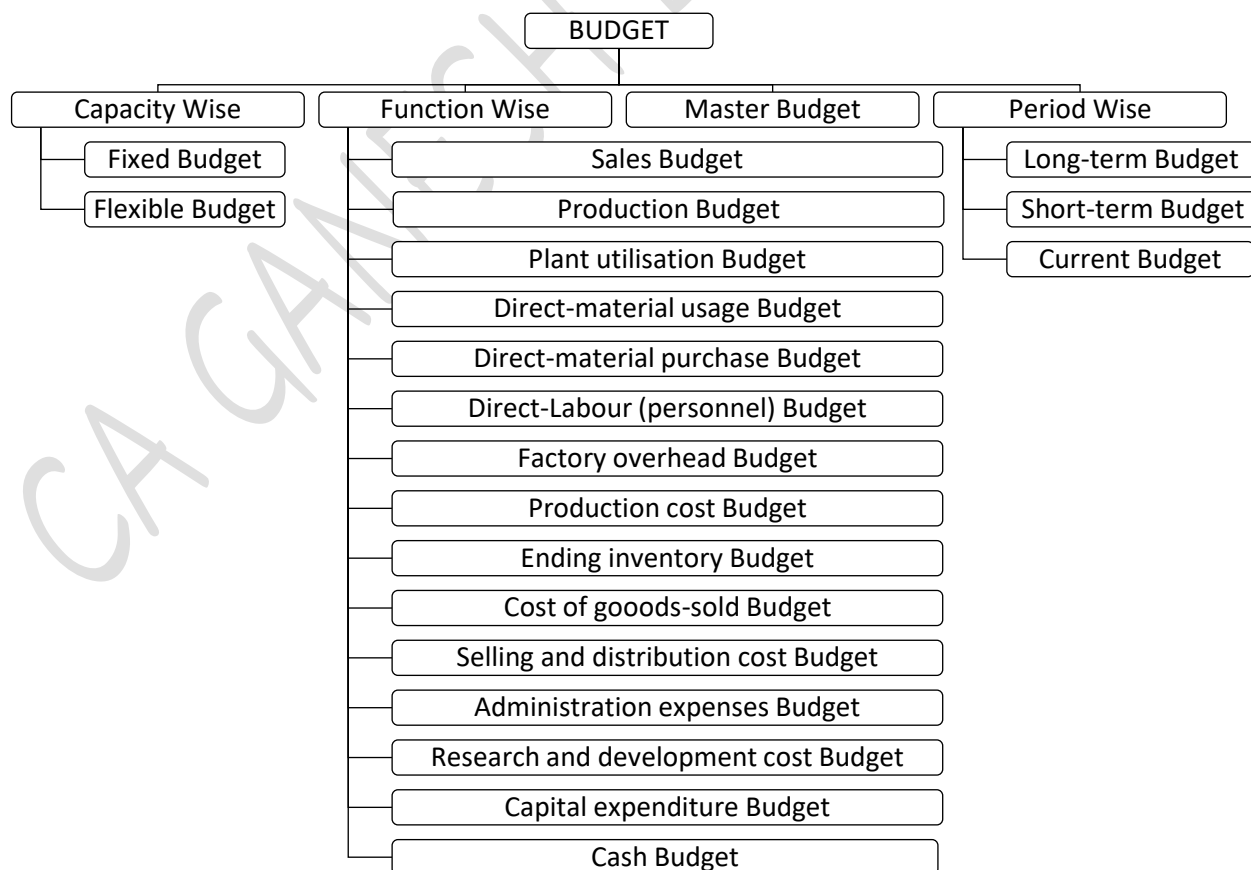
Typical budget manual may include the following:

- i. A statement regarding the objectives of the organization and how they can be achieved through budgetary control;
- ii. A statement about the functions and responsibilities of each executive, both regarding preparation and execution of budgets;
- iii. Procedures to be followed for obtaining the necessary approval of budgets. The authority of granting approval should be stated in explicit terms. Whether, one two or more signatures are required on each document should be clearly stated;
- iv. A form of organization chart to show who are responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- v. A timetable for the preparation of each budget.
- vi. The manner of scrutiny and the personnel to carry it out;
- vii. Reports, statements, forms and other record to be maintained;
- viii. The accounts classification to be employed. It is necessary that the framework within which the costs, revenue and other financial accounts are classified must be identical both in the accounts and budget department;
- ix. The reporting of the remedial action;
- x. The manner in which budgets, after acceptance and issuance, are to be revised or the matter amended these are included in budgets and on which action can be taken only with the approval of top management
- xi. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- xii. Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- xiii. A list of the organization's account codes, with full explanations of how to use them.
- xiv. Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

- 5. Budget period:** The period covered by a budget is known as budget period. There is no general rule governing the selection of the budget period. In practice the Budget Committee determines the length of the budget period suitable for the business. Normally, a calendar year or a period co-terminus with the financial year is adopted. The budget period for the calendar or financial year is then divided into shorter periods; it may be monthly or quarterly or for such periods as coincide with period of trading activity of the business.
- 6. Standard of activity or output:** For preparing budgets for the future, past statistics, though important, cannot be completely relied upon. The past usually represents a combination of good and bad factors. Therefore, though results of the past should be studied, but these should only be applied when there is a likelihood of similar conditions repeating in the future. Also, while setting the targets for the future, it must be remembered that in a progressive business, the achievement of a year should normally exceed those of earlier years. Therefore, what was good in the past is only fair for the current year and should work for much better in the future.

In budgeting, fixing the budget of sales, expenses, and of capital expenditure is important since these budgets determine the extent of development activity. For budgeting sales, one must consider the trend of economic activity of the country, recommendations of salesmen, customers and employees, effect of price changes on sales, the provision for advertisement campaign plan capacity etc.

DIFFERENT TYPES OF BUDGETS



Classification on the basis of Capacity or Flexibility

Fixed Budget: A budget prepared on the basis of standard or fixed level of activity is known as fixed budget. It does not change with a change in the level of activities. According to CIMA, “**a fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained**”. A fixed budget shows the expected results of a responsibility center for only one activity level.

Once the budget is prepared, it is not changed, even if the level of activity changes. Fixed budgeting is used by many service companies and for some administrative functions of manufacturing companies, such as purchasing, engineering, and accounting. Fixed Budget is used as an effective tool of cost control. In case, the level of activity attained is different from the level of activity for budgeting purposes, the fixed budget becomes ineffective. Fixed budget is suitable for fixed expenses. It is also known as a static budget.

Essential conditions:

1. When the nature of business is not seasonal.
2. There is no impact of external factors on the business activities.
3. The demand of the product is certain and stable.
4. Supply orders are received and issued regularly.
5. The market of the product is normally domestic but it can also apply in respect of service export, where fairly regular export orders are received
6. There is no need of special Labour or material in the production of the products.
7. Supply of production inputs is regular.
8. There is a trend of price stability.

Generally, all above conditions are not found in practice. Hence fixed budget is not suitable in business concerns.

Merits and Demerits of fixed budgets are tabulated below:

Merits	Demerits
1. Very simple to understand 2. Less time consuming	1. It does not suite a dynamic organization and may give misleading results. A poor or good performance may remain un- noticed. 2. It is not suitable for long period. 3. It is also found unsuitable particularly when the business conditions are changing constantly. 4. Accurate estimates are not possible.

Flexible Budget

A flexible budget is a budget which, by recognizing the difference in behavior between fixed and variable costs in relation to fluctuations in output, turnover, or other variable factors, is designed to change appropriately with such fluctuations. According to CIMA, **“a flexible budget is defined as a budget which, by recognizing the difference between fixed, semi-variable and variable costs is designed to change in relation to the level of activity attained.”** Unlike static (fixed) budgets, the flexible budgets show the expected results of a responsibility center for different activity levels.

One can view a flexible budget as a series of static budgets for different levels of activity. Such budgets are especially useful in estimating and controlling factory costs and operating expenses. It is more realistic and practicable because it gives due consideration to behavior of revenue and cost at different levels of activity. While preparing a flexible budget, the expenses are classified into three categories viz.

- i. Fixed,
- ii. Variable, and
- iii. Semi-variable.

Semi-variable expenses are further segregated into fixed and variable expenses. Flexible budgeting may be resorted to under the following situations:

- i. In the case of new business venture, due to its typical nature, it may be difficult to forecast the demand of a product accurately.
- ii. Where the business is dependent upon the fluctuations of nature e.g., a person dealing in wool trade may have enough market demand, if temperature goes below the freezing point and much less demand if the weather is relatively warm.
- iii. In the case of Labour-intensive industry where the production of the entity is dependent upon the availability of Labour.

Suitability for flexible budget:

- 1. Seasonal fluctuations in sales and/or production, for example in soft drinks industry;
- 2. a company which keeps on introducing new products or makes changes in the design of its products frequently;
- 3. industries engaged in make-to-order business like ship building;
- 4. an industry which is influenced by changes in fashion; and
- 5. general changes in sales.

Merits and Demerits of flexible budgets are tabulated below:

Merits	Demerits
1. With the help of flexible budget, the sales, costs and profit may be calculated easily by the business at various levels of production capacity. 2. In flexible budget, adjustment is very simple according to change in business conditions. 3. It also helps in determination of production level as it shows budgeted costs with classification at various levels of activity along with sales. Hence the management can easily select the level of production which shows the profit predetermined by the owners of the business. 4. It also shows the quantity of product to be produced to earn determined profit.	1. The formulation of flexible budget is possible only when there is proper accounting system maintained, perfect knowledge about the factors of production and various business circumstances is available. 2. Flexible Budget also requires the system of standard costing in business. 3. It is very expensive and Labour oriented.

Difference between Fixed and Flexible Budgets:

Sl. No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is known as rigid or inflexible budget.	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity.
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analyzed according to its behavior.
4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.

5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Classification on the basis of Function

A functional budget is one which is related to function of the business as for example, production budget relating to the manufacturing function. Functional budgets are prepared for each function and they are subsidiary to the master budget of the business.

The various types of functional budgets to be prepared will vary according to the size and nature of the business.

The various commonly used functional budgets are:

- i. Sales Budget
- ii. Production Budget
- iii. Plant Utilisation Budget
- iv. Direct-Material Usage Budget
- v. Direct-Material Purchase Budget
- vi. Direct Labour (Personnel) Budget
- vii. Production or Factory Overhead Budget
- viii. Production Cost Budget
- ix. Ending Inventory Budget
- x. Cost of Goods Sold Budget
- xi. Selling and Distribution Cost budget
- xii. Administration Expenses Budget
- xiii. Research and Development Cost Budget
- xiv. Capital Expenditure Budget
- xv. Cash Budget

The important functional budgets (also known as schedules to Master Budget) and the master budget are discussed and illustrated below:

Sales Budget:

- **Sales forecast is the commencement of budgeting and hence sales budget assumes primary importance.** The quantity which can be sold may be the principal budget factor in many business undertakings. In any case in order to chalk out a realistic budget programme, there must be an accurate sales forecast.

- **The sales budget is prepared for each product. This includes:**
 1. The quantity of estimated sales and
 2. The expected unit selling price.
 3. These data are often reported by regions or by sales representatives.
- In estimating the quantity of sales for each product, past sales volumes are often used as a starting point. These amounts are adjusted (increased or decreased) for factors that are expected to affect future sales. Such as the factors listed below.
 - i. Backlog of unfulfilled sales orders
 - ii. Planned advertising and promotion
 - iii. Expected industry and general economic conditions
 - iv. Productive capacity
 - v. Projected pricing
 - vi. Findings of market research studies
 - vii. Relative product profitability.
 - viii. Competition.
- Once an estimate of the sales volume is obtained, **the expected sales revenue can be determined by multiplying the volume by the expected unit sales price.** The sales budget represents the total sales in physical quantities and values for a future budget period. Sales managers are constantly faced with problems like anticipation of customer requirements, new product needs, competitor strategies and various changes in distribution methods or promotional techniques.
- The purposes of sales budget are not to attempt to estimate or guess what the actual sales will be, but rather to develop a plan with clearly defined objectives towards which the operational effort is directed in order to attain or exceed the objective. Hence, sales budget is not merely a sales forecast. A budget is a planning and control document which shows what the management intends to accomplish. Thus, the sales budget is active rather than passive document.
- A sales forecast, is a projection or estimate of the available customer demand. A forecast reflects the environmental or competitive situation facing the company whereas the sales budget shows how the management intends to react to this environmental and competitive situation.
- A good budget hinges on aggressive management control rather than on passive acceptance of whatever the market appears to offer. If the company fails to make this distinction, the budget will remain more a figure-work exercise than a working tool of dynamic management control.
- The sales budget may be prepared under the following classification or combination of classifications:
 - i. Products or groups of products.
 - ii. Areas, towns, salesmen and agents.
 - iii. Types of customers as for example: (i) Government, (ii) Export, (iii) Home sales, (iv) Retail depots.
 - iv. Period—months, weeks, etc.

Production Budget

Production Budget is a forecast of the production for the budget period of an organisation. Production budget is prepared in two parts, viz. production volume budget for the physical units of the products to be manufactured and the cost of production or manufacturing budget detailing the budgeted cost under material, Labour, and factory overhead in respect of the products.

Production budget shows the production for the budget period based upon:

1. Sales budget,
2. Production capacity of the factory,
3. Planned increase or decrease in finished stocks, and
4. Policy governing outside purchase.

Production budget is normally stated in units of output. Production should be carefully coordinated with the sales budget to ensure that production and sales are kept in balance during the period. **The number of units to be manufactured to meet budgeted sales and inventory needs for each product is set forth in the production budget.**

The production facility available and the sales budget will be compared and coordinated to determine the production budget. If production facilities are not sufficient, consideration may be given to such factors as working overtime, introducing shift working, sub-contracting or purchasing of additional plant and machinery. If, however, the production facilities are surplus, consideration should be given to promote advertising, reduction of prices to increase the sales, sub-contracting of surplus capacity, etc.

One of the conditions to be considered in all the compilation of production budget is the level of stock to be maintained.

- The level of stocks will depend upon the following three factors viz.:
 1. Seasonal industries in which stocks have to be built up during off season to cater to the peak season,
 2. A steady and uniform level of production to utilise the plant fully and to avoid retrenchment or lay-off of the workers, and
 3. To produce in such a way that minimum stocks are maintained at any time to avoid locking up of funds in inventory.
- Production budget can, therefore, show:
 1. Stabilized production every month, say, the maximum possible production or
 2. Stabilized minimum quantity of stocks which will reduce inventory costs.
 3. In the case of stabilized production, the production facility will be fully utilized, but the inventory carrying costs will vary according to stocks held. In the case of stabilized stocks method, however, the inventory carrying will be the lowest, but there may be under utilization of capacity.

Plant Utilisation Budget:

Plant utilization budget represents, in terms of working hours, weight or other convenient units of plant facilities required to carry out the programme laid down in the production budget.

The main purposes of this budget are:

1. To determine the load on each process, cost or groups of machines for the budget period.
2. To indicate the processes or cost centres which are overloaded so that corrective action may be taken such as: (i) working overtime (ii) sub- contracting (iii) expansion of production facility, etc.
3. To dovetail the sales production budgets where it is not possible to increase the capacity of any of the overloaded processes.
4. Where surplus capacity is available in any of the processes, to make effort to boost sales to utilize the surplus capacity.

Direct Material usage Budget:

The steps involved in the compilation of direct materials usage budget are as under:

1. The quality standards for each item of material have to be specified. In this connection, standardization of size, quality, colour, etc., may be considered.
2. Standard requirement of each item of materials required should also be set. While setting the standard quality, consideration should be given to normal loss in process. The standard allowance for normal loss may be given on the basis of past performance, test runs, technical estimates etc.
3. Standard prices for each item of materials should be set after giving consideration to stock and contracts entered into.

After setting standards for quality, quantity and prices, the direct materials cost budget can be prepared by multiplying each item of material required for the production by the standard price.

Direct Material Purchase Budget:

- The production budget is the starting point for determining the estimated quantities of direct materials to be purchased.
- Multiplying these quantities by the expected unit purchase price determines the total cost of direct materials to be purchased.

Two important considerations that govern purchase budgets are as follows:

- i. Economic order quantity.
 - ii. Re-order point with safety stocks to cover fluctuations in demand.
- The direct material purchases budget helps management maintain inventory levels within reasonable limits. For this purpose, the timing of the direct materials purchases should be coordinated between the purchasing and production departments.

Direct Labour (Personnel) Budget:

Once sales budget and Production budget are compiled and plant utilization budget is decided detailed amount of the various machine operations involved and services required can be calculated. This will facilitate preparation of an estimate of different grades of Labour required.

From this, the standard hours required to be worked can be calculated the total Labour component thus budgeted can be divided into direct and indirect Labour. Standard rates of wages for each grade of Labour can be introduced and then the direct and indirect Labour cost budget can be prepared.

Merits/advantages

- i. It defines the direct and indirect Labour force required.
- ii. It enables the personnel department to plan ahead in recruitment and training of workers so that Labour turnover can be reduced to the minimum.
- iii. It reveals the Labour cost to be incurred in the manufacture, to facilitate preparation of manufacturing cost budgets and cash budgets for financing the wage bill.

Production or Factory Overhead Budget:

- Production overheads consist of all items such as indirect materials, indirect Labour and indirect expenses. Indirect expenses. These include expenditures on factors such as power, fuel, fringe benefits, depreciation etc. The estimated overheads which are necessary for production in the factory are called factory overhead costs and included in the factory overhead budget.
- Factory overhead budget usually includes the total estimated cost for each item of factory overhead.
- The production overhead budget is useful for working out the pre- determined overhead recovery rates.
- A business may prepare supporting departmental schedules, in which the factory overhead costs are separated into their fixed and variable cost elements. Such schedules enable department managers to direct their attention to those costs for which they are responsible and to evaluate performance of each department.
- A careful study and determination of the behaviour of different types of costs will be essential in preparation of overhead budget.
- A few examples are given below to show how the expenses are estimated.
 1. Fixed expenses are normally policy costs and hence they are based on policy matters.
 2. For estimating indirect Labour, work study is resorted to and an estimate of number of indirect workers required for each level of direct workers employed is made—for example, one supervisor for every twenty direct worker
 3. In regard to the estimate of consumption of indirect materials, the age and condition of the plant and machinery are taken into consideration.

Production Cost Budget:

Production Cost Budget is a forecast of the production for the budget period of an organization. Production budget is prepared in two parts, viz. production volume budget for the physical units of the products to be manufactured and the cost of production or manufacturing budget detailing the budgeted cost under material, Labour, and factory overhead in respect of the products.

Production cost budget covers direct material cost, direct Labour cost and manufacturing expenses. After preparing direct material, direct Labour and production overhead cost budget, one can prepare production cost budget.

Ending Inventory Budget:

This budget shows the cost of closing stock of raw materials and finished goods, etc. required to be maintained by the business entity. This information is required to prepare cost-of-goods-sold budget and budgeted financial statements i.e., budgeted income statement and budgeted balance sheet.

Cost of Goods Sold Budget:

This budget covers direct material cost, direct Labour cost and manufacturing expenses. This is adjusted by addition of the cost of the opening inventory and reducing therefrom the cost of closing inventory of finished products.

Selling and Distribution Cost Budget:

Selling and distribution are the essential aspects of the profit earning function. At the same time, the pre-determination of these costs is very difficult. Selling & Distribution Cost Budget is a forecast of the cost of selling & distribution of goods during the budget period. **Selling cost is defined as the cost of seeking to create and stimulate demand and of securing orders.** These costs are, therefore, incurred to maintain and increase the level of sales. All expenses connected with advertising, sales promotion, sales office, salesmen, credit collection, market research, after sales service, etc. are generally grouped together to form part of the responsibility of the sales manager.

While making a budget, selling costs are divided into fixed and variable. Semi- variable costs should also be separated into variable and fixed elements.

The problems faced in the preparation of selling cost budgets are:

Heavy expenditure on selling and sales promotion may have to be incurred when the volume of sales is falling off. This will increase the percentage of such costs to total sales, and Sometimes intensive sales and promotion efforts are called for in one year and the benefit of such efforts accrue in the subsequent years. This makes it difficult to establish a proportion of selling cost to sales.

In spite of these problems, some relationship between selling cost and volume of sales has to be established and it is the duty of the Budget Controller to determine the amount of selling costs to be incurred to achieve the desired level of sales volume.

Using the past experience as a guide, consideration should be given to the future trend of sales, possible changes in competition etc., in pre-determination of selling costs.

- Distribution cost has been defined as the cost of the sequence of operations which begins with making the packet of product available for dispatch and ends with making the re-conditioned return of empty package, if any available for re-use. It includes transport cost, storage and warehousing costs, etc.
- Preparation of the advertising cost budget is the responsibility of the sales manager or advertisement manager. When preparing the advertisement cost budget, consideration should be given to the following factors:
 1. The best method of advertisement must be selected; costs will vary according to the method selected.
 2. The maximum amount to be spent in a period, say one year, has to be decided.
 3. Advertising and sales should be co-ordinated. It means that money should be spent on advertisement only when sufficient quantities of the product advertised are ready for sale.
 4. An effective control over advertisement expenditure should be exercised and the effectiveness of the advertisement should be measured.
 5. The choice of the method of advertising a product is based on the effectiveness of the money spent on advertisement in increasing or maintaining sales. If the output sold increases, the production cost will come down because of the economies of large-scale production.
- The amount to be spent on advertisement may be decided on the basis of the following factors:
 - a. A percentage on the total sales value of the budget period or on the expected profit may be fixed on the basis of past experience.
 - b. A sum which is expected to be incurred by the competitors may be fixed to be spent during the budget period.
 - c. A fixed sum per unit of output can be fixed and added to cost.
 - d. An amount is fixed on the basis of the ability of the company to spend on advertising.
 - e. An advertisement plan is decided upon and the amount to be spent is determined.
- Depending upon the nature of the product and the effectiveness of the media of the advertising the company prepares a schedule of various methods of advertisement, to be used for effective sales promotion. The number of advertisements (insertions) are determined and the cost calculated as per the rates applicable to each of the media selected. This is a sound method.

Administrative Expenses Budget

The administrative expenses are mostly policy costs and are, therefore, fixed in nature. **The most practical method to follow in preparing estimate of these expenses is to follow the past experience with due regard to anticipated changes either in general policy or the volume of business.** To bring such expenses under control, it is necessary to review them frequently and to determine at regular intervals whether or not these expenses continue to be adjusted. Examples of such expenses are: board meeting expenses, expenditure incurred on staff employed in human resources and finance departments, audit fees, depreciation of office equipment, insurance, subscriptions, postage, stationery, telephone, telegrams, office supplies, etc.

Research and Development Cost Budget

Research and development expenditure is to be incurred so that the products or methods of production do not become obsolete. The research and development budget is the forecast of all such expenses. **Research is required in order to develop and/or improve products and methods. When research results in definite benefit to the company, development function begins.** After development, formal production can commence on commercial scale and then production function starts. Since the areas of research and development cannot be precisely defined, the costs incurred under both the functions are clubbed together as research and development costs. Research and Development (R & D) plays a vital role in maintaining the business. For example, automobile manufacturers, and those who produce drugs, spend considerable sums on R & D to improve their products.

Research may be either pure research or applied research. Pure research increases knowledge whereas applied research aims at producing definite results like improved methods of production, etc.

Research and development expenses should be controlled carefully and hence a limit on the spending is placed, i.e., the amount to be spent is carefully determined or allocated.

The following are the methods of allocation of R & D expenses.

- a. A percentage based on total sales value. This method is good if sales value is steady from year to year.
- b. A percentage based on net profit.
- c. A total sum is estimated on the basis of past experience and future R & D plans and policies.
- d. A sum is fixed on the basis of cash resources available with the company.
- e. All factors which affect the importance of R & D are considered. For example, factors like demand for existing products, competition, economic conditions, etc., are considered carefully and a sum is set aside as R& D budget.

Capital Expenditure Budget:

The capital expenditure budget represents the planned outlay on fixed assets like land, building, plant and machinery, etc. during the budget period. This budget is subject to strict management control because it entails large amount of expenditure. The budget is prepared to cover a long period of years and it projects the capital costs over the period in which the expenditure is to be incurred and the expected earnings.

The preparation of capital budget is based on the following considerations:

1. Capital Budget is a budget prepared for capital receipts and expenditure such as investment on land and building, plant and machinery obtaining loans, issue of shares, purchase of assets etc.
2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments.
4. Factors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.
5. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.

Merits/Advantages of capital budgeting

1. Capital budget outlines the capital development programme and estimated capital expenditure during the budget period.
2. It enables the company to establish a system of priorities. When there is a shortage of funds, capital rationing becomes necessary.
3. It serves as a tool for controlling expenditure.
4. It provides the amount of expenditure to be incorporated in the future budget summaries for calculation of estimated return on capital employed.
5. This enables the cash budget to be completed. With other cash commitments capital expenditure commitment should also be considered for the completion of the budget.
6. It facilitates cost reduction programme, particularly when modernisation and renovation is covered by this budget.

Cash Budget:

Cash Budget is a detailed budget of cash receipts and cash payments incorporating both revenue and capital items for the budget period. This budget is usually of two parts giving detailed estimates of (i) cash receipts and (ii) cash disbursements. Estimates of cash-receipts are prepared on a monthly basis and depend upon estimated cash-sales, collections from debtors and anticipated receipts from other sources such as sale of assets, borrowings, etc. Estimates of cash disbursements are based on estimated cash purchases, payments to creditors, employees' remuneration, bonus, advances to suppliers, budgeted capital expenditure for expansion, etc.

Cash budget represents the cash requirements of the business during the budget period. **It is the plan of receipts and payments of cash for the budget period**, analysed to show the monthly flow of cash drawn up in such a way that the balance can be forecasted at regular intervals.

The cash budget is one of the most important elements of the budgeted balance sheet. Information from the various operating budgets, such as the sales budget, the direct materials purchases budget, and the selling and administrative expenses budget, affects the cash budget.

In addition, the capital expenditures budget, dividend policies, and plans for equity or long-term debt financing also affect the cash budget.

The main objectives of preparing cash budget are:

- i. The probable cash position, as a result of planned operation, is assessed; and thus, the excess or shortage of cash becomes clear. This helps in arranging short-term borrowings in advance to meet the situations of shortage of cash or making investments when cash is in excess.
- ii. Cash can be coordinated in relation to total working capital, sales investment and debt.
- iii. A sound basis for credit for current control of cash position is established.
- iv. The effect of sudden and seasonal requirements, large stocks, delay in collection of receipts, etc., on the cash position of the organization is revealed and things become under to the management.

Advantages of cash budget:

- i. It aids in securing option working capital need for smooth running of the operation and planning for payments to the shareholder
- ii. It eases strains of a cash shortage
- iii. It facilitates temporary cash investment wherever, and to whatever extent, found in excess
- iv. It provides for normal growth

Master Budget:

CIMA, London, defines it as “the summary budget, incorporating its component functional budgets, which is finally approved, adopted and employed.” When all the necessary functional budgets have been prepared, the budget officer will prepare the master budget which may consist of budgeted profit and loss account and budgeted balance sheet. These are in fact the budget summaries. When the master budget is approved by the board of directors, it represents a standard for the achievement of which all the departments will work. On the basis of the various budgets (schedules) prepared earlier in this study, we prepare below budgeted income statement and budgeted balance sheet.

Classification on the basis of Time Period:

These types of Budgets are classified on the basis of time periods. These types of budgets reflect the planning period of the organization.

Long term Budget: - Long Term Budget is a budget prepared covering a period of more than a year. The Budgets are prepared to depict long term planning of the business. The period of long-term

Budgets varies between three to ten year. These budgets are useful for those industries where gestation period is long i.e., the business entities manufacturing machinery, electricity etc.

1. **Short term Budget:** These budgets are generally for one or two years and are in the form of monetary terms. The consumer's good industries like Sugar, Cotton, and textile use short term budgets.
2. **Current Budgets:** - The period of current budgets is generally of months and weeks. These budgets relate to the current activities of the business. According to CIMA London "Current budget is a budget which is created which is established for use over a short period of time and is related to current conditions".

ZERO – BASED BUDGETING (ZBB)

Zero-based Budgeting (ZBB) is defined as a method of budgeting which requires each cost element to be specifically justified, though the activities to which the budget relates are not being undertaken for the first time. The cost of each activity has to be justified and without justification, the budget allowance is zero.

Zero based budgeting differs from the conventional system of budgeting because it mainly starts from scratch or zero and not on the basis of trends or historical levels of expenditure. In the customary budgeting system, the last year's figures are accepted as they are, or cut back or increases are granted. Zero based budgeting on the other hand, starts with the premise that the budget for next period is zero so long the demand for a function, process, project or activity is not justified for each rupee from the first rupee spent.

Zero-based Budgeting (ZBB) is an emergent form of budgeting which arises to overcome the limitations of incremental (traditional) budgeting system.

ZBB is an activity-based budgeting system where budgets are prepared for each activity rather than functional department. Justification in the form of cost benefits for the activity is required to be given. The activities are then evaluated and prioritized by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc. ZBB is suitable for both corporate and non-corporate entities. In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

In case of corporate entities, ZBB is best suited for discretionary costs like research and development cost, training programmes, advertisement etc.

Stages in Zero-based Budgeting:

ZBB involves the following stages:

- i. Identification and description of Decision packages

- ii. Evaluation of Decision packages
 - iii. Ranking (Prioritisation) of the Decision packages
 - iv. Allocation of resources
-
- i. **Identification and description of Decision packages:** Decision packages are the programmes or activities for which decision is required to be taken. The programmes or activities are described for technical specifications, financial impact in the form of cost benefit analysis and other issues like environmental, regulatory, social etc.
 - ii. **Evaluation of Decision packages:** Once Decision packages are identified and described, it is evaluated against factors like synchronization with organizational objectives, availability of funds, regulatory requirement etc.
 - iii. **Ranking (Prioritization) of the Decision packages:** After evaluation of the decision packages, it is ranked on the basis priority of the activities. Because of this prioritization feature **ZBB is also known as Priority-based Budgeting.**
 - iv. **Allocation of resources:** After ranking of the decision packages, resources are allocated for decision packages. Budgets are prepared like it is done first time without taking reference to previous budgets.

Advantages of Zero-based Budgeting:

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the evaluation of different activities and rank them in order of preference for the allocation of scarce resources.
- It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of wasteful expenditure can be easily identified and eliminated.
- Departmental budgets are closely linked with corporation objectives.
- The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Zero-based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

- It provides a systematic approach for evaluation of different activities.
- It ensures that the function undertaken are critical for the achievement of the objectives.
- It provides an opportunity for management to allocate resources to various activities after a thorough – cost benefit analysis.

- It helps in the identification of wasteful expenditure and then their elimination. It facilitates the close linkage of departmental budgets with corporate objectives
- It helps in the introduction of a system of Management by Objectives.

Difference between Traditional Budgeting and Zero- based budgeting:

Following are the points of difference between traditional budgeting and zero- based budgeting:

- Traditional budgeting is accounting oriented. Main stress happens to be on previous level of expenditure. Zero-based budgeting makes a decision- oriented approach. It is very rational in nature and requires all programmes, old and new, to compete for scarce resources.
- In traditional budgeting, first reference is made to past level of spending and then demand for inflation and new programmes. In zero- based budgeting, management focuses attention to only on decision packages, which enjoy priority to other
- In tradition budgeting, some managers deliberately inflate their budget request so that after the cuts they still get what they want. In zero-based budgeting, a rationale analysis of budget proposals is attempted. The managers, who unnecessarily try to inflate the budget request, are likely to be caught and exposed. Management accords its approval only to a carefully devised result-oriented package.
- Traditional budgeting is not as clear and as responsive as zero-base budgeting.
- In traditional budgeting, it is for top management to decide why a particular amount should be spent on a particular decision unit. In Zero-based budgeting, this responsibility is shifted from top management to the manager of decision unit.
- Traditional budgeting makes a routine approach. Zero-based budgeting makes a very straightforward approach and immediately spotlights the decision packages enjoying priority over other

Limitations of Zero-based Budgeting:

- The work involves in the creation of decision-making and their subsequent ranking has to be made on the basis of new data. This process is very tedious to management.
- The activities selected for the purpose of ZBB are on the basis of the traditional functional departments. So, the consideration scheme may not be implemented properly.

PERFORMANCE BUDGETING (PB)

Performance budgeting (PB) involves evaluation of the performance of an organisation in the context of both specific as well as overall objectives of the organisation. This requires complete clarity about both the short-term as well as long-term organisational objectives. The responsibility of the various levels of management should be predetermined in terms of results expected from them and the authority vested in them. In other words, performance budgeting requires fixing of the responsibility of each executive in organisation and the continuous appraisal of his performance. It is, therefore, considered to be synonymous with responsibility accounting.

Performance Budgeting provide a meaningful relationship between estimated inputs and expected outputs as an integral part of the budgeting system. **A performance budget is one which presents the purposes and objectives for which funds are required**, the costs of the programmes proposed for achieving those objectives, and quantitative data measuring the accomplishments and work performed under each programme. Thus, PB is a technique of presenting budgets for costs and revenues in terms of functions. Programmes and activities are correlating the physical and financial aspect of the individual items comprising the budget.

Traditional Budgeting vs. Performance Budgeting:

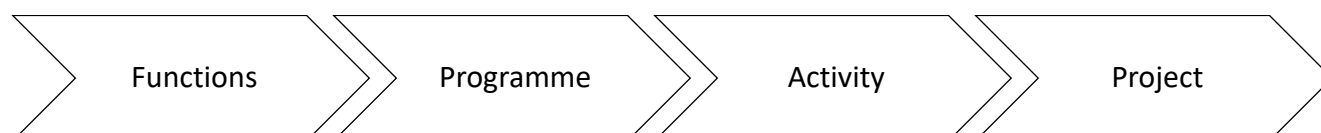
- The traditional budgeting gives more emphasis on the financial aspect than the physical aspects or performance. PB aims at establishing a relationship between the inputs and the outputs.
- Traditional budgets are generally prepared with the main basis towards the objects or items of expenditure i.e., it highlights the items of expenditure, namely, salaries, stores and materials, rates, rents and taxes and so on. In the PB emphasis is more on the functions of the organisation, the programmes to discharge this function and the activities which will be involved in undertaking these programmes.

Steps in Performance Budgeting:

According to the Administrative Reforms Commission (ARC), the following steps are the basic ones in PB:

- Establishing a meaningful functional programme and activity classification of government operations.
- Bring the system of accounting and financial management in accordance with this classification.
- Evolving suitable norms, yardsticks, work units of performance and units costs, wherever possible under each programme and activity for their reporting and evaluation.

The Report of the ARC use the following terms in an integrated sequence:



The term 'function' is used in the sense of 'objective'. For achieving objectives 'programmes' will have to be evolved. In respect of time horizon, it is essentially a replacement of traditional annual fiscal budgeting by a more output-oriented, but still an annual, exercise.

For an enterprise that wants to adopt PB, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal; constraints;
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralised responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Performance Reporting at various levels of management:

Report	: A major part of the management accountant's job consists of preparing reports to provide information for purposes of control and planning. The important consideration in drawing up of reports and determining their scope are the following:
Significance	: Are the facts in the reports reliable? Does it either called for action or demonstrate the effect of action? It is material enough.
Timeliness	: How late can the information be and still be of use? What is the earliest moment at which it could be used if it were available? How frequently is it required?
Accuracy	: How small should be an inaccuracy which does not alter the significance of the information?
Appropriateness	: Is the recipient the right person to take any action that is needed? Is there any other information which is required to support the information to anyone else jointly interested?
Discrimination	: Will anything be lost by omitting the item? Will any of the items gain from the omission? Is the responsibility for suppressing the item acceptable?
Presentation	: Is the report clear and unbiased? Is the form of it is suitable to the subject? Is the form of it suitable to the recipient?

The following are certain types of reports which are to be prepared and submitted to management regularly at predetermined time interval:

1. Top Management: (Including Board of Directors and financial managers)

- i. Balance Sheet
- ii. Profit & Loss Statement
- iii. Position of stocks
- iv. Disposition of funds or working capital;
- v. Capital expenditure and forward commitments together with progress of projects in hands;
- vi. Cash-flow statements;
- vii. Sales, production, and other appropriate statistics.

2. Sales Management:

- i. Actual sales compared with budgeted sales to measure performance by:
 - Products,
 - Territories
 - Individual salesmen, and
 - Customer
- ii. Standard profit and loss by product:
 - For fixing selling prices, and
 - To Concentrate on sales of most profitable products.
- iii. Selling expenses in relation to budget and sales value analyzed by:
 - Products,
 - Territories
 - Individual salesmen, and
 - Customer
- iv. Bad debts and accounts which are slow and difficult in collection.
- v. Status reports on new or doubtful Customer

3. Production Management:

- i. To Buyer: Price variations on purchases analysed by commodities.
- ii. To Foreman:
 - Operational efficiency for individual operators duly summarized as departmental average;
 - Labour utilization report and causes of lost time and controllable time;
 - Indirect shop expenses against the standard allowed; and
 - Scrap report.
- iii. To Works Managers:
 - Departmental operating statement;
 - General works operating statements (Expenses relating to all works expenses not directly allocable or controllable by departments);
 - Plant utilization report;

- Department Scrap report; and
- Material usage report.

4. Special Reports:

These reports may be prepared at the request of general management or at the initiative of the management accountants. The necessity for them may, in some cases, arise on account of the need for more detailed information on matters of interest first revealed; by the routine, reports. These reports may range over a very wide area. Some of the matters in respect of which such reports may be required can be:

- i. Taxation legislation and its effect on profits.
- ii. Estimates of the earning capacity of a new project.
- iii. Break-even analysis
- iv. Replacement of capital equipment.
- v. Special pricing analysis
- vi. Make or buy certain components
- vii. Statement of surplus available for payment of bonus under the Labour appellate tribunal formula.

BUDGET RATIO:

Ratio is a mathematical relationship between two or more related figures. Budget ratios provide information about the performance level, i.e., the extent of deviation of actual performance from the budgeted performance and whether the actual performance is favourable or unfavorable. If the ratio is 100% or more, the performance is considered as favourable and if ratio is less than 100% the performance is considered as unfavourable.

The following ratios are usually used by the management to measure development from budget.

Capacity Usage Ratio: This relationship between the budgeted number of working hours and the maximum possible number of working hours in a budget period.

Standard Capacity Employed Ratio: This ratio indicates the extent to which facilities were actually utilized during the budget period.

Level of Activity Ratio: This may be defined as the number of standard hours equivalent to work produced expressed as a percentage of the budget of standard hours

Efficiency Ratio: This ratio may be defined as standard hours equivalent of work produced expressed as a percentage of the actual hours spent in producing the work.

Calendar Ratio: This ratio may be defined as the relationship between the number of working days in a period and the number of working as in the relative budget period.

Budget Ratios:

$$(i) \text{ Efficiency Ratio} = \frac{\text{StandardHours}}{\text{ActualHours}} \times 100$$

$$(ii) \text{ Activity Ratio} = \frac{\text{StandardHours}}{\text{BudgetedHours}} \times 100$$

$$(iii) \text{ Calendar Ratio} = \frac{\text{Availableworking days}}{\text{Budgetedworking days}} \times 100$$

$$(iv) \text{ Standard Capacity Usage Ratio} = \frac{\text{BudgetedHours}}{\text{Max. possible hours in the budgeted period}} \times 100$$

$$(v) \text{ Actual Capacity Usage Ratio} = \frac{\text{ActualHoursworked}}{\text{Max. possible working hours in a period}} \times 100$$

$$(vi) \text{ Actual Usage of Budgeted Capacity Ratio} = \frac{\text{ActualworkingHours}}{\text{BudgetedHours}} \times 100$$

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

Prepare a quantitative production, material usage & purchases budget from the following data of a month.

Particulars	Product A	Product B
Budgeted sales quantity	15,000 units	17,500 units
Material consumption p.u:		
Material P (3 per kg)	2 kgs	4 kgs
Material Q (2 per kg)	3 ¹ / ₈ kgs	1 kgs

Stocks of products and materials are as under:

Particulars	Product A	Product B	Material P	Material Q
	(in units)	(in units)	(in kgs)	(in kgs)
Opening stock	750	875	12000	8000
Closing stock	1750	3375	?	?

The company wishes to operate a JIT material inventory system. As an initial procedure, it wishes to maintain a minimum stock of materials equivalent to 2 days consumption. There are 28 working days in a month.

PROBLEM – 2

The direct Labour hour requirement of three of the products, manufactured in a factory, each involving more than one Labour operation, are estimated as follows:

Direct Labour hour/unit (in minutes)

PRODUCT	A	B	C
Operation X	18	42	30
Operation Y	--	12	24
Operation Z	12	6	--

The factory work 8 hours per day, 6 days a week. The budget quarter is taken as 13 weeks, and during a quarter, lost hours due to leave and holidays and other causes is estimated to be 124 hours. The budgeted hourly rate for the workers manning the operation X, Y and Z are ₹ 2, ₹ 2.550 and ₹ 3 respectively. The budgeted sales of the products during the quarter are A – 9,000 units, B – 15,000 units and C – 12,000 units.

There is an opening stock of 5,000 units of B and 4,000 units of C and it is proposed to build up stock at the end of the budget quarter as A – 1,000 units and C – 2,000 units.

Prepare a manpower budget showing for each operation;

- Direct Labour hours
- Direct Labour cost and
- The number of operatives.

PROBLEM – 3

A single product company estimated its sales for the next year quarter wise as under:

Quarter	Sales (units)
I	30,000
II	37,500
III	41,250
IV	45,000

The opening stocks of finished goods are 10,000 units and the company experts to maintain the closing stocks of finished goods at 16,250 units at the end of the year. The production pattern in each quarter is based on 80% of the sales of the current quarter and 20% of the sales of the next quarter.

The opening stocks of raw materials at the beginning of the year are 10,000 kg. And the closing stock at the end of the year is required to be maintained at 5,000 kg. Each unit of finished output requires 2 kg. of raw materials.

The company proposes to purchases the entire annual, requirement of raw materials in the first three quarters in proportion and at the prices given below:

Quarter	Purchases of raw material	Price per kg
I	30%	₹ 2
II	50%	₹ 3
III	20%	₹ 4

The value of the opening stock of the raw material in the beginning of the year is ₹ 20,000.

You are required to present the following for the next year, quarter wise:

- Production budget (in units)
- Raw material consumption budget (in quantity)
- Raw material purchases budget (in quantity and value)
- Priced stores ledger card of the raw materials using the First in First out method.

PROBLEM – 4

Concorde Ltd. manufactures two products using two types of materials and one grade of Labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product- A	Product- B
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard Labour hours allowed per unit of product	3	5

Material-X and Material-Y cost ₹ 4 and ₹ 6 per kg and Labours are paid ₹ 25 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 180 direct worker.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A	400 units
Product-B	200 units
Material-X	1,000 kg.
Material-Y	500 kg.

The anticipated closing stocks for budget period are as below:

Product-A	4 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	6 days consumption

Required:

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

PROBLEM – 5

A company is engaged in the manufacture of specialized sub-assemblies required for certain electronic equipments. The company envisages that in the forthcoming month, December, 20x1, the sales will take a pattern in the ratio of 3:4:2 respectively of sub-assemblies, ACB, MCB and DP.

The following is the schedule of components required for manufacture:

Sub-assembly	Selling price	Base Board	Component requirements		
			IC 08	IC 12	IC 26
ACB	520	1	8	4	2
MCB	500	1	2	10	6
DP	350	1	2	4	8
Purchase price		₹ 60	₹ 20	₹ 12	₹ 8

The direct Labour time and variable overheads required for each of the assemblies are:

	Labour hours per Sub-assembly		
	Grade A	Grade B	Variable overheads per Sub-assembly (₹)
ACB	8	16	₹ 36
MCB	6	12	₹ 24
DP	4	8	₹ 24
Direct wages rate per hour	₹ 5	₹ 4	-

The Labourers work 8 hours a day 25 day a month. The opening stocks of Sub-assemblies and components for December, 20x1 are as under:

Sub-assemblies		Components	
ACB	800	Based Board	1,600
MCB	1,200	IC 08	1,200
DP	2,800	IC 12	6,000
		IC 26	4,000

Fixed overheads amount to ₹ 7,57,200 for the month and a monthly profit target of ₹ 12 lakhs has been set.

The company is eager for a reduction of closing inventories for December, 20x1 of Sub-assemblies and components by 10% of quantity as compared to the opening stocks prepared the following budget for December 20x1:

- Sales budget in quantity and value
- Production budget in quantity

- iii. Component usage budget in quantity
- iv. Component purchases budget in quantity and value
- v. Manpower budget showing the number of workers and the amount of wages payable.

PROBLEM – 6

K Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 20x2-20x3.

The following information are made available for this purpose:

- i. It expects to sell 1,50,000 bags of 'X' during the second quarter of 20x2- 20x3 at the selling price of ₹ 1,200 per bag.
- ii. Each bag of 'X' requires 2.5 mtr. of raw – material 'Y' and 7.5 mtr. of raw – material 'Z'.
- iii. Stock levels are planned as follows:
- iv.

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	45,000	33,000
Raw – Material 'Y' (mtr)	96,000	78,000
Raw – Material 'Z' (mtr)	1,71,000	1,41,000
Empty Bag (Nos.)	1,11,000	84,000

- i. Y' cost ₹160 per mtr., 'Z' costs ₹30 per mtr. and 'Empty Bag' costs ₹110 each.
- ii. It requires 9 minutes of direct Labour to produce and fill one bag of 'X'. Labour cost is ₹ 70 per hour.
- iii. Variable manufacturing costs are ₹ 60 per bag. Fixed manufacturing costs ₹ 40,00,000 per quarter.
- iv. Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are ₹ 3,75,000 per quarter.

Required

- i. PREPARE a production budget for the said quarter in quantity.
- ii. PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.
- iii. COMPUTE the budgeted variable cost to produce one bag of 'X'.

PROBLEM – 7

B Ltd. Manufactures two products viz. X and Y and sells them through two divisions, East and West. For the purpose of sales budget to the Budget Committee, the following information has been made available for the year 20x1:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	800 units at ₹ 18	1,200 units at ₹ 18	1,000 units at ₹ 18	1,400 units at ₹ 18
Y	600 units at ₹ 42	1,000 units at ₹ 42	400 units at ₹ 42	800 units at ₹ 42

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹ 2, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹ 2 it will have more demand in the market. The company management has agreed to the aforesaid price changes. On the basis of these price changes and the reports of salesmen, the following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over the budgeted sales

Product	East Division	West Division
X	+12.50%	+7.50%
Y	+22.50%	+12.50%

With the help of an intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Managers) are possible:

Product	East Division	West Division
X	120 units	140 units
Y	80 units	100 units

You are required to PREPARE Sales Budget for 20x2 after incorporating the above estimates and also show the Budgeted Sales and Actual Sales of 20x1.

PROBLEM – 8

Float glass Manufacturing Company requires you to PREPARE the Master budget for the next year from the following information:

Sales:	
Toughened Glass	₹ 6,00,000
Bent Glass	₹ 2,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ ₹ 150 per month
Factory overheads:	
Indirect Labour	—

Works manager	₹ 500 per month
Foreman	₹ 400 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 12,600
Light and power	₹ 3,000
Repairs and maintenance	₹ 8,000
Others sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 36,000 per year

PROBLEM – 9

ABC Ltd. is currently operating at 75% of its capacity. In the past two years, the levels of operations were 55% and 65% respectively. Presently, the production is 75,000 units. The company is planning for 85% capacity level during 20X2-20X3. The cost details are as follows:

	55% ₹	65% ₹	75% ₹
Direct Materials	11,00,000	13,00,000	15,00,000
Direct Labour	5,50,000	6,50,000	7,50,000
Factory Overheads	3,10,000	3,30,000	3,50,000
Selling Overheads	3,20,000	3,60,000	4,00,000
Administrative Overheads	1,60,000	1,60,000	1,60,000
	24,40,000	28,00,000	31,60,000

Profit is estimated @ 20% on sales.

The following increases in costs are expected during the year:

	In %
Direct Materials	8
Direct Labour	5
Variable Factory Overheads	5
Variable Selling Overheads	8
Fixed Factory Overheads	10
Fixed Selling Overheads	15
Administrative Overheads	10

PREPARE flexible budget for the period 20x2-20x3 at 85% level of capacity. Also ascertain profit and contribution.

PROBLEM – 10

A factory which expects to operate 7,000 hours, i.e., at 70% level of activity, furnishes details of expenses as under:

Variable expenses	₹1260
Semi-variable expenses	₹1200
Fixed expenses	₹1800

The semi-variable expenses go up by 10% between 85% and 95% activity and by 20% above 95% activity. PREPARE a flexible budget for 80, 90 and 100 per cent activities.

PROBLEM – 11

During the FY 2021-22, P Limited has produced 60,000 units operating at 50% capacity level. The cost structure at the 50% level of activity is as under:

	₹
Direct Material	300 per unit
Direct Wages	100 per unit
Variable Overheads	100 per unit
Direct Expenses	60 per unit
Factory Expenses (25% fixed)	80 per unit
Selling and Distribution Exp. (80% variable)	40 per unit
Office and Administrative Exp. (100% fixed)	20 per unit

The company anticipates that in FY 20x2-20x3, the variable costs will go up by 20% and fixed costs will go up by 15%.

The selling price per unit will increase by 10% to ₹ 880

Required:

- CALCULATE the budgeted profit/ loss for the FY 2021-22.
- PREPARE an Expense budget on marginal cost basis for the FY 20x2-20x3 for the company at 50% and 60% level of activity and FIND OUT the profits at respective levels.

PROBLEM – 12

The accountant of manufacturing company provides you the following details for year 20x1-20x2:

	₹		₹
Direct materials	1,75,000	Other variable costs	80,000
Direct Wages	1,00,000	Other fixed costs	80,000
Fixed factory overheads	1,00,000	Profit	1,15,000
Variable factory overheads	1,00,000	Sales	7,50,000

During the year, the company manufactured two products A and B and the output and costs were:

	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 2.00	₹ 3.50
Direct materials per unit	₹ 0.50	₹ 0.75
Direct wages per unit	₹ 0.25	₹ 0.50

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 0.25 per unit; and B ₹ 0.30 per unit.

During 20X2-20X3, it is expected that the demand for product A will fall by 25 % and for B by 50%. It is decided to manufacture a further product C, the cost for which is estimated as follows:

	Product C
Output (units)	2,00,000
Selling price per unit	₹ 1.75
Direct materials per unit	₹ 0.40
Direct wages per unit	₹ 0.25

It is anticipated that the other variable costs per unit will be the same as for product A.

PREPARE a budget to present to the management, showing the current position and the position for 20X2-20X3. Comment on the comparative results.

PROBLEM – 13

TQM Ltd. has furnished the following information for the month ending 30th June:

	Master Budget	Actual	Variance
Units produced and sold	80,000	72,000	
Sales (₹)	3,20,000	2,80,000	40,000 (A)
Direct material (₹)	80,000	73,600	6,400 (F)
Direct wages (₹)	1,20,000	1,04,800	15,200 (F)
Variable overheads (₹)	40,000	37,600	2,400 (F)
Fixed overhead (₹)	40,000	39,200	800 (F)
Total Cost	2,80,000	2,55,200	

The Standard costs of the products are as follows:

	Per unit ₹
Direct materials (1 kg. at the rate of ₹1 per kg.)	1.00
Direct wages (1 hour at the rate of ₹ 1.50)	1.50
Variable overheads (1 hour at the rate of ₹ 0.50)	0.50

Actual results for the month showed that 78,400 kg. of material were used and 70,400 Labour hours were recorded.

Required:

- i. PREPARE Flexible budget for the month and compare with actual results.
- ii. CALCULATE Material, Labour, Sales Price, Variable Overhead and Fixed Overhead Expenditure variances and Sales Volume (Profit) variance.

PROBLEM – 14

The following data is available for DKG and Co:

Standard working hours	8 hours per day of 5 days per week
Maximum capacity	50 employees
Actual working	40 employees
Actual hours expected to be worked per four week	6,400 hours
Standard hours expected to be earned per four weeks	8,000 hours
Actual hours worked in the four-week period	6,000 hours
Standard hours earned in the four-week period	7,000 hours

The related period is of 4 weeks. In this period there was a one special day holiday due to a national event.

CALCULATE the following ratios:

1. Efficiency Ratio
2. Activity Ratio
3. Calendar Ratio
4. Standard Capacity Usage Ratio
5. Actual Capacity Usage Ratio
6. Actual Usage of Budgeted Capacity Ratio

ADDITIONAL QUESTIONS FOR PRATICE**QFP 1 (Concept Similar to Problem – 4)**

A department of Company X attains sale of ₹ 6,00,000 at 80 per cent of its normal capacity and its expenses are given below:

Administration costs:	₹
Office salaries	90,000
General expenses	2 per cent of sales
Depreciation	7,500
Rates and taxes	8,750
Selling costs:	
Salaries	8 per cent of sales
Travelling expenses	2 per cent of sales
Sales office expenses	1 per cent of sales
General expenses	1 per cent of sales
Distribution costs:	
Wages	15,000
Rent	1 per cent of sales
Other expenses	4 per cent of sales

PREPARE flexible administration, selling and distribution costs budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity.

QFP 2 (Concept Similar to Problem – 4)

Jigyasa Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 20x2-20x3. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavyhigh (HH)
Budgeted Production units	1,80,000	1,20,000
	(₹)	(₹)
Direct material cost per unit	220	280
Direct Labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sold in the first four months of the year 20x2-20x3 are as under

	April	May	June	July
Minimax	8,000	10,000	12,000	16,000
Heavy high	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month-wise.

CHAPTER 15: SERVICE COSTING

INTRODUCTION

Service sector, being a fastest growing sector and having a significant contribution towards the GDP in India, is a very important sector where the role of the cost and management accounting is inevitable. The competitiveness of a service entity is very much dependent on a robust cost and management accounting system for competitive pricing and identification of value adding activities. Providers of services like transportation, hotels, financial services & banking, insurance, electricity generation, transmission and distribution etc. are very much cost conscious and thrive to provide services in a cost-effective manner. Irrespective of regulatory requirements to maintain cost records and get the records audited, service costing becomes integral and inseparable part of each service entity. In this chapter we will be discussing how costing is done in service sectors like Transportation, Toll roads, Electricity generation, transmission and distribution, Hospitals, Canteen & Restaurants, Hotels & Lodges, Educational institutes, Financial institutions, Insurance, Information Technology (IT) & Information Technology Enabled Services (ITES) etc.

Service costing is also known as operating costing.

Application of Service Costing

Internal:

The service costing is required for in-house services provided by a service cost centre to other responsibility centers as support services. Examples of support services are Canteen and hospital for staff, Boiler house for supplying steam to production departments, Captive Power generation unit, operation of fleet of vehicles for transport of raw material to factory or distribution of finished goods to the market outlets, IT department services used by other departments, research & development, quality assurance, laboratory etc.

External:

When services are offered to outside customers as a profit center inconsonance with organizational objectives as an output like goods or passenger transport service provided by a transporter, hospitality services provided by a hotel, provision of services by financial institutions, insurance and IT companies etc.

Service Costing vs Product Costing

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

- i. **Tangibility:** Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.
- ii. **Cost units:** Use of Composite cost units for cost measurement and to express the volume of outputs.

- iii. **Material vs Employee cost:** Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.
- iv. **Traceability of costs:** Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

SERVICE COST UNIT AND KPI

To compute the Service cost, it is necessary to understand the unit for which the cost is to be computed. All the costs incurred during a period are collected and analyzed and then expressed in terms of a cost per unit of service.

One specific issue with service costing is the difficulty in defining a realistic cost unit that represents a suitable measure of the service provided. The cost unit to be applied needs to be defined carefully and frequently, a composite cost unit may be deemed more appropriate.

For example, Hotels may use the 'Occupied Room Days' as an appropriate unit for cost ascertainment and control.

Other typical cost unit that may be used include:

Service industry	Unit of cost (examples)
Transport Services	Passenger- km., (In public transportation) Quintal- km., or Tone- km. (In goods carriage)
Electricity Supply service	Kilowatt- hour (kWh)
Hospital	Patient per day, room per day or per bed, per operation etc.
Canteen	Per item, per meal etc.
Cinema	Per ticket.
Hotels	Guest Days or Room Days
Bank or Financial Institutions	Per transaction, per services (e.g. per letter of credit, per application, per project etc.)
Educational Institutes	Per course, per student, per batch, per lecture etc.
IT & ITES	Cost per project, per module etc.
Insurance	Per policy, Per claim, Per TPA etc.

The costing should be comprehensive enough to show the effects like off-season and peak-season demand, full time, part time, etc.

Key Performance Indicator (KPI)

Key Performance Indicators (KPIs) are the quantitative and qualitative factors which are commonly used to assess the performance of an organization which are important to achieve its goal. Like calculation of cost for a cost unit, calculation of cost or revenue per KPI helps to the performance against industry standards. For example, in case of Telecom industry Average Return per User (ARPU) is a key indicator, shows average revenue generated from a user of its services. The list below shows few important KPIs for some Service Industries:

Industry	KPI	Meaning
Transportation	Number of Shipments,	This logistics metric monitors the number of orders that are shipped out of the warehouse.
	Truck Turnaround Rate (Truck Turning),	The time from when a delivery truck enters the warehouse to collect or deliver products to when it exits the facility.
	Lead Time (Order Cycle Time)	The amount of time in between order placement by customer and receipt of order.
	On-Time and In-Full (OTIF)	The number of orders delivered according to the schedule and quantity specified.
Hotel Industry	Cost per Occupied Room (CPOR)	The average cost per occupied room.
	Occupancy Rate	The ratio of rented or used rooms to the total amount of available rooms.
	Revenue per available room (RevPAR)	The average revenue per available room days.
Hospitals/ Health care Industry	Bed Occupancy Rate	The proportion of hospital beds in use at any one time.
	Staff-To-Patient Ratio	The number of staff resources present to attend to the patients in a hospital over a certain period of time.
	Average Treatment Charge	The average amount that a facility charges a patient for a treatment.
IT & ITES sector	Gross Burn Rate	The rate at which the company uses up its available cash to cover operating expenses.
	Customer Acquisition Cost (CAC)	The amount it takes to attract new customers.
	Customer Lifetime Value (CLV)	The typical net profit a company generates over the entire life cycle of a single customer.

	Monthly Recurring Revenue (MRR)	The amount earned each month through subscription renewals, new sales, upsells, and fluctuations on a monthly basis.
	Churn Rate	The percentage of customers that cancel their recurring subscriptions over a given time period.
	Cost Per Feature	How much a specific feature costs your business, based on usage and cloud costs.
Telecom	Average return per user (ARPU)	How much money a company is making for each person using its service.
	Subscriber acquisition cost (SAC)	Costs involved with gaining new subscribers.
	Network Operating Cost	Expenditure incurred on continual upkeep to telecom's network.
	Gross Revenue Retention (GRR)	How well a company is retaining its customers based on factors such as sales price increases, organic customer growth, and more.
Education Sector	Instructional Costs	The cost of part-time and full-time faculty members
	Administrative Costs Per Student.	How much an institution is spending on administrative services on a per-student basis.
	Tuition Costs	Costs accrued by students on a semester or annual basis.
	Student-to-Faculty Ratio	The number of students per faculty member, on a campus-wide basis or by department.
Insurance Sector	Average Cost Per Claim	The average cost of each claim made.
	Components of Claim Costs (CCC)	Costs which are associated with a claim like legal fees, time to settle, administration costs, and report delays.
	Cost Per Quote	The costs that the company incurs in order to get a quote in front of a potential client.
	Administrative Costs Per Policy	The cost of the policy administration to number of policies outstanding.
	Average Policy Size	The total amount of premium collected by the number of policies issued for a given time period.

Methods for ascertaining Service Cost Unit**Composite Cost Unit**

Sometime two measurement units are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometer.

Examples of Composite units are Tonne- km., Quintal- km, Passenger-km., Patient- day etc.

Composite unit may be computed in two ways.

- i. Absolute (Weighted Average) basis.
- ii. Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

Weighted Average or Absolute basis – It is a summation of the products of qualitative and quantitative factors. For example, to calculate absolute Tonne-Km for a goods transport is calculated as follows.:

$$\Sigma(\text{Weight Carried} \times \text{Distance})_1 + (\text{Weight Carried} \times \text{Distance})_2 + \dots + (\text{Weight Carried} \times \text{Distance})_n$$

Similarly, in case of Cinema theatres, price for various classes of seats is fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second Class seat – to ensure proper cost per composite unit.

Simple Average or Commercial Basis – It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Tonne-Km is arrived at by multiplying total distance km., by average load quantity.

$$\Sigma(\text{Distance} + \text{Distance} + \dots + \text{Distance } n) \times \left(\frac{W_1 + W_2 + \dots + W_n}{n} \right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

To understand the concept of absolute tonne-km., and commercial tonne-km., the following illustration may be referred.

STATEMENT OF COSTS FOR SERVICE SECTORS

For preparing a statement of cost or a cost sheet for service sector, costs are usually collected and accumulated for a specified period viz. A month, quarter or a year, etc.

The cost statement for services may be prepared either on the basis of functional classification as done for product costing or on the basis of variability. Cost sheet on the basis of variability is prepared classifying all the costs into three different heads:

1. Fixed costs or Standing charges
2. Variable costs or Operating expenses
3. Semi-variable costs or Maintenance expenses

Note: In the absence of information about semi-variable costs, the costs would be shown under fixed and variable heads only.

Treatment of Depreciation- Fixed or Variable?

If related to effluxion of time or calculated on time basis, will be treated as fixed. However, if the depreciation is calculated on the basis of activity level or usage, it will be treated as variable cost.

Treatment of Interest

Interest and finance charges shall be presented in the cost statement as a separate item of cost of sales. In general, interest is treated as fixed cost, unless otherwise given.

APPLICATIONS OF COSTING METHODS IN SERVICE COSTING

Costing techniques vis-a vis Service sector: So far in previous chapters we have learnt how to collect, accumulate and calculate cost for each cost elements like Material, Employee (Labour), Direct expenses and Overheads. We also learnt the various methods of costing like Job & Contract costing, Process & operation costing, Joint products & By products costing. Then again Cost Management techniques like Standard Costing, Budget and budgetary control Marginal costing are also equally applied in service sector.

In general, the service sectors are either Labour or capital intensive or both, that is the reason the proportion of costs of cost elements differs from manufacturing sectors. A manufacturing sector may have higher material cost than the Labour, but in case of service sector the situation reverses.

The system and techniques for cost collection, accumulation and valuation is similar as that has been learnt in previous chapters for each cost elements. The overhead allocation, apportionment and absorption techniques are also very similar.

Method of costing vis-à-vis Service sector: The choice of method of costing depends on nature of service provided. For example, Job costing method may be suitable for a business which is engaged in development of customized software, healthcare etc. Process costing may be suitable for utility business like power, water supplies etc., Joint products costing may be suitable for businesses which are providing bundled service like telecom, event management, educational institutes etc.

COSTING OF TRANSPORT SERVICES

Transport organizations can be divided into two categories viz. Goods transport and Passenger transport.

The cost unit for Goods transport organization is Tone– Kilometer – that means cost of carrying one Tone of goods over a distance of one kilometer.

Cost unit for Passenger transport organization is Passenger– Kilometer – that means cost of carrying one Passenger over a distance of one kilometer.

The costs are shown under the suggestive following heads:

- i. **Standing Charges or Fixed costs:** These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following:
 - Insurance
 - License fees
 - Salary to Driver, Conductor, Cleaners, etc if paid on monthly basis
 - Garage costs, including garage rent
 - Depreciation (if related to efflux of time)
 - Taxes
 - Administration expenses, etc.
- ii. **Variable costs or Running costs:** These costs are generally associated with the distance travelled. These costs include the following:
 - Petrol and Diesel
 - Lubricant oils,
 - Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
 - Depreciation (if related to activity)
 - Any other variable costs identified.
- iii. **Semi-Variable Costs or Maintenance Costs:** These costs include the following:
 - Repairs and maintenance
 - Tyres
 - Spares, etc.

COSTING OF HOTELS AND LODGES

Service costing is an effective tool in respect of hotel industry. Hotels are run on commercial basis. Hence it is necessary to compute the cost - to fix the price of various services provided by the hotel and to find out the profit or loss at the end of a particular period.

In this case, the costs associated with different services offered should be identified and cost per unit should be worked out. The cost unit may be Guest-day or Room Day. For calculation of cost per Guest Day or Room Day, estimated occupancy rate – at different point of time, for example Peak season or lean season, are taken into account.

COSTING OF HOSPITALS

A Hospital is providing various types of medical services to the patients. Hospital costing is applied to decide the cost of these services. A hospital may have different departments catering to varied services to the patients – such as

- Out Patient
- In Patient
- Medical services like X-Ray, Scanning, etc.
- General services like Catering, Laundry, Power house, etc.
- Miscellaneous services like Transport, Dispensary, etc.

Unit of Cost

Common unit of costs of various departments are as follows:

- Out Patient – Per Out-patient
- In Patient – Per Room Day
- Scanning – Per Case
- Laundry – Per 100 items laundered

Cost Segregation

The cost of hospital can be divided into fixed costs and variable costs

Fixed costs are based on timelines and irrespective of services provided. For example, Staff salaries, Depreciation on Building and Equipment, etc.

Variable costs vary with the level of services rendered. For example, laundry charges, Cost of food supplied to patients, Power, etc.

COSTING OF IT & ITES

Information Technology (IT) and Information Technology Enabled Services (ITES) organizations provide their customers with services or intangible products. These organizations are highly Labour intensive.

The services of IT and ITES organizations may be used for – provision of services to outside customers or provision of services internally (captive consumption)

In this sector employee (Labour) cost constitutes a significant portion of the total operating costs. The direct employee cost is traceable to services rendered.

In addition to employee cost, significant overhead costs for offering the services are incurred and are classified as service overhead. To arrive at the cost incurred for rendering the services, it is necessary to allocate / apportion such overheads to cost units.

Concept of Project

In general – IT & ITES industries, the jobs undertaken are considered as Project. Each project is unique in nature and varies in size, functionality requirements, duration and staffing requirements. When a project is taken up, a detailed planning is done – by breaking down the project into number of activities and their dependencies. Based on the above, project scheduling are developed. Then the skill level requirement for carrying out each of the activities is identified and the duration of each and every activity would be ascertained. This process is known as effort estimation. Once the skill level and duration is identified, then required man-power is identified for carrying out the activities. Normally, project scheduling and effort estimation is carried out together. The costs of development are primarily the costs of the effort involved, so the effort computation is used in both the cost and the schedule estimate.

Effort Involved**Direct Manpower**

In a typical software implementation project, three to four levels of man-power would be directly engaged, as mentioned below: -

- Software Engineers / Functional Consultants / Business Analysts
- Project Leaders
- Project Manager
- Program Manager, etc.

Depending on the nature and complexities of the projects being implemented, the number of persons engaged, their levels and duration of the engagement varies. For example, in a multi-continental, multi-time zone software implementation projects, in addition to the above manpower, Customer Account Manager, Portfolio Manager, etc. may be involved. The costs incurred on the above listed manpower are traceable with a project and hence forming part of direct costs of the project.

Support Manpower

In addition to the above persons, who are directly engaged in project, there could be support persons or indirect manpower, who are indirectly involved in the project. For example, Quality Assurance Team, Testing Team, Version Control team, Staffing Manager, etc. who are indirectly support the projects by providing required level of support services over the life of the projects. It is possible that the indirect manpower may be involved in more than one project, simultaneously. Their time spent, may or may not be traced on any particular project and will be used across multiple projects. If their time can be identified with a project, they will be treated as direct manpower. Accordingly, the cost incurred on them will be treated as direct cost. However, if their time is not traceable with a single project, then it may either be allocated or apportioned to various projects on some suitable basis.

Accordingly, the cost incurred on them will be treated as overhead and the same will be apportioned to various projects on some suitable basis. Effort Cost in these types of organizations are calculated on the basis of cost per Person Day or cost per Person week or cost per Person month. That means cost incurred for a person for rendering services per day or per week or per month. Depending on the requirement of the customer, the periodicity will be defined. For example, implementation of new software may require eight to twelve person months. In such a case, the cost will be calculated on Per Person month basis. On the other hand, implementation of one or two new functionality in already implemented (existing) software may require one- or two-week's efforts. In such a case, the cost will be calculated on per Person week basis.

Parameters in Computation of Total Cost

A. Hardware and software costs involved

- If they are identifiable with a project, then they are directly allocated to the project
- If they are not directly identifiable with a project or not fully allocable to a project, then they are treated as service overhead

B. Travel and training costs

- If they are incurred for a project, then they are directly allocated to the project
- If they are not directly identifiable with a project or allocable over a number of projects, then they are treated as service overhead. For example, Java (software language) training provided to the software engineers, may useful in multiple Java based projects. Hence treated as overhead costs

C. Effort costs

- Effort costs are basically identified with a project. They can be classified as direct cost, unless otherwise specified.
- Effort costs are not just the salaries of the software engineers or programmers who are involved in the project. Organizations compute effort costs in terms of overhead costs where they take the total cost of running the organization and divide this by the number of productive staff.

Therefore, the following costs are all part of the total effort cost:

1. Costs of providing, heating and lighting office space
2. Costs of support staff such as accountants, administrators, system managers, cleaners and technicians
3. Costs of networking and communications
4. Costs of central facilities such as a library or recreational facilities
5. Costs of Social Security and employee benefits such as pensions and health insurance, etc.

In short, effort cost includes Salary of the staff concerned and part of common overhead.

COSTING OF TOLL ROADS

The Construction of roads brings about a variety of benefits that are enjoyed practically by all sectors of the economy. Highway economic analysis is a technique whereby the cost and benefit from a scheme are quantified over a selected time horizon and evaluated by a common yardstick.

The economic analysis involves comparison of project costs and benefits under the "with" and "without" project conditions. The project is further subjected to sensitivity analysis by assessing the effects of adverse changes in the key variables. In addition, the combined effect of these changes is also assessed. This helps to gauge the economic strength of the project to withstand future risks and uncertainties.

Cost Involved

The project cost consists of following two main components:

Capital Costs

The capital cost consists of cost incurred during the construction period. Generally, this sort of road construction projects run across multiple financial years. The total expenditure to be incurred during the construction period is termed as capital cost. The total cost includes the cost of construction of road and other structures and consultancy charges. In addition to this cost, it also includes the cost of construction of tollbooths.

Construction expenses can be broadly classified as follows:

- Preliminary and pre-operative expenses
- Land Acquisition
- Materials
- Labour
- Overheads incurred in the course of actual construction
- Contingency allowance
- Interest during construction period

Operating and Maintenance Costs

Routine maintenance cost would be incurred once the Toll road is operational. Routine maintenance involves Patching of potholes, sealing of cracks, Edge Repair, Surface Renewal, Periodic maintenance for new highways would be met with in accordance with the analysis of the life cycle model carried out for the project.

Annual operating cost includes the cost of operating tollbooths, administrative expenses, emergency services, communications and security services and other costs of operation.

Maintenance cost includes the cost of annual maintenance (routine) and periodic maintenance.

- Annual maintenance cost includes primary maintenance of wearing surface, railings, roadside furniture, etc.
- Periodic maintenance cost includes the cost of overlays (wearing coats), painting of railings, etc.

Operating and Maintenance expenses can be broadly classified as follows:

- Toll collection expenses
- Administrative expenses for day-to-day operation.
- Maintenance expenses, which include routing and periodic maintenance.
- Interest expenses incurred for servicing term loans.

Build-Operate-Transfer (BOT) Approach

In recent years a growing trend emerged among Governments in many countries to solicit investments for public projects from the private sector under BOT scheme. BOT is an option for the Government to outsource public projects to the private sector.

With BOT, the private sector designs, finances, constructs and operate the facility and eventually, after specified concession period, the ownership is transferred to the Government. Therefore, BOT can be seen as a developing technique for infrastructure projects by making them amenable to private sector participation.

The fundamental principle in determining user levy is, 'if the price for a transport facility is set at a level that reflects the benefit, each user gains from improvements in the facility, it will result in traffic flow levels that equate social costs with user benefits.'

Toll Rate

In general, the toll rate should have a direct relation with the benefits that the road users would gain from its improvements. The benefits to road users are likely to be in terms of fuel savings, improvement in travel time and good riding quality.

To compute the toll rate following formula with rounding off to nearest multiple of five has been adopted:

$$\text{User Fee} = \text{Total Distance} \times \text{Toll Rate per km}$$

COSTING OF EDUCATIONAL INSTITUTIONS

Educational institutions like schools, colleges, technical institutes for education and training, are run to impart education and training to students. The objective of running these institutions may be 'Not-for profit' or 'For profit'. Like other business entities, cost and management accounting is also inevitable for this sector. The Government, Local body of any other organization which provides education and training to students with an objective to benefit and upliftment of the society, are also need cost and management accounting system for cost-social benefit analysis, allocation of funds and budgeting (zero-based budgeting), performance measurement and evaluation etc.

Income of the Educational Institutions:

The source of income of an institute may be classified on the basis of recurrence as follows:

One-time fees: These are the fees which are collected once in a course period or for a definite period like Admission fee, Development fee, Annual fee etc.

Recurring fees: Tuition fee, laboratory, computer and internet fee, library fee, training fee, amenities fee, sports fee, extracurricular activities fee etc.

The Government and other aided institutes may not be permitted to collect various fees like capitation fee and development fees etc. Further, unlike the trading and manufacturing organizations, these are not free to determine fees beyond a prescribed limit.

Other incomes: The indirect income like transport, hostel, mess and canteen for the students and staff are provided by the educational institutions normally on no profit no loss basis.

Expenditure of the Educational Institutions:**Operational Cost:**

Following are the major operational costs incurred by an educational institution:

- The salary of the teaching and non-teaching staff
- Laboratory maintenance charges
- Computer maintenance and internet charges,
- Building maintenance,
- Repairs and maintenance of equipment,
- Administrative expenses,
- Finance charges etc.

Cost Centres and basis of cost allocation:

Cost centres in educational institutions are classified as follows:

- Primary or Direct cost centres (like Civil Engineering department, Mechanical Engineering department, etc.)
- Service cost centres (like Laboratory, Library, Sports, etc.)
- Student's Self-Supporting Services (like Transport, Hostel & Mess, etc.)
- Administration Cost centres (like Research & Improvement, Examination)

Costs incurred are allocated to the respective cost centres, if they are identifiable with a cost centre and apportioned to service and administration cost centres on suitable basis.

Research and Development Cost

Educational institutions undertake academic research on various fields of specializations. The costs of such research including personal costs, books etc. are to be collected through a cost centre approach. All costs incurred in that cost centre are collected and set off against the revenue generated from such research projects.

If any balance is left out as undistributed, then such balance costs can be collectively distributed to all other course cost centre as a separate cost element namely "Research costs".

Cost of Publication of research and other materials

In an educational institution, there will be a separate department for conducting research publication related exercise. The cost incurred would be directly allocated to that department.

COSTING IN INSURANCE COMPANIES

Insurance or assurance industry operates in providing social security to the persons who subscribe for the policy. The Insurance companies are broadly classified as Life insurer and Non-Life Insurer (General Insurance providers). Life insurers provide assurance to the policy holders' life for the insured value. The Non-life insurers are providing insurance to the policyholder for actual loss up to insured value for the policy.

The insurance companies are need to analyses it various insurance product for profitability.

The product offered by insurance companies may include:

- i. Life Insurance policies- with or without maturity benefits
- ii. General insurance- Health, Fire, Property, Travel Insurance etc.
- iii. Others services- Re-insurance, Fund management- Pension, Gratuity and other etc.

Income of Insurance Companies

Income of insurance companies may include

- i. Premium on policy (periodic or onetime)
- ii. Commission on re-insurance
- iii. Fund administration fee and return on investment of funds etc.

Expenditure of Insurance Companies

The Expenditure of an insurance company can be classified as direct and indirect to a policy or product.

Direct- Commission paid to agents, claim settlement, cost of valuation, premium for re-insurance, legal and other costs etc.

Indirect Cost- Actuarial fees, market and product development costs, administration cost, asset management cost etc.

Method of Costing in an Insurance Company

The cost object in an insurance company may be a product, a policy, a department or region, an agent etc.

Activity Based Costing in Insurance Companies

Activity based costing (ABC) is used for analysis of cost-benefit of a product (Direct Product Profitability), policy profitability (Customer Profitability Analysis) etc.

Costs that occur in insurance companies are to be identified with appropriate activities that have caused its occurrence. Then costs must be reassigned from activities to cost objects (insurance contracts and policies, customers, delivery channels) based on identified cost drivers.

Identification of activities and assignment of costs are the most critical for the implementation of activity-based costing. The activities can be divided into two parts i.e. (i) Pre-product development activities and (ii) Post product development activities.

- i. **Pre-product development activities:** These are the activities which are carried out before a product is made. It includes market research, product development like specification of coverage, conditions, amount of premium, insurance contract, policy forms and provision for sales channel etc.
- ii. **Post product development activities:** This activity is further divided into parts i.e. (a) Selling of policy and (b) Processing of claims. (a) Selling of policy refers to appointment of distribution of sales channel (direct selling or through agencies), soliciting for policy, processing of applications etc. (b) Processing of claim includes claim inception, claim estimation, claim settlement and legal actions.

The activities costs are assigned to the products on the basis of appropriate cost drivers. The cost drivers may include no. of hours spent on processing of an application and claim processing, no. of application, no. of policy, no. of claim etc.

COSTING IN FINANCIAL INSTITUTIONS

In the past two-decade financial institutions have undergone major changes – in terms to increased regulations, competition from new entrants from both locally and globally, innovation of new products and services, technological advancement and increased expectations of new generation customers, etc.

Over and above the challenges posed by the prevailing environment as described above, financial institutions underwent considerable changes in terms of its high quality, sensitive staffing requirements and its productivity.

Manpower cost, other than interest cost and finance charges, is one of the largest single cost components in financial institutions. Hence, it is needless to say, that financial institutions are more interested in understanding and discovering the ways to more accurately allocate such costs to various product ranges offered by them and its customers.

If the financial institution is to survive under the present challenging economic conditions, it will have to add value to its products and services. It is imperative to note that the financial institution needs to know the contribution of its products, services and customers to value creation.

Cost Measurement in Financial Institutions

The objectives of cost measurement include –

- Understand the profitability by products offered and by customers
- Establishing a mechanism for pricing the products, by identifying the product level and activity level unit costs
- Understanding productivity issues and their relationship with strategic goals of the organization

In nutshell, financial institutions need to understand their position in various product lines and to find out how they can stay in competing edge or become a leader.

Activity Based Costing in Financial Institutions

Activity based costing can be a useful tool in allocating the cost elements to various products offered and the customers being serviced.

Activity based costing can help financial institutions to –

- Identify and analyze the profitability by product
- Analyze the profitability by customer
- Identify the activity level unit costs and build up product level costs, which in turn forms basis for product level pricing / customer level pricing

Financial institutions can improve their profitability by –

- Concentrating on products that are more profitable
- Focus on high margin customers

Costs that occur in financial institutions are to be identified with appropriate activities that have caused its occurrence. Then costs must be reassigned from activities to cost objects (various loan products offered by the organization, customers, etc.) based on identified cost drivers.

The concepts on activity-based costing as discussed under Costing of Insurance Companies also applicable to financial institutions. Please refer the same.

OTHER SERVICES- COSTING FOR POWER HOUSES

Power houses are engaged either in electricity generation or steam generation use the concepts of service costing i.e., 'Powerhouse Costing.' Service cost statement can be prepared by identifying the costs associated with the power generation or steam generation.

Cost unit is different for electricity generation and steam generation.

The cost unit for electricity generation organization is cost per kilowatt-hour (kWh) – that means cost of generating one kilowatt of power per hour. Please note that kWh is commonly known as a "Unit".

The costs are shown under the following heads:

- i. **Standing Charges or Fixed costs:** These are the fixed costs that remain constant irrespective of the power or stream generated. These costs include the following:
 - Rent, Rates & Taxes
 - Insurance
 - Depreciation
 - Salaries, if paid on Time (Monthly) basis
 - Administration expenses, etc.
- ii. **Variable costs or Running costs:** These costs are generally associated with the power or stream generated. These costs include the following:
 - Fuel Charges
 - Water Charges
 - Wages / Labour charges, if paid on the basis of production
 - Any other variable costs identified.
- iii. **Semi-variable costs or Maintenance costs:** These costs include the following:
 - Meters
 - Furnaces
 - Service materials
 - Tools, etc.

QUESTIONS FOR CLASSROOM DISCUSSION**PROBLEM – 1**

A Lorry starts with a load of 20 MT of Goods from Station A. It unloads 8 MT in Station B and balance goods in Station C. On return trip, it reaches Station A with a load of 16 MT, loaded at Station C. The distance between A to B, B to C and C to A are 80 Kms, 120 Kms and 160 Kms, respectively. COMPUTE "Absolute MT Kilometer" and "Commercial MT-Kilometer".

(MT Metric Ton or Ton)

PROBLEM – 2

ABC Transport Company has given a route 40 kilometers long to run bus

1. The bus costs the company a sum of ₹ 10,00,000
2. It has been insured at 3% p.a. and
3. The annual tax will amount to ₹ 20,000
4. Garage rent is ₹ 20,000 per month.
5. Annual repairs will be ₹ 2,04,000
6. The bus is likely to last for 2.5 years
7. The driver's salary will be ₹ 30,000 per month and the conductor's salary will be ₹ 25,000 per month in addition to 10% of takings as commission [To be shared by the driver and conductor equally.
8. Cost of stationery will be ₹ 21,000 per month.
9. Manager-cum-accountant's salary is ₹ 17,000 per month.
10. Petrol and oil will be ₹ 500 per 100 kilometers.
11. The bus will make 3 up and down trips carrying on an average 40 passengers on each trip.
12. The bus will run on an average 25 days in a month.

Assuming 15% profit on takings, CALCULATE the bus fare to be charged from each passenger.

PROBLEM – 3

SMC is a public school having five buses each plying in different directions for the transport of its school students. In view of a larger number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning the first trip picks up senior students and the second trip plying an hour later picks up the junior students. Similarly, in the afternoon the first trip takes the junior students and an hour later the second trip takes the senior students' home.

The distance travelled by each bus one way is 8 km. The school works 25 days in a month and remains closed for vacation in May, June and December. The bus fee, however, is payable by the students for all 12 months in a year. The details of expenses for a year are as under.

Driver's salary	₹ 4,500 per month per driver
Cleaner's salary (Salary payable for all 12 months) (one cleaner employed for all the five buses)	₹ 3,500 per month
License fee, taxes, etc.	₹ 8,600 per bus per annum
Insurance	₹ 10,000 per bus per annum
Repairs & maintenance	₹ 35,000 per bus per annum
Purchase price of the bus	₹ 15,00,000 each
Life of each bus	12 years
Scrap value of buses at the end of life	₹ 3,00,000
Diesel cost	₹ 45.00 per liter

Each bus gives an average mileage of 4 km per liter of diesel

The seating capacity of each bus is 50 students.

The seating capacity is fully occupied during the whole year.

Students picked up and dropped within a range up to 4 km. of distance from the school are charged half fare and fifty per cent of the students travelling in each trip are in this category. Ignore interest.

Since the charges are to be based on average cost you are required to:

1. PREPARE a statement showing the expenses of operating a single bus and the fleet of five buses for a year.
2. WORK OUT the average cost per student per month in respect of -
 - a. students coming from a distance of up to 4 km. from the school and
 - b. students coming from a distance beyond 4 km. from the school

PROBLEM – 4

GTC has a lorry of 6-ton carrying capacity. It operates a lorry service from city A to city B. It charges ₹ 2,400 per ton from city 'A' to city B and ₹ 2,200 per ton for the return journey from city 'B' to city 'A'. Goods are also delivered to an intermediate city 'C' but no concession or reduction in rates is given. Distance between the city A to B is 300 km and the distance from city 'A' to 'C' is 140 km.

In January 20x1, the truck made 12 outward journeys for city B. The details of journeys are as follows:

Outward journey	No. of journeys	Load (in ton)
A to B	10	6
A to C	2	6
C to B	2	4

Return journey	No. of journeys	Load (in ton)
B to A	5	8
B to A	6	6
B to C	1	6
C to A	1	0

Annual fixed costs and maintenance charges are ₹ 6,00,000 and ₹ 1,20,000 respectively. Running charges spent during January 20x1 are ₹ 2,94,400 (includes ₹ 12,400 paid as a penalty for overloading)

You are required to:

1. CALCULATE the cost as per (a) Commercial ton-kilometre. (b) Absolute ton kilometre
2. CALCULATE Net Profit/ Loss for the month of January, 20x1

PROBLEM – 5

A chemical factory runs its boiler on furnace oil obtained from Indian Oil and Bharat Petroleum, whose depots are situated at a distance of 12 km and 8 km from the factory site. Transportation of furnace oil is made by the company's own tank Lorries of 5-tonne capacity each. Onward trips are made only on full load and the Lorries return empty. The filling-in time takes an average of 40 minutes for Indian Oil and 30 minutes for Bharat Petroleum. But the emptying time in the factory is only 40 minutes for all. From the records available, it is seen that the average speed of the company's Lorries works out to 24 km per hour. The varying operating charges average 60 paise per km covered and fixed charges give an incidence of ₹ 7.50 per hour operation.

Calculate the cost per tonne-mile from each source.

PROBLEM – 6

A company is considering three alternative proposals for conveyance facilities for its sales personnel who has to do considerable travelling, approximately 20,000 kilometers every year. The proposals are as follows:

- i. Purchase and maintain its own fleet of cars. The average cost of a car is ₹ 6,00,000.
- ii. Allow the Executive to use his own car and reimburse expenses at the rate of 10 per kilometer and also bear insurance costs.
- iii. Hire cars from an agency at ₹ 1,80,000 per year per car. The company will have to bear the costs of petrol, taxes and tyres.

The following further details are available:

Petrol ₹ 6 per km.	Repairs and maintenance 0.20 per km.
Tyre ₹ 0.12 per km.	Insurance ₹ 1,200 per car per annum
Taxes ₹ 800 per car per annum	Life of the car: 5 years with an annual mileage of 20,000 km.

Resale value: ₹ 80,000 at the end of the fifth year.

WORK OUT the relative costs of three proposals and rank them.

PROBLEM – 7

Mr. X owns a bus which runs according to the following schedule:

(i)	Delhi to Chandigarh and back, the same day.	
	Distance covered:	250 km. one way.
	Number of days run each month:	8
	Seating capacity occupied	90%.
(ii)	Delhi to Agra and back, the same day.	
	Distance covered:	210 km. one way
	Number of days run each month:	10
	Seating capacity occupied	85%
(iii)	Delhi to Jaipur and back, the same day.	
	Distance covered:	270 km. one way
	Number of days run each month:	6
	Seating capacity occupied	100%
(iv)	Following are the other details:	
	Cost of the bus	Rs. 12,00,000
	Salary of the Driver	Rs. 24,000 p.m.
	Salary of the Conductor	Rs. 21,000 p.m.
	Salary of the part-time Accountant	Rs. 5,000 p.m.
	Insurance of the bus	Rs. 4,800 p.a.
	Diesel consumption 4 km. per litre at	Rs. 56 per litre
	Road tax	Rs. 15,915 p.a.
	Lubricant oil	Rs. 10 per 100 km.
	Permit fee	Rs. 315 p.m.
	Repairs and maintenance	Rs. 1,000 p.m.
	Depreciation of the bus	@ 20% p.a.
	Seating capacity of the bus	50 persons.

Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys:

- i. Delhi to Chandigarh ii. Delhi to Agra and iii. Delhi to Jaipur.

PROBLEM – 8

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹ 10,000 per month along with 5% of the total taking. It has three types of suites for its customers, viz, single room, double rooms and triple rooms.

The following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of a double room's suite is to be fixed at 2.5 times of the single room suite and that of triple room's suite as twice of the double room's suite.

The other expenses for the year 20x1 are as follows:

Staff salaries	₹ 14,25,000
Room attendants' wages	₹ 4,50,000
Lighting, heating and power	₹ 2,15,000
Repairs and renovation	₹ 1,23,500
Laundry charges	₹ 80,500
Interior decoration	₹ 74,000
Sundries	₹ 1,53,000

Provide profit 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite

PROBLEM – 9

A lodging home is being run in a small hill station with 100 single rooms. The home offers concessional rates during six off-season months in a year when the number of visitors is limited. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent.

The following are the cost estimates and other details for the year ending on 31st March 20x1. (Assume a month to be of 30 days).

- Occupancy during the season is 80% while in the off-season it is 40% only.
- Total investment in the home is 200 lakhs of which 80% relate to buildings and balance for furniture and equipment.
- Expenses:

Staff salary (Excluding room attendants):	₹ 5,50,000
Repairs to building	₹ 2,61,000
Laundry charges	₹ 80,000
Interior	₹ 1,75,000
Miscellaneous expenses	₹ 1,90,800

- iv. Annual depreciation is to be provided for buildings @ 5% and on furniture and equipment @ 15% on a straight-line basis.
- v. Room attendants are paid 10 per room day on the basis of occupancy of the rooms in a month.
- vi. Monthly lighting charges are ₹ 120 per room, except in four months in winter when it is 30 per room.

You are required to WORK OUT the room rent chargeable per day both during the season and the off-season months on the basis of the foregoing information.

PROBLEM – 10

ABC Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, it required

Rent per month	₹ 75,000
Supervisors - 2 persons	₹ 25,000 Per month - each
Nurses - 4 persons	₹ 20,000 per month - each
Ward Boys - 4 persons	₹ 5,000 per month - each

Doctors paid ₹ 2,50,000 per month-paid on the basis of the number of patients attended and the time spent by them.

Other expenses for the year are as follows:

Repairs (Fixed)	₹ 81,000
Food to Patients (Variable)	₹ 8,80,000
Other services to patients (Variable)	₹ 3,00,000
Laundry charges (Variable)	₹ 6,00,000
Medicines (Variable)	₹ 7,50,000
Other fixed expenses	₹ 10,80,000
Administration expenses allocated	₹ 10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied.

The hospital hired 750 beds at a charge of 100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required

- CALCULATE profit per patient day, if the hospital recovers on an average ₹ 2,000 per day from each patient
- FIND OUT Breakeven point for the hospital.

PROBLEM – 11

Following are the data pertaining to InfoTech Pvt. Ltd. for the year 20x1-x2:

Particulars	Amount
Salary to Software Engineers (5 persons)	₹ 15,00,000
Salary to Project Leaders (2 persons)	₹ 9,00,000
Salary to Project Manager	₹ 6,00,000
Repairs & maintenance	₹ 3,00,000
Administration overheads	₹ 12,00,000

The company executes a Project XYZ, the details of the same as are as follows:

- Project duration - 6 months
- One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas the Project Manager spends 2 months of effort, during the execution of the project.
- Travel expenses incurred for the project - ₹ 1,87,500
- Two Laptops were purchased at a cost of ₹ 50,000 each, for use in the project and the life of the same is estimated to be 2 years. PREPARE Project cost sheet.

PROBLEM – 12

BHG Toll Plaza Ltd built a 60 km. long highway and now operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that a total of 12 crore vehicles (only single type of vehicle) will be using the highway during the 10 years toll collection tenure.

Toll Operating and Maintenance costs for the month of April 20x1 are as follows:

i. Salary to

Collection Personnel (3 Shifts and 4 persons per shift)	₹ 550 per day per person
Supervisor (2 Shifts and 1 person per shift)	₹ 750 per day per person
Security Personnel (3 Shifts and 6 persons per shift)	₹ 450 per day per person
Toll Booth Manager (2 Shifts and 1 person per shift)	₹ 900 per day per person

ii. Electricity - ₹ 8,00,000

iii. Telephone - ₹ 1,40,000

iv. Maintenance cost - ₹ 30 Lakh

Monthly depreciation and amortization expenses will be ₹ 1.5 crores. Further, the company needs 25% profit over the total cost to cover interest and other costs.

Required:

- CALCULATE cost per kilometer per month.
- CALCULATE the toll rate per vehicle.

PROBLEM – 13

SLS Infrastructure built and operates 110 km. highways on the basis of Built Operate-Transfer (BOT) for a period of 25 years. A traffic assessment carried out to estimate the traffic flow per day shows the following figures:

SL No.	Type of vehicle	Daily traffic volume
1	Two wheelers	44,500
2	Car and SUVs	3,450
3	Bus and LCV	1,800
4	Heavy commercial vehicles	816

The following is the estimated cost of the project

SL No.	Activities	Amount (In lakhs)
1	Site clearance	₹ 170.70
2	Land development and filling work	₹ 9,080.35
3	Sub base and base courses	₹ 10,260.70
4	Bituminous work	₹ 35,070.80
5	Bridge, flyovers, underpasses, pedestrian subway, footbridge	₹ 29,055.60
6	Drainage and protection work	₹ 9,040.50
7	Traffic sign, marking and road appurtenance	₹ 8,405.00
8	Maintenance, repairing and rehabilitation	₹ 12,429.60
9	Environmental management	₹ 982.00
	Total Project cost	₹ 1,14,495.25

An average cost of ₹ 1,120 lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e., weight, size, time-saving etc.), the following weights have been assigned to the passing vehicles:

Sl. No.	Type of vehicle	%
1	Two wheelers	5%
2	Car and SUVs	20%
3	Bus and LCV	30%
4	Heavy commercial vehicles	45%

Required:

- i. CALCULATE the total project cost per day of the concession period.
- ii. COMPUTE toll fee to be charged for, per vehicle of each type, if the company wants to earn a profit of 15% on the total cost.

[Note: Concession period is a period for which infrastructure is allowed to operate and recovers its investment]

PROBLEM – 14

AD Higher Secondary School (AHSS) offers courses for 11 & 12 standards in three streams i.e. Arts Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes, but for accounting purposes, it treats higher secondary as a separate responsibility center. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year.

Particulars	Amount
Teachers' salary (25 teachers x 35,000 x 12 months)	₹ 1,05,00,000
Principal's salary	₹ 14,40,000
lab attendants' salary (2 attendants x 15,000 x 12 months)	₹ 3,60,000
Salary to library staff	₹ 1,44,000
Salary to peons (4 peons x 10,000 x 12 months)	₹ 4,80,000
Salary to other staffs	₹ 4,80,000
Examinations expenditure	₹ 10,80,000
Office & Administration cost	₹ 15,20,000
Annual day expenses	₹ 4,50,000
Sports expenses	₹ 1,20,000

Other information:

i.

Particulars	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 Hrs	120 Hrs	240 Hrs	60 Hrs
Time spent by principal for administration	208 Hrs	312 Hrs	480 Hrs	1,400 Hrs
Teachers for 11 & 12 standard	4	5	6	10

- iii. One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.
- iv. There is another teacher who teaches mathematics for science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year; it includes 160 classes for commerce students.
- v. One peon is fully dedicated to the higher secondary section. Other peons dedicate their 15% time to the higher secondary section.
- vi. All school students irrespective of section and age participate in annual functions and sports activities.

Required:

- a. CALCULATE cost per student per annum for all three streams.
- b. If the management decides to take a uniform fee of 1,000 per month from all higher secondary students, CALCULATE streamwise profitability.
- c. If management decides to take 10% profit on cost. COMPUTE fee to be charged from the students of all three streams respectively,

PROBLEM – 15

Sanziet Life care Ltd. operates in the life insurance business. Last year it launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'.

The company has incurred the following expenditures during the last year for the policy.

Particulars	Amount
Policy development cost	₹ 11,25,000
Cost of marketing of the policy	₹ 45,20,000
Sales support expenses	₹ 11,45,000
Policy issuance cost	₹ 10,05,900
Policy servicing cost	₹ 35,20,700
Claims management cost	₹ 1,25,600
IT cost	₹ 74,32,000
Postage and logistics	₹ 10,25,000
Facilities cost	₹ 15,24,000
Employees cost	₹ 5,60,000
Office administration cost	₹ 16,20,400

Number of policies sold- 528

Total insured value of policies 1,320 crores.

Required:

- i. CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support. (b) Operations, (c) IT and (d) Support functions.

- ii. CALCULATE cost per policy.
- iii. CALCULATE cost per rupee of insured value.

PROBLEM – 16

The loan department of a bank performs several functions in addition to the home loan application processing task. It is estimated that 25% of the overhead costs of the loan department are applicable to the processing of home-loan applications.

The following information is given concerning the processing of a loan application:

Particulars	Amount
Direct professional Labour: Loan processor monthly salary: (4 employees@ ₹ 60,000 each)	₹ 2,40,000
Loan department overhead costs (monthly):	
Chief loan officer's salary	₹ 75,000
Telephone expenses	₹ 7,500
Depreciation Building	₹ 28,000
Legal advice	₹ 24,000
Advertising	₹ 40,000
Miscellaneous	₹ 6,500
Total overhead costs	₹ 1,81,000

You are required to COMPUTE the cost of processing home loan applications on the assumption that five hundred home loan applications are processed each month.

PROBLEM – 17

PREPARE the cost statement of Ignus Thermal Power Station showing the cost of electricity generated per kWh, from the data provided below pertaining to the year 20x2-20x3.

Total units generated 20,00,000 kWh

	Amount ₹
Operating labour	30,00,000
Repairs & maintenance	10,00,000
Lubricants, spares and stores	8,00,000
Plant supervision	6,00,000
Administration overheads	40,00,000

5 kWh. of electricity generated per kg of coal consumed @ Rs. 4.25 per kg. Depreciation charges @ 5% on capital cost of ₹ 5,00,00,000.

PROBLEM – 18

Solar Power Ltd. has a power generation capacity of 1000 Megawatt per day. On an average it operates at 85% of its installed capacity. The cost structure of the plant is as under:

	Cost particulars	Amount (Rs. in Lakh)
1.	Employee cost per year	2500
2.	Solar panel maintenance cost per year	250
3.	Site maintenance cost per year	150
4.	Depreciation per year	5940

CALCULATE cost of generating 1kW of power.[1 Megawatt = 1,000 kW]

CHAPTER 16: COSTING THEORY

Basic Concepts

Q1. Why are cost and management accounting information are required by the staff at operational level? Describe. May'18

Answer

Operational level staffs - The operational level staffs like supervisors, foreman, team leaders are requiring information

- i. to know the **objectives and performance goals** for them
- ii. to know **product and service specifications** like volume, quality and process etc.
- iii. to know the **performance parameters** against which their performance is measured and evaluated.
- iv. to know **divisional (responsibility centre) profitability** etc.

Q2. Explain Opportunity Cost

Answer

This cost refers to the **value of sacrifice made or benefit of opportunity foregone** in accepting an alternative course of action. For example, a firm financing its expansion plan by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.

Q3. Discuss on Discretionary Cost Centre and Investment Centre. RTP May'18; RTP Nov 20

Answer

Discretionary Cost Centre: The cost centre whose output **cannot be measured in financial terms**, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and correlated with cost incurred on inputs.

Investment Centres: These are the responsibility centres which are not only responsible for profitability but also **has the authority to make capital investment decisions**. The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

Q4. Discuss the essential features of a good cost accounting system. RTP Nov'18; MTP Oct'19**Answer**

The essential features, which a good cost and management accounting system should possess, are as follows:

- i. **Informative and simple:** Cost and management accounting system should be tailor-made, practical, simple and capable of meeting the requirements of a business concern. The system of costing should not sacrifice the utility by introducing meticulous and unnecessary details.
- ii. **Accurate and authentic:** The data to be used by the cost and management accounting system should be accurate and authenticated; otherwise, it may distort the output of the system and a wrong decision may be taken.
- iii. **Uniformity and consistency:** There should be uniformity and consistency in classification, treatment and reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.
- iv. **Integrated and inclusive:** The cost and management accounting system should be integrated with other systems like financial accounting, taxation, statistics and operational research etc. to have a complete overview and clarity in results.
- v. **Flexible and adaptive:** The cost and management accounting system should be flexible enough to make necessary amendments and modification in the system to incorporate changes in technological, reporting, regulatory and other requirements.
- vi. **Trust on the system:** Management should have trust on the system and its output. For this, an active role of management is required for the development of such a system that reflects a strong conviction in using information for decision making.

Q5. Distinguish between Cost Control and Cost Reduction. RTP Nov'18; MTP Aug'18; RTP May'19; MTP April'19; May'19**Answer**

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	1. Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	2. Cost reduction recognises no condition as permanent, since a change will result in lower cost.

3. In case of cost control, emphasis is on past and present	3. In case of cost reduction, it is on present and future.
4. Cost control is a preventive function	4. Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	5. Cost reduction has no visible end.

Q6. Explain the difference between controllable & uncontrollable costs? RTP Nov'18; MTP Mar'19
Answer:
Controllable costs and Uncontrollable costs:

Cost that can be **controlled**, typically **by** a cost, profit or investment centre **manager** is called **controllable cost**. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre.

Costs which **cannot be influenced** by the action of a specified member of an undertaking are known as **uncontrollable costs**.

Q7. Differentiate between Cost Accounting and Management Accounting. RTP Nov'19; RTP May'20
Answer

		Cost Accounting	Management Accounting
i.	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
ii.	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
iii.	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
iv.	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
v.	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
vi.	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

Q8. Discuss cost classification based on variability. MTP Mar'18**Answer****Cost classification based on variability**

- i. **Fixed Costs** – These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output.
For example, rent, insurance of factory building etc., remain the same for different levels of production.
- ii. **Variable Costs** – These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.
- iii. **Semi-variable Costs** – These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Q9. Discuss the four different methods of costing along with their applicability to concerned industry? MTP Mar'18**Answer:**

Four different methods of costing along with their applicability to concerned industry have been discussed as below:

- i. **Job Costing:** The objective under this method of costing is to ascertain the cost of each job order. A job card is prepared for each job to accumulate costs. The cost of the job is determined by adding all costs against the job it has incurred. This method of costing is used in printing press, foundries and general engineering workshops, advertising etc.
- ii. **Batch Costing:** This system of costing is used where small components/ parts of the same kind are required to be manufactured in **large quantities**. Here batch of similar products is treated as a job and cost of such a job is ascertained as discussed under (1), above. If in a cycle manufacturing unit, rims are produced in batches of 2,500 units each, then the cost will be determined in relation to a batch of 2,500 units.
- iii. **Contract Costing:** If a job is very big and takes a long time for its completion, then method used for costing is known as Contract Costing. Here the cost of each contract is ascertained separately. It is suitable for firms engaged in the construction of bridges, roads, buildings etc.
- iv. **Operating Costing:** The method of Costing used in service rendering undertakings is known as operating costing. This method of costing is used in undertakings like transport, supply of water, telephone services, hospitals, nursing homes etc.

Q10. Discuss the prerequisite of installing cost accounting system. MTP Aug'18**Answer:**

Before setting up a system of cost accounting the under mentioned factors should be studied:

- i. **Objective:** The objective of costing system, for example whether it is being introduced for fixing prices or for insisting a system of cost control.
- ii. **Nature of Business or Industry:** The Industry in which business is operating. Every business industry has its own peculiarity and objectives. According to its cost information requirement cost accounting methods are followed. For example, an oil refinery maintains process wise cost accounts to find out cost incurred on a particular process say in crude refinement process etc.
- iii. **Organisational Hierarchy:** Costing system should fulfil the information requirements of different levels of management. Top management is concerned with the corporate strategy, strategic level management is concerned with marketing strategy, product diversification, product pricing etc. Operational level management needs the information on standard quantity to be consumed, report on idle time etc.
- iv. **Knowing the product:** Nature of product determines the type of costing system to be implemented. The product which has **by-products** requires costing system which account for by-products as well. In case of **perishable or short self-life**, marginal costing method is required to know the contribution and minimum price at which it can be sold.
- v. **Knowing the production process:** A good costing system can never be established without the complete knowledge of the production process. Cost apportionment can be done on the most appropriate and scientific basis if a cost accountant can **identify degree of effort or resources consumed in a particular process**. This also includes some basic technical know-how and process peculiarity.
- vi. **Information synchronisation:** Establishment of a department or a system requires substantial amount of organisational resources. While drafting a costing system, information needs of **various other departments should be taken** into account. For example, in a typical business organisation accounts department needs to submit monthly stock statement to its lender bank, quantity wise stock details at the time of filing returns to tax authorities etc.
- vii. **Method of maintenance of cost records:** The manner in which Cost and Financial accounts could be **inter-locked** into a single integral accounting system and how the results of separate sets of accounts i.e. cost and financial, could be **reconciled by** means of control accounts.
- viii. **Statutory compliances and audit:** Records are to be maintained to comply with statutory **requirements** and applicable cost accounting standards to be followed.
- ix. **Information Attributes:** Information generated from the Costing system should possess all the attributes of information i.e. complete, accurate, timeliness, relevant etc. to have an effective management information system (MIS).

Q11. State the limitations of cost and management accounting.**Answer**

Like other branches of accounting, cost and management accounting is also having certain limitations. The **limitations** of cost and management accounting are as follows:

1. **Expensive:** It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work, and hence additional money.
2. **Requirement of Reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus, Preparation of reconciliation statements is necessary to verify their accuracy.
3. **Duplication of Work:** It involves duplication of work as organization has to maintain two sets of accounts i.e., Financial Account and Cost Account.
4. **Inefficiency:** Costing system itself does not control costs but its usage does.

Q12. Discuss the impact of Information Technology in Cost Accounting.**Answer:**

The impact of IT in cost accounting may include the followings:

- i. After the introduction of ERPs, different functional activities get integrated and as a consequence a single entry into the accounting system **provides custom made reports** for every purpose and saves an organisation from preparing different sets of documents. **Reconciliation** process of results of both cost and financial accounting systems **become simpler** and less sophisticated.
- ii. A move towards **paperless** environment can be seen where documents like **Bill of Material, Material Requisition Note, Goods Received Note**, labour utilisation report etc. are no longer required to be prepared in multiple copies, the related department can get e-copy from the system.
- iii. Information Technology with the help of internet (including intranet and extranet) helps in **resource procurement and mobilisation**. For example, production department can get materials from the **stores without issuing material requisition note** physically. Similarly, purchase orders can be initiated to the suppliers with the help of extranet. This enables an entity to shift towards Just-in-Time (JIT) approach of inventory management and production.
- iv. Cost information for a cost centre or cost object is ascertained with **accuracy** in **timely** manner. Each cost centre and cost object is **codified** and all related costs are **assigned** to the cost object or cost centre. This process **automates the cost accumulation and ascertainment process**. The cost information can be customised as per the requirement. For example, when an entity manufacture or provide services, it can know information job-wise, batch-wise, process-wise, cost centre wise etc.

- v. **Uniformity** in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.
- vi. Cost and revenue **variance reports** are generated **in real time basis** which enables the management to take control measures immediately.
- IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

Q13. Explain the difference between product cost and period cost.**Answer:**

Product costs are those costs that are identified with the goods purchased or produced for resale. In a manufacturing organisation they are attached to the product and that are included in the inventory valuation for finished goods, or for incomplete goods. Product cost is also known as inventoriable cost. Under absorption costing method it includes direct material, direct labour, direct expenses, directly attributable costs (variable and non-variable) and other production (manufacturing) overheads. Under marginal costing method Product Costs includes all variable production costs and the all-fixed costs are deducted from the contribution.

Periods costs are the costs, which are not assigned to the products but are charged as expense against revenue of the period in which they are incurred. General Administration, marketing, sales and distributor overheads are recognized as period costs.

Q14. Mention and explain types of responsibility centres. Nov'18**Answer:**

There are four types of responsibility centres:

- i. **Cost Centres:** The responsibility centre which is held accountable for incurrence of costs which are under its control. The performance of this responsibility centre is measured against pre-determined standards or budgets. The cost centres are of two types:
(a) Standard Cost Centre and (b) Discretionary Cost Centre
- ii. **Revenue Centres:** The responsibility centres which are accountable for generation of revenue for the entity. Sales Department for example, is the responsible for achievement of sales target and revenue generation. Though, revenue centres does not have control on the all expenditures it incurs but some time expenditures related with selling activities like commission to sales person etc. are incurred by revenue centres.

- iii. **Profit Centres:** These are the responsibility centres which have both responsibility of generation of revenue and incurrence of expenditures. Since, managers of profit centres are accountable for both costs as well as revenue, profitability is the basis for measurement of performance of these responsibility centres. Examples of profit centres are decentralised branches of an organisation.
- iv. **Investment Centres:** These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres is measured based on Return on Investment (ROI) besides profit.

Q15. Narrate the objectives of cost accounting. RTP Nov 23**Answer**

The main objectives of introduction of a Cost Accounting System in a manufacturing organization are as follows:

- i. **Ascertainment of cost:** The main objective of a Cost Accounting system is to ascertain cost for cost objects. Costing may be post completion or continuous but the aim is to arrive at a complete and accurate cost figure to assist the users to compare, control and make various decisions.
- ii. **Determination of selling price:** Cost Accounting System in a manufacturing organisation enables to determine desired selling price after adding expected profit margin with the cost of the goods manufactured.
- iii. **Cost control and Cost reduction:** Cost Accounting System equips the cost controller to adhere and control the cost estimate or cost budget and assist them to identify the areas of cost reduction.
- iv. **Ascertainment of profit of each activity:** Cost Accounting System helps to classify cost on the basis of activity to ascertain activity wise profitability.
- v. **Assisting in managerial decision making:** Cost Accounting System provides relevant cost information and assists managers to make various decisions.

Q16. Distinguish between cost allocation and cost absorption. RTP Nov 23**Answer**

Cost allocation is the allotment of whole item of cost to a cost centre or a cost unit. In other words, it is the process of identifying, assigning or allowing cost to a cost centre or a cost unit.

Cost absorption is the process of absorbing all indirect costs or overhead costs allocated or apportioned over particular cost center or production department by the units produced.

Q17. Health Wealth Hospital is interested in estimating the cost for each patient stay. The hospital offers general health care facility i.e. only basic services. RTP Nov 22

You are required to:

1. CLASSIFY each of the following costs as either direct or indirect with respect to each patient.
2. CLASSIFY each of the following costs as either fixed or variable with respect to hospital costs per day.

	Direct	Indirect	Fixed	Variable
Electronic monitoring				
Meals for patients				
Nurses' salaries				
Parking maintenance				
Security				

Answer

Item	Direct	Indirect	Fixed	Variable
Electronic monitoring	YES			YES
Meals for patients	YES			YES
Nurses' salaries		YES	YES	
Parking maintenance		YES	YES	
Security		YES	YES	

Q18. What are cost units? Write the cost unit basis against each of the following Industry/Product- Automobile, Steel, Cement, Chemicals, Power and Transport. RTP Nov 22

Answer

Cost units are usually the units of physical measurement like number, weight, area, volume, length, time and value.

Industry or Product	Cost Unit Basis
Automobile	Number
Steel	Ton
Cement	Ton/ per bag etc.
Chemicals	Litre, gallon, kilogram, ton etc.
Power	Kilo-watt hour (kWh)
Transport	Passenger- kilometer

Q19. Define cost objects and give examples of any four cost objects May23**Answer****Definition of cost objects**

Cost object is anything for which a separate measurement of cost is required. Cost object may be a product, a service, a project, a customer, a brand category, an activity, a department or a programme etc.

Examples of cost objects

Product	Smart phone, Tablet computer, SUV Car, Book etc.
Service	An airline flight from Delhi to Mumbai, Concurrent audit assignment, Utility bill payment facility etc.
Project	Metro Rail project, Road projects etc.
Activity	Quality inspection of materials, Placing of orders etc.
Process	Refinement of crudes in oil refineries, melting of billets or ingots in rolling mills etc.
Department	Production department, Finance & Accounts, Safety etc.

Q20. Suggest any one basis of re-apportionment of service department overheads over production departments in the following instances: May 23

Cost of Service Department	Basis
i. Maintenance and Repair Shop ii. Hospital and Dispensary iii. Fire Protection iv. Stores Department v. Transport Department vi. Computer Section vii. Power House (Electric Power Cost) viii. Inspection ix. Tool Room x. Time- keeping	

Answer

a) Basis of re-apportionment of service department overheads over production departments

Cost of the Service Departments:	Basis
i. Maintenance and Repair shop	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked

ii. Hospital and Dispensary	No. of employees, No. of direct workers etc.
iii. Fire Protection	Capital values
iv. Stores Department	No. of requisitions, Weight or value of Materials issued.
v. Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size
vi. Computer Section	Computer hours, Specific allocation to departments
vii. Power House (Electric Power Cost)	Horse power, Kwh, Horse power × Machine hours, Kwh × Machine hours
viii. Inspection	Inspection hours, number of inspections.
ix. Tool room	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked
x. Time-keeping	No. of card punched, No. of employees

Q21. Mention the cost units (physical measurements) for the following Industry/product. Nov 22

- i. Automobile
- ii. Gas
- iii. Brick works
- iv. Power
- v. Steel
- vi. Transport (by road)
- vii. Chemical
- viii. Oil
- ix. Brewing
- x. Cement

Answer

Industry or Product	Cost Units
Automobile	Number
Gas	Cubic feet
Brick works	1,000 bricks
Power	Kilo-watt hour (kWh)
Steel	Tonne
Transport (by road)	Passenger- kilometer or Tonne-kilometer
Chemical	Litre, gallon, kilogram, tonne etc.
Oil	Barrel, tonne, litre

Brewing	Barrel
Cement	Ton/ per bag etc.

Q22. Write down the treatment of following items associated with purchase of materials. May 22

- i. Cash discount
- ii. IGST
- iii. Demurrage
- iv. Shortage
- v. Basic Custom Duty

Answer

Treatment of items associated with purchase of materials is tabulated as below

S. No.	Items	Treatment
i.	Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
ii.	Integrated Goods and Service Tax (IGST)	Integrated Goods and Service Tax (IGST) is paid on inter- state supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase.
iii.	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase
iv.	Shortage	Shortage in materials are treated as follows: Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. Shortage due to abnormal reasons: Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.
v.	Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is added with the purchase cost.

Cost Sheet

Q1. State Direct Expenses with examples.

Answer:

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in **an economically feasible manner to a cost object**. The following costs are examples for direct expenses:

- i. Royalty paid/ payable for production or provision of service;
- ii. Hire charges paid for hiring specific equipment;
- iii. Cost for product/ service specific design or drawing;
- iv. Cost of product/ service specific software;
- v. Other expenses which are directly related with the production of goods or provision of service.

Q2. Explain how Direct Expenses are measured and their treatment in cost accounting. May'19

Answer:

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs.

In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses forms part the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one-time payment, the cost is amortised over the estimated production volume or benefit derived. If the expenses incurred are of insignificant amount i.e., not material, it can be treated as part of overheads.

Q3. State the advantages of Cost-Sheets MTP Oct'18

Answer:

The main advantages of a Cost Sheet are as follows:

- i. It provides the **total cost** figure as well as **cost per unit** of production.

- ii. It helps in cost comparison.
- iii. It facilitates the **preparation of cost estimates** required for submitting tenders.
- iv. It provides sufficient help in arriving at the figure of **selling price**.
- v. It facilitates cost control by disclosing **operational efficiency**.

Overheads

Q1. Explain Single and Multiple Overhead Rates. MTP Mar'18

Answer:

Single and Multiple Overhead Rates:

Single overhead rate: It is one single overhead absorption rate for the whole factory. It may be computed as follows:

$$\text{Single overhead Rate} = \frac{\text{Overhead costs for the entire factory}}{\text{Total quantity of the base selected}}$$

The base can be total output, total labour hours, total machine hours, etc.

The single overhead rate may be **applied in factories which produces only one major product on a continuous basis**. It may also be used in factories where the **work performed in each department is fairly uniform and standardized**.

Multiple overhead rate:

It involves computation of separate rates for each production department, service department, cost center and each product for both fixed and variable overheads. It may be computed as follows:

Multiple overhead rate =

$$\left(\frac{\text{Overhead allocated/apportioned to each department/Cost centre or product}}{\text{Corresponding base}} \right)$$

Under multiple overheads rate, jobs or products are charged with varying amount of factory overheads depending on the type and number of departments through which they pass. However, the number of overheads rate which a firm may compute would depend upon two opposing factors viz. the degree of accuracy desired and the clerical cost involved.

Q2. Discuss with example the level of activity method of segregating semi-variable costs into fixed and variable costs. MTP Oct'18

Answer

Level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the **variable element may be ascertained with the help of the following formula.**

$$\frac{\text{Change in the amount of expense}}{\text{Change in the quantity of output}}$$

Suppose the following information is available:

	Production Units	Semi-variable expenses (₹)
January	100	260
February	140	300
Difference	40	40

The variable cost:

$$\frac{\text{"Change in Semi-variable expenses"}}{\text{"Change in production volume"}} = \frac{\text{Rs.40}}{40 \text{ units}} = \text{Rs.1/unit}$$

Thus, in January, the variable cost will be $100 \times \text{Rs.1} = \text{Rs.100}$ and the fixed cost element will be $(\text{Rs.260} - \text{Rs.100})$ or Rs.160. In February, the variable cost will be $140 \times \text{Rs.1} = \text{Rs.140}$ whereas the fixed cost element will remain the same, i.e., Rs.160.

Q3. Explain the difference between Allocation and Apportionment of expenses. MTP Oct`18

Answer

The **difference between the allocation and apportionment** is important to understand because the purpose of these two methods is the identification of the items of cost-to-cost units or centers.

However, the main difference between the above methods is given below.

1. Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually. On the other hand, apportionment deals with the **proportions of an item of cost** for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.
2. Allocation is a **direct process of charging** expenses to different cost centres whereas apportionment is an **indirect process** because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.
3. The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.
4. **Allocation is a much wider** term than apportionment.

Q4. State the bases of apportionment of following overhead costs: Nov`18

- i. Air-conditioning
- ii. Time keeping
- iii. Depreciation of plant and machinery
- iv. Power/steam consumption

v. Electric power (Machine operation)

Answer

Overhead Cost	Bases of Apportionment
i. Air- conditioning	Floor area, or volume of department
ii. Time keeping	Number of workers
iii. Depreciation of plant and machinery	Capital values
iv. Power/steam consumption	Technical estimates
v. Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed. Kilo-watt hours.

Q5. Explain the treatment of over and under absorption of overheads in cost accounts. RTP Nov 23**Answer**

Treatment of over and under absorption of overheads are:

- Writing off to costing P&L A/c: Small difference between the actual and absorbed amount should simply be transferred to costing P&L A/c, if difference is large then investigate the causes and after that abnormal loss/ gain shall be transferred to costing P&L A/c.
- Use of supplementary Rate: Under this method the balance of under and over absorbed overheads may be charged to cost of W.I.P., finished stock and cost of sales proportionately with the help of supplementary rate of overhead.
- Carry Forward to Subsequent Year: Difference should be carried forward in the expectation that next year the position will be automatically corrected.

Activity Based Costing

Q1. What is meant by Activity Based Management (ABM) and discuss how Activity Based Management can be used in the business? May 23

Answer:

Meaning of Activity Based Management (ABM)

The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Activity based management can be used in the following ways:

- i. **Cost Reduction:** ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.
- ii. **Business Process Re-engineering:** Business process re-engineering involves examining business processes and making substantial changes to how organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.
- iii. **Benchmarking:** Benchmarking is a process of comparing of ABC-derived activity costs of one segment of company with those of other segments. It requires uniformity in the definition of activities and measurement of their costs.
- iv. **Performance Measurement:** Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities.

Cost Accounting System

Q1. "Is reconciliation of cost accounts and financial accounts necessary in case of integrated accounting system?" Explain. MTP Mar'19

Answer:

In integrated accounting system cost and financial accounts are kept in the same set of books. Such a system will have to afford full information required for Costing as well as for Financial Accounts. In other words, information and data should be recorded in such a way so as to enable the firm to ascertain the cost (together with the necessary analysis) of each product, job, process, operation or any other identifiable activity. It also ensures the ascertainment of marginal cost, variances, abnormal losses and gains. In fact, all information that management requires from a system of Costing for doing its work properly is made available. **The integrated accounts give full information in such a manner so that the profit and loss account and the balance sheet can be prepared** according to the requirements of law and the management maintains full control over the liabilities and assets of its business. Hence, reconciliation is not required.

Q2. Explain integrated accounting system and state its advantages. May'19

Answer:

Integrated Accounting System: Integrated Accounts is the name given to a system of accounting, **whereby cost and financial accounts are kept in the same set of books.** Obviously, then there will be no separate sets of books for Costing and Financial records. Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, and process, operation of any other identifiable activity and for carrying necessary analysis. Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheets as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages of Integrated Accounting System

The main advantages of Integrated Accounts are as follows:

- i. **No need for Reconciliation** - The question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.
- ii. **Less efforts** - Due to use of one set of books, there is a significant saving in efforts made
- iii. **Less time consuming** - No delay is caused in obtaining information as it is provided from books of original entry.
- iv. **Economical process** - It is economical also as it is based on the concept of "Centralisation of Accounting function".

Q3. Indicate, for following items, whether to be shown in the Cost Accounts or Financial Accounts**Nov 22**

- i. Preliminary expenses written off during the year
- ii. Interest received on bank deposits
- iii. Dividend, interest received on investments
- iv. Salary for the proprietor at notional figure though not incurred
- v. Charges in lieu of rent where premises are owned
- vi. Rent receivables
- vii. Loss on sale of Fixed Assets
- viii. Interest on capital at notional figure though not incurred
- ix. Goodwill written off
- x. Notional Depreciation on the assets fully depreciated for which book value is Nil.

Answer

S. No.	Items	Accounts
i.	Preliminary expenses written off during the year	Financial Accounts
ii.	Interest received on bank deposits	Financial Accounts
iii.	Dividend, interest received on investments	Financial Accounts
iv.	Salary for the proprietor at notional figure though not incurred	Cost Accounts
v.	Charges in lieu of rent where premises are owned	Cost Accounts
vi.	Rent receivables	Financial Accounts
vii.	Loss on the sales of Fixed Assets	Financial Accounts
viii.	Interest on capital at notional figure though not incurred	Cost Accounts
ix.	Goodwill written off	Financial Accounts
x.	Notional Depreciation on the assets fully depreciated for which book value is nil	Cost Accounts

Job Costing

Q1. State the differences between Job costing and Batch costing. May'18; RTP Nov'18; MTP Oct'19; MTP May'20

Answer

Sr. No	Job Costing	Batch Costing
1	Method of costing used for non- standard and non- repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

Unit and Batch Costing

Q1. State how Economic Batch Quantity is determined? MTP Mar'18

Answer

In batch costing the most important problem is the determination of 'Economic Batch Quantity'. The determination of economic batch quantity involves two types of costs viz, (i) set up cost and (ii) carrying cost. With the increase in the batch size, there is an increase in the carrying cost but the set-up cost per unit of the product is reduced; this situation is reversed when the batch size is reduced. Thus, **there is one particular batch size for which both set up and carrying costs are minimum**. This size of a batch is known as economic or optimum batch quantity.

Economic batch quantity can be determined with the help of a table, graph or mathematical formula. The mathematical formula usually used for its determination is as follows:

Material Cost

Q1. Explain 'Just in Time' (JIT) approach of inventory management. May'18

Answer

Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

- i. Produce goods **only when it is required** and
- ii. the products should be delivered to customers at the time only when they want.

It is also known as '**Demand pull**' or '**Pull through**' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:



Q2. Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment. Nov'18

Answer

Obsolescence: Obsolescence is defined as "the loss in the intrinsic value of an asset due to its supersession".

Materials may become obsolete under any of the following circumstances:

- i. where it is a **spare part**, or a component of a machinery used in manufacture and **that machinery becomes obsolete**;
- ii. where it is used in the manufacture of a **product which has become obsolete**;
- iii. where the material itself is replaced by **another material due to either improved quality or fall in price**.

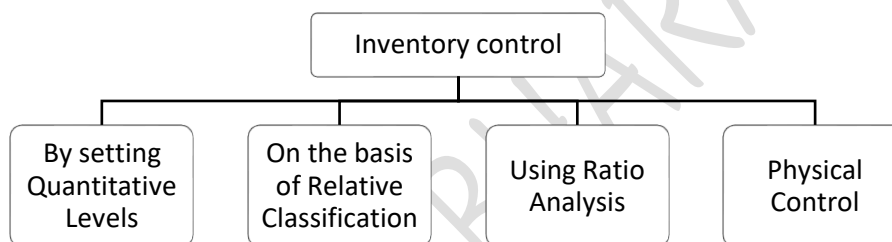
Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to **dispose it off at the best available price**. The loss arising out of obsolete materials on abnormal loss **does not form part of the cost of manufacture**.

Q3. Define Inventory Control and give its objectives. Nov'19**Answer**

Inventory Control: The Chartered Institute of Management Accountants (CIMA) defines Inventory Control as “The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks.”

The **objective** of inventory control is **to make a balance between sufficient stock and over - stock.**

The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance. Management may adopt the following **basis** for Inventory control:

**Q4. Distinguish between Bill of Materials and Material Requisition Note. MTP Oct'19****Answer:**

Bills of Material	Material Requisition Note
1. It is document or list of materials prepared by the engineering/ drawing department.	1. It is prepared by the foreman of the consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	2. It is a document authorizing Store-Keeper to issue material to the consuming department.
3. It often serves the purpose of a Store Requisition as it shows the complete schedule of materials required for a particular job i.e., it can replace stores requisition.	3. It cannot replace a bill of material.
4. It can be used for the purpose of quotation.	4. It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials drawn through Stores Requisition	5. It shows the material actually drawn from stores.

Employee Cost

Q1. Discuss the remedial steps to be taken to minimize the labour turnover. MTP Oct'19

Answer

The following steps are useful for minimizing labour turnover:

- a. **Exit interview:** An interview to be arranged with each outgoing employee to ascertain the reasons of his leaving the organization.
- b. **Job analysis and evaluation:** to ascertain the requirement of each job.
- c. Organization should make use of a **scientific system of recruitment, placement and promotion for employees.**
- d. Organization should create **healthy atmosphere, providing education, medical and housing facilities** for workers.
- e. Committee for **settling workers grievances.**

Q2. How would you account for idle capacity cost in Cost Accounting? RTP Nov23

Answer

Idle capacity costs are treated in the following ways in Cost Accounts:

- i. **If the idle capacity cost is due to unavoidable reasons:** A supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilised.
- ii. **If the idle capacity cost is due to avoidable reasons:** Such as faulty planning, etc. the cost should be charged to Costing Profit and Loss Account.
- iii. **If the idle capacity cost is due to trade depression, etc.:** Being abnormal in nature the cost should also be charged to the Costing Profit and Loss Account.
- iv. **If the idle capacity cost is due to seasonal factors,** then the cost should be charged to cost of production by inflating overhead rate.

Q3. Explain the treatment of Overtime Premium in following situations: May 22

- i. SV & Co. wants to grab some special orders, and overtime is required to meet the same.
- ii. Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.
- iii. S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.
- iv. Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.
- v. A customer requested the company MN Ltd. to expedite the job because of his urgency of work.

Answer

Treatment of Overtime premium in different situations

Situation	Treatment
i. SV & Co. wants to grab some special orders, and overtime is required to meet the same.	If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
ii. Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.	If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department (Y).
iii. S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.	The overtime premium is treated as a part of employee cost and job is charged at an effective average wage rate.
iv. Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.	Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.
v. A customer requested the company MN Ltd. to expedite the job because of his urgency of work.	Where overtime is worked at the request of the customer, overtime premium is also charged to the job/ customer directly.

Process & Operation Costing

Q1. Explain the term Equivalent units used in process industries. RTP Nov'19

Answer

Equivalent Units: Equivalent units or equivalent production units, means **converting the incomplete production units into their equivalent completed units**. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percentage of completion should be as accurate as possible. The formula for computing equivalent completed units is:

Equivalent completed units = (Actual number of units in the process of manufacture × Percentage of Work completed)

For instance, if 25% of work has been done on the average of units still under process, then 200 such units will be equal to 50 completed units and the cost of work-in process will be equal to the cost of 50 finished units.

Q2. How will you treat normal loss, abnormal loss and abnormal gain in process costing? Explain May' 23

Answer

Treatment of normal loss, abnormal loss and abnormal gain in process costing

Treatment of Normal loss in Cost Accounts: The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realised by the sale of normal process loss units should be credited to the process account.

Treatment of Abnormal loss in Cost Accounts: The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Treatment of Abnormal Gain in Cost Accounts: The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

Joint & By Products

Q1. Describe net realizable value method of apportioning joint costs to by- products MTP Aug'18

Answer:

Net Realisable Value method: The realisation on the disposal of the by-product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses in a sugar factory goes to reduce the cost of sugar produced in the factory.

When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realised from the sale of the by-product and only **the net realisations should be deducted from the total cost of production to arrive at the cost of production of the main product.**

Separate accounts should be maintained for collecting additional expenses incurred on:

- i. further processing of the by-product, and
- ii. selling, distribution and administration expenses attributable to the by-product.

Q2. How are By-products treated in Costing? Nov'18

Answer:

By-product cost can be dealt in cost accounting in the following ways:

- a. **When they are of small total value:** When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:
 1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The **credit to the Costing Profit and Loss Account** here is treated either as miscellaneous income or as additional sales revenue.
 2. The sale proceeds of the by-product may be treated **as deductions from the total costs.** The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.
- b. **When the by-products are of considerable total value:** Where by-products are of considerable total value, they **may be regarded as joint products** rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis.
- c. **Where they require further processing:** In this case, the net realisable value of the **by-product at the split-off point** may be arrived at by subtracting the further processing cost from the realisable value of by-products and then treated based on small value or large value as above.

Q3. How apportionment of joint costs up to the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss

(RTP MAY 21)

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- ❖ Estimated profit margins
- ❖ Selling & distribution expenses, if any
- ❖ Post-split off costs.

The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q4. DISCUSS the treatment of by-product cost in cost accounting. (RTP May 20)

Answer

By-product cost can be dealt in cost accounting in the following ways:

- i. When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:
 1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
 2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.
- ii. When the by-products are of considerable total value: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred up to the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

iii. Where they require further processing: In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i). In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

Q5. Distinguish between Joint products and By-products.

Answer

- i. Joint products and By-products: Joint Products are defined as the products which are
- ii. produced simultaneously from same basic raw materials by a common process or processes
- iii. but none of the products is relatively of more importance or value as compared with the other.
- iv. For example, spirit, kerosene oil, fuel oil, lubricating oil, wax, tar and asphalt are the examples
- v. of joint products.
- vi. By products, on the other hand, are the products of minor importance jointly produced with
- vii. other products of relatively more importance or value by the common process and using the
- viii. same basic materials. These products remain inseparable up to the point of split off. For
- ix. example in Dairy industries, batter or cheese is the main product, but butter milk is the by-product.

Points of Distinction:

1. Joint products are the products of equal economic importance, while the by-products are of lesser importance.
2. Joint products are produced in the same process, whereas by-products are produced from the scrap or the discarded materials of the main product.
3. Joint products are not produced incidentally, but by-products emerge incidentally also.

Q6. How apportionment of joint costs upto the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss.

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
 - Selling & distribution expenses, if any
 - Post-split off costs.
- The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q7. Describe briefly, how joint costs up to the point of separation may be apportioned amongst the joint products under the following methods: (PM)

- i. Average unit cost method
- ii. Contribution margin method
- iii. Market value at the point of separation
- iv. Market value after further processing
- v. Net realizable value method.

Answer

Methods of apportioning joint cost among the joint products:

- i. **Average Unit Cost Method:** Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained. The effect of application of this method is that all joint products will have uniform cost per unit.
- ii. **Contribution Margin Method:** Under this method joint costs are segregated into two parts – variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. If the products are further processed, then all variable cost incurred be added to the variable cost determined earlier. Then contribution is calculated by deducting variable cost from their respective sales values. The fixed costs are then apportioned over the joint products on the basis of contribution ratios.
- iii. **Market Value at the Time of Separation:** This method is used for apportioning joint costs to joint products up to the split off point. It is difficult to apply if the market values of the products at the point of separation are not available. The joint cost may be apportioned in the ratio of sales values of different joint products.
- iv. **Market Value after further Processing:** Here the basis of apportionment of joint costs is the total sales value of finished products at the further processing. The use of this method is unfair where further processing costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing.

- v. **Net Realisable Value Method:** Here joint costs is apportioned on the basis of net realisable value of the joint products,

Net Realisable Value = Sale value of joint products (at finished stage)

(-) estimated profit margin

(-) selling & distribution expenses, if any

(-) post-split off cost

Marginal Costing

Q1. What are the limitations of marginal costing? May'19

Answer

Limitations of Marginal Costing

- i. **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. **Most of the expenses are neither totally variable nor wholly fixed.** For example, various amenities provided to workers may have no relation either to volume of production or time factor.
- ii. **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.
- iii. **Scope for Low Profitability:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.
- iv. **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position fixed overheads, have to be included in work-in-progress.
- v. **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption **that fixed cost will remain static throughout is not correct.** Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. **The variable costs do not remain constant per unit of output.** There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.
- vi. **Marginal costing ignores time factor and investment:** The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.
- vii. **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

Q2. Differentiate between “Marginal and Absorption Costing”. (Nov 20)

Answer

S. No.	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.

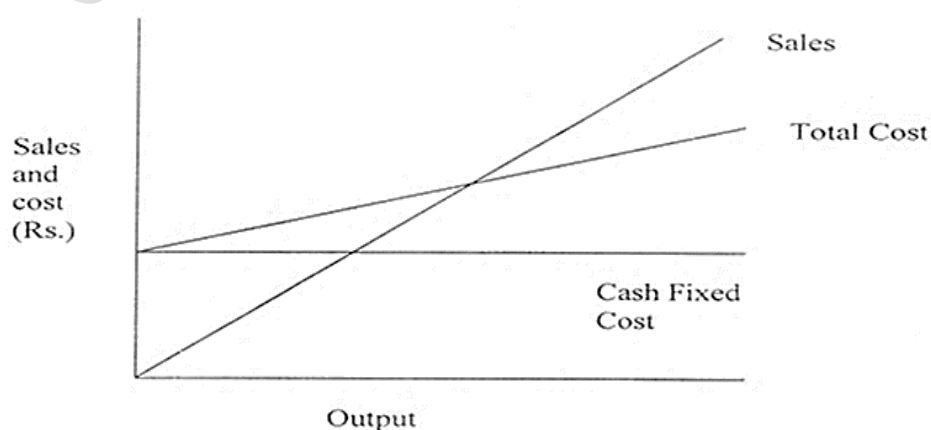
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Q3. Explain and illustrate cash break-even chart.

Answer

In cash break-even chart, only cash fixed costs are considered. Non-cash items like depreciation etc. are excluded from the fixed cost for computation of break-even point. It depicts the level of output or sales at which the sales revenue will equal to total cash outflow. It is computed as under:

Cash BEP (Units) = Cash Fixed Cost / Contribution per Units



Q4. Write short notes on Angle of Incidence.**Answer**

This angle is formed by the intersection of sales line and total cost line at the break-even point. This angle shows the rate at which profits are being earned once the break-even point has been reached. The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favorable position.

Q5. Discuss basic assumptions of Cost Volume Profit analysis.**Answer**

CVP Analysis: - Assumptions

- i. Changes in the levels of revenues and costs arise only because of changes in the number of products (or service) units produced and sold.
- ii. Total cost can be separated into two components: Fixed and variable
- iii. Graphically, the behaviour of total revenues and total cost are linear in relation to output level within a relevant range.
- iv. Selling price, variable cost per unit and total fixed costs are known and constant.

All revenues and costs can be added, sub traded and compared without taking into account the time value of money.

Q6. Elaborate the practical application of Marginal Costing.**Answer****Practical applications of Marginal costing:**

- i. **Pricing Policy:** Since marginal cost per unit is constant from period to period, firm decisions on pricing policy can be taken particularly in short term.
- ii. **Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.

Ascertaining Realistic Profit: Under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.

Standard Costing

Q1. Describe three distinct groups of variances that arise in standard costing.

Answer

The three distinct groups of variances that arise in standard costing are:

- i. Variances of efficiency. These are the variance, which arise due to efficiency or inefficiency in use of material, labour etc.
- ii. Variances of prices and rates: These are the variances, which arise due to changes in procurement price
- iii. Variances due to volume: These represent the effect of difference between actual activity and standard level of activity. and standard price.

Q2. "Calculation of variances in standard costing is not an end in itself, but a means to an end."

Discuss.

Answer

The crux of standard costing lies in variance analysis. Standard costing is the technique whereby standard costs are predetermined and subsequently compared with the recorded actual costs. It is a technique of cost ascertainment and cost control. It establishes predetermined estimates of the cost of products and services based on management's standards of efficient operation. It thus lays emphasis on "what the cost should be". These should be costs are when compared with the actual costs. The difference between standard cost and actual cost of actual output is defined as the variance.

The variance in other words in the difference between the actual performance and the standard performance. The calculations of variances are simple. A variance may be favourable or unfavourable. If the actual cost is less than the standard cost, the variance is favourable but if the actual cost is more than the standard cost, the variance will be unfavourable. They are easily expressible and do not provide detailed analysis to enable, management of exercise control over them. It is not enough to know the figures of these variances from month to month. We in fact are required to trace their origin and causes of occurrence for taking necessary remedial steps to reduce / eliminate them.

A detailed probe into the variance particularly the controllable variances helps the management to ascertain:

- i. the amount of variance
- ii. the factors or causes of their occurrence
- iii. the responsibility to be laid on executives and departments and
- iv. corrective actions which should be taken to obviate or reduce the variances.

Mere calculation and analysis of variances is of no use. The success of variance analysis depends upon how quickly and effectively the corrective actions can be taken on the analysed variances. In fact, variance gives information. The manager needs to act on the information provided for taking corrective action. Information is the means and action taken on it is the end. In other words, the calculation of variances in standard costing is not an end in itself, but a means to an end.

Q3. Describe the various steps involved in adopting standard costing system in an organization

Answer

The Steps of standard costing is as below:

- i. Setting of Standards: The first step is to set standards which are to be achieved.
- ii. Ascertainment of actual costs: Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.
- iii. Comparison of actual cost and standard cost: Actual costs are compared with the standards costs and variances are determined.
- iv. Investigation of variances: Variances arises are investigated for further action. Based on this performance is evaluated and appropriate actions are taken.
- v. Disposition of variances: Variances arise are disposed of by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

Budget & Budgetary Control

Q1. State the limitations of Budgetary Control System. (JAN 21)

Answer

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralised organisation, each unit has its own objective and these units enjoy some degree of discretion. In this type of organisation structure, coordination among different units is required. The success of the budgetary control depends upon willing co-operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organisation structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.
5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organization is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Q2. What are the important points an organization should consider if it wants to adopt Performance Budgeting? (NOV 20)

Answer

For an enterprise that wants to adopt Performance Budgeting, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal constraints.
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralized responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Q3. Explain the meaning of Budget Manual. (NOV 19)

Answer

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results.
- A form of organization chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.
- Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

Q4. DESCRIBE the salient features of budget manual. (RTP May 21)

Answer

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.
- A budget manual is a collection of documents that contains key information for those involved in the planning process.

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual.
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- It contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.

Q5. Describe the steps necessary for establishing a good budgetary control system.**Answer**

The following steps are necessary for establishing a good budgetary control system:

1. Determining the objectives to be achieved, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. Determining the activities that should be undertaken for the achievement of the objectives.
3. Drawing up a plan or a scheme of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. Laying out a system of comparison of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. Ensuring that corrective action will be taken where the plan has not been achieved and, if that is not possible, for the revision of the plan.

Q6. Explain briefly the concept of 'flexible budget'.**Answer**

Flexible Budget: A flexible budget is defined as "a budget which, by recognizing the difference between fixed, semi-variable and variable cost is designed to change in relation to the level of activity attained". In flexibility budgetary control system, a series of budgets are prepared one for each of a number of alternative production levels or volumes. Flexible budgets represent the amount of expense that is reasonably necessary to achieve each level of output specified. In other words, the allowances given under flexibility budgetary control system serve as standards of what costs should be at each level of output.

Q7. Discuss the components of budgetary control system**Answer****Components of budgetary control system**

The policy of a business for a defined period is represented by the master budget the details of which are given in a number of individual budgets called functional budgets. The functional budgets are broadly grouped under the following heads:

- a. Physical Budgets – Sales Quantity, Product Quantity, Inventory, Manpower budget.
- b. Cost Budgets – Manufacturing Cost, Administration Cost, Sales & Distribution cost, R & D Cost.
- c. Profit Budget.

Q8. List the eight functional budgets prepared by a business.**Answer**

The various commonly used Functional budgets are:

- Sales Budget
- Production Budget
- Plant Utilisation Budget
- Direct Material Usage Budget
- Direct Material Purchase Budget
- Direct Labour (Personnel) Budget
- Factory Overhead Budget
- Production Cost Budget.

Q9. Distinguish between Fixed and flexible budget**Answer****Difference between Fixed and Flexible Budgets**

	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is rigid	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions	It consists of various budgets for different level of activity.
3.	If the budgeted and actual activity levels differ significantly, then cost ascertainment and price fixation do not give a correct picture.	It facilitates the cost ascertainment and price fixation at different levels of activity.

4.	Comparisons of actual and budgeted targets are meaningless particularly when there is difference between two levels.	It provided meaningful basis of comparison of actual and budgeted targets.

Q10. Explain the Essentials of budget**Answer****Essentials of budget**

- It is prepared in advance and is based on a future plan of actions
- It relates to a future period and is based on objectives to be attained.
- It is a statement expressed in monetary and/ or physical units prepared for the implementation of policy formulated by management.

Q11. State the considerations on which capital expenditure budget is prepared.**Answer**

The preparation of Capital Expenditure Budget is based on the following considerations:

1. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.
2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments
4. Factors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.

Q12. Describe the steps involved in the budgetary control technique**Answer**

There are certain steps involved in the budgetary control technique. They are as follows:

- i. Definition of objectives:** A budget being a plan for the achievement of certain operational objectives, it is desirable that the same are defined precisely. The objectives should be written out; the areas of control demarcated; and items of revenue and expenditure to be covered by the budget stated.
- ii. Location of the key (or budget) factor:** There is usually one factor (sometimes there may be more than one) which sets a limit to the total activity. Such a factor is known as key factor. For proper budgeting, it must be located and estimated properly.
- iii. Appointment of controller:** Formulation of a budget usually required whole time services of a senior executive known as budget controller; he must be assisted in this work by a Budget Committee, consisting of all the heads of department along with the Managing Director as the Chairman.

- iv. **Budget Manual:** Effective budgetary planning relies on the provision of adequate information which are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.
- v. **Budget period:** The period covered by a budget is known as budget period. The Budget Committee determines the length of the budget period suitable for the business. It may be months or quarters or such periods as coincide with period of trading activity.
- vi. **Standard of activity or output:** For preparing budgets for the future, past statistics cannot be completely relied upon, for the past usually represents a combination of good and bad factors. Therefore, though results of the past should be studied but these should only be applied when there is a likelihood of similar conditions repeating in the future.

Q13. Explain 'Activity Based Budgeting'. Nov'18**Answer****Activity Based Budgeting (ABB)**

- Activity based budgeting analyse the **resource input or cost** for each activity.
- It provides a framework for **estimating the amount of resources** required in accordance with the budgeted level of activity.
- Actual results can be **compared** with budgeted results to highlight both in financial and non-financial terms those activities with major discrepancies from budget for potential reduction in supply of resources.
- It is a planning and control system which seeks to support the objectives of **continuous improvement**.
- It means planning and controlling the expected activities of the organization to derive a **cost-effective budget** that meet forecast workload and agreed strategic goals.
- ABB is the **reversing of the ABC process** to produce financial plans and budgets.

Q14. State the advantages of Zero-based budgeting. RTP May'18; May' 18; RTP Nov'20**Answer:****The advantages of zero-based budgeting are as follows:**

- It provides a systematic approach for the **evaluation of different activities and rank them** in order of preference **for the allocation of scarce resources**.
- It ensures that the **various functions undertaken by the organization are critical** for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a **thorough cost-benefit-analysis**. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of **wasteful expenditure can be easily identified** and eliminated.

- Departmental budgets are closely **linked with corporation objectives**.
- The technique can also be used for the introduction and implementation of the system of '**management by objective**.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Q15. Explain the meaning of Budget Manual. RTP Nov'19
Answer:

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory **explanation of the budgetary planning and control process**, including a statement of the budgetary objective and desired results.
- A **form of organization chart** to show **who is responsible** for the preparation of each functional budget and the way in which the budgets are interrelated.
- A **timetable** for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- **Copies of all forms** to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A **list of the organization's account codes**, with full explanations of how to use them.

Q16. Explain the difference between fixed budget and flexible budget. MTP Aug'18
Answer:

Sl.No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is known as rigid or inflexible budget	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analysed according to its behaviour.

4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.
5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Q17. What are the cases when a flexible budget is found suitable? May'19

Answer:

Flexible budgeting may be resorted to under following situations:

- i. In the case of **new business venture** due to its typical nature it may be difficult to forecast the demand of a product accurately.
- ii. Where the business is dependent upon the **mercy of nature** e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.
- iii. In the case of **labour - intensive industry** where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

- i. **Seasonal fluctuations** in sales and/or production, for example in soft drinks industry;
- ii. A company which keeps on introducing **new products or makes changes** in the design of its products frequently;
- iii. Industries engaged in **make-to-order business** like ship building;
- iv. An industry which is influenced by **changes in fashion**; and
- v. **General changes in sales**.

Q18. Define Zero Base Budgeting and mention its various stages. Nov'19**Answer:**

Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises **to overcome the limitations of incremental (traditional) budgeting system**. Zero-based Budgeting (ZBB) is defined as 'a method of budgeting which requires each cost element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity-based budgeting system where **budgets are prepared for each activity rather than functional department**. Justification in the form of **cost benefits for the activity** is required to be given. The activities are then **evaluated and prioritized** by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc. ZBB is **suitable for both corporate and non-corporate entities**. In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

- i. **Identification** and description of Decision packages
- ii. **Evaluation** of Decision packages
- iii. **Ranking** (Prioritisation) of the Decision packages
- iv. **Allocation** of resources

Service Costing

Q1. Describe Operation costing with two examples of industries where operation costing is applied. RTP May'18; RTP Nov'20

Answer

This product costing system is used when an entity produces **more than one variant of final product using different materials but with similar conversion activities**. Which means conversion activities are similar for all the product variants but materials differ significantly.

Operation Costing method is also known as **Hybrid product costing system** as materials costs are accumulated by job order or batch wise but conversion costs i.e., labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two examples of industries are Ready made garments and Jewellery making.

Q2. Describe Composite Cost unit as used in Service Costing and discuss the ways of computing it. Nov'19

Answer

Composite Cost Unit: Sometime **two measurement units** are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometre.

Examples of Composite units are Ton- km., Quintal- km, Passenger-km., Patient-day etc.

Composite unit may be computed in two ways:

- i. Absolute (Weighted Average) basis.
- ii. Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

- i. **Weighted Average or Absolute basis** – It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows:

$$\Sigma (\text{Weight Carried} \times \text{Distance})_1 + (\text{Weight Carried} \times \text{Distance})_2 + \dots + (\text{Weight Carried} \times \text{Distance})_n$$

Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second-Class seat – to ensure proper cost per composite unit.

- ii. **Simple Average or Commercial basis** – It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\sum (\text{Distance}_1 + \text{Distance}_2 + \dots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \dots + W_n}{n} \right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

Q3. DIFFERENTIATE between Service costing and Product costing. (May 21)

Answer

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

- Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.
- Use of Composite cost units for cost measurement and to express the volume of outputs.
- Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.
- Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

Q4. Explain standing charges and running charges in the case of transport organisations. LIST three examples of both. (Nov 20)

Answer

Standing Charges: These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following: -

- Insurance
- License fees

- Salary to Driver, Conductor, Cleaners, etc. if paid on monthly basis
- Garage costs, including garage rent
- Depreciation (if related to efflux of time)
- Taxes
- Administration expenses, etc.

Running Charges: These costs are generally associated with the distance travelled. These costs include the following-

- Petrol and Diesel
- Lubricant oils,
- Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
- Depreciation (if related to activity)
- Any other variable costs identified.

CHAPTER 17: MULTIPLE CHOICE

QUESTIONS (MCQs)

Introduction to Cost and Management Accounting

1. _____ is anything for which a separate measurement is required.
 - (a) Cost unit
 - (b) Cost object
 - (c) Cost driver
 - (d) Cost centre
2. Which of the following is true about Cost control:
 - (a) It is a corrective function
 - (b) It challenges the set standards
 - (c) It ends when targets achieved
 - (d) It is concerned with future
3. Cost units used in power sector is:
 - (a) Kilometer (K.M)
 - (b) Kilowatt-hour (kWh)
 - (c) Number of electric points
 - (d) Number of hours
4. Processes Costing method is suitable for
 - (a) Transport sector
 - (b) Chemical industries
 - (c) Dam construction
 - (d) Furniture making
5. Distinction between direct cost and indirect cost is an example of classification
 - (a) By Element
 - (b) By Function
 - (c) By Controllability
 - (d) By Variability

6. The advantage of using IT in Cost Accounting does not include:
- Integration of various functions
 - Stock needs to be reconciled with Goods Received Note
 - Reduction in multicity of documents
 - Customised reports can be prepared.
7. A taxi provider charges minimum Rs. 80 thereafter Rs. 12 per kilometer of distance travelled, the behaviour of conveyance cost is:
- Fixed Cost
 - Semi-variable Cost
 - Variable Cost
 - Administrative cost.
8. A Ltd. has three production department, and each department has two machines, which of the following cannot be treated as cost centre for cost allocation:
- Machines under the production department
 - Production departments
 - Both Production department and machines
 - A Ltd.
9. Which of the following is an example of functional classification of cost:
- Direct Material Cost
 - Fixed Cost
 - Administrative Overheads
 - Indirect Overheads.
10. Ticket counter in a Railway Station is an example of
- Cost Centre
 - Revenue Centre
 - Profit Centre
 - Investment Centre

Answers to the MCQs

1.	(b)	2.	(c)	3.	(b)	4.	(b)	5.	(a)	6.	(b)
7.	(b)	8.	(d)	9.	(c)	10.	(b)				

Cost Sheet

1. Generally, for the purpose of cost sheet preparation, costs are classified on the basis of:
 - (a) Functions
 - (b) Variability
 - (c) Relevance
 - (d) Nature
2. Which of the following does not form part of prime cost:
 - (a) Cost of packing
 - (b) Cost of transportation paid to bring materials to factory
 - (c) GST paid on raw materials (input credit cannot be claimed)
 - (d) Overtime premium paid to workers.
3. A Ltd. received an order, for which it purchased a special frame for manufacturing, it is a part of:
 - (a) Direct Materials
 - (b) Direct expenses
 - (c) Factory Overheads
 - (d) Administration Overheads
4. Salary paid to plant supervisor is a part of
 - (a) Direct expenses
 - (b) Factory overheads
 - (c) Quality control cost
 - (d) Administration cost
5. Depreciation of director's laptop is treated as a part of:
 - (a) Administration Overheads
 - (b) Factory Overheads
 - (c) Direct Expenses
 - (d) Research & Development cost.
6. A manufacture has set-up a lab for testing of products for compliance with standards, salary of this lab staffs are part of:
 - (a) Works overheads

- (b) Quality Control Cost
- (c) Direct Expenses
- (d) Research & Development Cost.

7. Audit fees paid to auditors is part of:

- (a) Administration Cost
- (b) Production cost
- (c) Selling & Distribution cost
- (d) Not shown in cost sheet.

8. Salary paid to factory store staff is part of:

- (a) Factory overheads
- (b) Production Cost
- (c) Direct Employee cost
- (d) Direct Material Cost.

9. Canteen expenses for factory workers are part of:

- (a) Factory overhead
- (b) Administration Cost
- (c) Marketing cost
- (d) None of the above.

10. A company pays royalty to State Government on the basis of production, it is treated as:

- (a) Direct Material Cost
- (b) Factory Overheads
- (c) Direct Expenses
- (d) Administration cost.

Answers to the MCQs

1.	(a)	2.	(a)	3.	(b)	4.	(b)	5.	(a)	6.	(b)
7.	(a)	8.	(a)	9.	(a)	10.	(c)				

Overheads – Absorption Costing Method

1. “Fixed overhead costs are not affected in monetary terms during a given period by a Change in output”. But this statement holds good provided:
 - (a) Increase in output is not substantial
 - (b) Increase in output is substantial
 - (c) Both (a) and (b)
 - (d) None of the above
2. Capacity is defined as actually utilized capacity of a plant.
 - (a) Theoretical
 - (b) Installed
 - (c) Practical
 - (d) Normal
3. The allotment of whole items of cost-to-cost centres or cost units is called:
 - (a) Overhead absorption
 - (b) Cost apportionment
 - (c) Cost allocation
 - (d) None of the above
4. Primary packing cost is a part of:
 - (a) Direct material cost
 - (b) Production Cost
 - (c) Selling overheads
 - (d) Distribution overheads
5. Director’s remuneration and expenses form part of:
 - (a) Production overhead
 - (b) Administration overhead
 - (c) Selling overhead
 - (d) Distribution overhead
6. Which of the following is not the classification of overhead based on its functionality?
 - (a) Factory Overhead

- (b) Administrative Overhead
- (c) Fixed Overhead
- (d) Selling Overhead

7. Bad debt is an example of:

- (a) Distribution overhead
- (b) Production overhead
- (c) Selling overhead
- (d) Administration overhead

8. Normal capacity of a plant refers to the difference between:

- (a) Maximum capacity and practical capacity
- (b) Practical capacity and normal capacity
- (c) Practical capacity and estimated idle capacity as revealed by long term sales trend.
- (d) Maximum capacity and actual capacity

9. The difference between actual factory overhead and absorbed factory overhead will be usually at the minimum level, provided pre- determined overhead rate is based on:

- (a) Maximum capacity
- (b) Direct Labour hours
- (c) Machine hours
- (d) Normal capacity

10. Which of the following overhead cost may not be apportioned on the basis of direct wages?

- (a) Worker's Holiday Pay
- (b) Perquisites to worker
- (c) ESI contribution
- (d) Managerial Salaries

Answers to the MCQs

1.	(a)	2.	(c)	3.	(c)	4.	(b)	5.	(b)	6.	(c)
7.	(c)	8.	(c)	9.	(d)	10	(d)				

Activity Based Costing

1. A cost driver is:
 - (a) An item of production overheads
 - (b) A common cost which is shared over cost centres
 - (c) Any cost relating to transport
 - (d) An activity which generates costs

2. In activity-based costing, costs are accumulated by activity using:
 - (a) Cost drivers
 - (b) Cost objects
 - (c) Cost pools
 - (d) Cost benefit analysis

3. A cost driver:
 - (a) Is a force behind the overhead cost
 - (b) Is an allocation base
 - (c) Is a transaction that is a significant determinant of cost
 - (d) All of the above

4. Which of the following is not a correct match:

Activity	Cost Driver
(a) Production Scheduling	Number of Production runs
(b) Dispatching	Number of dispatch orders
(c) Goods receiving	Goods received orders
(d) Inspection	Machine hours

5. Transactions undertaken by support department personnel are the appropriate cost drivers. Find the one which is not appropriate:
 - a) The number of purchase, supplies and customers' orders drives the cost associated with new material inventory, work-in-progress and finished goods inventory
 - b) The number of productions runs undertaken drives production scheduling, inspection and material handling
 - c) The quality of raw material issued drives the cost of receiving department costs
 - d) The number of packing orders drives the packing costs

6. Steps in ABC include:
- Identification of activities and their respective costs
 - Identification of cost driver of each activity and computation of an allocation rate per activity
 - Allocation of overhead cost to products/ services based on the activities involved
 - All of the above
7. Which of the following is not a benefit of ABC?
- Accurate cost allocation
 - Improved decision making
 - Better control on activity and costs
 - Reduction of prime cost
8. The steps involved for installation of ABC in a manufacturing company include the following except:
- Borrowing fund
 - Feasibility study
 - Building up necessary IT infrastructure and training of line employees
 - Strategy and value chain analysis
9. Which of the following statements are true: (1) Activity based Management involves activity analysis and performance measurement. (2) Activity based costing serves as a major source of information in ABM.
- (1) True; (2) False
 - (1) True; (2) True
 - (1) False; (2) True
 - (1) False; (2) False
10. The key elements of activity-based budgeting are:
- Type of activity to be performed
 - Quantity of activity to be performed
 - Cost of activity to be performed
 - All of the above

Answers to the MCQs

1.	(d)	2.	(c)	3.	(d)	4.	(d)	5.	(c)	6.	(d)
7.	(d)	8.	(a)	9.	(b)	10.	(d)				

Cost Accounting System

1. Under the Non-integrated accounting system
 - (a) Same ledger is maintained for cost and financial accounts by accountants
 - (b) Separate ledgers are maintained for cost and financial accounts
 - (c) (a) and (b) both
 - (d) None of the above
2. Notional costs
 - (a) May be included in Integrated accounts
 - (b) May be included in Non- integrated accounts
 - (c) Cannot be included in Non-integrated accounts
 - (d) None of the above
3. Under Non-integrated accounting system, the account made to complete double entry is
 - (a) Stores ledger control account
 - (b) Work in progress control account
 - (c) Finished goods control account
 - (d) General ledger adjustment account
4. Integrated systems of accounts are maintained
 - (a) In separate books of accounts for costing and financial accounting purposes
 - (b) In same books of accounts
 - (c) Both (a) & (b)
 - (d) None of the above
5. Under Non-integrated system of accounting, purchase of raw material is debited to which account
 - (a) Material control account / Stores ledger control account
 - (b) General ledger adjustment account
 - (c) Purchase account
 - (d) None of the above
6. Under Non-integrated accounts, if materials worth Rs. 1,500 are purchased for a special job, then which account will be debited:
 - (a) Special job account / Work in Process account
 - (b) Material Control account
 - (c) Cost Control account
 - (d) None of the above

7. Which account is to be debited if materials worth Rs. 500 are returned to vendor under Non-integrated accounts:
- Cost ledger control account
 - Finished goods control account
 - WIP control account
 - None of the above
8. Which of the following items is included in cost accounts?
- Notional rent
 - Donations
 - Transfer to general reserve
 - Rent receivable
9. When costing loss is Rs. 5,600, administrative overhead under-absorbed being Rs.600, the loss as per financial accounts should be
- Rs. 5,600
 - Rs. 6,200
 - Rs. 5,000
 - None of the above
10. Which of the following items should be added to costing profit to arrive at financial profit?
- Over-absorption of works overhead
 - Interest paid on debentures
 - Income tax paid
 - All of the above

Answers to the MCQs

1.	(b)	2.	(b)	3.	(d)	4.	(b)	5.	(a)	6.	(a)
7.	(a)	8.	(a)	9.	(b)	10.	(a)				

Job costing

1. In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:
 - (a) Process costing
 - (b) Operating costing
 - (c) Job costing
 - (d) None of the above
2. The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:
 - (a) Bin card
 - (b) Bill of material
 - (c) Material requisition slip
 - (d) None of the above
3. Job costing is similar to that under Batch costing except with the difference that a:
 - (a) Job becomes a cost unit.
 - (b) Batch becomes the cost unit instead of a job
 - (c) Process becomes a cost unit
 - (d) None of the above.
4. In job costing which of the following documents are used to record the issue of direct material to a job?:
 - (a) Goods received note
 - (b) Material requisition
 - (c) Purchase order
 - (d) Purchase requisition
5. The most suitable cost system where the products differ in type of materials and work performed is :
 - (a) Job Costing
 - (b) Process Costing
 - (c) Operating Costing
 - (d) None of these.

6. Which of the following statements is true:

- (a) Job cost sheet may be used for estimating profit of jobs.
- (b) Job costing cannot be used in conjunction with marginal costing.
- (c) A production order is an order received from a customer for particular jobs.
- (d) None of these.

7. Which of the following statements is true:

- (a) Job cost sheet may be prepared for facilitating routing and scheduling of the job
- (b) Job costing can be suitably used for concerns producing uniformly any specific product
- (c) Job costing cannot be used in companies using standard costing
- (d) Neither (a) nor (b) nor (c)

Answers to the MCQs

1.	(c)	2.	(b)	3.	(a)	4.	(b)	5.	(a)	6.	(a)
7.	(d)										

Unit and Batch Costing

1. Different businesses in order to determine cost of their product or service offering follow:
 - (a) Different methods of Costing
 - (b) Uniform Costing
 - (c) Different techniques of costing
 - (d) None of the above
2. In order to determine cost of the product or service, following are used:
 - (a) Techniques of costing like Marginal, Standard etc.
 - (b) Methods of Costing
 - (c) Comparatives
 - (d) All of the above
3. Unit Costing is applicable where:
 - (a) Product produced are unique and no 2 products are same
 - (b) Dissimilar articles are produced as per customer specification
 - (c) homogeneous articles are produced on large scale
 - (d) Products made require different raw materials
4. In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:
 - (a) Process costing
 - (b) Operating costing
 - (c) Job costing
 - (d) None of the above
5. Job Costing is:
 - (a) Applicable to all industries regardless of the products or services provided
 - (b) Technique of costing
 - (c) Suitable where similar products are produced on mass scale
 - (d) Method of costing used for non- standard and non- repetitive products.
6. The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:

- (a) Bin card
- (b) Bill of material
- (c) Material requisition slip
- (d) None of the above

7. Batch costing is a type of:

- (a) Process costing
- (b) Job Costing
- (c) Differential costing
- (d) Direct costing

8. Batch costing is similar to that under job costing except with the difference that a:

- (a) Job becomes a cost unit.
- (b) Batch becomes the cost unit instead of a job
- (c) Process becomes a cost unit
- (d) None of the above

9. The main points of distinction between job and contract costing includes:

- (a) Length of time to complete.
- (b) Big jobs
- (c) Activities to be done outside the factory area
- (d) All of the above

10. Economic batch quantity is that size of the batch of production where:

- (a) Average cost is minimum
- (b) Set-up cost of machine is minimum
- (c) Carrying cost is minimum
- (d) Both (b) and (c)

Answers to the MCQs

1.	(a)	2.	(b)	3.	(c)	4.	(c)	5.	(d)	6.	(b)
7.	(b)	8.	(b)	9.	(d)	10.	(d)				

Material cost

1. Direct material can be classified as
 - (a) Fixed cost
 - (b) Variable cost
 - (c) Semi-variable cost.
 - (d) Prime Cost
2. In most of the industries, the most important element of cost is
 - (a) Material
 - (b) Labour
 - (c) Overheads
 - (d) Administration Cost
3. Which of the following is considered to be the normal loss of materials?
 - (a) Loss due to accidents
 - (b) Pilferage
 - (c) Loss due to breaking the bulk
 - (d) Loss due to careless handling of materials.
4. In which of following methods of pricing, costs lag behind the current economic values?
 - (a) Last-in-first out price
 - (b) First-in-first out price
 - (c) Replacement price
 - (d) Weighted average price
5. Continuous stock taking is a part of
 - (a) Annual stock taking
 - (b) Perpetual inventory
 - (c) ABC analysis.
 - (d) Bin Cards
6. In which of the following methods, issues of materials are priced at pre-determined rate?
 - (a) Inflated price method

- (b) Standard price method
 (c) Replacement price method
 (d) Market price method.
7. When material prices fluctuate widely, the method of pricing that gives absurd results is
 (a) Simple average price
 (b) Weighted average price
 (c) Moving average price
 (d) Inflated price.
8. When prices fluctuate widely, the method that will smooth out the effect of fluctuations is
 (a) Simple average
 (b) Weighted average
 (c) FIFO
 (d) LIFO
9. Under the FSN system of inventory control, inventory is classified on the basis of:
 (a) Volume of material consumption
 (b) Frequency of usage of items of inventory
 (c) Criticality of the item of inventory for production
 (d) Value of items of inventory
10. Form used for making a formal request to the purchasing department to purchase materials is a
 (a) Material Transfer Note
 (b) Purchase Requisition Note
 (c) Bill of Materials
 (d) Material Requisition Note

Answers to the MCQs

1.	(b)	2.	(a)	3.	(c)	4.	(b)	5.	(b)	6.	(b)
7.	(a)	8.	(b)	9.	(b)	10.	(b)				

Employee cost and Direct Expenses

1. Idle time is the time under which-
 - (a) Full wages are paid to workers
 - (b) No productivity is given by the workers
 - (c) Both (a) and (b)
 - (d) None of the above
2. Cost of idle time due to non-availability of raw material is-
 - (a) Charged to overhead costs
 - (b) Charged to respective jobs
 - (c) Charged to costing profit and loss account
 - (d) None of the above
3. Time and motion study is conducted by-
 - (a) Time keeping department
 - (b) Personnel department
 - (c) Payroll department
 - (d) Engineering department
4. Identify, which one of the following, does not account for increasing labour productivity-
 - (a) Job satisfaction
 - (b) Motivating workers
 - (c) High labour turnover
 - (d) Proper supervision and control
5. Labour turnover is measured by-
 - (a) $\text{Number of persons replaced} \div \text{average number of workers}$
 - (b) $\text{Numbers of persons separated} \div \text{number of workers at the beginning of the year}$
 - (c) $(\text{Number of persons replaced} + \text{number of persons separated}) \div (\text{number of persons at the beginning} + \text{the number of persons at the end of the year})$
 - (d) None of the above

6. Time booking refers to a method wherein of an employee is recorded.
- (a) Attendance
 - (b) Food expenses
 - (c) Health status
 - (d) Time spent on a particular job
7. Employee Cost includes-
- (a) Wages and salaries
 - (b) Allowances and incentives
 - (c) Payment for overtime
 - (d) All of the above
8. If the time saved is less than 50% of the standard time, then the wages under Rowan and Halsey premium plan on comparison gives-
- (a) More wages to workers under Rowan plan than Halsey plan
 - (b) More wages to workers under Halsey plan than Rowan plan
 - (c) Equal wages under two plans
 - (d) None of the above
9. Standard time of a job is 60 hours and guaranteed time rate is Rs.0.30 per hour. What is the amount of wages under Rowan plan if job is completed in 48 hours?
- (a) Rs. 16.20
 - (b) Rs. 17.28
 - (c) Rs. 18.00
 - (d) Rs. 14.40
10. Important factors for control of employee cost can be-
- (a) Time and Motion Study
 - (b) Control over idle time and overtime
 - (c) Control over employee turnover
 - (d) All of the above

11. Out of the following methods attendance is marked by recognizing an employee based on physical and behavioural traits-
- (a) Punch Card Attendance method
 - (b) Bio- Metric Attendance system
 - (c) Attendance Register method
 - (d) Token Method
12. If overtime is required for meeting urgent orders, the overtime premium should be charged as-
- (a) Respective job
 - (b) Overhead cost
 - (c) Costing P& L A/c
 - (d) None of above

Answers to the MCQs

1.	(c)	2.	(c)	3.	(d)	4.	(c)	5.	(a)	6.	(d)
7.	(d)	8.	(a)	9.	(b)	10	(d)	11	(b)	12	(a)

Process & Operation costing

1. The type of process loss that should not be allowed to affect the cost of good units is:
 - (a) Abnormal loss
 - (b) Normal loss
 - (c) Seasonal loss
 - (d) Standard loss
2. 200 units were introduced in a process in which 20 units is the normal loss. If the actual output is 150 units, then there is:
 - (a) No abnormal loss
 - (b) No abnormal gain
 - (c) Abnormal loss of 30 units
 - (d) Abnormal gain of 30 units
3. 100 units are processed at a total cost of Rs. 160, normal loss is 10%, & scrap units are sold @ Rs. 0.25 each. If the output is 80 units, then the value of abnormal loss is:
 - (a) Rs. 2.50
 - (b) Rs. 16
 - (c) Rs. 17.50
 - (d) Rs. 17.75
4. When average method is used in process costing, the opening inventory costs are:
 - (a) Subtracted from the new costs
 - (b) Added to the new costs
 - (c) Kept separate from the costs of the new period
 - (d) Averaged with other costs to arrive at total cost
5. Spoilage that occurs under inefficient operating conditions and is ordinarily controllable is called:
 - (a) Normal spoilage
 - (b) Abnormal spoilage
 - (c) Normal defectives
 - (d) None of the above
6. The cost of normal process loss is -
 - (a) Absorbed by good units produced and amount realised by the sale of loss units should be debited to the process account.
 - (b) Debited to costing profit and loss account.

- (c) Absorbed by good units produced.
 - (d) Debited to costing profit and loss account and amount realised by the sale of loss units should be credited to the process account.
7. The value of abnormal loss is equal to:
- (a) Total cost of materials
 - (b) Total process cost less realizable value of normal loss
 - (c) Total process cost less cost of scrap
 - (d) Total process cost less realizable value of normal loss less value of transferred out goods.
8. Inter-process profit is calculated, because:
- (a) a process is a cost centre
 - (b) each process has to report profit
 - (c) the efficiency of the process is measured
 - (d) the wages of employees are linked to the process profitability.
9. Under Weighted Average (Average) Method:
- (a) The cost to complete the opening WIP is ignored.
 - (b) The cost to complete the opening WIP and other completed units are calculated separately.
 - (c) The cost of opening work-in-process and cost of the current period are aggregated and the aggregate cost is divided by output in terms of completed units.
 - (d) Closing stock of work in process is valued at current cost.
10. A process account is debited by abnormal gain, the value is determined as:
- (a) Equal to the value of normal loss
 - (b) Cost of good units less realizable value of normal loss
 - (c) Cost of good units less realizable value of actual loss
 - (d) Equal to the value of good units less closing stock
11. Lean Labs develops 55mm film using a four-step process that moves progressively through four departments. The company specializes in overnight service and has the largest drug store chain as its primary customer. Currently, direct labor, direct materials, and overhead are accumulated by departments.
- The cost accumulation system that best describes the system Lean Labs is using is:
- (a) Operation costing.
 - (b) Activity-based costing.
 - (c) Job-order costing.
 - (d) Process costing.

- 12.** When compared with normal spoilage, abnormal spoilage:
- (a) Arises more frequently from factors that are inherent in the manufacturing process.
 - (b) Is given the same accounting treatment as normal spoilage.
 - (c) Is generally thought to be more controllable by purchase department than production department.
 - (d) Is not typically influenced by the "tightness" of production standards.
- 13.** Assume 550 units were worked on during a period in which a total of 500 good units were completed. Normal spoilage consisted of 30 units; abnormal spoilage, 20 units. Total production costs were Rs. 2,200. The company accounts for abnormal spoilage separately on the income statement as loss due to abnormal spoilage. Normal spoilage is not accounted for separately. What is the cost of the good units produced?
- (a) Rs. 2,080 (b) Rs. 2,115 (c) Rs. 2,200 (d) Rs. 2,332
- 14.** IC Limited uses process costing systems and inspects its goods post manufacturing. An engineer noticed on May 31st the following:

Good units completed	15,000
Normal spoilage (units)	300
Abnormal spoilage (units)	100

Unit costs were: Material Rs. 2.50 and conversion costs (Labour & overheads) Rs. 6.00. The number of units that company would transfer to its finished goods stock and the related cost of these units are:

- (a) 15,000 units transferred at a cost of Rs. 127,500
- (b) 15,000 units transferred at a cost of Rs. 130,050
- (c) 15,000 units transferred at a cost of Rs. 135,000
- (d) 15,300 units transferred at a cost of Rs. 130,050

Answers to the MCQs

1.	(a)	2.	(c)	3.	(c)	4.	(b)	5.	(b)	6.	(c)
7.	(d)	8.	(c)	9.	(c)	10.	(b)	11.	(d)	12.	(d)
13.	(b)	14.	(b)								

Joint Products and By Products

1. In sugar manufacturing industries molasses is also produced along with sugar. Molasses may be of smaller value as compared with the value of sugar and is known as:
 - (a) Common product
 - (b) By- product
 - (c) Joint product
 - (d) None of them
2. Method of apportioning joint costs on the basis of output of each joint product at the point of split off is:
 - (a) Sales value method
 - (b) Physical unit method
 - (c) Average cost method
 - (d) Marginal cost and contribution method
3. In the Net realisable value method, for apportioning joint costs over the joint products, the basis of apportionment would be:
 - (a) Selling price per unit of each of the joint products
 - (b) Selling price multiplied by units sold of each of the joint products
 - (c) Sales value of each joint product less further processing costs of individual products
 - (d) Both (b) and (c)
4. The main purpose of accounting of joint products and by- products is to:
 - (a) Determine the opportunity cost
 - (b) Determine the replacement cost
 - (c) Determine profit or loss on each product line
 - (d) None of the above
5. Under net realizable value method of apportioning joint costs to joint products, the selling & distribution cost is:
 - (a) Added to joint cost
 - (b) Deducted from further processing cost
 - (c) Deducted from sales value
 - (d) Ignored

6. Which of the following is a co-product:
- (a) Diesel and Petrol in an oil refinery
 - (b) Edible oils and oil cakes
 - (c) Curd and butter in a dairy
 - (d) Mustard oil and Sunflower oil in an oil processing company.
7. Which of the following is an example of by-product
- (a) Diesel and Petrol in an oil refinery
 - (b) Edible oils and oil cakes
 - (c) Curd and butter in a dairy
 - (d) Mustard seeds and mustard oil.
8. Which of following method can be used when the joint products are of unequal quantity and used for captive consumption:
- (a) Technical estimates, using market value of similar goods
 - (b) Net Realisable value method
 - (c) Physical Units method
 - (d) Market value at split-off method.
9. Which of the following statement is not correct in relation to Co-products:
- (a) Co-products may also have joint products
 - (b) Costing for co-products are done according to process costing method
 - (c) Co-products do not have any by-products
 - (d) Co-products are treated as a separate cost object for costing purpose.
10. When a by-product does not have any realisable value, the cost of by-product is:
- (a) Transferred to Costing Profit & Loss A/c
 - (b) By-product cost is borne by the good units
 - (c) By-product cost is ignored
 - (d) By-product cost is determined taking value of similar goods
11. SG Ltd manufactures two products from a joint milling process. The two products developed are Mine support (MS) and Commercial building (CB). A standard production run incurs joint costs of Rs. 1,00,000 and results in 60,000 units of MS and 90,000 units of CB. Each MS sells for Rs. 200 per unit, and each CB sells for Rs. 450 per unit.
- Assuming no further processing work is done after the split-off point, the amount of joint cost allocated to Commercial building (CB) on a physical quantity allocation basis would be:

- (a) Rs. 60,000.
- (b) Rs. 180,000.
- (c) Rs. 225,000.
- (d) Rs. 120,000.

12. Kay Company manufactures two hair care lotions, Livi and Sili, out of a joint process. The joint (common) costs incurred are Rs. 6,30,000 for a standard production run that generates 1,80,000 gallons of Livi and 1,20,000 gallons of Sili. Livi sells for Rs. 240 per gallon, and Sili sells for Rs. 390 per gallon.

If additional processing costs beyond the split-off point are Rs. 140 per gallon for Livi and Rs. 90 per gallon for Sili, the amount of joint cost of each production run allocated to Livi on a physical-quantity basis is:

- (a) Rs. 340,000.
- (b) Rs. 378,000.
- (c) Rs. 232,000.
- (d) Rs. 580,000.

13. For the purpose of allocating joint costs to joint products, the sales price at point of sale, reduced by cost to complete after split-off, is assumed to be equal to the:

- (a) Joint costs
- (b) Sales price less a normal profit margin at point of sale
- (c) Net sales value at split off
- (d) Total costs.

Answers to the MCQs

1.	(b)	2.	(b)	3.	(d)	4.	(c)	5.	(c)	6.	(d)
7.	(b)	8.	(a)	9.	(c)	10.	(b)	11.	(a)	12.	(b)
13.	(c)										

Marginal Costing

1. Under marginal costing the cost of product includes:
 - (a) Prime costs only.
 - (b) Prime costs and variable overheads.
 - (c) Prime costs and fixed overheads.
 - (d) Prime costs and factory overheads.
2. Reporting under marginal costing is accomplished by:
 - (a) Treating all costs as period costs.
 - (b) Eliminating the work-in-progress inventory account.
 - (c) Matching variable costs against revenue and treating fixed costs as period costs.
 - (d) Including only variable costs in income statement.
3. Period costs are:
 - (a) Variable costs.
 - (b) Fixed costs.
 - (c) Prime costs.
 - (d) Overheads costs.
4. When sales and production (in units) are same then profit under:
 - (a) Marginal costing is higher than that of absorption costing.
 - (b) Marginal costing is lower than that of absorption costing.
 - (c) Marginal costing is equal to that of absorption costing.
 - (d) None of the above.
5. When sales exceed production (in units) then profit under:
 - (a) Marginal costing is higher than that of absorption costing.
 - (b) Marginal costing is lower than that of absorption costing.
 - (c) Marginal costing is equal than that of absorption costing.
 - (d) None of above.
6. The main difference between marginal costing and absorption costing is regarding the treatment of:
 - (a) Prime cost.
 - (b) Fixed overheads.
 - (c) Direct materials.
 - (d) Variable overheads.

7. Under profit volume ratio, the term profit:
- Means the sales proceeds in excess of total costs.
 - Means the same thing as is generally understood.
 - Is a misnomer, it in fact refers to contribution i.e. (sales revenue-variable costs).
 - None of the above.
8. Factors which can change the break-even point:
- Change in fixed costs.
 - Change in variable costs.
 - Change in the selling price.
 - All of the above.
9. If P/V ratio is 40% of sales then what about the remaining 60% of sales:
- Profit.
 - Fixed cost.
 - Variable cost.
 - Margin of safety.
10. The P/V ratio of a product is 0.6 and profit is Rs. 9,000. The margin of safety is:
- Rs. 5,400
 - Rs. 15,000
 - Rs. 22,500
 - Rs. 3,600

Answers to the MCQs

1.	(b)	2.	(c)	3.	(b)	4.	(c)	5.	(a)	6.	(b)
7.	(c)	8.	(d)	9.	(c)	10.	(b)				

Standard Costing

1. Under standard cost system the cost of the product determined at the beginning of production is its:
 - (a) Direct cost
 - (b) Pre-determined cost
 - (c) Historical cost
 - (d) Actual cost
2. The deviations between actual and standard cost is known as:
 - (a) Multiple analysis
 - (b) Variable cost analysis
 - (c) Variance analysis
 - (d) Linear trend analysis
3. The standard which is attainable under favourable conditions is:
 - (a) Theoretical standard
 - (b) Expected standard
 - (c) Normal standard
 - (d) Basic standard
4. The standard most suitable from cost control point of view is:
 - (a) Normal standard
 - (b) Theoretical standard
 - (c) Expected standard
 - (d) Basic standard
5. Overhead cost variances is:
 - (a) The difference between overheads recovered on actual output - actual overhead incurred.
 - (b) The difference between budgeted overhead cost and actual overhead cost.
 - (c) Obtained by multiplying standard overhead absorption rate with the difference between standard hours for actual output and actual hours worked.
 - (d) None of the above
6. Which of the following variance arises when more than one material is used in the manufacture of a product:
 - (a) Material price variance
 - (b) Material usage variance

- (c) Material yield variance
(d) Material mix variance
7. If standard hours for 100 units of output are 400 @ Rs.2 per hour and actual hours take are 380 @ Rs.2.25 per, then the labour rate variance is:
(a) Rs.95 (adverse)
(b) Rs.100 (adverse)
(c) Rs.25 (favourable)
(d) Rs.120 (adverse)
8. Controllable variances are best disposed-off by transferring to:
(a) Cost of goods sold
(b) Cost of goods sold and inventories
(c) Inventories of work-in-progress and finished goods
(d) Costing profit and loss account
9. Idle time variance is obtained by multiplying:
(a) The difference between standard and actual hours by the actual rate of labour per hour
(b) The difference between actual labour hours paid and actual labour hours worked by the standard rate
(c) The difference between standard and actual hours by the standard rate of labour per hour
(d) None of the above.
10. Basic standards are:
(a) Those standards, which require high degree of efficiency and performance.
(b) Average standards and are useful in long term planning.
(c) Standards, which can be attained or achieved
(d) Assuming to remain unchanged for a long time.

Answers to the MCQs

1.	(b)	2.	(c)	3.	(a)	4.	(c)	5.	(a)	6.	(d)
7.	(a)	8.	(d)	9.	(b)	10.	(d)				

Budget and Budgetary control

1. If a company wishes to establish a factory overhead budget system in which estimated costs can be derived directly from estimates of activity levels, it should prepare a:
 - (a) Master budget
 - (b) Cash budget
 - (c) Flexible budget
 - (d) Fixed budget
2. The classification of fixed and variable cost is useful for the preparation of:
 - (a) Master budget
 - (b) Flexible budget
 - (c) Cash budget
 - (d) Capital budget
3. Budget manual is a document:
 - (a) Which contains different type of budgets to be formulated only.
 - (b) Which contains the details about standard cost of the products to be made.
 - (c) Setting out the budget organization and procedures for preparing a budget including fixation of responsibilities, formats and records required for the purpose of preparing a budget and for exercising budgetary control system.
 - (d) None of the above
4. The budget control organization is usually headed by a top executive who is known as:
 - (a) General manager
 - (b) Budget director/budget controller
 - (c) Accountant of the organization
 - (d) None of the above
5. "A favourable budget variance is always an indication of efficient performance". Do you agree, give reason?
 - (a) A favourable variance indicates, saving on the part of the organization hence it indicates efficient performance of the organization.
 - (b) Under all situations, a favourable variance of an organization speaks about its efficient performance.
 - (c) A favourable variance does not necessarily indicate efficient performance, because such a variance might have been arrived at by not carrying out the expenses mentioned in the budget.
 - (d) None of the above.

6. A budget report is prepared on the principle of exception and thus-
- Only unfavourable variances should be shown
 - Only favourable variance should be shown
 - Both favourable and unfavourable variances should be shown
 - None of the above
7. Purchases budget and materials budget are same:
- Purchases budget is a budget which includes only the details of all materials purchased
 - Purchases budget is a wider concept and thus includes not only purchases of materials but also other item's as well
 - Purchases budget is different from materials budget; it includes purchases of other items only
 - None of the above
8. Efficiency ratio is:
- The extent of actual working days avoided during the budget period
 - Activity ratio/ capacity ratio
 - Whether the actual activity is more or less than budgeted activity
 - None of the above
9. Activity Ratio depicts:
- Whether actual capacity utilized exceeds or falls short of the budgeted capacity
 - Whether the actual hours used for actual production were more or less than the standard hours
 - Whether actual activity was more or less than the budgeted capacity
 - None of the above
10. Which of the following is usually a short-term budget:
- Capital expenditure budget
 - Research and development budget
 - Cash budget
 - Sales budget

Answers to the MCQs

1.	(c)	2.	(b)	3.	(c)	4.	(b)	5.	(c)	6.	(c)
7.	(b)	8.	(b)	9.	(c)	10.	(c)				

Service costing

1. Composite cost unit for a hospital is:
 - (a) Per patient
 - (b) Per patient-day
 - (c) Per day
 - (d) Per bed
2. Cost of diesel and lubricant is an example of:
 - (a) Operating cost
 - (b) Fixed charges
 - (c) Semi-variable cost
 - (d) None of the above
3. Cost units used in power sector is:
 - (a) Kilo meter (K.M)
 - (b) Kilowatt-hour (kWh)
 - (c) Number of electric points
 - (d) Number of hours
4. Absolute Tonne-km. is an example of:
 - (a) Composite units in power sector
 - (b) Composite unit of transport sector
 - (c) Composite unit for bus operation
 - (d) Composite unit for oil and natural gas
5. Depreciation is treated as fixed cost if it is related to:
 - (a) Activity level
 - (b) Related with machine hours
 - (c) Efflux of time
 - (d) None of the above
6. Jobs undertaken by IT & ITES organizations are considered as:
 - (a) Project
 - (b) Batch work
 - (c) Contract
 - (d) All the above

7. In Toll Road costing, the repetitive costs include:
- (a) Maintenance cost
 - (b) Annual operating costs
 - (c) None of the above
 - (d) Both (a) and (b)
8. BOT approach means:
- (a) Build, Operate and Transfer
 - (b) Buy, Operate and Transfer
 - (c) Build, Operate and Trash
 - (d) Build, Own and Trash
9. Pre-product development activities in insurance companies, include:
- (a) Processing of Claim
 - (b) Selling of policy
 - (c) Provision of conditions
 - (d) Policy application processing
10. Which of the following costing method is not appropriate for costing of educational institutes:
- (a) Batch Costing
 - (b) Activity Based Costing
 - (c) Absorption Costing
 - (d) Process Costing

Answers to the MCQs

1.	(b)	2.	(a)	3.	(b)	4.	(b)	5.	(c)	6.	(a)
7.	(a)	8.	(a)	9.	(c)	10.	(d)				



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