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M.COM.

SEMESTER - I

(REVISED SYLLABUS AS PER NEP 2020)

ADVANCED COST AND MANAGEMENT ACCOUNTING - I

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October 2024, Print - 1

Published by : Director,
Centre for Distance and Online Education,
University of Mumbai,
Vidyanagari, Mumbai - 400 098.

DTP Composed : Mumbai University Press
Printed by Vidyanagari, Santacruz (E), Mumbai

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Programme Name: M.Com (Advanced Accountancy)
CourseName: Advanced Cost and Management Accounting I

TotalCredits:04 **TotalMarks:100**
Universityassessment:50 **Collegeassessment:50**
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B) **Managerial Decisions through Cost Accounting such as Pricing Accepting Special Offer - Profit Planning - Make or Buy Decisions - Determining Key Factors - Determining Sales Mix - Determining Optimum Activity Level - Performance Evaluation - Alternative Methods of Production, Cost Reduction & Cost Control**

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References:

- **Cost Accounting by CMA G.C. Rao**
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1

MARGINAL COSTING AND ABSORPTION COSTING

Unit Structure

1.1 INTRODUCTION TO MARGINAL AND ABSORPTION COSTING

1.1.1 Meaning: Absorption Costing: The term "absorption costing" describes a costing technique that takes into consideration all manufacturing expenses. This approach is used by management to cover product expenses. Both direct and indirect costs are included in the expenses. The labour and materials used in production are considered direct costs. Factory rent, administrative expenses, insurance, and compliance are examples of indirect costs.

1.1.2 FEATURES OF ABSORPTION COSTING

Three types of costs are identified in absorption costing: fixed, semi-variable, and variable costs. Variable costs fluctuate according to the percentage of goods produced. Fixed costs remain constant regardless of production volume. Batch variation affects semi-variable costs.

A component of accounting practises and procedures is absorption costing. The cost of the inventory at the conclusion of an accounting period is ascertained through absorption costing. The closing inventory's value is raised because it includes fixed costs as well. The corporation makes more money when using this method of inventory valuation.

Since it accounts for every expense related to production, absorption costing is also referred to as full costing. Direct labour and material costs are examples of variable expenses. Insurance, security, and rent are examples of fixed costs. Factory electricity bills are one type of semi-

variable expense. So long as the product is being sold, all costs are borne by it under full costing.

Variable costing only takes into account variable costs; absorption costing takes into account the entire cost of production and allows for accurate accounting. Reporting high profits with high closing inventory values is made possible by the absorption costing method. The rationale behind this is the total absorption of production costs.

Advantages of Absorption Costing
Using the Absorption costing method has the following benefits:
It gives us a more accurate ending balance of inventory, as costs related to unsold goods are in the balance, and not expensed during the period;

1.1.3 ADVANTAGES OF ABSORPTION COSTING

1. Accounting for All Production-Related Expenses: The lowest cost associated with production is considered in absorption costing. This comes in handy when it comes to product pricing. This makes it possible to guarantee that the product's price is fair given the costs associated with its manufacture. It also guarantees that the prices of the products are reasonable and competitive.

2. Monitoring Earnings: Additionally, absorption costing gives the business a precise picture of its profitability.

3. Ideal for Small Enterprises: Small businesses find it easier to monitor product costs because they don't produce goods on a large scale. Businesses are able to accurately price their products for sale and anticipate their fixed costs.

4. Suitable for Changing Demands: Absorption costing provides a systematic costing tool for active businesses while taking into account the fluctuating turnover as costs are already fixed. It is an advantage for businesses that have a constant product demand.

1.1.4 DISADVANTAGES OF ABSORPTION COSTING

The disadvantages of absorption costing are mentioned below:

1. Excessive Assigning of Overhead Costs: In absorption costing, overhead expenses that aren't related to the product are allocated to each unit.

2. Overproduction to Reduce Costs: With this approach, profitability rises as a result of mass production of the goods. The fixed overhead expenses don't change. Therefore, the fixed costs per unit go down as production increases. The fixed overhead costs are not added to the expenses report while the units are still in stock. Profitability rises as a result.

3. Incomplete Data: The fixed overhead is included in the data used to determine a product's cost using this method. This action inflates the real

cost of manufacturing, making the data that is currently available insufficient for a thorough analysis.

4. Profitability Without Knowledge: Absorption costing only gives a limited amount of information about the company's profit margins because fixed expenses cannot be subtracted from revenue until units are sold. As a result, the balance sheet could show profitability while the income statement of the business shows unaccounted-for costs.

1.1.5 OTHER INFORMATION

Marginal costing excludes any fixed costs and is based only on the variable costs of production. Whereas the Both the variable, or direct, and the fixed, or indirect, costs of production are included in absorption costing.

Prime cost: This is the direct labour and direct material only.

Prime means first, so this is just the direct labour and direct material to make the item.

If no products are made, then no prime costs are incurred.

Marginal cost: This is calculated by adding the prime cost and the variable production overheads. Marginal means part of, so this is the prime cost and the variable production overheads added together. If no products are made, then no marginal costs are incurred.

Absorption cost: This is calculated by adding the marginal cost and the fixed production overheads. Absorption absorbs all production overheads associated with making a particular product.

Example:
Harvey Ltd. has asked you to prepare marginal cost per unit and the absorption cost per unit. for their new product “Pearson Pearl”. The following details are provided with respect to the planned production of the pearl.

Planned Production of 10,000 Pearls:

Sales Price Per Unit	=	2,000
Total Direct Materials	=	25,00,000
Total Direct Labour	=	18,00,000
Variable Cost Per Unit	=	700
Total Fixed Production Cost	=	10,00,000
Non-Production Overheads	=	15,00,000

Solution:

Prime Cost Per Unit

Particulars	Amount
Total Direct Materials	25,00,000
Total Direct Labour	18,00,000
Prime Cost	43,00,000
(÷) Total No. of Units Produced	10,000
Prime Cost Per Unit	4,300

Marginal Cost Per Unit

Particulars	Amount
Prime Cost Per Unit	4,300
(+) Variable Cost Per Unit	700
Total Marginal Cost Per Unit	5,000
(x) No. of Units Produced	10,000
Total Marginal Cost	5,00,00,000

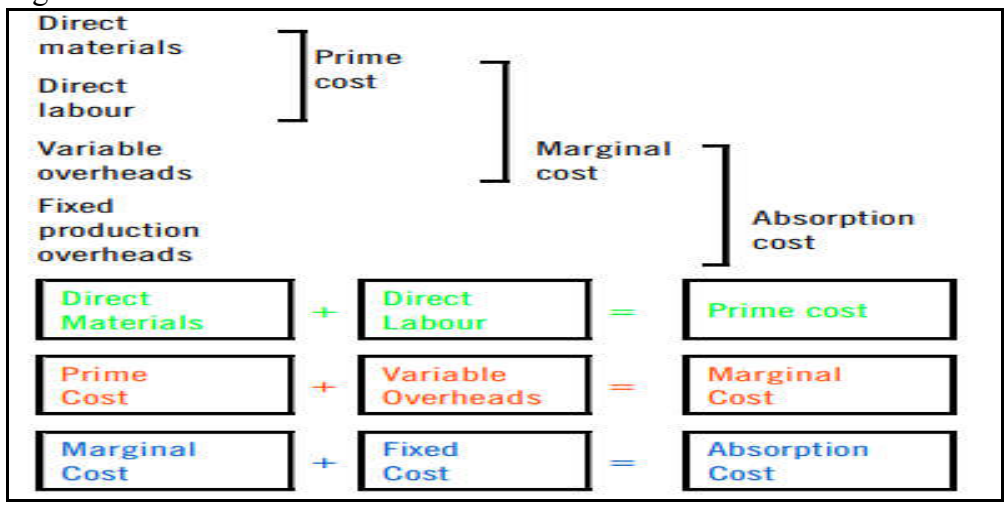
Absorption cost per unit

Particulars	Amount
Total Marginal Cost	5,00,00,000
(+) Fixed Production Overheads	10,00,000
Total Absorption Cost	5,10,00,000
(÷) No. of Units Produced	10,000
Total Marginal Cost Per Unit	5,100

Absorption Cost = Marginal cost + Fixed Production Overheads
Absorption Cost = ₹ 43,000 + ₹ 57,000 = ₹ 1,00,000
Absorption Cost = ₹ 1,00,000 / 1,000 units = ₹ 100

Note: The non-production overheads are ignored.

Figure 1.1



Source: https://www.pqmagazine.com/wp-content/uploads/2022/05/absortion_graph.png

1.2 MARGINAL COSTING

1.2.1 MARGINAL COST

The cost of manufacturing one extra unit is known as the marginal cost. Therefore, the amount that total cost varies when output changes by one unit is known as the marginal cost. By Variable Cost, we mean Marginal Cost. The amount of output or activity has no bearing on the marginal cost per unit. The total of all variable overheads, variable direct expenses, direct labour costs, and direct material costs is known as the marginal cost.

Illustration 01: Siddhi Ltd. produces 20,000 units of T-Shirts by incurring a total cost of 7,00,000. Break-up of costs are as follows:

i. Direct Material @ ₹ 15 per unit, ₹ 3,00,000,
ii. Direct labour cost @ ₹ 6 per unit, ₹ 1,50,000
iii. Variable overheads @ ₹ 4 per unit, ₹ 50,000
iv. Fixed overheads 2,00,000 (upto a volume of 30,000 units)

Solution 01:

In this example, if Siddhi Ltd. wants to know marginal cost of producing one extra unit from the current production i.e. 20,001st unit. The marginal cost would be the change in the total cost due production of this 20,001st extra unit. The extra cost would be 20, as calculated below:

Particulars	20,000 Units	20,001 Units	Change in Cost
	(A)	(B)	(C) = (B) – (A)
(i) Direct Material @ ₹ 15	3,00,000	3,00,015	15

(ii) Direct Labour @ ₹ 6	1,20,000	1,20,006	6
(iii) Direct Expenses @ ₹ 4	80,000	80,004	4
(iv) Fixed Overheads	2,00,000	2,00,000	0

1.2.2 MARGINAL COSTING

Marginal costing, also known as variable costing, is a costing technique used in managerial accounting to determine the cost of producing one additional unit of a product or service. It focuses on separating costs into variable costs and fixed costs. Only variable costs are charged to cost units under the marginal costing technique; fixed expenses related to a relevant period are deducted from the contribution for that period in the costing profit and loss account. Fixed costs are considered period costs under the Marginal Costing Technique.

Some names for marginal costing are variable costing, comparative costing, and contribution costing.

Mathematically,

- Total sales – Variable costs = Contribution
- Sales = Variable cost + Contribution
- Sales – Variable cost = Fixed cost ± profit/loss
- Contribution – Fixed costs = Profit

For example, the selling price of a product is ₹ 50 per unit and its variable cost is ₹ 30, the contribution per unit is ₹ 20.

Let's examine the following example to see how the marginal costing technique is used to determine profit.

Illustration 02:

Determine the annual profit using the marginal costing technique based on the following information:

Particulars	Product X	Product Y	Product Z
Units Produced (in Kgs)	15,000	25,000	35,000
Selling Price Per Unit	15	25	35
Variable Cost Per Unit	10	18	24
Total Fixed Cost	3,00,000		

Solution 02:

Particulars	Product X	Product Y	Product Z	Total
Sales	2,25,000	6,25,000	12,25,000	20,75,000
Less: Variable Cost	(1,50,000)	(4,50,000)	(8,40,000)	(14,40,000)
Contribution Per Unit	75,000	1,75,000	3,85,000	6,35,000
Less: Fixed Cost				(3,00,000)
Profits				3,35,000

Therefore, the marginal costing technique makes the assumption that the profit is the difference that results from the whole value of sales less the total value of variable expenses, or marginal costs. This difference serves as a fund (referred to as a contribution) to cover fixed costs. When making administrative decisions, the notion of contribution is a highly helpful tool for management.

1.3 BREAKEVEN ANALYSIS - COST VOLUME PROFIT ANALYSIS

1.3.1 Breakeven Analysis: Businesses can use break-even analysis, a financial computation, to ascertain when they will begin to turn a profit. The break-even point (BEP), or the sales level at which total revenues equal total costs and the business is neither profitable nor losses money, is calculated as part of this research.

Key Components:

1. Fixed Costs (FC): Costs that do not change with the level of production or sales. Examples include rent, salaries, and insurance.

2. Variable Costs (VC): Costs that vary directly with the level of production or sales. Examples include raw materials and direct labor.

3. Total Costs (TC): The sum of fixed and variable costs at any given level of production or sales.

4. Sales Revenue (SR): The income from sales of goods or services.

5. Profit Volume Ratio (PVR) or Contribution Margin (CM): The difference between sales revenue per unit and variable cost per unit. It contributes towards covering the fixed costs.

Break-Even Point Calculation

The break-even point can be calculated in terms of units or sales (in).

Break-Even Point in Units:

$$\text{Break-Even Point (units)} = \frac{\text{Fixed Costs}}{\text{Contribution Per Unit}}$$

Break-Even Point in Sales:

$$\text{Break-Even Point (sales)} = \frac{\text{Fixed Costs}}{\text{PVR}}$$

where the Contribution Margin Ratio is:

$$PVR\ OR\ \text{CMR} = \frac{\text{Sales Price per Unit} - \text{Variable Cost per Unit}}{\text{Sales Price per Unit}}$$

Uses of Break-Even Analysis

1. Decision Making: Helps in making decisions about pricing, budgeting, and planning.
2. Profit Planning: Assists in understanding the impact of cost structure changes on profitability.
3. Financial Forecasting: Aids in forecasting and setting sales targets.
4. Cost Control: Helps in identifying the impact of fixed and variable costs on the overall financial health of the business.
5. Investment Analysis: Useful in assessing the feasibility of new projects or business ventures.

Example

Suppose a company has the following financial details:

Fixed Costs = ₹ 50,000

Sales Price per Unit = ₹ 100

Variable Cost per Unit = ₹ 60

Break-Even Point in Units:

$$\text{Break-Even Point (units)} = \frac{50{,}000}{100 - 60} = \frac{50{,}000}{40} = 1{,}250 \text{ units}$$

Break-Even Point in Sales:

$$\text{Contribution Margin Ratio} = \frac{100 - 60}{100} = 0.4$$

$$\text{Break-Even Point (sales dollars)} = \frac{50{,}000}{0.4} = ₹\,1{,}25{,}000$$

This means the company needs to sell 1,250 units or generate ₹ 1,25,000 in sales to cover all its costs.

1.3.2 Cost-Volume-Profit (CVP) Analysis:

Cost-Volume-Profit (CVP) analysis is a managerial accounting technique that examines the relationships between costs, sales volume, and profit. CVP analysis extends beyond just finding the break-even point. It examines how changes in costs (both fixed and variable), sales volume, and pricing affect a company's profit. It is done with the objective to understand the interrelationships between cost, volume, and profit to aid in decision-making regarding pricing, production levels, product mix, and more.

Key Components

In addition to the Fixed Costs (FC), Variable Costs (VC), Sales Price per Unit (SP), Contribution Margin (CM) ($\mathbf{CM = SP - VC}$), Contribution Margin Ratio (CMR) $\mathbf{CMR = \frac{CM}{SP}}$, Break-Even Point (BEP) Break-Even Point in Units: $\mathbf{BEP\ (units) = \frac{FC}{CM}}$

Break-Even Point in Rupees: $\mathbf{BEP\ (Rupees) = \frac{FC}{CMR}}$

and the one separately related to CVP in addition to above is:

Target Profit: The desired profit level a company aims to achieve.

Target Profit Calculations

Target Profit in Units:

$$\mathbf{Target\ Profit\ (units) = \frac{FC + Target\ Profit}{Contribution\ per\ Unit}}$$

Target Profit in Rupees: $\mathbf{Target\ Profit\ (Rupees) = \frac{FC + Target\ Profit}{PVR}}$

Uses of BEP and CVP Analysis

1. Pricing Decisions: Determining optimal pricing strategies to achieve profit goals.
2. Sales Forecasting: Estimating sales needed to reach break-even or target profit levels.
3. Cost Control: Understanding the impact of changes in fixed and variable costs on profitability.
4. Budgeting and Planning: Preparing budgets and financial plans by estimating the effects of cost structure and sales volume changes.
5. Profit Planning: Setting sales targets and profit goals, understanding the implications of different sales volumes and cost structures.
6. Decision Making: Supporting decisions related to product mix, market expansion, and capacity utilization.

Example

Suppose a company has the following financial details:

- Fixed Costs = ₹ 50,000

- Sales Price per Unit = ₹ 100

- Variable Cost per Unit = ₹ 60

- Target Profit = ₹ 30,000

Break-Even Point in Units:

$$\text{BEP (units)} = \frac{50{,}000}{100 - 60} = \frac{50{,}000}{40} = 1{,}250 \text{ units}$$

Break-Even Point in Rupees:

$$\text{CMR} = \frac{100 - 60}{100} = 0.4$$

$$\text{BEP (Rupees)} = \frac{50{,}000}{0.4} = ₹\ 1{,}25{,}000$$

Target Profit in Units:

$$\text{Target Profit (units)} = \frac{50{,}000 + 30{,}000}{40} = \frac{80{,}000}{40} = 2{,}000 \text{ units}$$

Target Profit in Rupees:

$$\text{Target Profit (in ₹)} = \frac{50{,}000 + 30{,}000}{0.4} = \frac{80{,}000}{0.4} = ₹\ 2{,}00{,}000$$

This analysis shows that the company needs to sell 1,250 units or generate ₹ 125,000 in sales to break even, and sell 2,000 units or generate ₹ 2,00,000 in sales to achieve a target profit of ₹ 30,000.

1.4 BREAK-EVEN CHARTS

A break-even chart visually represents the relationship between costs, revenue, and profit at different levels of production and sales. It helps to easily identify the break-even point where total revenues equal total costs.

Key Components of a Break-Even Chart

1. Axes:

X-Axis: Represents the number of units sold or produced.

Y-Axis: Represents the amount of money (in Rupees).

2. Lines:

Fixed Costs Line: A horizontal line representing fixed costs, which remain constant regardless of the number of units produced.

Total Costs Line: A line starting at the fixed costs level and increasing linearly with the number of units, representing the sum of fixed and variable costs.

Total Revenue Line: A line starting from the origin (0,0) and increasing linearly with the number of units, representing total revenue.

3. Break-Even Point (BEP): The point where the total revenue line intersects the total costs line. At this point, total revenue equals total costs, resulting in neither profit nor loss.

How to Create a Break-Even Chart

To create a break-even chart, follow these steps:

1. Determine the fixed costs (FC).

2. Determine the variable cost per unit (VC).

3. Determine the sales price per unit (SP).

4. Calculate the total costs for different production levels:

$$\text{Total Costs} = \text{Fixed Costs} + (\text{Variable Cost per Unit} \times \text{Number of Units})$$

5. Calculate the total revenue for different production levels:

$$\text{Total Revenue} = \text{Sales Price per Unit} \times \text{Number of Units}$$

6. Plot the fixed costs line.

7. Plot the total costs line.

8. Plot the total revenue line.

9. Identify the break-even point where the total revenue line intersects the total costs line.

Example

Suppose a company has the following financial details:

Fixed Costs = ₹ 50,000

Sales Price per Unit = ₹ 100

Variable Cost per Unit = ₹ 60

Step-by-Step Construction:

1. Fixed Costs Line: A horizontal line at ₹ 50,000.

2. Total Costs Line: Starts at ₹ 50,000 and increases by ₹ 60 for each additional unit sold.

3. Total Revenue Line: Starts at ₹ 0 and increases by ₹ 100 for each additional unit sold.

4. Break-Even Point: Calculate using the formula:

$$\text{BEP (units)} = \frac{50{,}000}{100 - 60} = \frac{50{,}000}{40} = 1{,}250 \text{ units}$$

Graphical Representation:

Constructing a Chart

Here's a simple representation of how you would plot these lines on a graph:

1. Plot the Fixed Costs Line: Draw a horizontal line at ₹ 50,000 across the graph.

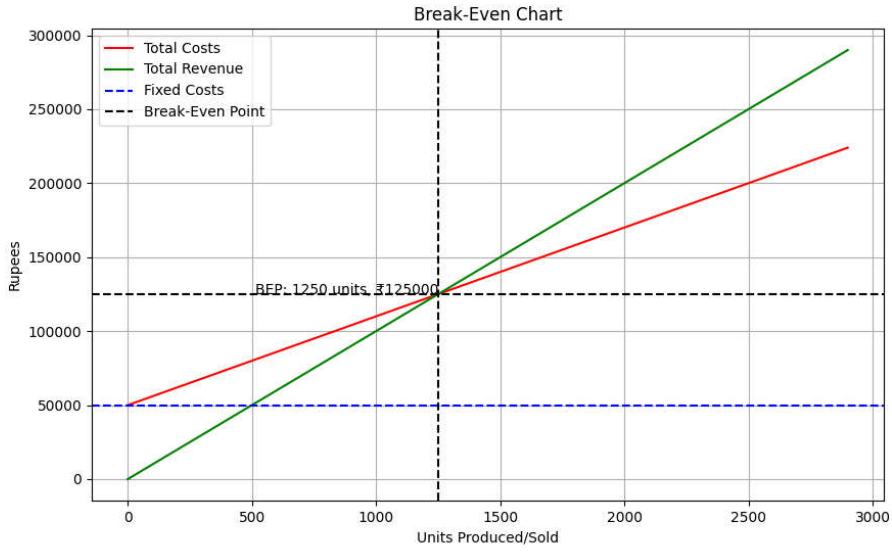
2. Plot the Total Costs Line: Start from ₹ 50,000 and plot a line that rises for each additional unit, with a slope corresponding to the variable cost per unit (₹ 60).

3. Plot the Total Revenue Line: Start from the origin (0,0) and plot a line that rises for each additional unit, with a slope corresponding to the sales price per unit (₹ 100).

Example Chart:

A	B	C	D = A x C	E = B + D	F	G = F x A	H = F - C	I = B ÷ H
Units Produced / Sold	Fixed Costs (₹)	Variable Cost per Unit (₹)	Total Variable Costs (₹)	Total Costs (₹)	Sales Price per Unit (₹)	Total Revenue (₹)	Contribution Per Unit	Break Even Cost
0	50,000	60	0	50,000	100	-	40	1,250
100	50,000	60	6,000	56,000	100	10,000	40	1,250
200	50,000	60	12,000	62,000	100	20,000	40	1,250
300	50,000	60	18,000	68,000	100	30,000	40	1,250
400	50,000	60	24,000	74,000	100	40,000	40	1,250
500	50,000	60	30,000	80,000	100	50,000	40	1,250
600	50,000	60	36,000	86,000	100	60,000	40	1,250
700	50,000	60	42,000	92,000	100	70,000	40	1,250
800	50,000	60	48,000	98,000	100	80,000	40	1,250
900	50,000	60	54,000	1,04,000	100	90,000	40	1,250
1000	50,000	60	60,000	1,10,000	100	1,00,000	40	1,250
1100	50,000	60	66,000	1,16,000	100	1,10,000	40	1,250
1200	50,000	60	72,000	1,22,000	100	1,20,000	40	1,250

1300	50,000	60	78,000	1,28,000	100	1,30,000	40	1,250
1400	50,000	60	84,000	1,34,000	100	1,40,000	40	1,250
1500	50,000	60	90,000	1,40,000	100	1,50,000	40	1,250
1600	50,000	60	96,000	1,46,000	100	1,60,000	40	1,250
1700	50,000	60	1,02,000	1,52,000	100	1,70,000	40	1,250
1800	50,000	60	1,08,000	1,58,000	100	1,80,000	40	1,250
1900	50,000	60	1,14,000	1,64,000	100	1,90,000	40	1,250
2000	50,000	60	1,20,000	1,70,000	100	2,00,000	40	1,250
2100	50,000	60	1,26,000	1,76,000	100	2,10,000	40	1,250
2200	50,000	60	1,32,000	1,82,000	100	2,20,000	40	1,250
2300	50,000	60	1,38,000	1,88,000	100	2,30,000	40	1,250
2400	50,000	60	1,44,000	1,94,000	100	2,40,000	40	1,250
2500	50,000	60	1,50,000	2,00,000	100	2,50,000	40	1,250
2600	50,000	60	1,56,000	2,06,000	100	2,60,000	40	1,250
2700	50,000	60	1,62,000	2,12,000	100	2,70,000	40	1,250
2800	50,000	60	1,68,000	2,18,000	100	2,80,000	40	1,250
2900	50,000	60	1,74,000	2,24,000	100	2,90,000	40	1,250
3000	50,000	60	1,80,000	2,30,000	100	3,00,000	40	1,250



1Compiled by the author

This chart helps visualize the break-even point and understand the relationships between fixed costs, variable costs, total revenue, and total costs. By analysing the chart, businesses can make informed decisions about pricing, production levels, and cost management.

1.5 INCOME STATEMENT UNDER MARGINAL COSTING AND ABSORPTION COSTING

Work-in-progress and finished goods inventories are valued at marginal cost, excluding fixed costs, according to the marginal costing method. In contrast, complete costing or absorption costing determines the product's cost after accounting for both fixed and variable costs.

Let's understand the same with the help of an illustration.

The following information is provided by the management of Gemini Ltd. You are required to prepare income statement as per

a. Absorption Costing

b. Marginal Costing

Particulars	Information
Production (in Units)	2,00,000
Sales (in Units)	1,80,000
Sales Price Per Unit	₹ 6
Variable manufacturing costs per unit	₹ 4
Fixed overheads	₹ 1,20,000
Selling and distribution costs (₹ 16,000 is variable)	₹ 40,000

Solution:

a. Income Statement as per Absorption Costing

Particulars	Amount	Amount
Sales (2,00,000 x 6)		12,00,000
Less: Manufacturing Cost		
Variable Cost (1,00,000 x 4)	4,00,000	
Fixed Overheads	1,20,000	
Total Manufacturing Cost	5,20,000	
Less: Closing Stock (20,000 Units) $\left[\frac{5,20,000 \times 20,000}{2,00,000}\right]$	(52,000)	
Cost of Goods Sold		(4,68,000)
Gross Margin [12,00,000 - 4,68,000]		7,32,000
Less: Selling and Distribution Cost		
Fixed	24,000	
Variable	16,000	
Total Selling and Distribution Cost		(40,000)
Net Profit		6,92,000

b. Income Statement as per Marginal Costing

Particulars	Amount	Amount
Sales (2,00,000 x 6)		12,00,000
Less: Variable Cost		
Manufacturing Cost (1,00,000 x 4)	4,00,000	
Less: Closing Stock (20,000 Units x 4)	(80,000)	(3,20,000)
Selling and Distribution Cost (Given)		(16,000)
Contribution		8,64,000
Less: Fixed Cost		
Manufacturing Cost		(1,20,000)
Selling and Distribution Cost		(24,000)
Net Profit		7,20,000

1.6 SOLVED ILLUSTRATIONS

Illustration 01:

The Swim suit manufacturing company budgeted the following data for the coming year for 1,00,000 units.

[Adapted from ICMAI]

Particulars	Amount
Sales per unit	10
Variable Cost per unit	2
Fixed Cost	2,00,000

You are required to calculate:

a. P/V Ratio, B.E.P and Margin of Safety

b. Evaluate the effect of each of the individual situation:

(i) 20% increase in physical sales volume

(ii) 20% decrease in physical sales volume

(iii) 5% increase in variable costs

(iv) 5% decrease in variable costs

(v) 10% increase in fixed costs

(vi) 10% decrease in fixed costs

(vii) 10% decreases in selling price and 10% increase in sales volume

(viii) 10% increase in selling price and 10% decrease in sales volume

(ix) ₹ 5,000 variable cost decrease accompanied by ₹ 15,000 increase in fixed costs

Solution 01:

a. PV Ratio

$$PV\ Ratio = \frac{Contribution}{Sales}$$

$$PV\ Ratio = \frac{8,00,000}{10,00,000}$$

$$PV\ Ratio = 0.80\ or\ 80\%$$

b. B.E.P

B.E.P (in Units)	B.E.P (in ₹)
$BEP\ (in\ ₹) = \frac{Fixed\ Cost}{Contribution\ Per\ Unit}$ $BEP\ (in\ ₹) = \frac{2,00,000}{8}$ $BEP\ (in\ ₹) = 25,000$	$BEP\ (in\ ₹) = \frac{Fixed\ Cost}{PV\ Ratio}$ $BEP\ (in\ ₹) = \frac{2,00,000}{0.80}$ $BEP\ (in\ ₹) = 2,50,000$

c. Margin of Safety

Margin of Safety (in Units)	Margin of Safety (in ₹)
Margin of Safety = Actual Sales – BEP Margin of Safety = 1,00,000 – 25,000 Margin of Safety = 75,000	Margin of Safety = Actual Sales – BEP Margin of Safety = 10,00,000 – 2,50,000 Margin of Safety = 7,50,000

2.

Situation	PV Ratio	B.E.P (in Units)	B.E.P (in ₹)	Margin of Safety (in Units)	Margin of Safety (in ₹)
(i) 20% increase in physical sales volume	$=\frac{9,60,000}{12,00,000}$ = 0.8	$\frac{2,00,000}{8}$ = 25,000	$\frac{2,00,000}{0.8}$ = 2,50,000	= 1,20,000 – 25,0 = 95,000	= 12,00,000 – = 9,50,000
(ii) 20% decrease in physical sales volume	$=\frac{6,40,000}{8,00,000}$ = 0.8	$=\frac{2,00,000}{8}$ = 25,000	$=\frac{2,00,000}{0.8}$ = 2,50,000	= 80,000 – 25,000 = 55,000	= 8,00,000 – = 5,50,000
(iii) 5% increase in variable costs	$=\frac{7,90,000}{10,00,000}$ = 0.79	$=\frac{2,00,000}{7.9}$ = 25,316.46	$=\frac{2,00,000}{0.79}$ =2,53,164.56	= 1,00,000 – 25,316.46 = 74,683.54	= 10,00,000 – =7,46,835.44
(iv) 5% decrease in variable costs	$=\frac{8,10,000}{10,00,000}$ = 0.81	$=\frac{2,00,000}{8.1}$ = 24,691.36	$=\frac{2,00,000}{0.81}$ =2,46,913.58	= 1,00,000 – 24691.3 = 75,308.64	= 10,00,000 – =7,53,086.42
(v) 10% increase in fixed costs	$=\frac{8,00,000}{10,00,000}$ = 0.8	$=\frac{2,20,000}{8}$ = 27,500	$=\frac{2,20,000}{0.8}$ = 2,75,000	= 1,00,000-27,500 = 72,500	=10,00,000-2,75,000 = 7,25,000
(vi) 10% decrease in fixed costs	$=\frac{8,00,000}{10,00,000}$ = 0.8	$=\frac{1,80,000}{8}$ = 22,500	$=\frac{1,80,000}{0.8}$ = 2,25,000	= 1,00,000 – 22 = 77,500	= 10,00,000 – = 7,75,000

(vii) 10% decreases in selling price and 10% increase in sales volume	$= \frac{7,70000}{9,90,000}$ = 0.78	$= \frac{1,80,000}{7}$ = 25,714.29	$= \frac{1,80,000}{0.78}$ =2,30,769.23	= 110000-25714.29 = 84285.71	=990000-230769.23 = 759230.77
(viii) 10% increase in selling price and 10% decrease in sales volume	$= \frac{8,10,000}{9,90,000}$ = 0.82	$= \frac{1,80,000}{9}$ = 20,000	$= \frac{1,80,000}{0.82}$ = 2,19,512.2	= 90,000 − 20,0 = 70,000	= 9,90,000 − = 7,70,487.80
(ix) ₹ 5,000 variable cost decrease accompanied by ₹ 15,000 increase in fixed costs	$= \frac{8,05,000}{10,00,000}$ = 0.81	$= \frac{2,15,000}{8.05}$ = 26,708.07	$= \frac{2,15,000}{0.81}$ = 2,65,432.1	= 1,00,000 − 26 = 73,291.93	= 10,00,000 − = 7,34,567.9

Working Note:

Particulars	Amount	Cost Per Unit
Sales per unit	10,00,000	10
Less: Variable Cost per unit	(2,00,000)	(2)
Contribution	8,00,000	8
Less: Fixed Cost	(3,00,000)	
Profit	5,00,000	

Situations	Sales Volume	SPPU	VCPU	CPU	Sales	VC	Contribution	Fixed Cost
(i) 20% increase in physical sales volume	1,20,000	10.00	2.00	8.00	12,00,000	2,40,000	9,60,000	2,00,000

(ii) 20% decrease in physical sales volume	80,000	10.00	2.00	8.00	8,00,000	1,60,000	6,40,000	2,00,000
(iii) 5% increase in variable costs	1,00,000	10.00	2.10	7.90	10,00,000	2,10,000	7,90,000	2,00,000
(iv) 5% decrease in variable costs	1,00,000	10.00	1.90	8.10	10,00,000	1,90,000	8,10,000	2,00,000
(v) 10% increase in fixed costs	1,00,000	10.00	2.00	8.00	10,00,000	2,00,000	8,00,000	2,20,000
(vi) 10% decrease in fixed costs	1,00,000	10.00	2.00	8.00	10,00,000	2,00,000	8,00,000	1,80,000
(vii) 10% decreases in selling price and 10% increase in sales volume	1,10,000	9.00	2.00	7.00	9,90,000	2,20,000	7,70,000	1,80,000
(viii) 10% increase in selling price and 10% decrease in sales volume	90,000	11.00	2.00	9.00	9,90,000	1,80,000	8,10,000	1,80,000
(ix) ₹ 5,000 variable cost decrease accompanied by ₹ 15,000 increase in fixed costs	1,00,000	10.00	1.95	8.05	10,00,000	1,95,000	8,05,000	2,15,000

Illustration 03:

(a) From the following information calculate :

i. Break – Even Point.
ii. P/V Ration
iii. Profit
iv. Profit at 75% capacity,
v. Profit at 100% capacity

A. Budgeted Sales ₹ 2,40,000 (at 80% capacity)

B. Direct Materials: 40% of Sales.

C. Direct Labour: 20% on sales.

D. Variable Overheads (Factory) 15% on sales.

E. Variable Overheads (Administration) 10% of sales.

F. Fixed Cost ₹ 25,000

Solution 03:

	Activity Level		
Particulars	75%	80%	100%
Sales	2,25,000	2,40,000	3,00,000
Less : Variable Cost			
Direct Material (40%)	(90,000)	(96,000)	(1,20,000)
Direct Labour (20%)	(45,000)	(48,000)	(60,000)
Factory Overheads (15%)	(33,750)	(36,000)	(45,000)
Administration Overheads (10%)	(22,500)	(24,000)	(30,000)
Total Variable Expenses	(1,91,250)	(2,04,000)	(2,55,000)
Contribution	33,750	36,000	45,000
Less : Fixed Cost	(25,000)	(25,000)	(25,000)
(3) Profit	8,750	11,000	20,000
(1) BEP (in Rs.)	1,66,667	1,66,667	1,66,667
Fixed Cost/P.V. Ratio	$=\frac{25,000}{0.15}$	$=\frac{25,000}{0.15}$	$=\frac{25,000}{0.15}$
(2) P/V Ratio Contribution/Sales	$0.15 = \frac{33,750}{2,25,000}$	$0.15 = \frac{36,000}{2,40,000}$	$0.15 = \frac{45,000}{3,00,000}$

Illustration 04:

Company Rashid Ltd. and Nabi Ltd., both under the same management, makes and sells the similar type of product. This budgeted Profit and Loss Accounts for January – June, 2024, are as under:

	Rashid Ltd.		Nabi Ltd.	
Particulars	Amount (in ₹)	Amount (in ₹)	Amount (in ₹)	Amount (in ₹)
Sales		10,00,000		10,00,000
Less : Variable Cost	6,00,000		5,00,000	
Fixed Cost	80,000	(6,80,000)	1,80,000	(6,80,000)
Profit		3,20,000		3,20,000

You are required to:

a. Calculate the Break-Even Point for each company.

b. Calculate the sales volume at which each of the two companies with profit of ₹ 20,000.

c. Calculate margin of Safety for both the companies.

Solution 04:

Particulars	Rashid Ltd.	Nabi Ltd.
Sales	10,00,000	10,00,000
Less : Variable Cost	(6,00,000)	(5,00,000)
Contribution	4,00,000	5,00,000
Less : Fixed Cost	(80,000)	(1,80,000)
Profit	3,20,000	3,20,000
P/V Ratio $= \frac{Contribution}{Sales}$	0.40 $= \frac{4,00,000}{10,00,000}$	0.50 $= \frac{5,00,000}{10,00,000}$
a. BEP (in Rs.) $= \frac{Fixed\ Cost}{P.V.Ratio}$	2,00,000 $= \frac{80,000}{0.4}$	3,60,000 $= \frac{1,80,000}{0.5}$
b. Sales volume at which profit will be of ₹ 20,000. $= \frac{Fixed\ Cost + Desired\ Profit}{P.V.Ratio}$	2,50,000 $= \frac{80,000 + 20,000}{0.4}$	4,00,000 $= \frac{180000 + 20,000}{0.5}$
c. Margin of Safety (Actual Sales - Break Even Sales)	8,00,000 10,00,000-2,00,000	6,40,000 10,00,000-3,60,000

Illustration 05

a. Reshma Ltd. has earned contribution of ₹ 4,00,000 and net profit of ₹ 1,00,000 on sales of ₹ 10,00,000. What is its margin of safety?

b. If margin of safety is ₹ 2,40,000 (40% of sales) and P/V Ratio is 30% of AB Ltd., calculate its

(i) Break even sales and (ii) Amount of profit on sales of ₹ 9,00,000.

c. A company sells its product at ₹ 16 per unit. In a period, if it produces and sells 8,000 units, in 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 rupees as well as in units.

d. A company earned a profit of ₹ 80,000 during the year 2022-23. The Selling price and marginal cost of the product are ₹ 20 and ₹ 15 per unit respectively, find out the amount of `Margin of Safety'.

e. The profit volume (P/V) ration of B B & Co. dealing in precision instruments is 50% and the margin of safety is 40%. You are required to work out the break-even point and the net profit if the sale volume is Rs. 50 lakhs.

Solution:

a. Margin of Safety

Margin of Safety = Actual Sales - Break Even Sales

= 10,00,000 - 7,50,000

= 2,50,000

Working Note:

Sales	10,00,000
Less : Variable Cost (Balancing Figure)	(6,00,000)
Contribution	4,00,000
Less : Fixed Cost (Balancing Figure)	(3,00,000)
Profit	1,00,000
P/V Ratio	0.40
Contribution/Sales	=400000/1000000

b. (i) Break even sales and (ii) Amount of profit on sales of ₹ 9,00,000.

(i) Break even sales:

$$Margin\ of\ Safety = Actual\ Sales - Break\ Even\ Sales$$

$$2{,}40{,}000 = 6{,}00{,}000 - Break\ Even\ Sales$$

$$Break\ Even\ Sales = 3{,}60{,}000$$

(ii) Amount of profit on sales of ₹ 9,00,000

$$Desired\ Profit = Sales\ x\ P.V.Ratio - Fixed\ Cost$$

$$Desired\ Profit = 9{,}00{,}000\ x\ 0.30 - 1{,}08{,}000$$

$$Desired\ Profit = 2{,}70{,}000 - 1{,}08{,}000$$

$$Desired\ Profit = 1{,}62{,}000$$

Working Note:

$$Sales = \frac{Margin\ of\ Safety}{0.40}$$

$$Sales = \frac{2{,}40{,}000}{0.40}$$

$$Sales = 6{,}00{,}000$$

Sales at Break Even Sales	3,60,000
Less : Variable Cost (Balancing Figure)	(2,52,000)
Contribution @ 30% (3,60,000 x 30%)	1,08,000
Less : Fixed Cost (Balancing Figure)	(1,08,000)
Profit	0

c. Break Even point

$$P.V.Ratio = \frac{Diff\ in\ Profit}{Diff\ in\ Sales}$$

$$P.V.Ratio = \frac{(20{,}000x4) - (8{,}000x - 5)}{(20{,}000x16) - (8{,}000x16)}$$

$$P.V.Ratio = \frac{(80{,}000 + 40{,}000)}{(3{,}20{,}000 - 1{,}28{,}000)}$$

$$P.V.Ratio = \frac{1{,}20{,}000}{1{,}92{,}000}$$

$$P.V.Ratio = 0.625 \text{ or } 62.5\%$$

$$Profit = Sales \times P.V.Ratio - Fixed\ Cost$$

$$80{,}000 = (20{,}000 \times 16) \times (62.5\%) - Fixed\ Cost$$

$$80{,}000 = (3{,}20{,}000) \times (62.5\%) - Fixed\ Cost$$

$$80{,}000 = 2{,}00{,}000 - Fixed\ Cost$$

$$Fixed\ Cost = 2{,}00{,}000 - 80{,}000$$

$$Fixed\ Cost = 1{,}20{,}000$$

$$Contribution = Sales \times BEP$$

$$Contribution = 3{,}20{,}000 \times 0.625$$

$$Contribution = 2{,}00{,}000$$

Contribution Per Unit = Contribution/No. of Units Sold

Contribution Per Unit = 2,00,000/20,000

Contribution Per Unit = 10

$$Break\ Even\ point\ (in ₹) = \frac{Fixed\ Cost}{P.V.Ratio}$$

$$Break\ Even\ point\ (in ₹) = \frac{1{,}20{,}000}{0.625}$$

$$Break\ Even\ point\ (in ₹) = 1{,}92{,}000$$

$$Break\ Even\ point\ (in\ Units) = \frac{Fixed\ Cost}{Contribution\ per\ Unit}$$

$$Break\ Even\ point\ (in\ Units) = \frac{1{,}20{,}000}{10}$$

$$Break\ Even\ point\ (in\ Units) = 12{,}000$$

d. Margin of Safety

$$Margin\ of\ Safety = \frac{Profit}{P.V.Ratio}$$

$$Margin\ of\ Safety = \frac{80{,}000}{0.25}$$

$$Margin\ of\ Safety = 3{,}20{,}000$$

$$P.V.Ratio = \frac{Contribution}{Sales}$$

$$P.V.Ratio = \frac{20 - 15}{20}$$

$$P.V.Ratio = \frac{5}{20}$$

$$P.V.Ratio = 0.25$$

e. Break-even point and the net profit if the sale volume is ₹ 60 lakhs.

Sales	60,00,000
Less : Margin of Sales (60,00,000 x 25%)	(15,00,000)
BEP	45,00,000

P.V. Ratio = 40%

At BEP Level, Contribution = Fixed Cost

Contribution at BEP Level = BEP Sales x P.V. Ratio

Contribution at BEP Level = 45,00,000 x 40%

Contribution at BEP Level = 18,00,000

At BEP Level, Contribution = Fixed Cost, ∴Fixed Cost = Contribution at BEP = 18,00,000

$$Profit = Sales \times P.V.Ratio - Fixed\ Cost$$

$$Profit = 60{,}00{,}000 \times 40\% - 18{,}00{,}000$$

$$Profit = 24{,}00{,}000 - 18{,}00{,}000$$

$$Profit = 6{,}00{,}000$$

1.7 SUMMARY

Marginal Cost refers to the additional cost incurred by producing one more unit of a good or service. It is a crucial concept in economics and business because it helps firms understand the cost implications of increasing production.

Key Points:

1. Definition: Marginal cost is the increase in total cost that arises from an extra unit of production. It is calculated by taking the change in total cost

that comes from producing one additional unit and dividing it by the change in the quantity of output.

2. Cost Components: Marginal cost typically includes variable costs, which change with production levels, such as labor and raw materials. It does not usually include fixed costs, which remain constant regardless of production levels.

3. Importance in Decision Making: Understanding marginal cost helps businesses determine the optimal level of production. When the marginal cost is less than the marginal revenue (the additional revenue from selling one more unit), a company can increase profits by producing more. Conversely, if marginal cost exceeds marginal revenue, producing additional units would reduce profits.

4. Graphical Representation: On a graph, marginal cost is usually depicted as a curve that first decreases due to increasing returns to scale and then increases as diminishing returns set in.

5. Relation to Average Cost: Marginal cost intersects with average total cost at the latter's minimum point. When the marginal cost is below the average total cost, the average total cost is decreasing. When it is above, the average total cost is increasing.

Understanding marginal cost is essential for pricing strategies, cost control, and maximizing profitability in both short and long-term business planning.

1.8 FORMULAS

1. P.V. Ratio:

$$a.P.V.Ratio = \frac{Sales - Variable\ Cost}{Sales}$$

$$b.P.V.Ratio = \frac{Contribution}{Sales}$$

$$c.P.V.Ratio = \frac{Fixed\ Cost + Profit}{Sales}$$

$$d.P.V.Ratio = \frac{Diff\ in\ Profit}{Diff\ in\ Sales}$$

$$e.P.V.Ratio = \frac{Contribution\ per\ Unit}{Sales\ Per\ Unit}$$

2. Break Even Point (BEP)

$$BEP\ (in\ ₹) = \frac{Fixed\ Cost}{P.V.\ Ratio}$$

$$BEP\ (in\ \text{Units}) = \frac{Fixed\ Cost}{Contribution\ per\ Unit}$$

3. Fixed Cost

$$Fixed\ Cost = Contribution - Profit$$

$$Fixed\ Cost = Contribution + Loss$$

$$Fixed\ Cost = Total\ Cost - Variable\ Cost$$

$$Fixed\ Cost\ at\ BEP = Sales\ x\ P.V.\ Ratio$$

4. Contribution

$$Contribution = Sales - Fixed\ Cost$$

$$Contribution = Sales\ X\ P.V.\ Ratio$$

$$Contribution = (Break\ Even\ Sales + Margin\ of\ Safety\ Sales)\ X\ P/V\ Ratio$$

5. Sales

$$Total\ Sales = Break\ Even\ Sales + Margin\ of\ Safety\ Sales$$

$$Sales = Variable\ Cost + Contribution$$

6. Profit

$$Profit = Sales - V.C. - Fixed\ Cost$$

$$Profit = Sales - Total\ Cost$$

$$Profit = Sales\ x\ P.V.\ Ratio - Fixed\ Cost$$

$$Profit = Margin\ of\ Safety\ Sales\ x\ P.V.\ Ratio$$

7. Margin of Safety

$$Margin\ of\ Safety = Actual\ Sales - Break\ Even\ Sales$$

$$Margin\ of\ Safety\ (in\ ₹) = \frac{Profits}{P.V.\ Ratio}$$

$$MOS\ (units) = \frac{Profits}{Contribution\ per\ unit}$$

$$MOS\ Ratio = \frac{MOS\ Sales}{Total\ Sales}\ x\ 100$$

8. Desired Sales

$$Desired\ Sales = \frac{Fixed\ Cost + Desired\ Sales}{P.V.\ Ratio}$$

9. Desired Profit

$$Desired\ Profit = Desired\ Sales\ x\ P.V.Ratio - Fixed\ Cost$$

1.9 EXERCISE

I. Choose the correct alternative

1. What does marginal cost represent in economics?

A. The total cost of production

B. The fixed cost of production

C. The cost of producing one additional unit

D. The variable cost of the first unit

Answer: C. The cost of producing one additional unit

2. Which of the following is included in the calculation of marginal cost?

A. Fixed costs only

B. Variable costs only

C. Both fixed and variable costs

D. Overhead costs only

Answer: B. Variable costs only

3. At what point does the marginal cost curve typically intersect the average total cost curve?

A. At the highest point of the average total cost curve

B. At the lowest point of the average total cost curve

C. It never intersects the average total cost curve

D. At the midpoint of the average total cost curve

Answer: B. At the lowest point of the average total cost curve

4. If the marginal cost of producing an additional unit is greater than the marginal revenue, what should a firm do to maximize profit?

A. Increase production

B. Decrease production

C. Keep production constant

D. Raise prices

Answer: B. Decrease production

5. Marginal cost is calculated by which of the following formulas?

A. Total Cost ÷ Total Quantity

B. Change in Total Cost ÷ Change in Quantity

C. Fixed Cost + Variable Cost

D. Total Revenue ÷ Total Quantity

Answer: B. Change in Total Cost ÷ Change in Quantity

6. A company's total cost increases from ₹ 10,000 to ₹ 12,000 when production is increased from 500 units to 600 units. What is the marginal cost of producing one additional unit?

A. ₹ 2

B. ₹ 10

C. ₹ 20

D. ₹ 200

Answer: B. ₹ 10

7. If a company's total fixed cost is ₹ 5,000 and the total variable cost is ₹ 15,000 for producing 1,000 units, what is the average cost per unit?

A. ₹ 15

B. ₹ 20

C. ₹ 25

D. ₹ 30

Answer: B. ₹ 20

8. A firm produces 100 units of a product with a total cost of ₹ 3,000. If the variable cost per unit is ₹ 20, what is the total fixed cost?

A. ₹ 1,000

B. ₹ 2,000

C. ₹ 3,000

D. ₹ 4,000

Answer: A. ₹ 1,000

9. A company's total cost is ₹ 8,000 when producing 400 units and ₹ 10,000 when producing 500 units. What is the marginal cost per unit for increasing production from 400 to 500 units?

A. ₹ 15

B. ₹ 20

C. ₹ 25

D. ₹ 30

Answer: B. ₹ 20

10. If the marginal cost of producing the 101st unit is ₹ 35 and the total cost of producing 100 units is ₹ 5,000, what is the total cost of producing 101 units?

A. ₹ 5,010

B. ₹ 5,035

C. ₹ 5,070

D. ₹ 5,100

Answer: B. ₹ 5,035

II. State whether the statement is true or false

1. Marginal costing only considers variable costs in the calculation of the cost of producing an additional unit.

2. In marginal costing, fixed costs are allocated to each unit of production.

3. The marginal cost curve typically decreases at first due to economies of scale and then increases due to diseconomies of scale.

4. If the marginal cost of producing an additional unit is higher than the selling price, the company should continue producing more units to maximize profit.

5. Marginal costing is useful for short-term decision-making, such as determining the pricing of products and evaluating the profitability of additional production.

Answer:

1. True

2. False

3. True

4. False

5. True

III. Brief Questions:

1) What do you mean by differential costs and incremental revenue?

2) State the managerial decision which can be taken with the help of Differential cost Analysis?

3) Explain the importance of the marginal cost technique in managerial decision making.

4) In the context of cost volume profit analysis, what is meant any limiting factor? Discuss its utility.

5) Explain briefly the circumstances under which selling prices below marginal cost may be justified.

6) How does cost volume profit analysis help control of cost?

7) "Cost Volume Profit analysis is helpful for profit planning". Explain.

8) What is `analysis of margin of contribution' ? Discuss the need for it.

9) Define marginal costing, What are the features of marginal costing?

10) "Cost-volume profit analysis is a very useful technique to management for cost control, profit planning and decision making". Explain.

IV. Short Notes:

1. Define cost-volume-analysis.
2. State any four objectives of cost volume profit analysis.
3. State any four assumptions of cost volume profit analysis.
4. State any four limitations of cost volume profit analysis.
5. What is Contribution ? How is it different from profit ?
6. Give Marginal Costing Equation.
7. Give three ways by which P/V Ratio can be improved.
8. What is Margin of Safety? How can it be improved?
9. Why are P/V Ratio and Marginal of Safety calculated?
10. Distinguish BE charts from P/V charts.
11. Write a note on Cash Break-even chart.

V. Unsolved Illustration:

1. You are provided with the undermentioned information with respect to the sales and costs of sales of a manufacturing firm.

The sales and cost of sales during the two years were as follows:

Year	Sales	Cost of Sales
2020	10,00,000	6,00,000
2021	18,00,000	16,00,000

You are required to:

I. Calculate

a) P. V. Ratio.

b) Break Even Point.

c) Margin of safety in 2021.

d) Profit when sales are Rs. 12,00,000.

e) Sales required earning a profit of Rs. 75,000

2. Rasha Ltd. provides the following information, calculate BEP in value and in units.

i. Sales – 60,000 units at ₹ 240 per unit.

ii. Profit volume ratio = 40%

iii. Fixed Cost = ₹ 4,80,000

3. From the following information of Reddy Ltd. Calculate the P/V Ratio and Margin of Safety.

i. Sales ₹ 80, 00,000

ii. Variable Cost ₹ 60,00,000

iii. Profit ₹ 10,00,000

4. Riddhi Ltd., produced and sold 2,000 motor e-bikes last year at a price of ₹ 4,000 each.

The cost structure per motor bike is as follows:

Particulars	Amount (in ₹)
Materials	8,000
Labour	6,000
Variable overheads	4,000
Marginal Cost	2,000
Fixed Overheads	4,000
Profit	6,000
Sales Price	30,000

The company has to reduce selling price to ₹ 32,000 due to tough competition in the coming year. Assuming no change in costs, state the number of cycles to be sold at the new price to ensure the same amount of total profit as in the last year.

5. A company produces and markets industrial containers and packing cases. Due to competition, the company proposes to reduce the selling price. If the present level of profit is to be maintained, indicate the number of units to be sold if the proposed reduction in selling price is: (a) 5%; (b) 10%; (c) 15%.

The following additional information is available:

Particulars	Amount (₹)	Amount (₹)
Present Sales Turnover (40,000 Units)		40,00,000
Variable Cost – 30%		
Fixed Cost		10,00,000

Reference:

https://icmai.in/upload/Students/Syllabus2016/Inter/Paper-8-January-2021.pdf

https://resource.cdn.icai.org/66539bos53753-cp14.pdf

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2

MANAGERIAL DECISIONS - I

Unit Structure:

2.0 LEARNING OBJECTIVES

After studying this chapter you should be able to

1. Importance of Marginal Costing in decision making
2. Different Costs used by management for decision making
3. Explain the short term decision making and long term decision making
4. Analyse different situations where management takes the decisions with the help of Marginal costing concepts
5. Advise the management the best course of action after proper evaluation of all the available information

2.1 INTRODUCTION

The concept of Marginal Costing is of great importance for managerial decision making. Marginal costing is a technique of costing which enables management to take certain important business decisions. Marginal costing furnishes information regarding additional cost to be incurred, if additional activity is undertaken or saving in cost which may be expected if any of the ongoing activity is discontinued. Thus marginal costing helps management to analyse the benefit expected from the proposed course of action..It enables management to study different scenario under various alternatives.

2.2 LONG –TERM AND SHORT-TERM DECISIONS

There are two sorts of decisions involved in decision making: They are Long-term and short-term operational decisions.

Long Term Decision Making-Management is forced to consider options beyond the present year by long-term decisions. Major factors in long-term decisions are return on investment and the worth of money.

Short Term Decision Making- Making short-term operating decisions entail choosing options that can be put into action in less than a year. Many unique, one-time decisions are involved in these short-term operating choices, including: i) make or buy; ii) sell or process further; iii) accept or reject an order, among many more choices.

2.3 TYPES OF COSTS USED FOR DECISION MAKING

The Following types of Costs used for decision making:

1. **Marginal Cost-**Marginal cost is aggregate of total variable i.e. Prime Cost plus variable overheads.

2. **Opportunity Cost-**This cost is value of opportunity foregone by adopting particular strategy or employing resources in specific manner. The opportunity cost is very important for selection of projects from alternative projects.

3. **Replacement cost –** It is cost of an asset in current market for the purpose of replacement. This cost is used for determining the optimum time for replacement of machinery.

4. **Imputed Cost-** It is hypothecated or notional cost not involving the actual cash payment computed only for the purpose of decision making.

5. **Sunk Cost-** Sunk cost is historical cost which is incurred in the past. Sunk costs are not affected by increase or decrease in the volume of output.

6. **Controllable Cost-**Controllable cost is the cost which cannot be influenced or controlled by concerned cost centre.

7. **Relevant Cost-** Relevant costs are cost relevant for specific purpose. These costs are relevant for specific decision making and irrelevant for other decision making.

8. **Normal Cost –** Normal cost is cost generally incurred at a given level of output. Normal cost incudes those element of cost which occure in normal situations.

9. **Abnormal Costs-** Abnormal cost is unusual cost whose occurrence is generally irregular and unexpected .These costs are incurred in abnormal situation and help the management to take the decision in abnormal circumstances.

2.4 IMPORTANT DECISIONS BY MANAGEMENT WHERE MARGINAL COSTING PLAYS VITAL ROLE

Some important decisions by management where marginal costing plays vital role are discussed below.

1. **Fixation of price**- .It is always expected that price charged to customer for particular product must cover entire cost as well as some element of profit. The technique of of marginal costing can be applied for fixing price only for short period. In long run Total Cost must be considered. In short run price may be fixed below total cost and yet bring advantage to the businessman. These special circumstances may be as follows

a) Pricing under Recession or Depression.During recession period or Depession phase, the price of the product has to be redcuced.. Sometimes it becomes necessary to fix the price below Total Cost.In such situation it must be rembered that fixed cost will have to be incurred even if product is not manufactured or sold . Hence loss is equal to fioxed cost only.

b) Pricing Below Marginal Cost is done in following circumstances
i) If the firm has already bought raw material in bulk quantities which is perishable in nature.
ii) If the firm has accumulated a large quantity of stock and the price in market is continuously falling.
iii) To popularize the new product.
iv) Increase in Sale of those products having high

2. **Product Mix decision**: Product mix decisions implies deciding priority of products to be produced and sold so as to maximize profit. When a firm is manufacturing a number of products finds that one or more of its products are un remunerative from the profitability point of view, the firm may consider the following two options.

Option I- To drop the un-remunerative product and to leave the capacity unutilized. If the contribution of product proposed to be dropped is less than the avoidable fixed costs due to discontinuance of this product, then drop the product otherwise not.

Option II- To drop the un-remunerative product and to utilize the capacity for the manufacture of a more remunerative product, which may be existing or new product. If the contribution of product proposed to be dropped is less than the Contribution of the product proposed to be produced by utilizing the released capacity, then drop the product otherwise..

3. **Key factor** : Key Factor is a limiting factor which puts limitation on production and sales activity. Some examples of key factor are
i. Shortage of Raw Material.

ii. Shortage of labor Hour

iii .Limited Machine capacity available

iv. Limited Sales Capacity

v .Available Funds

The basis of decision making – In case of key factor the basis of decision making are key factor and contribution per unit of key factor. Following formula is used.

$$\text{Contribution per unit of Key Factor} = \frac{\text{Contribution per Unit}}{\text{Key factor per unit}}$$

b. Product mix decision when Demand for two or more products at different price level are given.-

When a firm can produce two or more products from the same production facilities and the demand for each product is affected by change in price management has to choose product mix that can give maximum profit. In this situation first Total contribution of each product at each selling price is calculated and then product mix giving maximum contribution is selected.

4. **Make or Buy Decision**-Management frequently faces the dilemma of choosing to produce a product or component if it is more cost-effective than purchasing it from an outside source to the cost that a supplier has offered. Costing of absorption would be misleading in making decisions. In the event that purchasing from an outside source is chosen, the supplier's quote should be cheaper than the marginal cost.If the decision must be made within the company, all additional costs, such as interest on capita and depreciation on new plants, should be included in the cost of production. It is better to manufacture the product rather than obtaining it from an outside source if the cost of production is less than the price quoted.

A company generally buy a component instead of making it in following situations.

1) If the cost of buying is less than manufacturing
2) If the company does not have requisite resources to make
3) If the component shows much seasonal demand resulting into considerable risk in maintaining the inventory.
4) If transport and other infrastructure facilities are available.

5. **Acceptance of an Offer-**

When a firm has surplus resources , receives an offer from a special or Export market. The management has to take the decision whether to accept or reject the offer should be taken after considering following steps.
Steps

1) Ascertain whether a firm has additional capacity to fulfill offer
2) Ascertain whether Fixed cost has already been recovered
3) Calculate incremental cost for accepting offer-Incremental Cost= Total Cost for Existing & Additional Output less Total cost for existing output.
4) Calculate Average incremental cost per unit.
5) Average incremental cost is incremental cost on additional output.
6) Compare Average incremental cost with offer price per unit.
7) Accept the offer if offer price is more than the average incremental cost
8) Reject the offer if offer price is less than the average incremental cost.

6. Shut down or Continue Decision:

A decision about whether to shut down or continue should be based on marginal cost analysis. Following factors are considered while taking this decision.

Cost Factors:

1) Present Contribution
2) Present Fixed Costs
3) Fixed Costs if plant is shut down
4) Additional costs for plant shut down (Extra maintenance cost)
5) Costs to be incurred on reopening(Overhauling the plant, Recruitment and training of staff, cost of technical obsolescence).

The Management should

- Calculate operating losses if plant is continued.
- Calculate operating losses if plant is shut down
- Continue the plant if Operating losses for continuing the plant are less than for shut down plant.
- Shut Down the plant if Operating losses for continuing the plant are more than for shut down plant.

2.5 EXERCISE:

Q1. Select the correct answer in each of the following:

1. While computing profit in marginal costing, _____.

a. The fixed cost gets added to the contribution

b. **The total marginal cost gets deducted from total sales revenue**

c. The total marginal cost gets added to total sales revenue

d. None of the above

2. Measurable value of an alternative use of resources is

a) Sunk Cost **b) Opportunity cost**

c) Fixed cost d) Differential cost

3. The decision maker should consider, in case of limiting factor to maximize the Profit

a) Sales **b) Contribution**

c) Variable cost d) Fixed cost

4. In make or buy decision

a) **Only marginal cost is relevant**

b) Only fixed cost is relevant

c) Total cost is relevant

d) None of these

5. A cost incurred in the past and hence irrelevant for current decisions making is

a) Fixed cost b) Direct cost

d) Discretionary cost **d) Sunk cost.**

6. The term 'Contribution' refers to the .

a.**Excess of selling price over variable cost per unit**

b.Difference between the selling price and total cost

c.Subscription towards raising capital

d.None of the above

Q2. Answer the in brief

1. What is long term & short term decision making?
2. Explain the concept of Key Factor.

Q3. Answer the following in detail

1 Explain different types of Cost involved in managerial decision making?

2. Discuss various managerial decisions based on marginal costing.

3

MANAGERIAL DECISIONS - II

Unit Structure:

3.0 LEARNING OBJECTIVES

After studying the unit the students will be able to solve the problems on managerial decision making.

3.1 SOLVED PROBLEMS

Q1 Bharat furniture manufactures chairs provide you the following information. Fixed Cost Rs 100000.Variable Cost Rs 40 per chair , Capacity 2000 chairs, Selling Price Rs 140.

From the above information.

1,.Find Break Even Point

2. Find number of chairs to be sold to get a profit of Rs 60000

3. Find Break Even Point in Rs and .No. of Chairs if Selling Price is changed to Rs 120

4. If the company. can manufacture 600 chairs extra with an additional fixed Cost of Rs 4000 What should be the .Selling Price. to maintaining profit same as (2) above.

Answer:

.Capacity. 2000 chairs p.a.

Selling Price Rs140

Less: Variable Cost. Rs 40

Contribution. Rs 100

P/V /Ratio=. Contribution/Sales*100=100/140*100=71.43%.

1) Fixed Cost / Contribution per unit = 100000/ 100

= 1000chairs

2) .No. of chairs to be sold to get profit of Rs 60000

Contribution.=. Fixed Cost + Profit=100000+60000.=Rs 160000

Number of Chairs= Contribution / Contribution per chair= 160000/100=**1600 Chairs**

3) New Selling Price= Rs 120Contribution=S.P.- V. Cost =120-40=80 Per Chair

PVR=80/120=66.66666% BEP=FC/PVR =50000/66.66666%=75000

BEP in units=75000/120=**625 Chairs**

4) 600 more chairs are to be sold at additional fixed cost of Rs 4000.

Revised sales in units=2000+600=2600 Revised Fixed cost=100000+4000=104000

Profit per chair as per (2)above is Total profit/number of chairs 60000/2000=30per chair

Let Selling price per chair be x

Sales=Variable Cost + Fixed cost + Profit

2600x=(2600*20)+ 104000+(2600*30)

2600x= 52000+104000+780002600x=234000X=234000/2600=90

Conclusion-Hence SP should be 90 per chair

Q2.Chumki and Co has PV ratio 40%. By what % must sales be increased to offset

1) 10% Reduction in Selling Price

2,) 20%reduction in Selling Price

Answer

. Let's assume Sales is equal to 100

Sales. 100

Less: Contribution. 40 (As PV Ratio is 40%)

Variable Cost 60

1) IF Selling Price is reduced by 10%

New Selling Price

Sale. 90

Less: Variable Cost 60

Hence, Contribution 30

Volume of Sales required for Same contribution as earlier will be=. Contribution *New Sales /New Contribution

40*90/30= 120

Thus, if Selling Price is reduced by 10% the volume of Sales will have to be increased by 20%.

2) If selling Price is reduced and 20%
New Sales. 80
Variable Cost. 60
Contribution. 20

Volume of Sales required for Same contribution as earlier will be=. Contribution *New Sales /New Contribution

40*80/20=160

Thus , if Selling Price is reduced by 10% the volume of Sales will have to be increased by 60%.

Conclusion:

1) If Selling Price is reduced by 10% the volume of Sales will have to be increased by 20%.

2) Selling Price is reduced by 10% the volume of Sales will have to be increased by 60%.

3. Sayali Ltd manufactures and sells three products A B and C.All three products are made from same set of machines.

Production is limited by machine capacity..From the following information show the priority the company should give to maximize profit.

Particular.	A.	B.	C
Raw material cost pu	11.25.	16.25	21.25
Direct labour.	2.5.	2.5.	2.5
Other variable OH.	1.5.	2.25.	3.55
Standard machine time required.	39	20	28
Selling Price.	25	30	35

Answer

Statement showing contribution and priority

Particulars	A	B	C
Selling Price	25.00	30.00	35.00
Less: Variable Cost per unit (Material+ Labour +Variable Overheads)	15.25	21	27.30
Contribution Per Unit	9.75	9	7.70
Standard Manufacturing Time required per unit per minute	39	20	28
Contribution Per Minute=Contribution/ Standard Manufacturing Time required per minute	0.25	0.45	0.275
Ranking	III	I	II

Conclusion: The priority the company should give to maximize profit should be

Product	Rank
B	**I**
C	**II**
A	**III**

Q4. Expansion limited manufactures automobile accessories and parts.The following are the total cost of processing 100000 units

Direct material cost Rs 500000 Direct Labour Cost Rs 800000 Variable Factory Overheads Rs 600000 Fixed factory overheads Rs 500000.The purchase price of the component is Rs 22.The fixed overheads would continue to be incurred even when the component is bought from outside, although there would have been reduction to the extent of Rs 200000.

1) Should the part be made or bought considering that the present facility when released following a buying decision would remain idle?

2) In case the released capacity can be rented out to another manufacturer for Rs 150000 having good demand. What should be your decision?

Answer

A)Statement showing comparative cost. (Rs in lakhs)

Particulars	Make	Buy
Marginal cot or Total Variable Cost	19	--
Purchase Cost	---	22
Fixed Factory Overheads	5	3
Total cost	24	25

A) The part should be made because the fixed overheads would continue to be incurred to the extent of Rs 3 lakhs(5 Lakhs-2 Lakhs) even if component is bought from outside

B) Statement showing comparative cost (Rs in lakhs)

The part should be bought because its net cost is less.

Particulars	Make	Buy
Total Cost	24	25
Less: Rented Out For	---	1.5
Total cost	24	23.50

Conclusion:

A) The part should be made because the fixed overheads would continue to be incurred to the extent of Rs 3 lakhs(5 Lakhs-2 Lakhs) even if component is bought from outside

B) The part should be bought because its net cost is less.

Q5 Taurus Ltd produces three products A, B and C .The cost and other details of these three products are as under.

Particulars	A.	B.	C
Selling price. (Per Unit)	200.	160.	100
Variable cost (Per Unit).	120.	120	40
Maximum Production			

per month (Units) 5000 8000 6000

Total Hours Available for the month 200 Hours

Maximum Demand

per month (Units) 2000 4000 2400

Fixed Expenses per month Rs 276000.

The processing hours can not be increased beyond 200 hours per month

You are required to

a) Compute the most profitable product mix

b). Compute the overall break even sales of the company for the the month based on calculation (a) above

Answer:

Statement Showing Contribution and Priority.

PARTICULARS	A	B	C
Maximum Production Per Month (Units)	5000	8000	6000
Maximum Production Per Hour (Units)	5000 /200 =25	8000 /200 =40	6000 /200 =30
Hours Required for Maximum Demand	2000 /25=80	4000/40 = 100	2400/30= 80
Selling Price Per Unit (Rs)	200	160	100
Less: Variable Cost per unit	120	120	40
Contribution Per Unit	80	40	60
Contribution per Hour (Key Factor)	80*25=2000	40*40=1600	60*30=1800
Priority on the basis of Contribution	I	III	II

Statement Showing Profitable Product Mix

Products	Units	Hours
A	Maximum demand 2000 Units	2000/25= 80
C	Maximum demand 2400 Units	2400/30 =80
B	Balance (for 40 Hours) 1600 Units	1600/40=40
Total		200

Statement Showing Profit

Particulars	A	B	C	TOTAL
Sales	400000	256000	240000	896000
Less : Variable Cost	240000	192000	96000	528000
Contribution	160000	64000	144000	368000
Less: Fixed Expenses	---	---	---	276000
Profit				92000

b) Profit Volume Ratio=Contribution / Sales *100= 368000 / 896000*100=41.0714 %

Overall Break Even Sales of Company

= Fixed Cost / Profit Volume Ratio= 276000 /41.0714%= 672000

Conclusion:-a) Most Profitable Product Mix A= 2000 units + C 2400 Units +B 1600 Units

b) P/V Ratio= 41.0714% and Break Even Sales= 672000.

Q6 .The cost sheet of a product is as follows

Particulars	Rs Per Unit
Direct Material	10.00
Direct Wages	05.00
Factory Overheads	
Fixed	01.00
Variable	02.00
Administrative Expenses	
Selling & Distribution Expenses	
Fixed	00.50
Variable	01.00
Cost of Sales	21.00

The selling price per unit is Rs 25.00. The above cost information is for an output of 50000 units, whereas the capacity of the firm is 60000 units. A foreign customer is desirous of buying 10000 units @ Rs 19 per unit. The extra cost of exporting the product is Rs 0.50 per unit.

You are required to advice management, whether the export should be accepted?

Answer

Particulars	50000 Units		60000 units	
	Rs	Rs PU	Rs	Rs PU
Sales Domestic (50000*25) Export (10000*19)	 1250000 -------		 1250000 190000	
Total sales (A)	1250000	25.00	1440000	24.00
Variable Cost				
Direct Material	500000	10.00	600000	10.00
Direct wages	250000	5.00	300000	5.00
Cost of Export	---	--	5000	0.08
Factory Overheads	100000	2.00	120000	2.00
Selling & Distribution overheads	50000	1.00	60000	1.00
Total Variable Cost (B)	900000	18.00	1085000	18.08
Contribution (C)= (A)-(B)	350000	7.00	355000	5.92
Fixed Cost				
Factory Overheads	50000	1.00	50000	0.83
Administration	75000	1.50	75000	1.25
Selling & Distribution	25000	0.50	25000	0.42
Total Fixed Cost (D)	150000	3.00	150000	2.50
Profit= (E)= (C)- (D)	200000	4.00	205000	3.42

Conclusion: If the Export Order is accepted, Profit increases from Rs 200000 to Rs 250000. i.e. by Rs 5000 and therefore , Management should accept Export Order.

Q7.A soap manufacturer manufactures soaps in three different fragrance Rose, Sandal and Lotus. Overheads are incurred on the basis of Labour Hours. Wages are paid Rs 1.00 per Hour.

Estimate for the three products show the following.

Particulars	Rose (Rs)	Sandal (Rs)	Lotus (Rs)
Materials	10.00	8.00	3.00
Wages	6.00	3.00	2.00
Other Overheads	12.00	6.00	4.00
	28.00	17.00	9.00
Net Profit/ Loss	2.00	3.00	3.00
Average Selling Price	26.00	20.00	12.00
Annual sales (Units)	10000	20000	5000

The manufacturer felt that he would be well advised to Discontinue producing the Rose and Lotus fragrance even though it would mean that some of the production facilities would remain unused. He cannot increase the Sale of Sandal fragrance. It has been ascertained that 60% of overheads are fixed.

You are required to advise the manufacturer.

Answer

Statement of Cost & Contribution

Particulars	Rose (Rs)	Sandal (Rs)	Lotus (Rs)
Material	10.00	8.00	3.00
Wages	6.00	3.00	2.00
Variable Overheads (40%)	4.80	2.40	1.60
Total Variable Cost	20.80	13.40	6.60
Selling Price	26.00	20.00	12.00
Contribution	5.20	6.60	5.40
Less: Fixed Cost (60%)	2.20	3.60	2.40
Net Profit/ Loss	(2.80)	3.00	3.00
P/V Ratio = Contribution / Sales *100	5.20/26*100=20%	6.60/20*100=33%	5.40/12*100=45%

Note: The above statement clearly explains that Fragrance Rose is incurring Loss and also Its P/V Ratio is less as compared to other two fragrances, Hence

Conclusion:It is advisable that the manufacturer should discontinue the fragrance Rose and Increase the production of fragrance Sandal & Lotus.

Q8. The following data are expected from annual planning budget .

Particulars	Product A (Rs)	Product B (Rs)	Product C (Rs)	Total (Rs)
Sales: 5000 Units @ Rs 2 each 10000 Units @ Rs 6 each 20000 Units @ R 4 each	 10000 ----- ----	 ---- 60000 ----	 ---- ---- 80000	 150000
Cost: Fixed Variable Total	 1000 3000 4000	 13500 12000 25500	 12000 48000 60000	 26500 63000 89500
Net Profit/ Net Loss	6000	34500	20000	60500

You are required to compute Break Even Points for each product and the company's Break Even Point assuming a constant Sales Mix quantity Ratio of 1:2:4.

Based on the data given, what product should be pushed & why?

Also compute the Company's Break Even Point assuming constant Sales Mix as follows.

Case-I- Product A-10000, Units, Product B -10000 Units, Product C-15000 Units.

Case-II - Product A-5000, Units, Product B -15000 Units, Product C-10000 Units.

Answer

Particulars	Product A (Rs)	Product B (Rs)	Product C (Rs)	Total (Rs)
Sales	10000	60000	80000	150000
Less: Variable Cost	3000	12000	48000	63000
Contribution	7000	48000	32000	87000
Less: Fixed Cost	1000	13500	12000	26500
Profit	6000	34500	20000	60500

P/V Ratio= Contribution / Sales *100	7000/1000*100 =70%	48000/6000 *100 =80%	32000/80000 *100 =40%	87000/150000*100 =58%
Break even Point= Fixed Cost / P/V ratio	1000/70% = Rs 1429.	13000 /80% = Rs 16875.	12000/40% =Rs 30000	26500/58% = Rs 45690

Therefore Company should Push up Product B as the P/V Ratio is highest.

Case I- Product A-10000, Units, Product B -10000 Units, Product C-15000 Units

Particulars	Product A (Rs)	Product B (Rs)	Product C (Rs)	Total (Rs)
Sales	20000	60000	60000	140000
Less: Variable cost	6000	12000	36000	54000
Contribution	14000	48000	24000	86000

Company' s P/ V Ratio= Contribution / Sales *100= 86000/140000*100= 61.43%

Company' S Break Even Point= Fixed Cost/ PV Ratio=26500/ 61.43%= Rs 43139.

Case-II - Product A-5000, Units, Product B -15000 Units, Product C-10000 Units

Particulars	Product A (Rs)	Product B (Rs)	Product C (Rs)	Total (Rs)
Sales	10000	90000	40000	140000
Less: Variable cost	3000	18000	24000	45000
Contribution	7000	72000	16000	95000

Company' s P/ V Ratio= Contribution / Sales *100= 95000/140000 *100= 67.86%

Company' S Break Even Point= Fixed Cost/ PV Ratio=26500 / 67.86%= 39050

Conclusion: 1) Company should Push up Product B as the P/V Ratio is highest.

2) Case-I-Company' s P/ V Ratio= Contribution / Sales *100= 86000/140000*100= 61.43%

3) Case II-Company' S Break Even Point= Fixed Cost/ PV Ratio=26500/ 61.43%= Rs 43139.

Q9 Gupta Sports Specialists Ltd. Is manufacturer of sports products. Presently, the company is working below chess boards sets in the national market at Rs. 150 per unit. During April, 2016, 600 units were sold which is the regular sales volume for each month all through the year.

The unit cost of production is :

Direct Materials Rs. 60

Direct Labour Rs. 30

Factory Overhead Rs. 30

Selling and administration Overhead Rs. 15

The company has received an export order on 20-4-2016 for supply of 600 units to be dispatched by 30-6-2016. However, the order stipulates the price per unit at Rs. 100 only. The cost analysis indicated that the cost of direct material and direct labour that are to be incurred on the export order would be same amount per unit as the regular line of production. However an amount of Rs. 2,000 will have to be incurred on special packing, labeling get up etc. No additional factory selling or administrative overhead costs would be incurred in executing the export order since the firms is operating below normal capacity. Using differential cost analysis method, prepare the income statement to show whether the acceptance of the export order would be profitable to the company. Assumptions and comments if any may be given separately.

Answer

Particulars	Existing Position without export order Export order differential figures Proposed position with export order	Existing Position without export order Export order differential figures Proposed position with export order	Existing Position without export order Export order differential figures Proposed position with export order
Units for 2 months (nos.) 1,200	Units for 2 months (nos.) 1,200		
Selling price per unit	Rs 150	Rs 100	Rs --
Direct Material@ Rs. 60 p.u	72000	36000	108000

Direct Labour @ Rs. 30 p.u	36000	18000	54000
Factory Overheads	36000	----	36000
Special packing, labeling etc.	---	2000	2000
Selling & Admin. Overheads @ Rs. 15 p.u. (for 2 months)	18000	---	18000
Total Cost (B)	162000	56000	218000
Profit (A – B)	18000	4000	22000
Sales (A)	180000	60000	240000

600 units p.m. x Rs. 30 x 2 months = Rs. 36,000

Conclusion:-The export order should be accepted as it would give additional profit of Rs. 4000.

Q10. Following information is available regarding Two products Table & Chair

Particulars	Table (Per Unit) Rs	Chair (Per Unit) Rs
Direct Material	100	120
Direct wages	120	80
Variable Overheads	180	120
Selling Price	500	400
Factory Overheads Rs 15000		

From the following Alternatives, Which Sales Mix will bring Higher Profit.

I. 500 Units of Table and 500 Units of Chairs

II. 800 Units of Table and 200 Units of Chairs

III. 300 Units of Table and 700 Units of Chairs

IV.800 Units of Chairs

Support your answer with workings

Statement of Contribution per unit

Particulars	Table (Per Unit) Rs	Chair (Per Unit) Rs
Direct Material	100	120
Direct wages	120	80
Variable Overheads	180	120
Total variable cost	400	320
Selling Price	500	400
Contribution	100	80

Statement showing Option wise Analysis

Particulars	Option I	Option II	Option III	Option IV
Option Details	500 Units of Table and 500 Units of Chairs	800 Units of Table and 200 Units of Chairs	300 Units of Table and 700 Units of Chairs	800 Units of Chairs
Contribution	(500*100) + (500*80) = 90000	(800* 100)+ (200*80) =96000	(300*100)+ (700*80) =86000	800*80 =64000
Less: Fixed Cost (Same for all options)	15000	15000	15000	15000
Profit	75000	81000	71000	49000

Conclusion: Option B will. Result in Highest Profit.

Q11. The following Extracts are taken from Sales budget of a company for the current year.

Particulars	Rs in '000'.	
Sales: 40000 units @ Rs 25 per unit		1000
Selling Costs:		
Advertising	100	
Salesman Salary	80	
Travelling Expenses	50	
Rent of Sales Office	10	
Others	10	250

The management is considering a proposal to establish a new market in the Eastern Region in the next year. It is proposed to increase the advertising expenditure by 25% and appoint an additional Sales Supervisor at a salary of Rs 300000 p.a. to establish a market. This will involve additional traveling and travelling expense shall increase by 10%.

Target Annual Sales volume at the existing selling price of the new market is 10000 units.The estimated variable cost of production is Rs 12 per unit.

Should the company try to establish the new market.

Answer

Statement showing Incremental sales Revenue

Particulars	Rs in '000'.	
New market 10000 units @ 25		250
Less: Differential cost:		
Variable Cost of Production 10000 Units @ Rs 12	120	
Increase in advertising expenditure 25 % of Rs 100000	25	
Additional sales Supervisor; Salary	30	
Additional travelling expenses 10% of Rs 50000	5	180
Incremental profit		70

Conclusion: It may be advised that in view of the additional profit(Incremental profit) of rs 70000 , the company should try to establish the new market.

Q12 Soham Company is working well below normal capacity due to recession. The directors of the company have been approached with an enquiry for special job. The costing department estimated the following in respect of the job.

Direct materials Rs.10,000

Direct labour 500 hours @ Rs.2 per hour

Overhead costs: Normal recovery rates

Variable Re.0.50 per hour

Fixed Re.1.00 per hour

The directors ask you to advise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.

Answer:

Calculation of Marginal cost:	(Rs.)
Direct materials	10,000
Direct labour	1,000
Variable overhead @ Re.0.50 per hour	250
Marginal cost	11,250

Here the minimum price to be quoted is Rs.11,250 which is the marginal cost. By quoting so, the company is sacrificing the recovery of the profit and the fixed-costs. The fixed costs will continue to be incurred even if the company does not accept the offer.

Conclusion: Any price above Rs.11,250 is welcome

3.2 EXERCISE

Q1 .Auto parts limited has an annual production of 90000 units of a motor component. The components cost structure is as given below.

Materials	Rs 270 per unit
Labour (25% Fixed)	Rs 180 Per unit
Expenses: Variable Fixed	 Rs 90 Per unit Rs 135 per unit
Total	Rs 675 Per unit

A) The purchase manager has an offer from a supplier who is willing to supply the component at Rs 540.Should the component be purchased and production stopped?

B) Assume the resources now used for these components manufacturing are to be used to produce another new product for which the selling price is Rs 485.

In the later case Material Price will be Rs 200 per unit, 90000 units of this product can be produced at the same cost basis as above for labour & expenses.

Discuss whether it would be advisable to divert the resources to manufacture that new product on the footing that the component presently being produced would , instead of being produced, be purchased from the market.

Ans: A) Company will have to pay Rs 45 per unit more if purchased from the market. The excess amount of 90000 units will be Rs 4050000. It is therefore, advisable that the the company should not stop its production.

B) If another product is produced there will be saving of Rs 15 per unit. The savings on 90000 units will be Rs 1350000.It is advisable that the company should manufacture new product and the old product may be purchased from the market.

Q2.From the following information :

A) Calculate and Present the Marginal Product cost and Contribution Per Unit.

B) State which of the alternative Sales Mix you would recommend to the management & Why?

Particulars	X	Y
Selling Price	Rs 25	Rs 20
Direct Materials	Rs 8	Rs 6
Direct wages	24 Hours @ Rs 0.25 per hour	16 Hours @ Rs 0.25 per Hour
Fixed Overheads	Rs 750	
Variable Overheads	150% of Direct Wages	150% of Direct Wages

Alternative Sales Mix 1) 250 Units of X & 250 Units of Y

2) Nil Units of X & 400 Units of Y

3) 400 Units of X & 100 Units of Y.

Ans

A) Contribution= X-Rs 2 & Y Rs 4, P/V Ratio= X-8% & Y-20%

B) Alternative 2 Gives Highest Profit & Contribution.

Hint: profit- Alternative I-Rs 750, Alternative II- Rs 850 Alternative III- Rs 450

Q3.The Jaya Snow company manufactures and sells direct to consumers 5000 jars of snow per month @ Rs 25 per jar. The company;d normal production capacity is 10000 jars of snow per month.

The analysis of cost of 5000 jars is as follows

Particulars	Rs
Direct Material	20000
Direct Labour	49500
Power	2800
Other Expenses	8600
Cost of Jars	12000
Fixed Expenses	159100
Total	252000

The company has received an offer for the export under a differential brand name of 60000 jars of snow at 5000 jars per month at Rs 15 per jar.

Write a short report on the advisability or otherwise of accepting the offer.

Ans: The offer should be rejected. Present contribution Rs 32100, after accepting contribution the total contribution will come down to 14200.Thus will decrease by Rs 17100.

Q4, The following particulars are taken from the records of a company engaged in manufacturing two products A & B, from a certain material.

Particulars	Product A per unit (Rs)	Product B per Unit (Rs)
Sales	2500	5000
Material Cost (@ Rs 50per kg)	500	1250
Direct Labour(@ Rs 30 per hour	750	1500
Variable Overheads	250	500
Total Fixed Overheads: Rs 1000000.		

Comment on the profitability of each product when:

1) Total Sales in value is limited

2) Raw Material is in short supply

3) Production capacity is the limiting factor

4) Total availability of Raw Materials is 20000 Kg & maximum Sales potential of each product is 1000 units. Find the product mix to yield maximum profit.

Ans:

1. **Product A is more profitable as its profit volume ratio is more than B**

   (P/V Ratio=A=40%, B=35%)

2. **As Raw Material is short in supply. Contribution per kg of Raw Material is to be analyzed.Hence Product A is more profitable.**

   Contribution per Kg of Raw Material =A=Rs 100, B=Rs 70.

3. **As production capacity is limiting factor, Contribution per Direct Labour Hour is to be analyzed. Product A is more profitable.**

   Contribution per Direct Labour Hour =A=Rs 40, B=Rs 35.

4. Product Mix to yield maximum profit is A=1000 Units & B =400 Units. At this mix Contribution is 1700000 & profit is Rs 700000.

Q5. The price structure of Electric fan made by Vijaya Electric Company Ltd is as follows

Particulars	Rs Per Fan
Material	600
Labour	200
Variable Overheads	200
	1000
Fixed Overheads	500
Profit	500
Selling Price	2000

The cost is based on manufacture of 100000 fans p.a. The company Expects that due to competition, they will have to reduce the selling price. However, they want to keeep total profit in tact.

You are required to prepare a statement showing the position, if

1) Selling price is reduced by 10% &

2) Selling price is reduced by 20%

Ans:Profit Volume ratio: Option 1)= 44.44% , Option 2)= 37.50%

Q6.A Arnav concern, manufacturing Product X has provided the following information:

Sales 75,000

Direct materials 30,000

Direct labour 10,000

Variable overhead 10,000

Fixed overhead 15,000

In order to increase its sales by Rs.25,000, the concern wants to introduce the Product Y, and estimates the costs in connection therewith as under:

Direct materials 10,000

Direct labour 8,000

Variable overhead 5,000

Fixed overhead NIL

Advise whether the Product Y will be profitable or not.

Ans:Y should be introduced.(Hint: Contribution when only X-Rs 25000, If Y is Introduced Contribution of Y will be Rs 2000. Total contribution will be Rs 25000+2000=27000. Fixed cost=Rs 15000.Thus profit for only X=25000-15000=10000

Profit when Y is introduced =27000 -15000=12000.

If product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 towards fixed cost and profit

Q7. A multi product company has the following costs and outputdata for the last year.

Particulars	X	Y	Z
Sales Mix	40%	35%	25%
Selling Price (Rs)	20	25	30
Variable cost (Rs)	10	15	18
Total Fixed Cost Rs 150000			
Total sales Rs 500000			

The company proposes to replace product Z by product S.

Estimated cost and output data are :

Particulars	X	Y	Z
Sales Mix	50%	30%	20%
Selling Price (Rs)	20	25	28
Variable cost (Rs)	10	15	14
Total Fixed Cost Rs 150000			
Total sales Rs 500000			

Analyze the proposed change and suggest what decision the company should take.

Ans: Present BEP= Rs 340909 Profit=Rs 70000

After Replacement BEP= Rs.319149 Profit= Rs 85000.

A comparison of the present situation and the proposed situation shows that if product Z is replaced by product X, profit would increase by Rs. 15,000 and breakeven point will reduce by Rs. 21760/-. This change is beneficial and therefore product Z may be dropped, provided all other relevant factors remain constant.

❖❖❖❖

4

STANDARD COSTING - I

Unit structure

4.0 OBJECTIVES

After studying this unit, you would be able to:

- Understand the terms Standard Cost and Standard Costing.
- Understand the process of setting the standards for various elements of cost.
- Understand how standard costing operates.
- Explain the advantages and disadvantages of standard costing.
- Calculate the Material, Labour, Overhead and Sales Variances.
- Understand the use of standard costing for cost reduction.

4.1 INTRODUCTION

- Managers are constantly comparing their product cost with the budgets. The reasons for deviations are constantly analyzed and responsibilities are promptly fixed. Standard costing is a managerial device to determine efficiency and effectiveness of cost performance.

- Standard costing explains the reasons for the difference between actual profit and profit as per standard relating to the operating period.
- It also helps to explain the variances according to their causes and responsibilities.

4.2 STANDARD COST

- Standards are the expectations in regard to the performance.
- Standard Cost is a scientifically pre-determined cost, which is arrived at assuming a particular level of efficiency in utilization of material, labour and indirect services.
- CIMA defines standard cost as "a standard expressed in money. It is built up from an assessment of the value of cost elements. Its main uses are providing bases for performance measurement, control by exception, reporting, valuing stock and establishing selling prices". It reveals a very useful information for cost control.
- According to I.C.W.A., London ,"Standard cost is a pre-determined cost which is calculated from management's standards of efficient operations and the relevant necessary expenditure."
- Standard cost is like a model which provides basis of comparison for actual cost.

4.3 STANDARD COSTING

- Standard costing is a system of cost accounting which makes use of pre-determined standard costs relating to each element of cost i.e. material, labour and overhead.
- Standard costing is a control technique which compares standard costs and revenues with actual result to obtain variances which are used to stimulate improved performance.
- According to I.C.W.A., London,"Standard costing is the preparation and use of standard costs, their comparison with actual cost and the analysis of variance to their causes and point of incidence."
- Use of standard costing is not confined to industries having repetitive processes and homogeneous product only. This technique has established the advantages of its use in industries having non repetitive processes like manufacture of automobiles, turbines, boilers and heavy electrical equipments.

4.4 ADVANTAGES OF STANDARD COSTING

The advantages of standard costing are as follows:-

- Use of standard costing leads to optimum utilization of men, materials and resources.

- Its use provides a yardstick for comparison of actual cost performance.
- Only distinct deviations are reported to management. Thus, it helps application of the principle of "management by exception."
- It is very useful to management in discharging functions, like planning, control, decision – making and price fixation.
- It creates an atmosphere of cost consciousness.
- It motivates workers to strive for accomplishment of defined targets. It give rise to an attitude that is conducive to efficiency.
- It highlights areas, where probe promise improvement.
- Its introduction leads to simplification of procedures and standardization of products.
- Its introduction enables the management to reduce time required for preparation of reports for pricing, control or quotation purposes.
- Its use enables to find out the cost of finished goods immediately after completion.
- If standard costing is used, stock ledgers can be kept in terms of quantities only. This eliminates much clerical effort in pricing, balancing and posting on stores ledgers cards.
- Its use may encourage action for cost reduction.

4.5 LIMITATIONS OF STANDARD COSTING:-

- It is very difficult to set realistic standards.
- The maintenance of cost data is very costly.
- Establishment of cost standards requires higher degree of technical skills which is expensive.
- Standard costing is not suitable for small organisations due to financial limitations.
- Variance analysis is post mortem of past events
- High standards adversely affect employee morale**.**
- Implementation requires genuine interest, active participation, support and co-operation of management.
- It is very difficult to revise standards once set.

4.6 SETTING OF STANDARDS

- Determination of standards for various elements of cost is an exercise that requires skill, imagination and experience.
- For setting standards, routines and process of working conditions are thoroughly studied and motion studies are conducted and different tests are carried out to ensure that standards are realistic and conform to management's view of efficient operations and relevant expenditure.

- The job of setting the standards is done by a group, which is represented by Engineering Department, Production Department, Purchase Department, Human Resource Department and Cost Accounts Department

Setting of standards can be divided in two categories:-

A) Determination of quantity standards and

B) Determination of price standards.

- Quantity standards are pre- determined expressing in physical terms the relationship between a unit produced and resources consumed.
- Price standards are pre-determined measures expressing in momentary terms the cost per unit of resources consumed.
- Quantity standards are developed by representatives of Engineering Department in liaison with representatives of Purchase Department.
- Wage rate standards are developed by Human Resource Department. Accounts Department works in advisory capacity supplying the information based on historical costing.

4.7 ANALYSIS OF VARIANCES

- The comparison of actual performance with standard performance reveals the variance.
- A variance represents a deviation of the actual result from the standard result.
- There can be cost variance, profit variances, sales value and operational and planning variances.
- Whether a variance is favorable or unfavorable is ultimately determined with reference to the impact on profit. For example, a variance will be adverse, if the actual cost exceeds the standard cost or vice versa. Profit variance will be favorable if actual profit exceeds standard profit or vice versa.
- Variance analysis is an exercise, which involves efforts to isolate the causes of variance in order to report to management those situations which can be corrected and controlled by timely action.
- The extent to which the causes are established, depends upon the amount of time, effort and money, that a company is willing to spend in accumulating data as that variance occur.
- In variance analysis, a point is reached where incremental information is not worth its incremental cost.This point indicates the limit of variance analysis and it is determined by judgment in the light of individual circumstances.

- Variance analysis must be devised to suit the conditions prevailing within a particular enterprise.
- Analysis of variances must be followed by intelligent and factual interpretation. Computation, classification and reporting of variances is a significant characteristic of

Types of Variances: - A) Cost Variance:-

a) Material Cost Variance
b) Labour Cost Variance
c) Overheads Cost Variance
i) Variable Overheads Cost Variance
i) Fixed Overheads Cost Variance

B) Sales Variance

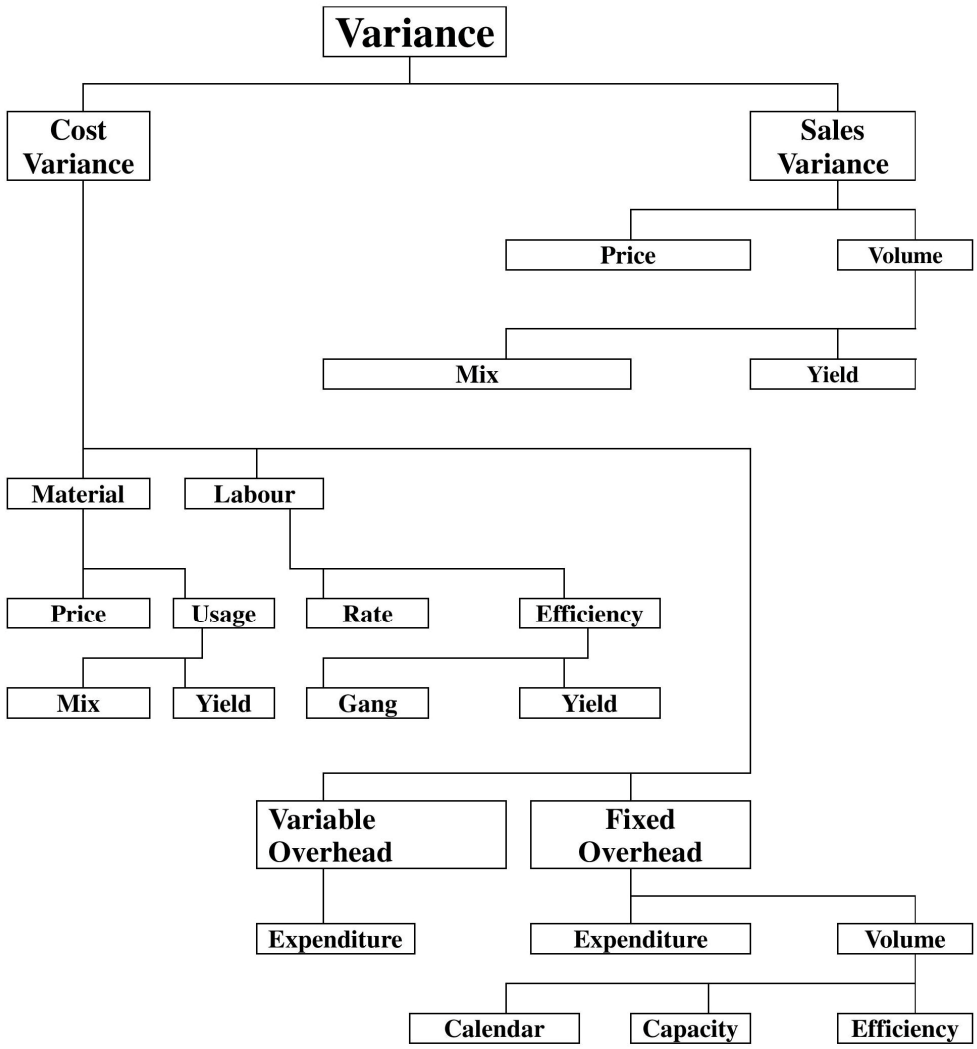


Chart 1.1:-Chart showing Classification of Variances

4.8 MATERIAL VARIANCE

1) Material Cost Variance

It represents the difference between actual cost of material used and standard cost of material specified for output achieved. Material cost variance arises due to variation in prices and usage of materials.

The following formula is used to find out material cost variance:

Material Cost Variance = Standard Cost of Material Used – Actual Cost of Material Used

Materials cost variances are as follows: -

2) Material Price Variance:- It is that part of material cost variance which is due to the difference between the actual price paid and standard price specific for the material. It is determined as follows:-

Material Price Variance = Actual Quantity of Material Used (Standard Price – Actual Price)

3) Material Usage Variance: - It is that part of material cost variance which is due to difference between the actual quantity used and standard quantity specific for output. This indicates whether or not material was properly unitized. It is determined as follows:-

Material Usage Variance = Standard Price per unit (Standard Quantity –Actual Quantity)

4)Material Mix Variance: - It is that part of material usage variance which is due to difference between the actual composition of mix and standard composition mixing the different types of material. It is determined as follows:-

Material Mix Variance = Standard Price per unit (Revised Standard Quantity–Actual Quantity)

5) Material Yield Variance: - It is that portion of material usage variance which is due to difference between the actual yield optance and standard yield specific. It is determined as follows:-

Material Yield Variance =Standard Price per unit (Actual Output – Standard Output)

Illustration 1

The standard mix to produce one unit of product is as follows.

Material =	X	60	units	@	15	per	unit	900
								1,600
Material =	Y	80	units	@	20	per	unit	2,500
Material = 240 units	Z	100	units	@	25	per	unit	5,000

During the month of April, 10 units were actually produced and actual consumption was as follow:

Material X 640 units @ 17.50 per unit	=	11,200
Material Y 950 units @ 18 per unit	=	17,100
Material Z 870 units @ 27.50 per unit	=	23,925
	2460 units	52,225

Calculate the following:

1. Material Cost Variance
2. Material Price Variance
3. Material Usage Variance
4. Material Mix Variance
5. Material Yield Variance

Actual 10units			
Material	Units	Rate	Total
X	640	17.50	11,200
Y	950	18	17,100
Z	870	27.50	23,925
Total	2,460		52,225

Solution:

Cost Analysis

Standard 10 units			
Material	Units	Rate	Total
X	600	15	9,000
Y	800	20	16,000
Z	1,000	25	25,000
Total	2,400		50,000

1. MCV = SMC – AMC
   = 50,000-52,225
   =Rs. 2,225 (A)

2. MPV = (SP-AP) ×AQ

X = (15-17.50) × 640	= Rs. 1,600 (A)
Y = (20-18) × 950	= Rs. 1,900 (F)
Z = (25-27.50) × 870	= Rs. 2,175 (A)
Total	Rs. 1,875 (A)

3. MUV = (SQ-AQ) × SP

X = (600-640) × 15	= Rs. 600 (A)
Y = (800-950) × 20	= Rs. 3,000 (A)
Z = (1,000-870) × 25	= Rs. 3,250 (F)
Total	Rs. 350 (A)

4. MMV = SCSM – SCAM

SCSM = RSQ × SP

$X\frac{600}{2,400} \times 2,460 = 615 \times 15$ = 9,225

$Y\frac{800}{2,400} \times 2,460 = 820 \times 20$ = 16,400

$Z\frac{1,000}{2,400} \times 2,460 = 1,025 \times 25$ = 25,625

51,250

SCAM = AQ × SP

X = 640 × 15	= 9,600
Y = 950 × 20	= 19,000
Z = 870 × 25	= 21,750
	50,350

MMV = 51,250 – 50,350 = Rs. 900 (F)

5. MVY = (SY - AY) ×SR

SY = $\frac{10}{2,400} \times 2,460$ SR = $\frac{SC}{SO} = \frac{50,000}{10} = 5,000$

= (10.25-10) × 5,000

= Rs. 1,250 (F)

MCV = MPV + MUV

= Rs. 1,875 A + Rs. 350 (A)

= Rs. 2,225 (A)

MUV = SMV + MYV

= Rs. 900 F + Rs. 1,250 (A)

= Rs. 350 (A)

Check Your Progress:

Q.1. Define the following terms:-

a) Material Cost Variance

b) Material Price Variance

c) Material Usage Variance

d) Material Mix Variances

e) Material Yield Variance

Q.2. Give formulae of the following:-
a) Material Cost Variance
b) Material Price Variance
c) Material Usage Variance
d) Material Mix Variances
e) Material Yield Variance

4.9 LABOUR VARIANCE

1) Labour Cost Variance:-Labour cost variance is the difference between the actual wages paid and standard wages for the production. It is calculated as follows:-

Labour Cost Variance = Standard Labour Cost – Actual Labour Cost

Labour Cost Variance = (Standard Hours X Standard Rate) – (Actual Hours X Actual Rate)

Following are the labour cost variances:-

2) Labour Rate Variance: It is that portion of labour cost variance which is due to the difference between the actual labour rate and standard labour rate. It is determined as follows:-

Labour Rate Variance = Actual Hours (Standard Rate – Actual Rate)

3) Labour Efficiency Variance: It is that part of labour cost variance which is due to the difference between the actual hours worked and standard hours allowed for achieving output target. It is determined as follows:-

Labour Efficiency Variance = Standard Rate (Standard Hours – Actual Hours)

4) Labour Mix Variance: - Production may be completed if labour is mixed according to standard proportion. Standard mix may not be adhered to under some circumstances and substitute will have to be made. It is determined as follows: -

Labour Mix Variance = Standard Rate (Actual Labour Mix – Revised Standard

Labour Mix)

5) Labour Yield Variance: - It is that part of labour efficiency variance which is due to difference between actual output and standard output of specific workers. It is determined as follows:-

Labour Yield Variance = Average Standard Labour Hours Rate (Actual Production – Standard Production on Actual Hours)

Illustration 2

Engaged in manufacturing Article 'P' for the week ended 8th March 2023.

The standard Labour Hours and Rates per hour per 1,000 Article 'P' were as follows:

Workers	Hours	Rate per Hours
Skilled Labour	500	Rs. 40
Semi-skilled Labour	400	Rs. 16
Unskilled Labour	800	Rs. 24

The Actual Production was 7,500 articles 'P' for which the actual hours worked and rates per hour are given.

Workers	Hours	Rate per Hours
Skilled Labour	3,900	Rs. 44
Semi-skilled Labour	3,225	Rs. 18
Unskilled Labour	6,900	Rs. 22

From the above set of data, you are asked to Calculate:

a) Labour Cost Variance

b) Labour Rate Variance

c) Labour Mix Variance

d) Labour Yield Variance

Solution

a) Labour Cost Variance (LCV)

= Std. Labour Cost – Actual Labour Cost

= 3,42,000-3,81,450

= Rs. 39,450 (A)

b) Labour Rate Variance (LVR) = (SR - AR) x AH

Skilled = (40 - 44) x 3,900 = Rs. 15,600 (A)

Semi-Skilled = (16 - 18) x 3,225 = Rs. 6,450 (A)

Unskilled = (24 - 22) x 6,900 = Rs. 13,800 (F)

Rs. 8,250 (A)

c) Labour Efficiency Variance (LEV) = (SH – AH) x SR

Skilled = (3,750 – 3,900) x 40 = Rs. 6,000 (A)

Semi-Skilled = (3,000 – 3,225) x 16 = Rs. 3,600 (A)

Unskilled = (6,000 – 6,900) x 24 = Rs. 21,600 (A)

Rs. 31,200 (A)

d) LMV = SCSLM – SCALM

SCSLM = RSLH x SLR

Skilled = $\frac{3,750}{12,750}$ x 14,025 x 40 = Rs. 1,65,000

Semi-Skilled = $\frac{3,000}{12,750}$ x 14,025 x 16 = Rs. 52,800

Unskilled = $\frac{6,000}{12,750}$ x 14,025 x 24 = Rs. 1,58,400

Rs. 3,76,200

SCALM = ALH x SLR

Skilled = 3,900 x 40 = Rs. 1,56,000

Semi-skilled = 3,225 x 16 = Rs. 51,600

Unskilled = 6,900 x 24 = Rs. 1,65,600

Rs. 3,73,200

LMV = 3,76,200 – 3,73,200

= Rs. 3,000 (F)

e) LYV = (SLY – ALY) x SR

RSLY = $\frac{7,500}{12,750}$ x14,025 = 8,250

SR= $\frac{3,42,000}{7,500}$ = 45.6

LVY = (8,250 – 7,500) x 45.6 = Rs. 34,200 (F)

Reconciliation

LCV = LRV + LEV

= 8,250 (A) + 31,200 (A)

= Rs. 39,450 (A)

LEV = LMV + LYV

= 3,000 (F) + 34,200 (A)

= Rs. 31,200 (A)

Working Notes

1. Std Hours for Actual Output

Skilled = $\frac{500x7500}{1,000}$ = 3,750 Hrs.

Semi-Skilled = $\frac{400x7500}{1,000}$ = 3,000 Hrs.

Unskilled = $\frac{800x7500}{1,000}$ = 6,000 Hrs.

2. Computation of Revised Std. Hours

$$RSH = \frac{\text{Total Hours Worked}}{\text{Total Std.Hours}} \times \text{Std. hr. of Concerned Labour}$$

$$\text{Skilled} = \frac{14,025}{12,750} \times 3,750 = 4,125 \text{ Hrs.}$$

$$\text{Semi-Skilled} = \frac{14,025}{12,750} \times 3,000 = 3,300 \text{ Hrs.}$$

$$\text{Unskilled} = \frac{14,025}{12,750} \times 6,000 = 6,600 \text{ Hrs.}$$

3. Computation of Cost

Labour **1**	**SH** **2**	**SR** **3**	**Amount** **(2x3)** **4**	**AH** **5**	**AR** **6**	**Amount** Rs. **(5x6)** **7**
Skilled	3,750	40	1,50,000	3,900	44	1,71,600
Semi-Skilled	3,000	16	48,000	3,225	18	58,050
Unskilled	6,000	24	1,44,000	6,900	22	1,51,800
Input	12,750		3,42,000	14,025		3,81,450
Output	7,500			7,500		

Check Your Progress:

Q.1.Give the formulae of the following:-

a) Labour Cost Variance

b) Labour Rate Variance

c) Labour Efficiency Variance

d) Labour Mix Variance

e) Labour Yield Variance

Q.2. Explain the following terms:-

a) Labour Cost Variance

b) Labour Rate Variance

c) Labour Efficiency Variance

d) Labour Mix Variance

e) Labour Yield Variance

4.10 OVERHEAD VARIANCE

Overhead Cost Variance

It is the different between standard overhead cost and actual overhead cost of producing goods. **There are two types of overhead variance:-**

A) Variable Overhead Variance
B) Fixed Overhead Variance

4.11 VARIABLE OVERHEAD VARIANCE: -

It is the difference between standard variable overhead cost and actual variable overhead cost. It is determined as follows:-

Variable Overhead Cost Variance = Standard Variable Overhead Cost – Actual Variable Overhead Cost.

Variable Overhead Cost is again divided into two parts:-

a) Variable Overhead Expenditure Variance: It is that portion of variable overhead variance which arrives due to difference between actual variable overhead and standard variable overhead appropriate to the level activity. It determined as follows:-

Variable Overhead Expenditure Variance = Standard Variable Overhead at Actual Level – Actual Variable Overhead

b)Variable Overhead Efficiency Variance : It is the difference between actual hours worked at standard variable overhead rate and standard variable overhead for production. It is determined as follows:-

Variable Overhead Efficiency Variance =Standard Variable Overhead – Actual Variable Overhead for Production.

Illustration 3

Following information is obtained from Sunrise Ltd

Budgeted production for the period	600 units
Budgeted variable overhead	Rs 15600/-
Standard Time for one unit	20 hours
Actual Production for the period	500 units
Actual Variable overhead	Rs 14000/-
Actual Hours Worked	
9000 Hrs	

Calculate:

1.Variable Overhead Expenditure Variance

2.Variable Overhead Efficiency Variance

3.Variable Overhead Cost Variance

Solution:

1. Variable Overhead Expenditure Variance = Standard Variable Overhead at Actual Level – Actual Variable Overhead

= 11,700-14,000 = 2,300 (A)

SVOH = 15,000/12,000 X 9,000 = Rs.11,250

2. Variable Overhead Efficiency Variance = Standard Variable Overhead – Actual Variable Overhead for Production.

= 13,000-11,700= Rs. 1,300 (F)

3. Variable Overhead Cost Variance = Standard Variable Overhead Cost. – Actual Variable Overhead Cost.

= 13,000-14,000= Rs. 1,000 (A)

Check your progress

Q.1.Explain the following terms:-

a) Variable Overheads Cost Variance

b) Variable Overheads Expenditure Variance

c) Variable Overheads Efficiency Variance

Q.2. Give the formulae of the following:-

a) Variable Overheads Cost Variance

b) Variable Overheads Expenditure Variance

c) Variable Overheads Efficiency Variance

4.12 FIXED OVERHEAD VARIANCE

1) Fixed Overhead Cost Variance:-It represents the difference between actual fixed overheads incurred and standard cost of fixed overheads absorbed.

Fixed Overhead Cost Variance = Standard Cost of Fixed Overhead – Actual Fixed Overhead

Fixed overhead cost is divided into:-

2) Fixed Overhead Volume Variance: - It is that part of fixed overhead variance which is due to difference between actual fixed overheads incurred and standard allowance for fixed overheads.

Fixed Overhead Volume Variance =Standard Rate X (Budgeted Output – Actual Output)

3) Fixed Overhead Expenditure Variance: - It is that part of fixed overhead variance which is due to difference between actual fixed overheads incurred and budgeted fixed overheads.

Fixed Overhead Expenditure Variance = Budgeted Fixed Overhead – Actual Fixed Overhead

4) Fixed Overhead Calendar Variance: - It is that part of fixed overhead volume variance which is due to difference between budgeted fixed overhead and fixed overhead for dates available during the period at standard rate.

Fixed Overhead Calendar Variance = Standard Rate (Budgeted Quantity – Revised Budgeted Quantity)

5) Fixed Overhead Efficiency Variance:- It is that portion of volume variance which is reflected increased or reduced output arising from efficiency being above or below standard.

Fixed Overhead Efficiency Variance = Standard Rate (ActualProduction – Standard Production)

6) Fixed Overhead Capacity Variance: - It is that part of fixed overhead variance which arrives due to different between capacity utilized and capacity available.

Fixed Overhead Capacity Variance = Standard Rate (Revised Budgeted Units - Budgeted Units)

Illustration 4

From the following data calculate overhead variance :

Particulars	**Budgeted**	**Actual**
Output	15,000 Units	16,000 Units
No of Working Days	25	27
Fixed Overheads	Rs. 30,000	Rs. 30,500
Variable Overheads	Rs. 45,000	Rs. 47,000

There was an increase of 5% in capacity.

Solution:

1. Total overhead variance = Actual output in standard rate – Actual overhead

= 16,000 X 5 –(30,500+ 47,000)

= Rs 2,500 (F)

2. Variable Overhead Variance = Standard rate X Actual output –Actual Overhead

= 3 X 16,000 – 47,000

= Rs. 1,000 (F)

3. Fixed Overhead Variance = Standard rate X Actual Output –Actual Overhead

= 2 X 16,000 – 30,500 = Rs 1,500 (F)

4. Fixed overhead volume Variance = Standard Rate X Actual Output – Budgeted Overhead

=2 X 16,000 -30,000

= Rs. 2,000 (F)

5. Fixed overhead Expenditure Variance = Budgeted Fixed – Actual Fixed overhead

Rs 30,000- Rs 30,500 = Rs 500 (A)

6. Fixed Overhead Capacity Variance = Standard Rate (Revised Budgeted Units – Budgeted Units)

Rs 2 (15,750- 15,000) = 2 X 750 = Rs 1,500 (F)

7. Fixed overhead calendar variance = Standard Rate (Actual Quantity – Standard Quantity)

2 (15,750/25 X2) = Rs.1,260 X 2 = Rs. 2,520 (F)

8. Fixed overhead efficiency variance = Standard Rate (Actual Production – Standard Production)

= 2 (16,000 - 17,010) = Rs. 2,020 (A)

Note: Standard production = 15,000 units

+ Increase Due Capacity increase = 750 units

+ Increased production for 2 days =1,260 units

Total = 17,010 units

Check your progress

Q.1.Explain the following terms:-
a) Fixed Overhead Cost Variance
b) Fixed Overhead Volume Variance
c) Fixed Overhead Expenditure Variance
d) Fixed Overhead Calendar Variance
e) Fixed Overhead Efficiency Variance
f) Fixed Overhead Capacity Variance

Q.2. Give the formulae of the following:-

a) Fixed Overhead Cost Variance

b) Fixed Overhead Volume Variance

c) Fixed Overhead Expenditure Variance

d) Fixed Overhead Calendar Variance

e) Fixed Overhead Efficiency Variance

f) Fixed Overhead Capacity Variance

4.13 SALES VARIANCE

Sales variance is difference between the actual value achieved in a given period and budgeted value of sales. Sales value variance is useful for sales managers in determining the effect of changes in different factors on sales value. The following are types of variance:-

1) Sales Value Variance: - It is the difference between the actual sales value reliable and the standard value of sale as per the budget.

Sales Value Variance = Actual Value of Sale – Budgeted Value of Sale

= (Actual Quantity X Actual Price) – (Standard Quantity X Standard Price)

2) Sales Price Variance: - It is that portion of the total sales value variance which is due to difference between actual sales price realised and budgeted sales price

Sales Price Variance = Actual Quantity (A c t u a l Price – Standard Price)

3) Sales Volume Variance: - It is that portion of total sales value variance which is due to difference between the standard value of the actual sales effected and standard value of sales as per the budget.

Sales Volume Variance = Standard Price (Actual Quantity –Standard Quantity)

4) Sales Mix Variance: - It is that portion of sales volume variance which is due to the difference between the standard value of actual sales effected and actual value of sales.

Sales Mix Variance = Standard Price (Standard Sales Value of Actual Mix– Standard Sales Value of Revised Standard Mix)

5) Sales Quantity Variance: - It is that portion of sales volume variance which is due to the difference between standard value of actual sales effected and standard values of sales as per the budget.

Sale Quantity Variance = Standard Price (Revised Standard Mix – Standard Mix)

Illustration 5

From the following information about sales, calculate:

(a) Sales value Variance **(b) Sales Price Variance**

(c) Sales Volume Variance **(d) Sales Mix Variance**

(e) Sales Quantity Variance

Product	**Standard**		**Actual**	
	Units	Rate per Unit Rs.	Units	Rate per Unit Rs.
X	15,000	6	20,000	5.50
Y	16,000	7	15,000	8.50
Z	9,000	8	15,000	10.00

Solution

Product	**Budgeted quantity BQ**	**Budgeted Price BP**	**Actual Qty. AQ**	**Actual Price AP**	**Revised Budgeted Qty RBQ**	**BQ x BP**	**RBQ x BP**	**AQ x BP**	**AQ x AP**
X	15,000	6	20,000	5.50	18,750	90,000	1,12,500	1,20,000	1,10,000
Y	16,000	7	15,000	8.50	20,000	1,12,000	1,40,000	1,05,000	1,27,500
Z	9,000	8	15,000	10.00	11,250	72,000	90,000	1,20,000	1,50,000
Total	40,000		50,000		50,000	2,74,000	3,42,500	3,45,000	3,87,000,

RBQ $= \frac{Total\ of\ AQ}{Total\ of\ BQ}$ x BQ of Concerned product

X $= \frac{50,000}{40,000}$ x 15,000 = 18,750

Y $= \frac{50,000}{40,000}$ x 16,000 = 20,000

X $= \frac{50,000}{40,000}$ x 9,000 = 11,250

a) Sales value variance = (BQ x BP) – (AQ x AP)

X = 90,000 - 1,10,000 = Rs. 20,000 (A)

Y = 1,12,000 – 1,27,500 = Rs. 15,500(A)

Z = 72,000 - 1,50,000 = Rs. 78,000 (A)

2,74,000 - 3,87,500 = Rs. 1,13,500 (A)

b) Sales price variance (SPV) = AQ (BP – AP)

X = 1,20,000 - 1,10,000 = Rs. 10,000 (F)

Y = 1,05,000 – 1,27,500 = Rs. 22,500 (A)

Z = 1,20,000 - 1,50,000 = Rs. 30,000 (A)

3,45,000 - 3,87,500 = Rs. 42,500 (A)

c) Sales volume variance = (BQ x BP) – (AQ x BP)

X = 90,000 - 1,20,000 = Rs. 30,000 (A)

Y = 1,12,000 – 1,05,000 = Rs. 7,000 (F)

Z = 72,000 - 1,20,000 = Rs. 48,000 (A)

2,74,000 - 3,45,000 = Rs. 71,000 (A)

d) Sales mix variance = (RBQ – BP) – (BQ X BP)

X = 1,12,500 - 1,20,000 = Rs. 7,500 (A)

Y = 1,40,000 – 1,05,000 = Rs. 35,000 (F)

Z = 90,000 - 1,20,000 = Rs. 30,000 (A)

3,42,500 - 3,45,000 = Rs. 2,500 (A)

e) Sales Quantity variance = (BQ x BP) - (RBQ x BP)

X = 90,000 - 1,12,500 = Rs. 22,500 (A)

Y = 1,12,000 – 1,40,000 = Rs. 28,000 (A)

Z = 72,000 - 90,000 = Rs. 18,000 (A)

2,74,000 - 3,42,500 = Rs. 68,500 (A)

Verification

1. SVV = SPV + SVoV

Rs. 1,13,500 (A) = Rs. 42,500 (A) + Rs. 71,000 (A)

2. SVoV = SMV + SQV

Rs. 71,000 (A) = Rs. 2,500 (A) + Rs. 68,500 (A)

Check Your Progress:-

Q.1.Explain the following terms:-
a) Sales Value Variances
b) Sales Price Variances
c) Sales Volume Variances
d) Sales Mix Variances
e) Sales Quantity Variances

Q.2.Give formulae:-
a) Sales Value Variances
b) Sales Price Variances
c) Sales Volume Variances
d) Sales Mix Variances
e) Sales Quantity Variances

4.14 THEORY QUESTIONS

Q.1. What standard costing? Explain the advantages and limitations of costing.

Q.2. What is meant by standard cost? How standard cost is determined?

Q.3.What are the advantages and limitations of standard costing?

Q.4. Write short note:-Variance Analysis.

Q.5.Fill in the blanks by selecting appropriate options:-

A) Material cost variance arises due to variation in price and ---------- of materials.

(a)quality (b) quantity (c) volume (d) delivery

B) Idle time variance is due to difference between labour hours applied and labour hours------

(a) utilised (b) supplied (c) unutilised (d) underutilised

C) Fixed overhead capacity variance arises due to difference between capacity utilized and ---------capacity.

(a)spare (b) excess (c) fixed (d) planned

D) Sales mix variance is due to the difference between standard value of actual sales and actual value of ----------sales .

(a) realised (b) effected (c) margin (d) volume

E) Standard cost is a specifically---------cost.

(a) Pre-determined (b) Estimated (c) Planned (d) Average

F) Difference between Standard Cost and Actual Cost is called----------

(a) variance (b) profit (c) loss (d) wastage

G) Idle time variance is always ----------

(a) controllable (b) favorable (c) adverse (d) none of the above

H) Material yield variance arises due to change in the----------

(a) wastage (b) input (c) output (d) none of the above

I) Sales Volume Variance is--------

(a) SQV + SMV (b) SVV + SQV (c) SPV + SQV (d) none of the above

J) Purchase manager is responsible for ------

(a) efficient buyer (b) labour problem (c) poor maintenance (d) none of the above

(Ans- A- b , B– a , C – d , D – a , E – a, F-a, G-b, H-a, I-a, J-a)

5

STANDARD COSTING - II

Unit structure

4.0 OBJECTIVES

After studying this unit, you would be able to:

❖ Able to solve the problems onMaterial, Labour, Variable Overheads, Fixed Overheads and Sales Variance analysis.

4.2 SolvedProblems

Illustration 1 (Material Variance)

Product	Standard			Actual		
	SQ	SP	SC	AQ	AP	AC
X		50	40,000		45	37,800
Y	800	20	8,000	840	25	12,000
Z	400	15	3,000		15	2,700
*	200	*	51,000	480	*	52,500
Input	1,400	*	*	180	*	*
Normal Loss		*			*	
Output	50		51,000	1,500		52,500
	1,350					
				150		
				,350		

From the above information calculate the following variance:

a) Material Coast Variance

b) Material Price Variance

c) Material Usage Variance

d) Material Mix Variance

e) Material Yield Variance

Solution:

Cost Analysis

Product	Standard			Actual			Revised quantity for Actual Output (RQ)	
	SQ	SP	SC	AQ	AP	AC		RQ
X	800	50	40,000	840	45	37,800	X : 800/1400*1500=857	
Y	400	20	8,000	480	25	12,000		857
Z	200	15	3,000	180	15	2,700	Y : 400/1400*1500=429	
*	1400	*	51,000	1500	*	52,500	Z : 200/1400*1500=214	429
Input	50	*	*	150	*	*		
Normal Loss		*			*			214
Output								
	1350		51,000	1350		52,500		1500

1.Material cost variance = Standard Cost Variance – Actual Cost

MCV = 51,000-52,500

MCV = Rs.1,500 (A)

2.Material Price Variance (MPV) = (SP-AP) x Actual Quantity

X : (50-45) 840 = Rs.4,200 (F)

Y : (20-25) 480 = Rs.2,400 (A)

Z : (15-15) 180 =Rs. 0

MPV = Rs.1,800 (F)

3. Material Usage Variance(MUV) = (SQ-AQ) x SP

X : (800-840) 50 =Rs. 2,000 (A)

Y : (400-480) 20 =Rs. 1,600 (A)

Z : (200-180) 15 = Rs.300 (F)

MUV = Rs. 3,300 (A)

MCV = MPV+MUV

= 1800(F) + 3300(A)

= Rs.1500(A)

4. Material mix Variance (MMV) = (Revised Std. Quantity – Actual Quantity) x SP

X : (857-840) 50 = Rs.850 (F)

Y : (429-480) 20 = Rs.1,020 (A)

Z : (214-180) 15 = Rs.510 (F)

MMV = Rs.340 (F)

RSQ

$X = \frac{800}{1,400} \times 1,500 = 857.14$ i.e. 857

$Y = \frac{400}{1,400} \times 1,500 = 428.57$ i.e. 429

$Z = \frac{200}{1,400} \times 1,500 = 214.29$ i.e. 214

5. Material Yield Variance (MVY) = (Standard yield – Actual yield) x SP

= (1,446-1,350) x 37.77

= 3,626 (A)

Illustration 2(Material Variance)

Pranali Ltd manufacture a single product the standard cost of which is as follows :

Material A 60% @ Rs20/ per Kg. Material B 40% @ Rs10/ per Kg.

Normal lost is 20% of input . Due to shortage of material A the standard mix was changed. Actual result for January 2011 were as follows :

Material A – 105 Kg. @ Rs20/ per kG Material B – 95 Kg @ Rs9/ per Kg.

Input 200 kg

Loss 35 Kg

Output 165 Kg

Calculate A Material cost variance B Material price variance C Material usage variance D material mix variance E material yield variance.

Solution

A Material Cost Variance is = Standard Cost of Material used – Actual cost of Material

Rs. 3300 –Rs.2955 = Rs..345 (F)

Actual cost of material used A -105kg @ Rs20 = Rs.2,100

B – 95 kg @ Rs9 = Rs 855 Total = Rs.2955

Standard cost of material = A 123.75 @ Rs20 = Rs..2,475

B 82.5 @ Rs 10 = Rs825

Total = Rs.3300

123.75 = 120 X 165/160 82.5 = 80X 165/160

B Material Price Variance = Actual Quantity (Standard Price – Actual Price)

A = 105(20-20) =Rs. 0

B = 95 (10-9) = Rs.95(F)

Total = Rs.95(F)

C Material Usage Variance = Standard Price (Standard Quantity – Actual Quantity)

A = 20 X (495/4-1 05) =Rs. 375 (F)

B = 10 (165/2-95) = Rs.125 (A)

Total = Rs.250 (F)

D Material Mix Variance = Standard Price (Revised Standard Quantity - Actual Quantity)

A = 20(120-105) = Rs.300 (F)

B = 10 (80-95) = Rs.150 (A)

Total = Rs.150 (F)

E Material Yield Variance = Standard Price (Actual Output – Standard Output) .

20 (165-160) = Rs.100 (F)

Standard price of output Material A= 60 x 20 = Rs. 1200

Material B= 40 x 10 = Rs. 400

Total = 100= Rs. 1,600

Loss 20

Output 80

Standard Cost Price = Rs. 1,600/80 = Rs. 20

Illustration 3

Standard labour hours and rate for production of one unit of article A is given below:

Particulars	Per Unit Hours	Rate Per Hour(Rs)	Total (Rs)
Skilled Workers	5	1.50	7.50
Unskilled Workers	8	0.50	4.00
Semi-skilled Workers	4	0.75	3.00
		Total	14.50

Actual Data

Articles Produces1000 units

Particulars	Hours	Rate Per Hour(Rs)	Total (Rs)
Skilled Workers	4500	2.00	9,000
Unskilled Workers	10000	0.45	4,500
Semi-skilled Workers	4200	0.75	3,150
		Total	16,650

Calculated

1. Labour cost variance

2. Labour rate variance

3. Labour efficiency variance

4. Labour Mix Variance

Solution:

1) Labour cost variance = Standard labour cost – Actual labour cost

Skilled = STD Hours X STD Rate – Actual Hours X Actual rate.

= 5,000 X1 .5 – 4,500 X 2 = 7,500-9,000= Rs 1,500 (A)

Semi Skilled = 4,000 X 0.75-4,200X0.75 = 3,000-3,150 = Rs 150 (A)

Unskilled = 8,000 X 0.5 – 10,000 X 0.45 = 4,000-4,500 = Rs 500 (A)

=1500 + 500 + 150 = Rs.2,150(A)

b) Labour Rate Variance (LVR) = (SR - AR) x AH

Skilled = (1.5-2) x 4,500 = Rs.2,250 (A)

Unskilled = (0.75 – 0.75) x 4,200 =Rs.0

Semi-Skilled = (0.5 - .45) x 10,000 =Rs.500 (F)

1,750 (A)

c) Labour Efficiency Variance (LEV) = (SH – AH) x SR

Skilled = (5,000 – 4,500) x 1.5 = Rs.750 (F)

Unskilled = (4,000 – 4,200) x 0.75 = Rs.150 (A)

Semi-Skilled = (8,000 – 10,000) x 0.5 = Rs.1,000 (A)

Rs.400 (A)

d) Labour Mix Variance = Standard Rate (Actual Labour Mix –Revised Standard

Labour Mix)

Skilled = 1.5 x (5,500 – 4,500) = Rs.1,000(F)

Unskilled = 0.75 x (8,000 – 10,000) = Rs.1,500 (A)

Semi-Skilled = 0.5 x(4,400 – 4,200) = Rs.100 (F)

Rs.400 (A)

Illustration 4 (Labour Variance)

A gang of workers usually consist of 10 skilled. 5 semi-skilled and 5 unskilled labour in a factory. They paid at standard hourly rates of 5.00 3.20 and 2.80 respectively. In a normal working week of 40 hours, the gang is expected to produce 1,000 units of output. In a certain week, the gang consisted of 13 skilled, 4 semi-skilled and 3 unskilled labour. Actual wages were paid at the rates of 4.80; 3.40 and 2.60 respectively. 960 units were produced.

You are required to calculate:-

i) Labour cost variance.

ii) Labour rate variance.

iii) Labour efficiency variance.

iv) Labour mix variance.

Solution

Cost Analysis

	Standard Cost			Actual Cost		
	Hours	**Rates**	**Amount**	**Hours**	**Rates**	**Amount**
Skilled	$\frac{40x10x960}{1,000} = 384$	5	1,920	13x40 =520	4.80	2,496
Semi-Skilled	$\frac{40x5x960}{1,000} = 192$	3.20	614.40	4x40 =160	3.40	544
Unskilled	$\frac{40x5x960}{1,000} = 192$	2.80	537.60	3x40 =120	2.60	312
	= 768		3,072.00	= 800		3,352

i) Total Labour Cost Variance:

= Std. labour cost – Actual labour cost

= 3,072 – 3,352

= Rs.280 (A)

ii) Labour Rate Variance:

(Std. Rate – Actual Rate) x Actual Hours

Skilled = (5 – 4.80) x 520 =Rs. 104 (F)

Semi-skilled = (3.20 – 3.40) x 160 = Rs.32 (A)

Unskilled = (2.80 – 2.60) x 120 =Rs.24 (F)

Rs.96 (F)

iii) Labour efficiency variance:

(Std. Hours – Actual Hour) x Std. Rate

Skilled = (384 - 520) x 5 = Rs.680 (A)

Semi-skilled = (192 - 160) x 3.20 = Rs.102.4 (F)

Unskilled = (192 - 120) x 2.80 = Rs.201.6 (F)

376 (A)

Actual Hours = 800 – 40

= 760

iv) Labour Mix Variance:

SCSM – SCAM SCAM= ALH x SLR

$\frac{SCSM}{Skilled} = \frac{384}{768}$ x 800 = 400 x 5 = 2,000 skilled = 520 x 5 = 2,600

Semi – skilled = $\frac{192}{768}$ x 800 = 200 x 3.20 =640

Semi-skilled = 160 x 3.20 = 512

Unskilled= $\frac{192}{768}$ x 800 = 200 x 2.80 =560 Unskilled = 120 x 2.80 = 336

3,200 3,448

LMV = 3200 – 3448

= Rs.248 (A)

Illustration 5 (Overhead Variance)

The following information has been obtained from the record of a manufacturing organization using the standard Costing System for the month of March, 2022.

Particulars	**Standard**	**Actual**
Production (Units)	4,000	3,800
Working Days	20	21
Fixed Overheads (Rs.)	40,000	39,000
Variable Overhead (Rs.)	12,000	12,000

You are required to calculate the following overhead variance:

i) Variable overhead variance

ii) Fixed overhead variance

(a) Expenditure variance,

(b) Volume variance,

(c) Efficiency variance,

(d) Calendar variance

iii) Also prepare Reconciliation Statement for the same.

Solution:

i) Standard Variable Overhead for Actual Output or Recovered Variable Overhead (RVO)

$$12{,}000 \times \frac{3{,}800}{4{,}000} = 11{,}400$$

Actual Variable Overhead (Given) = 12,000

VOV = RVO – AVO

= 11,400- 12,000

= Rs.600 (A)

ii) Fixed overhead variance

Recovered FO – Standard Fixed Overhead for Actual Output

Recovered FO – AFO

= 3,800 x 10 – 39,000

= 38,000 – 39000

= Rs.1,000 (A)

a) Fixed Overhead Expenditure Variance

Budgetary Overhead – Actual Overhead

= 40,000 - 39000

= Rs.1,000 (F)

b) Fixed Overhead Volume Variance

SFO – BFO

= 38,000 – 40,000

= Rs.2,000 (A)

c) Fixed Overhead Efficiency Variance

= Std. Rate per day x (Std. Time for Actual Output – Actual Time)

$= \frac{20}{4{,}000} \times 3800 = 19$

= 2,000 (19- 21)

= 2,000 x(-2)

=Rs.4,000(A)

d) Calendar Variance

BFO - $\frac{BFO}{Budgeted\ Working\ Days}$ x Actual Working Days

= 40,000- $\frac{40,000}{20}$ x 21

= 40,000 – 42000

= Rs.2,000 (A)

Summary of Fixed Overhead Variance

FOCV = FOEV + FOEff. V + Focal V

= 1,000 (F) + 4,000 (A) + 2,000 (F)

= Rs.1,000 (A)

iii) Reconciliation Statement

Std. Fixed Overhead for Actual Output
38,000

Less: Variance

Expenditure 1,000 (F)

Calendar 2,000 (F)3,000

35,000

Add: Efficiency Variance (A)
4,000

Actual Fixed Overhead
39,000

Illustration 6 (Overhead Variance)

Mathura Ltd. has furnished the following information:

	Budget	**Actual**
No. of working days	25	27
Production (units)	20,000	22,000
Fixed Overheads	30,000	31,000

Budgeted fixed overhead rate is Re. 1 per hour. Actual hours worked were 31,500.

Calculate:-

1. Fixed overhead Variance

2. Fixed overhead Volume Variance

3. Fixed overhead Expenditure Variance

4. Efficiency Variance

5. Capacity Variance

Solution:

1. FOV = Standard Fixed Overhead - Actual Fix Overheads

For Actual Output

$= \left(\frac{30,000}{20,000} \times 22,000\right) - 31,000$

$= 33,000 - 31,000$

$= Rs.2,000 (F)$

2. Fixed Overhead = (Budgeted Output – Actual Output) x Standard fixed Overhead per unit

of output Volume Variance

$= (20,000 - 22,000) \times \frac{30,000}{20,000}$

$= 2000 \times 1.5$

$= Rs.3,000 (A)$

3. Fixed Overhead = Budgeted fixed overhead – Actual fixed overheads

Expenditure variance

$= 30,000 - 31,000$

$= Rs.1,000 (A)$

4. Efficiency Variance = (Standard Hours for Actual Production - Actual Hous) x Standard Rate per hour

$= (33,000 - 31,500) \times 1$

$= Rs. 1,500 (F)$

5. Capacity Variance = (Actual Hours – Budgeted Hours) x Standard rate per hour

= (31,500-30,000) x 1

=Rs. 1,500 (F)

Reconciliation:

Total Variance	Rs.2,000 (F)
Expenditure Variance	Rs. 1,000 (A)
Volume Variance	Rs.3,000 (A)
Capacity	Rs. 1,500 (F)
Efficiency	Rs.1,500 (F)

Illustration 7 (Overhead Variance)

In department A of a plant, the following data are submitted for the week ended 31st March, 2022.

Standard output for 40 hours per week	1,400 units
Budgeted Fixed Overheads	Rs. 1,400
Actual Output	1,200 units
Actual Hours worked	32 Hours
Actual fixed overhead	Rs. 1,500

You are required to prepare a Statement of variance.

Solution:

Calculation of Fixed Overhead Variance:

1. Fixed Overhead Cost Variance

Recovered Fix Overheads – Actual Fixed Overheads

= (1 x 1,200 units) - 1,500

= Rs. 300 (A)

2. Fixed Overhead Expenditure Variance

Budgeted Fixed Overheads – Actual Fixed Overheads

= 1,400 - 1,500

= Rs. 100 (A)

3. Fixed Overhead Volume Variance

Recovered Fixed Overhead – Budgeted Fixed Overheads

= 1,200 - 1,400

= Rs.200 (A)

Fixed Overhead Volume Variance is further analysed into:

a) Fixed Overhead Efficiency Variance

Standard Overhead Rate per hour (Standard hour Actual Output – Actual hours)

$= \frac{1,400}{40} \times (\frac{40}{1,400} \times 1,200 - 32)$

$= 35 \times (\frac{480}{14} - 32)$

$= 35 \times \frac{(480-448)}{14}$

$= 35 \times \frac{32}{14}$

= Rs.80(F)

b) Fixed Overhead Capacity Variance

Standard Overhead Rate per hour (Actual Hours – Budgeted Hours)

= 35 (32 - 40)

= Rs.280 (A)

Summary of fixed Overhead Variance:

Expenditure Variance	Rs.100 (A)
Volume Variance:	
a) Efficiency Variance Rs. 80 (F)	
b) Capacity Variance Rs.280 (A)	Rs.200 (A)
Fixed Overhead Cost Variance	Rs.300 (A)

Illustration8 (Sales Variance)

The budgeted and the actual sale for a period in respect of three products are given below:

Budgeted Figures

Product	Quantity	Price Rs.	Value Rs.
A	1,000	5	5,000
B	750	10	7,500
C	500	15	7,500
	2,250		20,000

Actuals

Product	Quantity	Price Rs.	Value Rs.
A	1,200	6	7,200
B	700	9	6,300
C	600	14	8,400
	2,500		21,900

Calculate Sales Variances.

Solution:

Analysis of Data

Products	Budgeted			Actual			Actual Quantity x Budgeted Price Value
	Quantity	Price Rs.	Value Rs.	Quantity	Price Rs.	Value Rs.	
A	1,000	5	5,000	1,200	6	7,200	6,000
B	750	10	7,500	700	9	6,300	7,000
C	500	15	7,500	600	14	8,400	9,000
	2,250		20,000	2,500		21,900	22,000

Computation of Sales Variance:

1. Sales Value Variance:

Actual Sales – Budgeted Sales

= 21,900 - 20,000

= Rs. 1,900 (F)

2. Sales Price Variance:

Actual Quantity (Actual Price – Budgeted Price)

= 1,200 (6- 5) + 700 (9 - 10) + 600 (14 - 15)

= 1,200 (Fav.) + 700 (Adv.) + 600 (Adv.)

= Rs.100 (A)

3. Sales Volume Variance:

Budgeted Selling Price per unit (Actual Quantity – Budgeted Quantity)

= 5 (1,200 – 1,000) + 10 (700 - 750) + 15 (600- 500)

= 1000 (F) + 500 (A) + 1,500 (F)

= Rs.2,000 (F)

4. Sales Mix Variance:

Total Actual Quantity { Budgeted Price Per unit of Actual Mix - Budgeted price per unit of Budgeted mix }

$= 2{,}500 = \frac{22{,}000}{2{,}500} - \frac{20{,}000}{2{,}250}$

= 2,500 (8.80 - 8.888)

= Rs. 222 (A)

5. Sales Quantity Variance:

Budgeted price per unit of

Budgeted mix (Total Actual Quantity – Total Budgeted Quantity)

$= \frac{20{,}000}{2{,}250}$ (2,500 – 2,500)

= Rs.2,222 (F)

Reconciliation

Sales Price Variance	Rs.100 (A)
Sales Volume Variance	
i) Mix Variance 222 (A)	Rs.2,000 (F)
ii) QuantityVariance 2,222 (F)	Rs.1,900 (F)
Sales Value Variance	

Illustration 9 (Sales Variance)

A company's Budgeted Sales of product A 40,000 units are having standard selling price of 10/- per unit and product B 60,000 units are having standard selling price 12/- per units.

Actual sales of product A 70,000 units at 14/- per unit and Product B 50,000 units at 8/- per unit.

You are required to calculate:

(a) Sales Value Variance,

(b) Sales Price Variance,

(c) Sales Volume Variance,

(d) Sales Mix Variance,

(e) Sales Quantity Variance

Solution:

Cost Analysis

	Budget			**Actual**		
Product	**BQ**	**BP**	**Amount BQ x BP**	**AQ**	**AP**	**Actual Sales**
A	40,000	10	4,00,000	70,000	14	9,80,000
B	60,000	12	7,20,000	50,000	8	4,00,000
	1,00,000		11,20,000	1,20,000		13,80,000
	Revised Budget			**Standard 14**		
	RBQ	**BP**		**AQ x BP**		
A	48,000	10	4,80,000	70,000	10	7,00,000
B	72,000	12	8,64,000	50,000	12	6,00,000
	1,20,000		13,44,000	1,20,000		13,00,000

a) Sales Value Variance = Budgeted Sales – Actual Sales

A = (4,00,000 – 9,80,000) = Rs.5,80,000 (A)

B = (7,20,000 – 4,00,000) = Rs.3,20,000 (F)

Rs.2,60,000 (A)

b) Sales Price Variance = (BP - AP) x AQ

A = (10 – 14) x 70,000 =Rs. 2,80,000 (A)

B = (12 – 8) x 50,000 = Rs.2,00,000 (F)

Rs.80,000 (A)

c) Sales Volume Variance = (BQ - AQ) x BP

A = (40,000 –70,000) x 10 = Rs.3,00,000 (A)

B = (72,000 – 50,000) x 12 = Rs.2,64,000 (F)

Rs.56,000 (A)

d) Sales Mix Variance = (RBQ - AQ) x BP

A = (48,000 – 70,000) x 10 = Rs.2,20,000 (A)

B = (72,000 – 50,000) x 12 = Rs.2,64,000 (F)

Rs.44,000 (F)

e) Sales Quantity Variance = (RBQ-BQ) x BP

A = (48,000 – 40,000) x 10 =Rs.80,000 (F)

B = (72,000 – 60,000) x 12 = Rs.1,44,000 (F)

Rs.2,24,000 (F)

Note:

	A	B
AQ =	70,000	50,000
BQ =	40,000	60,000

RBQ = 40,000 x $= \frac{1,20,000}{1,00,000}$ = 48,000

60,000 x $= \frac{1,20,000}{1,00,000}$ = 72,000

Illustration 10 (Sales Variance)

Compute the following variance from the data given below:

1) **Total Sales Margin Variance.**
2) **Sales Margin Volume Variance.**
3) **Sales Margin Price Variance.**
4) **Sales Margin Quantity (Sub-volume) Variance.**

Product	Budgeted Quantity units	Actual Quantity units	Budgeted Sale Price per unitRs	Actual Sale Price per unitRs	Standard Cost per unitRs
X	240	400	50	45	30
Y	160	200	25	20	15

Solution:

1. a) Actual Margin per unit

= Actual Sales Price per unit – Standard Cost per unit

Product X = 45- 30 = Rs. 15

Product Y = 20 - 15 = Rs. 5

b) Budgeted Margin per unit

= Budgeted Sales Price per unit – Standard Cost per unit

Product X = 50- 30 = Rs.20

Product Y = 25 - 10 = Rs.10

2. a) Actual Profit

= Actual Quantity of Product units sold x Actual Margin per unit

Product X = 400 x 15 = Rs.6,000

Product Y = 200 x 5 = Rs. 1,000

Rs. 7,000

b) Budgeted Profit

= Budgeted Quantity of units to be sold x Budgeted Margin per unit

Product X = 240 x 20 = Rs.4,800

Product Y = 160 x 10 = Rs.1,600

Rs.6,400

3. a) Budgeted Margin per unit on Actual Mix

$$= \frac{(20 \times 400) + (10 \times 200)}{600}$$

$$= \frac{8,000 + 2000}{600}$$

= 16.666

b) Budgeted Margin per unit on Budgeted Mix

$$= \frac{(20 \times 240) + (10 \times 160)}{400}$$

$$= \frac{(4800 + 1600)}{400} = \text{Rs.16}$$

4. Total Sales Margin Variance

= Actual profit – Budgeted Profit

= 7,000- 6,400 = Rs.600 (F)

4.2 EXERCISES

Q.1. (Material Variance)

In a factory the standard mix consists of 60 kgs of X and 40 kgs of Y. The standard loss of production is 30%. The standard price of X is 5 per kg and of Y 10 per kg.

X : 80kgs at 4.50 per kg. Y : 70 kgs at 8 per kg. Actual yield : 115 kgs.

Calculate:

a) Material Coast Variance.

b) Material Price Variance.

c) Material revised usages variance.

d) Material Mix Variance.

e) Material Yield Variance.

Answer: Material Cost variance: Rs.230(F) Material Price Variance: Rs.180 (F), Material Usage Variance: Rs.50 (F), Material Mix variance: Rs.50(A), Material Yield Variance: Rs.100 (F)

Q.2. (Material Variance)

Following details are given for Product X

Material	Standard (for 1 unit produced)		Actual (for 10 units produced)	
	Qty (kgs)	Price (per kg)	Qty (kgs)	Price (per kg)
A	50	12	600	15
B	50	20	700	19
C	100	25	920	28

Calculate all the Material variance.

Answer: Material Cost variance: Rs.7,060(A) Material Price Variance: Rs.3,860 (A), Material Usage Variance: Rs.3,200 (A), Material Mix variance: Rs.1,310(A), Material Yield Variance: Rs4,510 (A)

Q.3. (Material Variance)

The standard cost of a certain chemical mixture is as follow:

Material		**Cost per tonne (Rs)**
I (40%)	20	A standard loss of 10% is expected in
II (60%)	30	production.

For a period, the actual consumption data was follow:

Material	**Cost per tonne (Rs)**
I (180 tonnes)	18
II (220 tonnes)	34

Calculate all the Material variance.

Answer: Material Cost variance: Rs.204.44 (A) Material Price Variance: Rs.520(A) Material Usage Variance: Rs.315.4 (F), Material Mix variance: Rs.200(F), Material Yield Variance: Rs.116 (F)

Q.4. (Material Variance)

X Ltd is engaged in producing dietary supplement "Funkids" for growing children, It produces "funkids" in a batch of 10 Kgs. Standard material inputs required for 10 kgs of "Funkids" are as below:-

Material	Quantity(in Kgs)	Rate per Kg. (in Rs.)
Vita –X	5	110
Proto-D	3	320
Mine-L	3	450

During the month of March 2024, actual production was 5,000 Kgs. Of "FUnkids" for which the actual quantities of material used for a batch and the prices paid thereof are as under:

Material	Quantity (in Kgs)	Rate per Kg. (in Rs.)
Vita-X	6	115
Proto-D	2.5	330
Mine-L	2	405

You are required to calculate the following variances based on the above given information for the month of March, 2024 for X Ltd.

1. Material Cost variance.

2. Material Price Variance

3. Material usage variance

4. Material Mix variance

5. Material Yield Variance

Answer: Material Cost variance: Rs2,82,500 (F) Material Price Variance: Rs.27,500 (F), Material Usage Variance: Rs.2,55,000 (F), Material Mix variance: Rs.1,89,420 (F), Material Yield Variance: Rs.65,580 (F)

Q.5.(Labour Variance)

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:-

1. Labour Cost Variance

2. Labour Rate Variance

3. Labour Efficiency Variance

4. Labour Mix Variance

5. Labour Yield Variance

(Ans.: LCV- Rs. 2,494 A, MRV- 2,000 A, LEV- 424 A, LMV- Rs.80 F,LEV-384F)

Q.6. (Material and Labour Variance)

The following details relating to a product are made available to you:

StandardCostperUnit:

Material 50 kg @ Rs 40 per kgLabour400hours@ Rs1perhour

ActualCost:

Material 4,900 kg @ Rs 42 per kgLabour 39,600 hours @ Rs 1 per hour Actual Production100 units

Yourarerequiredtocalculate:

i) Material Cost Variance ii) Material Price Variance

iii) Material Usage Variance iv) Labour Cost Variance

v) Labour Rate Variance vi) Labour Efficiency Variance

(Ans.: MCV- Rs. 5,800 A, MPV- 9,800 A, MUV- 4,000 F, LCV- Rs.3,500 A,LRV-3,960A,LEV-400F)

Q.7. (Labour Variance)

A gang of workers usually consists of 10 skilled. 5 semi-skilled and 5 unskilled labour in a factory. They paid at standard hourly rates of 5.00 3.20 and 2.80 respectively. In a normal working week of 40 hours, the gang is expected to product 1,000 units of output. In a certain week, the gang consisted of 13 skilled, 4 semi-skilled and 3 unskilled labour. Actual wages were paid at the rates or 4.80; 3.40 and 2.60 respectively. Two hours were lost due to abnormal idle time and 960 units of output were produced.

You are required to calculate:

i) Labour Cost Variance.

ii) Labour Rate Variance.q

iii) LabourIdle Time Variance.

iv) LabourEfficiency Variance.

v) LabourMix Variance.

(Ans.: LCV- Rs. 280 A, LRV- 96F, LITV- 40Hours, ,LEV-32F, LMV- Rs.248 A)

Q.8. (Overhead Variance)

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 1,44,000 per month. The standard time require to manufacture one unit of product is 4 hours.

In April, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were 1,42,000.

Compute:

a) Effective Variance.

b) Capacity Variance.

c) Calendar Variance.

d) Expenditure Variance.

e) Volume Variance.

f) Total Fixed Overheads Variance.

[Ans.(a) 6,360 (F) (b) 17,280 (A) (c)5,760 (A) (d) 2,000 (F) (e) 16,680 (A)(f) 14,680 (A)]

Q.9. (Overhead Variance)

The following information has been obtained from the records of a manufacturing organization using the Standard Costing System for the month of March, 2006.

Particulars	**Standard**	**Actual**
Production(Units)	4,000	3,800
Working Days	20	21
Fixed Overheads	40,000	39,000
Variable Overheads	12,000	12,000

You are required to calculate the following Overhead Variances:

a) Variable Overhead Variance

b) Fixed Overhead Variance

c) Expenditure

d) Efficiency Variance

e) Volume Variance

f) Calendar Variance

Also prepare Reconciliation Statement for the same

(Ans.-VOHCV-600A, FOHCV-1,000A, FOHVV-2, 000A, FOHExp. V-1,000F, FOHEffi. V-4,000A, FOHCV-2, 000F)

Q.10..(Overhead Variance)

The following figures are extracted from the books of a company:

Particulars	Standard	Actual
Output(Units)	6,000	6,500
Houirs	3,000	3,300
Fixed Overheads	1,200	1,250
Variable Overheads	600	6,650
Total Overhead Cost	7200	7,900
Number of Days	25	27

You are required to calculate the following overheads variances :

i) Overhead Cost Variance

ii) Variable Overhead Cost

iii) Fixed Overhead Cost Variance

iv) Fixed Overhead Volume Variance

v) Fixed Overhead Efficiency Variance

vi) Fixed Overhead Capacity Variance.

(Ans.-VOHCV- 600 A, FOHCV- 50 F, FOHVV- 2,000 A, FOHExp.V- 1,000 F, FOHEffi.V- 4,000 A, FOHCV- 2,000 F)

Q.11. (Sales Variance)

A Company's Budgeted Sales of product A 40,000 units are having standard selling price of 10/- per unit and product B 60,000 units are having standard selling price 12/- per unit.

Actual Sales of Product A 70,000 units at 14/- per unit and Product B 50,000 units at 8/- per unit.

You are required to calculate:

(a) Sales value Variance, (b) Sales Price Variance, (c) Sales Volume Variance, (d) Sales Mix Variance, (e) Sales Quantity Variance

(Ans.: SValueV-2, 60,000F, SPV-80, 000A, SVolumeV-1, 80,000 F, SQV-2,24,000 F, SMV-44, 000A)

Q.12. (Sales Variance)

From the following information about sales, calculate:

(a) Sales value Variance (b) Sales Price Variance

(c) Sales Volume Variance (d) Sales Mix Variance

(e) Sales Quantity Variance

Product	Standard		Actual	
	Units	Rate per Unit	Units	Rate per Unit
X	15,000	6	20,000	5.50
Y	16,000	7	15,000	8.50
Z	9,000	8	15,000	10.00

(Ans.:SValueV-1,13,500F,SPV-42,500F,SVolumeV-71,000 F,SQV-68,500F,SMV-2,500F)

Q.13. (Sales Variance)

A company manufacturing and marketing a product supplies the following information:

Units	Standard Sales		Units	Actual Sales	
	Price	Amount		Price	Amount
10,000	3.00	30,000	5,000 8,000	3.00 2.50	15,000 20,000
10,000		30,000	13,000		35,000

Calculate:

a)Sales Value Variance
b)Sales Price Variance
c)Sales Volume Variance
d)Sales Mix Variance
e)Sales Quantity Variance

(Ans.:SValueV-20, 000F, SPV-5, 000A, SVolumeV-25,000 F,SQV-24,200A, SMV-800F)

Q.14. (Sales Variance)

A Company's Budgeted Sales of product A are 40,000 unitsat standard selling price of Rs 10 per unit and product B 60,00 unit sat standard selling price of Rs 12 per unit.

Actual Sales of Product A are 70,000 units at 14 per unit and Product B 50,000 unit sat 8 per unit.

You are required to calculate:

a)Sales Value Variance
b)Sales Price Variance
c) Sales Volume Variance
d)Sales Mix Variance
e)SalesQuantityVariance

(Ans.: S ValueV-2,60,000A, SPV-80,000A, SVolumeV-1,80,000 A,SQV-2,24, 000A, SMV-44,000F)

6

BUDGETING AND BUDGETARY CONTROL

Budget is a precise statement of financial and quantitative implications of the course of actions that management has decided to follow in the immediate next period of time. Budget is a basis for the Management to see how the organization has been functioning i.e. whether the targets are set by management have been achieved or not. It is a very effective control tool.

After studying the chapter,the desired outcomes will be that one will be capable to

1. Understand Budgeting process, benefits of Budgeting, advantage of Budgetary control, limitations of budget.

2. Prepare different types of Budgets i.e. Cash Budget, Flexible Budget etc.

3. Comparison of budgeted and actual expenses.

4. Understand the meaning of zero-base budgeting, its benefits and limitations

5. Understand about Budget Manual, Budget Period, Budget Period.

BUDGET

In "A Dictionary for Accountants", Kohler defines budget as:

1. Any financial plan serving as an estimate of and a control over future operations.

2. Hence, any estimate of future costs.

3. Any systematic plan for the utilization of manpower, material or other resources.

The Chartered Institute of Management Accountants, London, (terminology) defines a budget as

"A plan expressed in money. It is prepared and approved prior to the budget period and may show income,

expenditure and the capital to be employed. May be drawn up showing incremental effects on former

budgeted or actual figures, or be compiled by zero-based budgeting."

A budget is a precise statement of the financial and quantitative implications of the course of action thatmanagement has decided to follow in the immediate next period of time (usually a year).

Thus, the essential features of a budget are as follows:

(i) It is a statement expressed in monetary and/or physical units prepared for the implementation ofpolicy formulated by the management.

(ii) It is laid down prior to the budget period during which it is followed.

(iii) It is prepared for the definite future period.

(iv) The policy to be followed to attain the given objective must be laid before the budget is prepared.

As per Oxford dictionary the word budget means the money that is available to a person or an organization and a plan of how it will be spent over a period of time.

A person may be a living human being or an Artificial Person enacted under law.

Spent over a period of time would mean it can be budgeted for the coming months or coming six months or for the next financial year.

The Latin word for the term "budget" is bulga, which means "leather bag" or "bulge". The English word "budget" comes from the Middle French word bougette, which is a diminutive of bouge, meaning "bag". The word bougette comes from the Latin word bulga.

The word "budget" was first recorded in the late Middle English period between 1400 and 1450.

Every country prepares its budget and India is no exception to the same our Budget comes every year on 1st February. Which now is known as bahikhata which means Income and Expenditure.

Budget is a financial plan that outlines an organization's expected income, expenditure, and financial goals over a specific period. *Budgetary control* refers to the process of comparing actual financial performance against the budget to ensure that financial objectives are met. It helps in monitoring costs, controlling financial resources, and guiding decision-making.

BUDGETING

Budgeting is the complete process of designing, implementing and operating budgets. The main emphasis inthis is short-term budgeting process involving the provision of resources to support plans which are being implemented.

BUDGETARY CONTROL

Budgetary control is intimately connected with budgets. The Chartered Institute of Management Accountants,London defines Budgetary control as "the establishment of budgets, relating the responsibilities of executiveto the requirements of a policy and the continuous comparison of actual with budgeted results either tosecure by individual action the objectives of that policy or to provide a firm basis for its revision".

A budgetary control system secures control over performance and costs in the different parts of a business:

(i) by establishing budgets

(ii) by comparing actual attainments against the budgets; and

(iii) by taking corrective action and remedial measures or revision of the budgets, if necessary.

The budget is a blue-print of the projected plan of action expressed in quantitative terms and for a specifiedperiod of time. The budgets put the plan in a concrete form and follow up action to see that plan is adhere tocomplete the system of control. In other words, while budgeting is the art of planning, budgetary control is theact of adhering to the plan. In fact, budgetary control involves continuous comparison of actual results withthe budgets and taking appropriate remedial action promptly.

It is well recognised that a control system involves fixing of targets (in the form of specific tasks), collection ofinformation regarding actuals and continuous comparison of actuals with the targets with a view to reportingfor action. A budgetary control system, in this sense is also a control system. It is an excellent system fordecentralisation of authority without losing control over the operations of the firm.

One should not consider (budgets or) budgetary control as something rigid or strait-jacket. It is one of thesystem whereby dynamism is infused into an organisation through the process of targets, the achievement ofwhich will mean progress; of allowing a good deal of freedom of action within the delegated field ofexecutives and of seeing to it that all concerned will work in a concerted manner for achieving the firm'sobjectives.

There is always a good scope for initiative and drive but not for recklessness or too much caution.

De Paula has put the main idea of budgetary control through an analogy thus "the position may be linked tothe navigation of a ship across the sea. The log is kept written regarding happenings and position of the shipfrom hour to hour and valuable lessons are to be learnt by the captain from a study of the factor that causedthe misadventures in the past. But to navigate his ship safely over the seven seas the captain requires hisnavigating officer to work out the course ahead and constantly to check his ship's position against thepredetermined one. If the ship is off its course, the navigating officer must report immediately so that thecaptain

may take prompt action to regain his correct course".

Problems in Budgeting and Budgetary Control:

1. **Inaccurate Forecasts**: Estimating future revenues and costs is challenging, leading to budget deviations.
2. **Lack of Flexibility:** Static budgets may not adapt to unexpected economic changes or market conditions.
3. **Time-Consuming:** Preparing detailed budgets can be resource-intensive, particularly for large organizations.
4. **Lack of Accountability:** If employees do not take ownership of the budget, they may disregard budgetary constraints.
5. **Budgetary Slack:** Managers might intentionally underestimate revenues or overestimate expenses to create more lenient budgets.

Solutions:

1. **Accurate Forecasting Tools:** Use advanced analytics and historical data to make more accurate projections.
2. **Flexible Budgeting:** Implement flexible budgets that adjust to changes in business activities.
3. **Automation:** Use budgeting software to streamline the budgeting process and reduce manual efforts.
4. **Clear Communication and Ownership**: Ensure that department heads are accountable for adhering to their respective budgets.
5. **Regular Reviews**: Conduct regular budget reviews and adjust where necessary to ensure alignment with organizational goals.

An organisation just like a living person aspires to grow and build a fortune for itself and also for its shareholders.

For example, a Rajesh & Rajni are Husband and Wife both aspire to start a company named Stylo Shoes small store which will buy shoes and sandals from the manufactures like Bata, Adidas, Nike, Puma and many others and sells the same.

Before opening the store there would have been many questions which both Rajesh & Rajni would have jotted down like:

Purchasing the store or taking the store on Rent

Doing the Interiors of the store

Cost of overheads such as Electricity expenses; Insurance; Salaries to staff and all the others expenses which would help them in maintain the store in proper and just manner.

The budget of buying the store and putting up the interiors will be part of a capital expenditure whereas, jotting the points down and making the monthly budget for income and expenses will be defined as Operating expenditure budget called in the practical world as OpEx.

Every Organisation Small, Big or MNC's they define their expenditure in 2 parts OpEx (Operating Expenditure) and the other being CapEx (Capital Expenditure).

This chapter will deal with OpEx where the budgeting aspect of the operating expenditure will be covered.

For every organisation the most important aspects are to grow its Revenue (Sales) and the other being to minimize its Cost (Expenses).

Profit is a byproduct if this two are taken care.

For a Manufacturing organisation there are many expenses and these expenses are integrated for making the budgets for example

Purchase department

Production Department

Overheads Department (Expenses like Rent, Salaries, Insurance etc)

Marketing Department (this to control the cost of Marketing and Advertising cost) to name a few there will many more departments.

Budgeting is forecasting future incomes and expenses so as an organisation is ready for any situation.

OBJECTIVES OF BUDGETARY CONTROL

The objectives of budgetary control are the following:

(1) To use different levels of management in a co-operative endeavour for achievement of the objectives of the firm.

(2) To facilitate centralised control with delegated authority and responsibility.

(3) To achieve maximum profitability by planning income and expenditure through optimum use of theavailable resources.

(4) To ensure adequate working capital in other resources for efficient operation of business.

(5) To reduce losses and wastes to the minimum.

(6) To bring out clearly where effort is needed to remedy the situation.

(7) To see that the firm is not deflected from marching towards its long-term objectives without beingoverwhelmed by emergencies.

(8) Various activities like production, sales, purchase of materials etc. are co-ordinated with the help ofbudgetary control.

ADVANTAGES OF BUDGETARY CONTROL

Budgetary control makes all the differences between drifting in an unchartered sea and following a wellplotted course towards a predetermined distinction. It serves as a valuable aid to management throughplanning, co-ordination and control.

The principal advantages of a budgetary control system are enumerated below:

(1) Budgetary control aims at maximisation of profits through effective planning and control of incomeand expenditure - directing capital and resources to the best and most profitable channel.

(2) There is a planned approach to expenditure and financing of the business so that economy isaffected in the utilisation of funds to the optimum benefit of the concern.

(3) It provides a clear definition of the objective and policies of the concern and a tool for objectingthese policies to periodic examination.

(4) The task of managerial co-ordination is facilitated through budgetary control.

(5) Since each level of management is aware of the task and is fully conscious as to the best way bywhich it is to be performed, maximum effective utilisation of men, materials and resources can beattained.

(6) Reports are furnished under the principles of management or control by exception. Only deviationsfrom budgets which point out the weak spots and inefficiencies are properly looked into.

(7) It cultivates in the management the habit of thinking ahead - making careful study of the problems inadvance before taking decisions.

(8) A budgetary control system assists delegation of authority and is a powerful tool of responsibilityaccounting.

(9) Budgets are the fore-runners of standard costs in the sense that they create necessary conditions tosuit setting up of standard costs.

(10) The method of evaluating performance against budgets provides a suitable basis for establishingincentive system of remuneration by results as also spotting people with exceptional qualities ofleadership and management.

(11) Since it involves foreseeing difficulties of various types, it will lead to their removal in time.

LIMITATIONS OF BUDGETARY CONTROL

(1) Budgetary control starts with the formulation of budgets which are mere estimates. Therefore, theadequacy or otherwise of budgetary control system, to a very large extent, depends upon theadequacy or accuracy with which estimates are made.

(2) Budgets are meant to deal with business conditions which are constantly changing. Therefore,budgets estimates lose much of their usefulness under changing conditions because of their rigidity.

It is necessary that budgetary control system should be kept adequately flexible.

(3) The system of budgetary control is based on quantitative data and represent only an impersonalappraisal to the conduct of business activity unless it is supported by proper management ofpersonal administration.

(4) It has often been found that in practice the organisation of budgetary control system become topheavy and, therefore, costly specially from the point of view of small concern.

(5) Budgets and budgetary control have given rise to a very unhealthy tendency to be regarded as thesolvent of all business problems. This has resulted in a very lukewarm human effort to deal withsuch problems and ultimately results in failure of budgetary control system.

(6) It is a part of human nature that all controls are resented to. Budgetary control which places restrictions on the authority of executive is also resented by the employees.

The limitations stated above merely point to the need of maintaining the budgetary control system on arealistic and dynamic basis rather than as a routine.

INSTALLATION OF BUDGETARY CONTROL SYSTEM

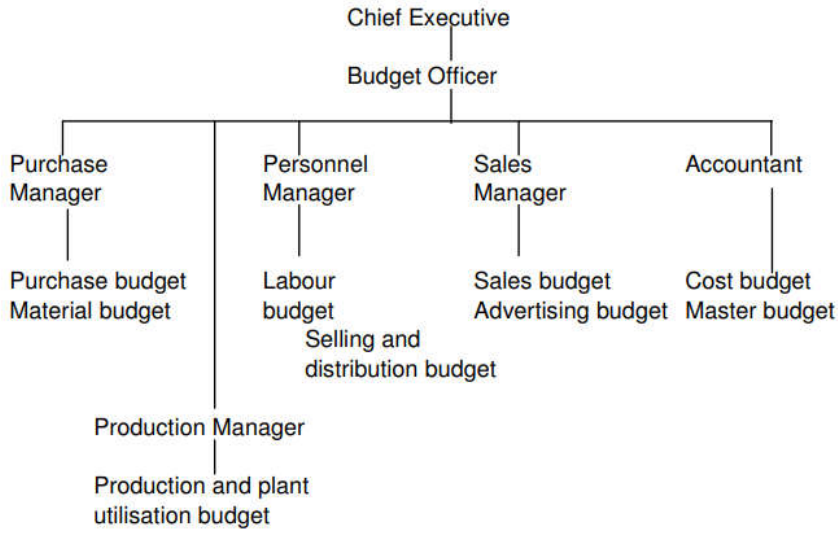
The following steps should be considered in detail for sound budgets and for successful implementation ofthe budgetary control system.

(i) Organisation Chart: An organisational chart is a statement defining functional representatives ofexecutives responsible for accomplishment of organisational objectives. This chart shows:

(i) Functional responsibility of a particular executive.

(ii) Delegation of authority to various levels.

(iii) Relative position of a functional head with heads of other functions.
An organisation chart forbudgetary control may be as follows:



(ii) Budget Centre: A budget centre is a section of the organisation of the undertaking defined for thepurpose of budget control. Budget centre should be established for cost control and all the budgets shouldbe related to cost centres. Budget centres will disclose the sections of the organisation where plannedperformance is not achieved. Budget centre must be separately delimited because a separate budget has tobe set with the help of the head of the department concerned. To illustrate, production manager has to beconsulted for the preparation of production budget and finance manager for cash budget.

(iii) Budget Manual: A budget manual is a document which sets outstanding instructions governing theresponsibilities of persons and the procedures, forms and records relating to the preparation and use ofbudgets and it is a booklet containing standing instructions regarding the procedures to be followed and thetime schedules to be observed. The following are some important matters dealt with in the budget manual:

(i) the dates by which preliminary forecasts and plans are to submitted;

(ii) the form in which these are to be submitted and the persons to whom these are to be forwarded;

(iii) the important factors that must be considered for each forecast or plan;

(iv) the categorisation of expenses, e.g., variable and fixed, and the manner in which each category isto be estimated and dealt with;

(v) the manner of scrutiny and the personnel to carry it out;

(vi) the matters which must be settled only with the consent of the managing director, departmentalmanager, etc.;

(vii) the finalisation of the functional budgets and their compilation into the master budget;

(viii) the form in which the various reports are to be made out, their periodicity and dates, the persons towhom these and their copies are to be sent;

(ix) the reporting of the remedial action;

(x) the manner in which budgets, after acceptance and issuance, are to be revised or amended; and

(xi) the matters, included in budgets, on which action may be taken only with the approval of topmanagement.

The main idea behind the budget manual is to inform line executives beforehand about procedures to befollowed rather than issuing frequent instructions from the controller's office regarding procedures and formsto be used. Such frequent instructions can be a source of friction between the line and staff management.

(iv) Budget Controller: To line up the various functions of Budget Committee, to bring them together and toco-ordinate their efforts in the matter of preparation of target figures, there should be a person usuallydesignated as the Budget Controller, who can provide ready data relating to all the functions. He is more orless the secretary to the budget committee. The Budget Controller does not control; he is staff man; headvises but does not issue instructions. His duties will comprise mainly of:

(1) Helping in preparation of the various budgets and their coordination and compilation into the masterbudget;

(2) Compiling of information about actual performance on a continuous basis comparing it against thebudget figures, ascertaining causes of deviation and preparing reports based thereon and sendingthem to the appropriate executive;

(3) Bringing to the notice of the management the need for revision of budgets and assisting them in thetask; and

(4) Compiling information of all types for the purposes of efficient preparation of budgets and properreporting.

(v) Budget Committee: The budget committee is a group of representatives of various functions in anorganisation. As all functions are inter-related and as any change in one's target will have its impact on thatof the other, it is necessary to discuss the targets so that a mutually agreed programme is determined. Thisis the co-ordination in budget making. It is a powerful force in knitting together the various activities of thebusiness and enforcing real control over operations. The budget manual should specify the responsibilitiesand duties of the budget committee, which should include the following:

(1) Receive and review budget estimates from the respective divisions or departments and makerecommendations.

(2) Recommend decisions or budget matters where there may be conflicts between departments ordivisions.

(3) Recommend changes and approval of the revised budget.

(4) Receive, study and analyse periodic reports comparing the budget with actual performance.

Consider policies with respect to follow-up procedures.

(5) Consider and make recommendations for revision of the budget when conditions warrant.

(6) Consider recommendations for changes in budget policies and procedures.

(7) Make recommendations for the budget manual.

PREPARATION & MONITORING OF VARIOUS TYPES OF BUDGETS

Depending upon the various bases adopted, budgets may be classified into different categories. Budgetsmay be classified on the basis of:

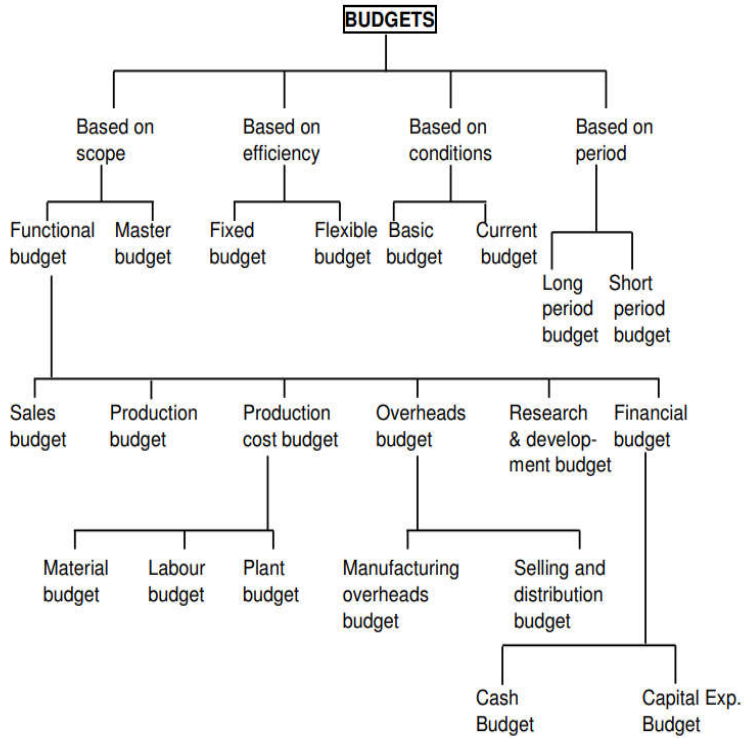
(i) the coverage or scope they encompass

(ii) the capacity or efficiency towhich they are related

(iii) the conditions on which they are based and

(iv) the periods which they cover.

Thisis clearly shown with the help of the following diagram:



Before an organizationmoves to financial budget a basic structural forms of budgeting are made these are basic forms of budgeting:

A. Strategic Plan Budget

A strategic plan budget aligns a company's long-term goals with its financial planning. It is crucial for guiding the company's future route and safeguarding that capitals are allocated efficiently to achieve planned objectives.

Components

- **Major Initiatives**: Projects or programs that drive the company's long-term goals.
- **Market Expansion Plans**: Strategies for entering new markets or expanding in existing ones.
- **Long-term Investments**: Investments in assets or capabilities that will benefit the company over several years.

Process

1. **Goal Setting**: Define long-term objectives aligned with the company's mission and vision.
2. **Market Analysis**: Conduct thorough research to understand market trends and opportunities.
3. **Resource Allocation**: Allocate resources to initiatives that support strategic goals.
4. **Monitoring and Adjustment**: Regularly review progress and adjust the budget as needed.

Challenges

- **Predicting Long-term Trends**: Accurately forecasting market conditions and trends over several years.
- **Aligning Departmental Goals**: Ensuring that all departments work towards the same strategic objectives.
- **Resource Allocation**: Balancing short-term needs with long-term investments.

Examples and Solutions

Example 1: Market Expansion

Scenario: A company plans to expand into a new geographic market over the next five years.

Solution:

1. **Goal Setting**: Set a target to achieve a 20% market share in the new region within five years.
2. **Market Analysis**: Conduct market research to identify potential customers, competitors, and regulatory requirements.
3. **Resource Allocation**: Allocate budget for market research, marketing campaigns, and establishing a local presence.
4. **Monitoring and Adjustment**: Regularly review market entry progress and adjust strategies based on performance and market feedback.

Example 2: New Product Development

Scenario: A tech company aims to develop a new product line to diversify its offerings.

Solution:

1. **Goal Setting**: Define the objective to launch the new product line within three years.
2. **Market Analysis**: Analyse customer needs, technological trends, and competitor products.
3. **Resource Allocation**: Budget for R&D, prototyping, testing, and marketing.
4. **Monitoring and Adjustment**: Track development milestones, gather customer feedback, and refine the product accordingly.

Example 3: Sustainability Initiatives

Scenario: A manufacturing company wants to implement sustainability initiatives to reduce its carbon footprint.

Solution:

1. **Goal Setting**: Set a target to reduce carbon emissions by 30% over five years.
2. **Market Analysis**: Identify sustainable technologies and practices that can be adopted.
3. **Resource Allocation**: Allocate funds for upgrading equipment, training employees, and implementing sustainable practices.
4. **Monitoring and Adjustment**: Measure progress through regular audits and adjust strategies to meet targets.

Best Practices

- **Involve Senior Leadership**: Ensure that top management is involved in setting goals and monitoring progress.
- **Be Flexible**: Be prepared to adjust the budget as circumstances change.
- **Communicate Clearly**: Ensure that all stakeholders understand the strategic goals and their roles in achieving them.
- **Use Data**: Base decisions on thorough market analysis and data-driven insights.

Strategic budgeting is a commanding tool for positioning financial resources with long-term objectives, safeguarding that a company can achieve its strategic goals while maintaining financial solidity.

Example 1: Market Expansion Budget

Scenario: A company plans to expand into a new geographic market over the next five years. The estimated cost for market research, marketing campaigns, and establishing a local presence is ₹ 50,00,00,000.

Calculate the annual budget allocation for this market expansion.

Solution:

Annual Budget Allocation = Total estimated Cost / Number of years

ABA = ₹ 50,00,00,000/5 = 10,00,00,000

Therefore, the Annual Budgetary Allocation = INR 10,00,00,000 for market expansion.

Example 2: New Product Development Budget

Scenario: A tech company aims to develop a new product line within three years. The total estimated cost for R&D, prototyping, testing, and marketing is ₹ 90,00,00,000.

Determine the quarterly budget allocation for the new product development.

Solution:

The quarterly budgetary allocation will be as its 3 years so in a year there are 4 quarters so for three years it will be 12 quarters.

So quarterly allocation = ₹ 90,00,00,000/12

= ₹ 7,50,00,000.

The above budgets deal with more towards the yearly planning and not in detail analysis of incomes and expenses.

The next sets of budgets and its types will be to understand in detail the various types of budgets which will provide a more detailed understanding of incomes and expenses.

1. FUNCTIONAL BUDGETS

Budgets for a period are really classified according to the various activities in the organisation. All activitiesare interrelated. The forecasts for individual activities are prepared and co-ordinated with those of otheractivities and then consolidated to show the total effect of all the activities as a whole. Approved targets forindividual functions are known as “functional budgets”. The consolidation of all functional budgets is knownas the “Master Budget”. This is nothing but the targeted profit and loss statement and balance sheet of theorganisation.

Principal functional budgets are:

Sales Budget: The sales budget is a forecast of total sales, expressed in terms of money and quantity.

The first step in the preparation of the sales budget is to forecast as accurately as possible the salesanticipated during the budget period. Sales forecasts are influenced by a variety of factors, external as wellas internal. External factors include general business conditions, Government policy, etc. Internal factorsconsist of sales-prices, sales trend, new-products, etc. The sales-budget is based on sales forecasting whichis the responsibility of the sales manager and market research staff. The sales budget is regarded as thekeystone of budgeting.

Production Budget: The production budget is a forecast of the production for budget period. It isprepared in two parts, viz.., production value budget for the physical units of the products to be manufacturedand the cost of manufacturing budget detailing the budgeted costs. The main steps involving in thepreparation of a production budget are production planning; consideration of capacity; integration with salesforecasts, inventory-policies, management's overall policies. The operation of a production budget results invarious advantages, main being: optimum utilisation of productive resources of the enterprise, production ofgoods according to schedule enabling the concern to adhere to delivery dates, proper scheduling of factorsof production.

Production Cost Budget: It may be further classified as under:

Materials Budget: Materials requirement budget, commonly known as materials budget, assist thepurchase department in suitably planning the purchases, fixing the maximum and minimum levels ofmaterials, components etc. The timing and amount of funds which will be needed to make purchases arealso known with the help of the materials budget.

Labour Budget: The labour content of each item of production as per the production budget isdetermined in terms of grades and trades of the workers required and the labour time for each job, operationand process. The rates of pay, allowances, bonus, etc., of each category are then considered and labourcost to be set for each budget centre is calculated by multiplying the wage rate with the labour hours for thenumber of units of products budgeted.

Plant Utilisation Budget: Plant Utilisation Budget is prepared for the estimation of plant capacity tomeet the budgeted production during the budgeted period. It is a forecast of plant capacities available forfulfilling production requirements as specified in the production budget. This budget is expressed in workinghours or other convenient units.

Followings are the features of Plant Utilisation Budget:

1. It will be base for the requirement of machine for sale and production department.

2. It will provide the base of reasonable depreciation so that machine can be replaced in future.

3. It may be base for the new inventions in the context of plant & machinery.

4. It will indicate the budgeted machine load on departments or machines.

5. It reveals that overloading on some departments, so that sales volume may be increased by providing after-sales service, advertisement campaign reducing selling price.

Overhead Budget: It may be further classified as under:

Manufacturing Overhead Budget: The following steps are required to be taken up to prepare themanufacturing overhead budget:

(i) Classification of expenditure into fixed, variable and semi-variable and collection thereof in accordance with a schedule of standing order numbers;

(ii) Departmentalisation of expenditure;

(iii) Determining the level of activity for setting the overhead rates; and level of activity may be actual,budgeted level or normal capacity; and

(iv) Establishing the variable overhead rates per unit of production or productive hour.

Selling and Distribution Budget: The selling expenses include all items of expenditure on the

promotion, maintenance and distribution of finished products. This budget which is closely related to thesales budget is the forecast of the cost of selling and distribution, for the budgeted period. Selling anddistribution expenses may be fixed or variable with regard to the volume of sales; separate budgets areusually established for fixed or variable selling and distribution expenses.

Research and Development Budget: This depends mostly on management decisions regarding theresearch and development effort - the projects already in hand and the proposed projects.

Financial Budget: It may be further classified as under

Cash Budget: Cash forecast precedes a cash budget. A cash forecast is an estimate showing theamount of cash which would be available in a future period. This budget usually of two parts giving detailedestimates of

(i) cash receipts and

(ii) cash disbursements.

Estimates of cash-receipts are prepared on amonthly basis and depend upon estimated cash-sales, collections from debtors and anticipated receipts fromother sources such as sale of assets, borrowings etc. Estimates of cash disbursements are based onestimated cash purchases, payment to creditors, employee's remuneration, bonus, advances to suppliers,budgeted capital expenditure for expansion etc.

The main objectives of preparing cash budget are as follows:

(i) The probable cash position as a result of planned operation is indicated and thus the excess orshortage of cash is known. This helps in arranging short term borrowings in advance to meet thesituations of shortage of cash or making investments in times of cash in excess.

(ii) Cash can be co-ordinated 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. onthe cash position of the organisation is revealed.

A cash budget can be prepared by any of the following methods:

(i) Receipts and payments method

(ii) Balance sheet method.

(i) Receipts and Payments Method: In this method the cash receipts from various sources and cashpayments to various agencies are estimated. Delay in cash receipts and lag in payments are taken intoaccount for making estimates. Since this method is based on the concept of cash accounting, accruals andadjustments obviously cannot find place in the preparation of cash budgets. The opening balance of cash ofa period and the estimated cash receipts are added and from this, the total of estimated cash payments isdeducted to find out the closing balance.

(ii) Balance Sheet Method: Under this method of preparing cash budget a forecast balance sheet isprepared as at the end of the budget period with all items of assets and liabilities except cash balance whichis arrived at as a balancing figure. The magnitude of the two sides of the balance sheet excluding cashbalance would determine whether the bank account would show a debit or credit balance i.e. cash balance atbank or bank overdraft.

Capital Expenditure Budget: Capital expenditure budget is the plan of the proposed outlay on fixedassets and is very closely related to the cash budget. Capital expenditure forecasting is a continuousprocess and by nature it is a long-term function. Capital forecasts should be made for a number of years.

Along with the long-term forecast, there should also be a short-term forecast to cover the general budgetperiod under consideration. It is also essential that the capital expenditure budget be properly co-ordinatedwith all the operational budgets of the concern so as to form an integral part of the overall plan.

MASTER BUDGET

Master budget is a consolidated summary of the various functional budgets. A master budget is the summarybudget incorporating its component functional budget and which is finally approved, adopted and employed.

It is the culmination of the preparation of all other budgets like the sales budget, production budget, purchasebudget etc. It consists in reality of the budgeted profit and loss account, the balance sheet and the budgetedfunds flow statement.

The master budget is prepared by the budget committee on the basis of co-ordinated functional budgets and becomes the target of the company during the budget period when it is finally approved. This budget acts as the company's individualised key to successful financial planning and control. It provides the basis of computing the effect of any changes in any phase of operations, such as sales volume, product mix, prices, labour costs, material costs or change in facilities. It segregates income, costs and profits by areas of responsibility. Master budget presents all this information to the depth appropriate for the top management action.

In the master budget, costs are classified and summarised by types of expenses as well as by departments.

This information extends the range of usefulness of master budget. It is considered as the best mode of understanding the company's micro-economic position relating to the forthcoming budget period. Master Budget is not merely a compendium of theoretical calculations. The figures that it contains, are the reflection of the actual intentions of the company relating to different areas for the forthcoming budget period.

FIXED BUDGETS

A budget may be established either as a fixed budget or a flexible budget. A fixed budget is a budgetdesigned to remain unchanged irrespective of the level of activity actually attained. A fixed budget is onewhich is designed for a specific planned output level and is not adjusted to the level of activity attained at thetime of comparison between the budgeted and actual costs. Obviously, fixed budgets can be establishedonly for a small period of time when the actual output is not anticipated to differ much from the budgetedoutput. However, a fixed budget is liable to revision if due to business conditions undergoing a basic changeor due to other reasons, actual operations differ widely from those planned in the fixed budget. Thesebudgets are most suited for fixed expenses but they have only a limited application and is ineffective as atool for cost control.

FLEXIBLE BUDGETS

The Chartered Institute of Management Accountants, London defines flexible budget as a budget which byrecognising different cost behaviour patterns, is designed to change as volume of output changes. It is abudget prepared in a manner so as to give the budgeted cost for any level of activity. It is a budget which byrecognising the difference between fixed, semi-fixed and variable cost is designed to change in relation tothe activity attained. It is designed to furnish budgeted cost at any level of activity attained.

Flexiblebudgeting is desirable in the following cases:

(i) Where the level of activity during the year varies from period to period, either due to the seasonalnature of the industry or to variation in demand.

(ii) Where the business is a new one and is difficult to foresee the demand.

(iii) Where the undertaking is suffering from shortage of a factor of production such as materials, labour,plant capacity, etc.

The main characteristic of flexible budget is that it shows the expenditure appropriate to various levels ofoutput. If the volume changes the expenditure appropriate to it can be established from the flexible budgetfor comparison with actual expenditure as a means of control. It provides a logical comparison of budgetallowances with actual cost. When flexible budget is prepared, actual cost at actual activity is compared withbudgeted cost at actual activity i.e. two things to a like base. For preparation of flexible budget, items of costhave to be analysed individually to determine how different items of cost behave to change in volume.

Therefore, in-depth cost analysis and cost identification is required for preparation of flexible budget.

Following are the striking features of flexible budgets:

(i) They are prepared for a range of activity instead of a single level.

(ii) They provide a very dynamic basis for comparison because they are automatically geared tochanges in volume.

(iii) They provide a tailor-made budget for a particular volume.

(iv) These are based upon adequate knowledge of cost behaviour pattern.

Flexible budgets may be prepared in the following method:

(i) Tabular method or multi-activity method

(ii) Formula method or ratio method and

(iii) Graphic method.

ZERO BASE BUDGETING

Zero base budgeting is a revolutionary concept of planning the future activities and there is a sharpcontradiction from conventional budgeting. Zero base budgeting, may be better termed as "De nova budgeting"or budgeting from the beginning without any reference to any base-past budgets and actual happening. Zerobase budgeting may be defined as "a planning and budgeting process which requires each manager to justifyhis entire budget request in detail from scratch (hence zero base) and shifts the burden of proof to eachmanager to justify why he should spend any money at all. The approach requires that all activities be analysedin decision packages which are evaluated by systematic analysis and ranked in order of importance".

CIMA defines zero base budgeting as "a method of budgeting whereby all activities are re-evaluatedeach time a budget is set. Discrete levels of each activity are valued and a combination chosen tomatch funds available."

It is a technique which complements and links the existing planning, budgeting and review processes. Itidentifies alternative and efficient methods of utilising limited resources in effective attainment of selectedbenefits. It is a flexible management approach which provides a credible rationale for reallocating resourcesby focusing on systematic review and justification of the funding and performance levels of currentprogrammes of activities.

The concept of zero base budgeting was developed in U.S.A. Under zero-base budgeting, each programmeand each of its constituent part is challenged for its very inclusion in each years budget. Programmeobjectives are also re-examined with a view to start things afresh. It requires review analysis and evaluationof each programme in order to justify its inclusion or exclusion from final budget. Following steps are usuallyinvolved:

(i) Describing and analysing all current or proposed programmes usually called "decision packages".

This consists of identification, analysis and formulation assists an evaluation in terms of purposes,consequence, performance measures, alternatives and cause and benefits. Decision units are thelowest level programmes or organisational entity for which budgets are prepared.

(ii) Ranking of decision packages alongwith documents in support of these packages.

(iii) The sources are allocated in accordance with the ranking.

Zero-base budgeting is based on the premise that every rupee of expenditure requires justification. Thetraditional budgeting approach includes expenditures of previous year which are automatically incorporated innew budget proposals and only increments are subjected to debate. Zero base budgeting assumes that aresponsibility centre manager

has had no previous expenditure. Important features of zero-base budgeting are:

(i) Concentration of efforts is not simply on "how much" a unit will spend but "why" it needs to spend.

(ii) Choices are made on the basis of what each unit can offer for a specific cost.

(iii) Individual unit's objects are linked to corporate targets.

(iv) Quick budget adjustments can be made if, during the operating year costs are required to maintain expenditure level.

(v) Alternative ways are considered.

(vi) Participation of all levels in decision-making.

Difference between Traditional Budgeting and Zero Base Budgeting

(i) Traditional budgeting is accounting-oriented. Main stress happens to be on previous level ofexpenditure. Zero base budgeting makes a decision oriented approach.

(ii) In traditional budgeting, first reference is made to past level of spending and then demand is madefor inflation and new programmes. In zero base budgeting a decision unit is broken intounderstandable decision packages which are ranked according to importance to enable topmanagement to focus attention only on decision packages which enjoy priority to others.

(iii) In traditional budgeting, some managers deliberately inflate their budget request so that after thecuts they still get what they want. In zero base budgeting, a rational analysis of budget proposal isattempted.

(iv) Traditional budgeting is not as clear and responsive as zero base budgeting.

(v) In traditional budgeting, it is for top management to decide why a particular amount should be spenton a particular decision unit. In zero base budgeting this responsibility is shifted from topmanagement to the manager of decision unit.

(vi) Traditional budgeting makes a routing approach while zero base budgeting makes a very straightforward approach and immediately spotlights the decisions packages enjoying priority over others.

Advantages of Zero Base Budgeting:

(i) Zero base budgeting is not based on incremental approach, so it promotes operational efficiencybecause it require managers to review and justify their activities or the fund requested.

(ii) Since this system requires participation of all managers, preparation of budgets, responsibility of alllevels at management in successful execution of budgetary system can be ensured.

(iii) This technique is relatively elastic because budgets are prepared every year on a zero base. Thissystem makes it obligatory to develop financial planning and management information system.

(iv) This system weeds out inefficiency and reduces the cost of production because every budgetproposal is evaluated on the basis of cost benefit analysis.

(v) It provides the organisation with a systematic way to evaluate different operations and programmesundertaken by the management. It enables management to allocate resources according to priorityof the programmes.

(vi) It is helpful to the management in making optimum allocation of scarce resources because a uniqueaspect of zero-base budgeting is the evaluation of both current and proposed expenditure andplacing it some order of priority.

Criticism against zero base budgeting:

(1) Defining the decision units and decision packages is rather difficult.

(2) Zero base budgeting requires a lot of training for managers.

(3) Cost of preparing the various packages may be very high in large firms involving large number ofdecision packages.

(4) It may lay more emphasis on short term benefits to the detriment of long-term objectives of theorganisation.

(5) It will lead to enormous increase in paper work created by the decision packages. The assumptionsabout costs and benefits in each package must be continually up dated and new packagesdeveloped as soon as new activities emerge.

(6) Where objectives are very difficult to quantify as in research and development, zero base budgetingdoes not offer any significant control advantage.

PROGRAMME BUDGETING

A program budget is a budget designed for a specific activity or program. This budget includes only revenueand expenses for a specific program. Program budgets are used in many organizations including businessesand schools. Establishing a budget by grouping expenditures and revenues into functional activities, orprograms. Rather than having a budget item for capital equipment that might be spread over many differentprograms (as is done in line-item budgeting), a program budget would include only proposed capitalexpenditures for a specific program.

The program budget allocates money to major program areas, focusing on the expected results of servicesand activities to be carried out. Program areas often utilized by government entities include public safety,public works, human services, leisure services, and general government. The emphasis of program project'sis on the attainment of long-term local community goals.

PERFORMANCE BUDGETING

The concept of performance budgeting relates to greater management efficiency specially in governmentwork. With a view to introducing a system's approach, the concept of performance budgeting was developedand as such there was a shift from financial classification to 'cost' or 'objective' classification. Performancebudgeting, is therefore, looked upon as a budget based on functions, activities and projects and is linked tothe budgetary system based on objective classification of expenditure.

According to National Institute of Bank Management, Bombay performance budgeting technique is, theprocess of analysing identifying, simplifying and crystallising specific performance objectives of a job to beachieved over a period in the frame work of the organisational objectives, the purpose and objectives of thejob. The technique is characterised by its specific direction towards the business objectives of theorganisation. Thus, performance budgeting lays immediate stress on the achievement of specific goals overa period of time. It requires preparation of periodic performance reports. Such reports compare budget andactual data and show any existing variances.

The purpose of performance budgeting is to focus attention upon the work to be done, services to berendered rather than things to be spent for or acquired. In performance budgeting, emphasis is shifted fromcontrol of inputs to efficient and economic management of functions and objectives. Performance budgetingtakes a system view of activities by trying to associate the inputs of the expenditure with the output ofaccomplishment in terms of services, benefits etc. In performance budgeting, the objectives of the budgetmakers and setting the task and sub-task for accomplishment of the defined objectives are to be clearlydecided well in advance before budgetary allocations of inputs are made. Each homogenous function isbroken down into a number of subordinate functions.

The main purposes of performance budgeting are:

1. To review at every stage, and at every level of the organisation, so as to measure progress towardsthe short-term and long-term objectives.

2. To inter-relate physical and financial aspects of every programme, project or activity.

3. To facilitate more effective performance audit.

4. To assess the effects of the decision-making of supervisor to the middle and top-managers.

5. To bring annual plans and budgets in line with the short and long-term plan objectives.

6. To present a comprehensive operational document showing the complete planning fabric of theprogrammes and prospectus their objectives inter-woven with the financial and physical aspects.

A performance budget presents estimate for expenditure and earnings in terms of functions, programmes,activities and projects. For introducing performance budgeting financial requirements are put up in relation to:

(a) Programmes and outlay indicating the range of work to be done by each categorised agency.

(b) Object-wise classification showing objects of expenditure, e.g. office establishment, etc. is usuallyshown in the conventional budgets.

(c) Sources of financing.

However, performance budgeting has certain limitations such as difficulty in classifying programmes andactivities, problems of evaluation of various schemes, relegation to the background of importantprogrammes. Moreover, the technique enables only quantitative evaluation scheme and sometimes theneeded results cannot be measured.

7

CASH BUDGET

Q.1. Zen Company making for a stock in the first Quarter of the year is assisted by its bankers with overdraft accommodation. The following are the relevant budget figures:

Month	Sales (₹)	Purchase (₹)	Wages (₹)
November	2,40,000	1,66,000	19,600
December	2,56,000	1,92,000	20,000
January	1,44,000	3,24,000	16,000
February	2,32,000	3,28,000	8,000
March	1,68,000	3,58,000	20,800

Budgeted cash at bank, 1st January, 2023 = ₹ 34,400. Credit terms of sales on payment by the end of the month following the month of supply. On an average one-half of sales are paid on the due date while the other half are paid during the next month. Creditors are paid during the month following the month of supply.

You are required to prepare a cash budget for the quarter, 1st January - 31st March, 2023 showing the budget amount of bank facilities required at each month.

Solution:

Cash Budget for the Quarter ending 31st March, 2023.

Particulars	**Jan.**	**Feb.**	**March**
A. Opening	34,400	74,400	(57,600)
B. Receipts			
Received from Debtors	2,48,000	2,00,000	1,88,000
C. Total (A + B)	2,82,400	2,74,400	1,30,400
D. Payments			
Paid to creditors	1,92,000	3,24,000	3,28,000
Expenses (wages)	16,000	8,000	20,800
E. Total	2,08,000	3,32,000	3,48,800
F. Closing (C – E)	74,400	(57,600)	(2,18,400)

Working Notes:

M. No. (M)	**1**	**2**	**3**	**4**	**5**
Month	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**March**
a. Sales	2,40,000	2,56,000	1,44,000	2,32,000	1,68,000
b. Received from debtors (M – 2) X 1/2	--	--	1,20,000	1,28,000	72,000
c. Received from debtors (M – 1) X 1/2	--	--	1,28,000	72,000	1,16,000
d. Received from debtors (total) (b + C)	--	--	2,48,000	2,00,000	1,88,000
e. Materials	1,66,000	1,92,000	3,24,000	3,28,000	3,58,000
f. Paid to creditors (M – 1)	--		1,92,000	3,24,000	3,28,000

Note: Negative (credit) balance in February and March indicate the amount of bank facilities required.

Q.2. Pharma Ltd. Is preparing its cash budget for the year 2022-23. An extract from the budget for the same year shows the following values:

Month	**Sales (₹)**	**Purchase of Material (₹)**	**wages (₹)**
April	3,00,000	1,00,000	20,000
May	3,60,000	1,20,000	24,000
June	2,80,000	1,30,000	26,000
July	3,00,000	1,40,000	28,000

1. 40% of its sales are expected to be for cash. Of its credit sales, 50% are expected to pay in the month after the month of sales and 50% are expected to pay in the second month after the month of sales.
2. The company has estimated to pay 50% of total material in cash and rest amount will be paid in the following month.
3. Wages are paid on the second day of the following month.
4. The opening balance of cash as on 1st May is ₹ 60,000.

Prepare the Cash Budget for the period May to July.

Solution:

Cash Budget for the Quarter ending 31st March, 2023.

Particulars	May	June	July
A. Opening	60,000	1,64,000	3,25,000
B. Receipts			
1. Cash Sales (40%)	1,44,000	1,12,000	1,20,000
2. Collection from Debtors:			
a. After 1 month (30%)	90,000	1,08,000	84,000
b. After 2 months (30%)	--	90,000	1,08,000
C. Total Receipts (A + B)	2,94,000	4,74,000	6,37,000
D. Payments			
1. Cash Purchases (50%)	60,000	65,000	70,000
2. Creditors for materials (50%) (after 1 Month)	50,000	60,000	65,000
3. Wages (next month)	20,000	24,000	26,000
E. Total Payments	1,30,000	1,49,000	1,61,000
F. Closing (C – E)	1,64,000	3,25,000	4,76,000

Flexible Budget:

Q.3. A factory is currently working at 50% capacity and produces 20,000 units. Prepare a Flexible budget and estimate the profits of the company when it works at 60% and 80% capacity and advise the company. At 60% working Raw material cost increases by 2% and selling price falls by 2%. At 80% Raw Material cost increases by 5% and selling price falls by 5%. At 50% capacity the product cost 360 per unit and is sold at 400 per unit.

The unit cost of 360 is made up as follows:

Material	200
Labour	60
Factory Overheads	60 (40% fixed)
Administrative Overheads	40 (50% fixed)

Solution:

Capacity (%)		50		60		80
Units		20,000		24,000		32,000
	Per Unit	₹	Per unit	₹	per unit	₹
A. Sales	400	8,000,000	392	9408000	380	12160000
B. Variable cost						
Direct Materials	200	4000000	204	4896000	210	6720000
Direct Labour	60	1200000	60	1440000	60	1920000
Variable Overheads						
Factory Overheads	36	720000	36	864000	36	1152000
Administration Overheads	20	400000	20	480000	20	640000
Total Variable cost	316	6320000	320	7680000	326	10432000
C. Contribution (A - B)	84	1680000	72	1728000	54	1728000
D. Fixed Cost						
Factory	24	480000	20	480000	15	480000
Administration	20	400000	16.66667	400000	12.5	400000
Total Fixed Costs	44	880000	36.66667	880000	27.5	880000
E. Total Cost (B + D)	360	7200000	356.6667	8560000	353.5	11312000
F. Profit (A - E)	40	800000	35.33333	848000	26.5	848000

Q.4. The budgeted output of a factory specializing in the production of single product at the optimum capacity of 6,400 units per annum amounts of ₹ 3,52,096 as detailed below:

Particulars	₹	₹
Fixed cost		41,376
Variable cost:		
Power	2,880	
Repair, etc.	3,400	
Miscellaneous	1,080	
Direct Materials	98,560	
Direct Labour	2,04,800	3,10,720
		3,52,096

Having regard to possible impact on sales turnover by market trends, the company decides to have a flexible budget with production of 3,200 and 4,800 units (the actual quantity proposed to be produced being left to a later date before commencement of budget period.) Prepare a flexible budget for production levels at 50% and 75%. Assuming the sales per unit

is maintained at ₹ 80 as the present, indicate the effect of net profits. Selling in distribution expenses continue at ₹ 7,200.

Solution:

Flexible Budget

Particulars	Rate (₹)	3,200 units	4,800 units	6,400 units
		50%	75%	100%
A. Fixed Expenses		41,376	41,376	41,376
B. Variable Expenses				
Direct Materials	15.40	49,280	73,920	98,560
Direct Labour	32.00	1.02,400	1,53,600	2.04,800
Power	0.45	1440	2,160	2,880
Repair, etc.	0.531	1700	2,550	3,400
Miscellaneous	0.169	540	810	1,080
Total Cost		1,96,736	2,74,416	3,52,096
C. Administration Selling & Distribution		7,200	7,200	7,200
D. Cost Of sales		2,03,936	5,48,832	3,59,296
E. Sales	80,000	2,56,000	3,84,000	5,12,000
F. Profit		5 2,064	1,02,384	1,52,704

Working Note:

1. Repairs = 3,400 /6400 X 3200 =1,700

2. Miscellaneous = 1,080 / 6400 X 3200 = 540

Q.5.

Draw up a flexible budget for overhead expenses on the basis of the following data and determine the overhead rates at 70%, 80% and 90% capacity.

Particulars	Capacity level (80%) (₹)
Variable Overheads:	
Indirect Labour	24,000
Stores including spares	8,000
Semi-variable Overheads:	

Power (30% fixed, 70% Variable)	40,000
Repairs and Maintenance (60% fixed, 40% variable)	4,000
Fixed Overheads:	
Depreciation	22,000
Insurance	6,000
Salaries	20,000
Total Overheads	1,24,000

Solution:

Flexible Budget

Capacity	70% (₹)	80% (₹)	90% (₹)
Variable Overheads:			
Indirect Labour	21,000	24,000	27,000
Stores including spares	7,000	8,000	9,000
Semi-variable Overheads:			
Power: Fixed	12,000	12,000	12,000
Variable	24,500	28,000	31,500
Repairs and Maintenance: Fixed	2,400	2,400	2,400
Variable	1,400	1,600	1,800
Fixed Overheads:			
Depreciation	22,000	22,000	22,000
Insurance	6,000	6,000	6,000
salaries	20,000	20,000	20,000
D. Total overheads	1,16,300	1,24,000	1,31,700

Q.6. The Expenses Budget for a production of 10,000 units in a factory are furnished as follows:

Particulars	Per Unit (₹)
Material	140
Labour	50
Overheads	40
Fixed Over Heads (₹ 2,00,000)	20
Variable Expenses (Direct)	10
Selling Expenses (10% fixed)	26
Distribution Expenses (20% fixed)	14
Administrative Expenses (₹ 50,000) (100% Fixed)	10
Total	310

Prepare a Budget for production of:

6,000 units, 8,000 units and 10,000 units showing variable cost, fixed cost in amount and cost per unit at each level of production.

Solution:

Units	6,000		8,000		10,000	
	C.P.U.	Total Cost	C.P.U.	Total Cost	C.P.U.	Total Cost
Variable Cost:						
Material	140	840000	140	1120000	140	1400000
Labour	50	300000	50	400000	50	500000
Variable Overheads	40	240000	40	320000	40	400000
Variable Expenses	10	60000	10	80000	10	100000
Selling Expenses	23.4	140400	23.4	187200	23.4	234000
Distribution Expenses	11.2	67200	11.2	89600	11.2	112000
A. Total Variable Cost	**274.6**	**1647600**	**274.6**	**2196800**	**274.6**	**2746000**
Fixed Cost:						
Selling Expenses	4.33	26,000	3.25	26,000	2.6	26,000
Distribution Expenses	4.67	28,000	3.5	28,000	2.8	28,000
Administration Expenses	16.67	100000	12.5	100000	10	100000
Fixed Overheads	33.33	200000	25	200000	20	200000
B. Total Fixed Cost	**59**	**354000**	**44.25**	**354000**	**35.4**	**354000**
C. Total Cost (A + B)	**333.6**	**2001600**	**318.85**	**2550800**	**310**	**3100000**

Purchase and Production Budget

Q.7. Draw a Material Procurement budget (Quantitative) from the following information:

Estimated sales during the next year will be 80,000 units. Material required will be 6 units of Material X and 10 Units of Material Y for each unit of finished product sold.

Estimated opening balance at the commencement of the next year:

Finished product 10,000 units

Material X 24,000 units

Material Y 40,000 units

Materials on Order:

Material X 14,000 units

Material Y 22,000 units

The desired closing balances at the end of the next year:

Finished product 14,000 units

Material X 30,000 units

Material Y 50,000 units

Materials on Order:

Material X 16,000 units

Material Y 20,000 units

Solution:

Material Procurement (Purchase) Budget (Quantitative)

Particulars	**X**		**Y**	
Units of Material Required (WN)	30,000	2,52,000	50,000	4,20,000
Add: Closing Stock Required	16,000	46,000	20,000	70,000
Material On Order				
Less: Opening Stock	24,000	2,98,000	40,000	4,90,000
Material on Order	14,000	38,000	22,000	62,000
Units to be purchased		2,60,000		4,28,000

Working Note:

The Total Production required for the year has been calculated as below:

	Units
Estimated sales	80,000
add: Closing stock	14,000
	94,000
Less: Opening Stock	(10,000)
Production in Units	84,000

Material Required

X - 84,000 X 6 = ₹ 5,04,000

Y – 84,000 X 10 = ₹ 8,40,000

Q.8. (Production Budget)

Minal Ltd. gives you the following cost details for manufacture of Product A at capacity level of 20,000 units.

Particulars	₹	Nature of Variability
Direct Material	24,00,000	100% Variable
Direct Labour	16,00,000	100% Variable
Factory Overheads:		
Lightning & Heating	9,60,000	75% Variable
Repairs & Maintenance	7,20,000	50% Variable
Depreciation	9,60,000	100% Fixed
Office Overheads	4,00,000	10% Variable
Selling & Distribution Overheads	6,00,000	50% Variable
Total	76,40,000	

Prepare a production cost budget for production of 15,000 units and 25,000 units. Showing Total Cost & Unit Cost at each level.

Solution:

In the books of Minal Ltd.

Production cost Budget – Product A

Units	20,000		15,000		25,000	
	Per Unit	₹	Per Unit	₹	Per Unit	₹
Direct Material	120.00	24,00,000	120.00	18,00,000	120.00	30,00,000
Direct Labour	80.00	16,00,000	80.00	12,00,000	80.00	20,00,000
Prime Cost	200.00	40,00,000	200.00	30,00,000	200.00	50,00,000
Add: Factory Overheads:						
Lightning & Heating	48.00	9,60,000	52.00	7,80,000	45.60	11,40,000
Repairs & Maintenance	36.00	7,20,000	42.00	6,30,000	32.40	8,10,000
Depreciation	48.00	9,60,000	64.00	9,60,000	38.40	9,60,000
Works Cost	332.00	66,40,000	358.00	53,70,000	316.40	79,10,000

Add: Office Overheads	20.00	4,00,000	26.00	3,90,000	16.40	4,10,000
Cost Of Production	352.00	70,40,000	384.00	57,60,000	332.80	83,20,000
Add: Selling & Distribution Overheads	30.00	6,00,000	35.00	5,25,000	27.00	6,75,000
Total Cost	382.00	76,40,000	419.00	62,85,000	359.80	89,95,000

Partly Variable Overheads

Particulars	per unit	20,000	15,000	25,000
Factory Overheads:				
1. Lightning & Heating				
Variable 75%	36.00	7,20,000	5,40,000	9,00,000
Fixed 25%	12.00	2,40,000	2,40,000	2,40,000
	48.00	9,60,000	7,80,000	11,40,000
2. Repairs & Maintenance				
Variable 50%	18.00	3,60,000	2,70,000	4,50,000
Fixed 50%	18.00	3,60,000	3,60,000	3,60,000
	36.00	7,20,000	6,30,000	8,10,000
3. Depreciation				
Fixed 100%	48.00	9,60,000	9,60,000	9,60,000
4. Office Over Heads				
Fixed 90%	18.00	3,60,000	3,60,000	3,60,000
Variable 10%	2.00	40,000	30,000	50,000
	20.00	4,00,000	3,90,000	4,10,000
Selling & Distribution Overheads				
Fixed 50%	15.00	3,00,000	3,00,000	3,00,000
Variable 50%	15.00	3,00,000	2,25,000	3,75,000
	30.00	6,00,000	5,25,000	6,75,000

Variable Overheads = Unit Produced X Overhead per unit.

Q.9. (Production Budget)

From the following data, prepare a Production Budget for Max Ltd. For the six months period ending on 30th June, 2023.

Stock for the Budgeted period:

Product	As on 1st January, 2023	As on 30thJune, 2023
X	12,000	20,000
Y	18,000	16,000
Z	24,000	35,000

Other relevant data:

Product	Normal Loss in Production	Requirement to fulfill sales programme (units)
X	4%	1,20,000
Y	2%	1,00,000
Z	5%	1,60,000

Solution:

Production Budget for 6 months ending on 30th June, 2023

Particulars	Products (Units)		
	X	Y	Z
Budgeted Sales	1,20,000	1,00,000	1,60,000
Add: Closing Stock	20,000	16,000	35,000
Total Required Stock	1,40,000	1,16,000	1,95,000
Less: Opening Stock	12,000	18,000	24,000
Net Production	1,28,000	98,000	1,71,000
Add: Normal Loss in production = Net Production X Normal Loss % /(100 – Normal Loss%)	4%	2%	5%
	5,334	2,000	9,000
Gross Production	1,33,326	1,00,000	1,80,000

Q.10. Agro food products Ltd. has prepared the following sales budget for the first five months of 2023:

	Sales Budget (Units)
January	21,600
February	31,200
March	24,400
April	20,800
May	19,600

Inventory of Finished goods at the end of every month is to be equal to 25% of sales estimate for the next month. On 1st January, 2023 there were 5,400 units of product on hand. There is no work-in-progress at the end of any month.

Every unit of product requires two types of materials in the following quantities and rates:

Material L 4 kg @ ₹ 3 each

Material N 5 kg @ ₹ 2 each

Materials equal to one half of the requirement of next month's production are to be in hand at the end of every month. This requirement was met on 1st January, 2023

Prepare the following budgets for the quarter ending 31st March, 2023

(a) Production Budget (Quantitative)

(b) Material Purchase Budget (Quantitative)

Solution:

AGRO Food Products Ltd.

Production Budget (in units) for Quarter Ending 31st March, 2023

Particulars	January	February	March	Total
Sales	21,600	31,200	24,400	
Add: Closing Stock	7,800	6,100	5,200	
	29,400	37,300	29,600	
Less: Opening Stock	5,400	7,800	6,100	
Total	24,000	29,500	23,500	77,000

Material requirement Budget for the Quarter ending 31st March, 2023.

Particulars	January	February	March
Production (Units)	24,000	29,500	23,500
Material L			
	Kg.	Kg.	Kg.
Required for Production	96,000	1,18,000	94,000
Add: Desired Closing Stock	59,000	47,000	41,000
	1,55,000	1,65,000	1,35,000
Less: Opening Stock	48,000	59,000	47,000
	1,07,000	**1,06,000**	**88,000**
Material L			
Required for Production	1,20,000	1,47,500	1,17,500
Add: Desired Closing Stock	73,750	58,750	51,250
	1,93,750	2,06,250	1,68,750
Less: Opening Stock	60,000	73,750	58,750
	1,33,750	**1,32,500**	**1,10,000**

Working Notes:

1. Production for April in units

Sales		20,800
Add: Closing Stock		4,900
		12,850
Less: Opening Stock		5,200
		20,500

2. Material required for production in April

L: 20,500 X 4 = 82,000 Kgs.

N: 20,500 X 5 = 1,02,500 Kgs.

A. CHOOSE THE CORRECT OPTIONS FROM THE GIVEN OPTIONS:

1. A master budget comprises

a) The budgeted profit and loss account
b) Budgeted cash flow, budgeted profit and loss, budgeted balance sheet
c) Budgeted cash flow
d) Entire sets of budgets prepared

2. Which of the following is normally the most appropriate sequence of events in the preparation of the indicated budgets?

a) Sales budget, cash budget, budgeted balance sheet, production budget
b) Sales budget, cash budget, production budget, budgeted balance sheet
c) Sales budget, production budget, cash budget, budgeted balance sheet
d) Sales budget, production budget, budgeted balance sheet, cash budget

3. One of the following is not a basic element of a budget:

a) Defines the responsibility of each employee
b) Comprehensive plan
c) Expressed in financial terms
d) Future plan for a specified period

4. One of the following is not a basic element of a budget:

a) Defines the responsibility of each employee
b) Comprehensive plan
c) Expressed in financial terms
d) Future plan for a specified period

5. A budget is expressed in

a) Financial terms only
b) Quantitative terms only
c) Both financial and quantitative terms
d) Financial and / or quantitative terms

6. The budget which helps to plan and control cash is

a) Production budget
b) Cash budget
c) Sales budget
d) Flexible budget

7. Which among the following is Cash Receipts?

a) Loans taken
b) Accounts Payables
c) Payments to suppliers
d) Payments to Employees

8. Higher cash and bank balance _____.

a) decreases profitability
b) increases profitability
c) increases operating efficiency
d) decreases operating efficiency

9. Calculate Cash closing balance for the month of March if opening balance Rs. 150,000 , cash sales Rs. 3,20,000 , collection from debtors Rs. 240,000, Total payments Rs. 5,15,000.

a) Rs.195000
b) Rs.200000
c) Rs.186000
d) Rs.397000

10. When a flexible budget is used, a decrease in the actual production level within a relevant range would ___

a) Decrease variable cost per unit
b) Decrease variable costs
c) Increase total fixed costs
d) Increase variable cost per unit

11. The cost of material at 50% capacity is Rs 10,000 and budget is to be prepared at 60%, 90% and 100% of normal capacity. The cost of material at 60% and 90% capacity will be

a) Rs.12000 and Rs.18000
b) Rs.12000 and Rs.20000
c) Rs.11000 and Rs.18000
d) Rs. 10000 and Rs.12000

Correct Answer:

Q.1. – b; 2 - c; 3 - a; 4 – a: 5 – d; 6 – a; 7 – b; 8 – a; 9 – a; 10 – b; 11 – a.

B. State which of the Answers are Correct and which are Incorrect?

1. Flexible budget is appropriate for control of direct materials and direct labour but not selling and administrative expenses.

2. A major disadvantage of static budgets isthat the variances between actual and budget on a static budget result from comparing actual costs at one level of activity to budgeted costs at a different level of activity.

3. Sales budget provide the foundation for a traditional financial control system.

4. Master budget is the basis for preparation of the budgeted profit & loss account and the Budgeted Balance Sheet

5. Expectationis a technique that uses historical data as input to make informed estimates that are predictive in determining the direction of future trends

6. Research and development budget is calculated from the desired ending inventory and the sales forecast

True: Q. 2 , 4

False: Q. 1, 3, 5, 6.

C. Give Brief Answers for the same:

1. Explain the meaning of Budgeting and its various types

2. Give the limitations of budgeting

3. Explain Master Budget

4. Explain Cash Budget and its various types

5. What do you understand by Flexible Budget?

D. Unsolved Sums

1. Venkey's food products Ltd. has prepared the following sales budget for the first five months of 2023:

	Sales Budget (Units)
January	43,200
February	62,400
March	48,800
April	41,600
May	39,200

Inventory of Finished goods at the end of every month is to be equal to 10% of sales estimate for the next month. On 1st January, 2023 there were 10,800 units of product on hand. There is no work-in-progress at the end of any month.

Every unit of product requires two types of materials in the following quantities and rates:

Material L 6 kg @ ₹ 3 each

Material N 7 kg @ ₹ 2 each

Materials equal to 2 times of the requirement of next month's production are to be in hand at the end of every month. This requirement was met on 1st January, 2023

Prepare the following budgets for the quarter ending 31st March, 2023

(a) Production Budget (Quantitative)

(b) Material Purchase Budget (Quantitative)

2. The Expenses Budget for a production of 20,000 units in a factory are furnished as follows:

Particulars	Per Unit (₹)
Material	280
Labour	100
Overheads	80
Fixed Over Heads (₹ 4,00,000)	40
Variable Expenses (Direct)	20
Selling Expenses (15% fixed)	52
Distribution Expenses (10% fixed)	28
Administrative Expenses (₹ 1,00,000) (100% Fixed)	20
Total	620

Prepare a Budget for production of:

5,000 units, 15,000 units and 20,000 units showing variable cost, fixed cost in amount and cost per unit at each level of production.

3.

Prashant Co. Ltd. Wishes to prepare cash budget from May. You are required to prepare a cash budget for the first six months from the following estimated revenue and expenses.

Months	Total Sales	Materials	Wages	Overheads	
	Rs.	Rs.	Rs.	Production	Mktg
				Rs.	Rs.
May	4,00,00,000	1,50,00,000	20,00,000	16,00,000	300000
June	6,00,00,000	1,75,00,000	22,00,000	12,00,000	375000
July	10,00,00,000	2,55,00,000	23,00,000	12,00,000	350000
August	12,00,00,000	4,45,00,000	23,00,000	14,00,000	350000
September	14,00,00,000	5,65,00,000	24,00,000	15,00,000	350000
October	18,00,00,000	7,60,00,000	24,00,000	16,00,000	400000

Cash balance on 1st May was Rs. 10,00,000

A new machine is to be installed at Rs. 2,50,00,000 on credit to be repaid by two equal instalments in July & August.

Rs. 10,00,000 being the amount of second call may be received in July,

1. Period of credit allowed by suppliers is to be two months.

2. Period of credit allowed to customers is to be one month.

3. Delay in payment of Overheads is to be one month.

4. Delay in payment of wages is 30 days

5. Assume cash sales to be 20% of total sales.

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8

OPERATING COSTING – I

Unit Structure

8.0 LEARNING OBJECTIVES

After learning this unit, learner will be able to:

- Understand the key characteristics of service organisations vis-à-vis manufacturing organisations.
- Understand the cost accounting methods used for service organisations.
- Understand the cost units used in different service organisations.
- Apply cost classifications, such as fixed and variable costs, to analyse costs in service organisations
- Calculate the costs for different service organisations.

8.1 INTRODUCTION

Operating costing is also known as service costing. This method is applied in those undertakings which are involved in rendering service rather than in manufacturing products. CIMA defines Operating costing as that form of operation costing which applies where standardized services are provided either by an undertaking or by a service cost centre within an undertaking. Thus, Operating costing is a method of ascertaining the cost of providing or operating a service within or outside the undertaking.

Service organizations are entities that primarily engage in the delivery of intangible products or services rather than tangible goods. Unlike manufacturing or product-oriented businesses, service organizations focus on providing services to meet the needs and demands of their clients or customers. These organizations play a crucial role in various sectors of the economy, including finance, healthcare, education, hospitality, consulting, and more.

Examples of service organizations include banks, insurance companies, healthcare, schools, consulting firms, hotels, and transportation services. The success of service organizations often depends on the quality of the customer experience, effective communication, and the ability to meet or exceed customer expectations.

Key characteristics of service organizations:

The following are the peculiar characteristics of service costing.

1. Intangibility: Services are intangible, meaning they cannot be touched, felt, or seen before they are consumed. This characteristic poses challenges in terms of marketing and quality assurance.

2. Inseparability: Services are often produced and consumed simultaneously. In many cases, the customer is involved in the service delivery process, making the provider and the consumer inseparable during the service encounter.

3. Perishability: Unlike physical goods, services cannot be stored or inventoried for future use. They are perishable in the sense that they must be consumed at the time of production.

8. Heterogeneity: Services are variable and can differ from one service to another. Factors such as the service provider, the customer can influence the quality and nature of the service.

5. Lack of Ownership: Customers do not own services; they are essentially purchasing the benefits or outcomes of the service. This lack of ownership distinguishes services from tangible products.

8.2 APPLICATION OF OPERATING COSTING

Operating costing is generally applied in the following service industries:

a) Transport
b) Hotels
c) Hospitals
d) Colleges
e) Electricity supply companies
f) Water supply companies
g) Gas supply companies
h) Cinema

8.3 COST UNIT IN OPERATING COSTING

It is necessary to decide a suitable cost unit for each type of service industry which will lead to proper determination of cost. The cost unit used in operating cost is to be computed after considering all the technical and other factors affecting the operating cost. A cost unit under operating costing may be of two types as follows:

8.3.1 Simple Cost Unit: A cost unit is said to be simple cost unit when only one cost unit is used.For example:

Service Industries	Cost Unit
1. Private Transport	Per kilometre, per hour, per trip, per passenger.
2. Water	Per 1000 litres
3. Canteen	Per meal, per person, per staff
4. Educational Institutes	Per student, per course, per batch
5. Bank or financial Institutions	Per service, per transactions
6. Insurance	Per policy, per claim

8.3.2 Composite Cost Unit: A cost unit is said to be composite cost unit when two units are merged into one.For example:

Service Industries	Cost Unit
1. Passenger Transport	Per passenger – km
2. Goods Transport	Per tonne – km
3. Hotel	Per room-days, per room-night, per bed-days
4. Hospital	Per patient–days, per bed–days
5. Electricity supply companies	Per kilowatt-hour
6. Cinema or Theater	Per ticket - show

8.4 COSTING OF TRANSPORT SERVICES

8.4.1 Introduction:

Transport costing is a method of ascertaining the cost of providing service by a transport undertaking. Transport undertakings include goods transport and passenger transport organisations.

8.4.2 Objectives:

The objectives of Transport costing are as follows:

a) To ascertain the operating cost of running a vehicle.
b) To determine a fare for carrying passenger or goods for a certain distance.
c) To fix hire charges where vehicles are given on hire.

8.4.3 Practical steps involved in Transport costing:

1. **Selection of cost unit:** Select the cost unit as follows:

Service Industry	Cost unit	Meaning
Passenger Transport	Passenger – km	Cost of carrying one Passenger for a distance of one Kilometre.
Goods Transport	Tonne – km	Cost of carrying one Tonne for a distance of one Kilometre.

2. Calculation of Cost Unit:

a. Passenger – Km = Passengers actually carried x Distance x No. of trips x Days x No of vehicles

b. Tonne – Km = Weight actually carried (tonnes) x Distance x No. of trips x Days x No of vehicles

c. Total Kilometres = Distance x No. of trips x Days x No of vehicles

3. Classification of cost:

A) **Standing charges or Fixed costs:** These are costs which remains constant irrespective of the distance travelled.

- Salary to Driver, Conductor and Cleaners (if paid on monthly basis).
- Salary of Manager, Accountant and other administrative staff.
- Garage rent
- Depreciation (if related to time period)
- License fees
- Insurance
- Taxes
- Administration expenses
- Any other fixed cost identified

B) **Running costs or Variable costs:** These are costs which varies according to the distance travelled.

- Petrol and Diesel
- Lubricant Oil & Grease
- Wages of Driver, Conductor and Cleaners (if paid on the basis of kilometres travelled).
- Depreciation (if relatedtokilometres)
- Any other variable cost identified

C) **Maintenance costs or Semi-variable Cost:** These costs include the following:

- Repairs and maintenance
- Tyres and tubes
- Spare parts

4. Preparation of Operating Cost Sheet

Format of Transport Operating Cost Sheet:

Cost Sheet for a Month/Year

Particulars	**Amount (In Rs.)**	**Amount (In Rs.)**
A. Standing charges or Fixed costs		
1. Salary to Driver, Conductor and Cleaners	xxx	
2. Salary of Manager, Accountant etc.	xxx	
3. Garage rent	xxx	
4. Depreciation	xxx	
5. License fees	xxx	
6. Insurance	xxx	
7. Taxes	xxx	
8. Administration expenses	xxx	
9. Other fixed cost	xxx	xxx
B. Running costs or Variable costs		
1. Petrol and Diesel	xxx	
2. Lubricant Oil & Grease	xxx	
3. Wages of Driver, Conductor and Cleaners	xxx	
4. Depreciation (on kilometres)	xxx	
5. Other variable cost	xxx	xxx
C. Maintenance costs or Semi-variable Cost		
1. Repairs and maintenance	xxx	
2. Tyres and tubes	xxx	
3. Spare parts	xxx	xxx
Total Operating Cost (A + B + C)		xxx
Add: Profit / Loss		xxx
Total Revenue / Total Takings		xxx

5. Calculation of Cost/Fare per passenger km/per tonne km

- Cost per passenger-Km = Total Operating Cost / Total Passenger – kms
- Cost per Tonne-Km = Total Operating Cost / Total tonne – Kms
- Fare/Rate per Passenger - Km = Total Revenue / Total Passenger – kms
- Fare/Rate per tonne - Km = Total Revenue / Total tonne – kms

8.5 COSTING OF HOTELS AND LODGES

8.5.1 Introduction

Hotel costing is a method of ascertaining the cost of providing services by a hotel. Hotels run on commercial basis. Hence, it is important to ascertain the cost, so as to fix the price of various services provided by the hotel and also to find out the profit or loss at the end of a particular period.

8.5.2 Objectives

The objectives of hotel costing are as follows:

a) To ascertain the operating cost of running a hotel.

b) To determine the room rent to be charged.

8.5.3 Cost unit in hotel industry

Service Industry	**Cost unit**	**Meaning**
Hotel	Room – Days	Charges of one room for one day
Dormitory	Bed – Days	Charges of one bed one day

8.5.4 Calculation of Cost Unit:

Room-Days = No. of Rooms x Occupancy Rate x No. of days

Bed – Days = No. of Beds x Occupancy Rate x No. of days

8.5.5 Preparation of Operating Cost Sheet

Format of Hotel Operating Cost Sheet:
Cost Sheet for a Year

Particulars	**Amount (In Rs.)**	**Amount (In Rs.)**
Staff Salaries		xxx
Room Attended Wages		xxx
Lighting and Heating		xxx
Power		xxx
Repairs and Renovations		xxx
Linen		xxx
Interior Decoration		xxx
Depreciation:		
- on Building	xxx	
- on Furniture and Fixtures	xxx	
- on Air- Conditioners	xxx	
- on Water Heaters	xxx	xxx
Other Administrative charges		xxx
Total Operating		xxx
Add: Profit / Loss		xxx
Total Revenue / Total Hire Charges		xxx

8.5.6 Calculation of Room Rent

- Room Rent = Total Revenue / Total Room-Days
- Bed Charges = Total Revenue / Total Bed - Days

8.6 COSTING OF HOSPITALS

8.6.1 Introduction

Hospital costing is a method of ascertaining the cost of providing various services by a hospital. Hospital provides various medical services to patients. A hospital may have different departments for providing various services to the patients. The different departments that the hospital may have are as follows:

- Out Patient Department (OPD)
- Admitted Patient
- Medical services like X-ray, MRI, Scanning, Pathology etc.
- Catering
- Laundry
- Transport
- Pharmacy

8.6.2 Objectives

The objectives of hospital costing are as follows:

c) To ascertain the operating cost of running a hospital.

d) To determine the charges per bed/ per patient on the basis of operating cost.

8.6.3 Cost unit in hospital

Department	Cost unit
Admitted Patient	Per Bed - Days / Per Room-days
Out Patient	Per OutPatient
Scanning	Per Case
Laundry	Per 100 items laundered
Catering	Per Patient per day

8.6.4 Calculation of Cost Unit:

Room-Days = No. of Rooms x Occupancy Rate x No. of days

Bed – Days = No. of Beds x Occupancy Rate x No. of days

Patient – Days = No. of Patients admitted x No. of days

8.6.5 Classification of Cost

Fixed Cost: Fixed cost relates to a particular period and is not affected by the services provided. For example, rent of hospital building, deprecation on building and equipment, staff salary etc.

Variable Cost: These are the costs that varies with the level of service provided. For example, Medicines supplied to patients, Food supplied to patients, laundry charges, power, Honorarium paid to visiting doctors etc.

8.6.6 Preparation of Operating Cost Sheet

Format of Hospital Operating Cost Sheet:
Cost Sheet for a Year

Particulars	Amount (In Rs.)	Amount (In Rs.)
A. Fixed costs		
1. Staff Salaries	xxx	
2. Building Rent	xxx	

3. Cost of Oxygen, X-ray etc. provided to out patients	xxx	
4. Repairs	xxx	
5. Deprecation	xxx	
on Building	xxx	
on Equipment	xxx	
6. Other Administrative charges	xxx	xxx
B. Variable costs		
1. Honorarium to Doctors	xxx	
2. Food Supplied to Patients	xxx	
3. Medicines	xxx	
4. Laundry	xxx	
5. Extra bed hire charges	xxx	xxx
Total Operating Cost (A + B + C)		xxx
Add: Profit / Loss		xxx
Total Revenue		xxx

1. Calculation of Bed Charges/ Room Charges for patients

- Bed Charges = Total Revenue / Total Bed - Days
- Room Charges = Total Revenue / Total Room - Days

4.7 EXERCISE

8.7.1 Multiple Choice Questions

1. Composite unit is a distinctive feature of _____.

(a) Single Costing
(b) Operating Costing
(c) Process Costing
(d) Job Costing

2. Composite cost unit for a hospital is _____.

(a) Per patient
(b) Per patient-day
(c) Per day
(d) Per bed

3. Cost of diesel and lubricant is an example of:
(a) Variable cost
(b) Fixed cost
(c) Semi-variable cost
(d) None of the above

8. 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

5. 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

6. Operating Costing uses the method of _____ costing when costing a particular trip by a bus.
(a) Process
(b) Standard
(c)Operation
(d) Job

(Answers: 1 – b, 2 – b, 3 – a, 4 – b, 5 – b, 6 – d)

8.7.2 State whether True or False:

1. Operating Costing is also known as Operation Costing.
2. Transport cost of passengers is ascertained with reference to per passenger per kilometre.
3. Operating costing uses the method of Process costing when ascertaining the cost of supply of electricity.
4. For a hospital, the composite cost unit is Room – days.
5. For Goods transport, the composite cost unit is tonne-kms.

(Answer: 1– False, 2 – True, 3 – True, 4 – False, 5 – True)

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9

OPERATING COSTING - II

Unit Structure

9.0 LEARNING OBJECTIVES

After learning this unit, learner will be able to:

- Understand the key characteristics of service organisations vis-à-vis manufacturing organisations.
- Understand the cost accounting methods used for service organisations.
- Understand the cost units used in different service organisations.
- Apply cost classifications, such as fixed and variable costs, to analyse costs in service organisations
- Calculate the costs for different service organisations.

9.1 COSTING OF TRANSPORT SERVICES

Illustration 1:

From the following information calculate total kms and total passesnger kms.

No. of Buses	10
Days operated in a month	25 days
Trips made by each bus	5 trips
Distance of route (one way)	50 kms
Capacity of the Bus	50 passengers
Normal passenger travelling	90% of capacity

Solution:

Total Kms = 50 kms x 2 ways x 5 trips x 25 days x 10 buses

= 1,25,000 kms

Total Passenger Kms = Passengers actually carried x Distance x No. of trips x Days x No of vehicles

= (50 pass. x 90%) x 50 kms x 2 ways x 5 trips x 25 days x 10 buses

= 56,25,000 passenger - kms

Illustration 2:

A truck owner provides the following information:

Capacity of the truck	10tonnes
Distance covered each way	40 kms
No. of round trips per day	4
No. of days operated in a month	25 days
Operating cost of a truck for a month	Rs. 2,00,000

On outward trip, freight is available to the extent of 80% capacity and on return 20% of capacity.

You are required to calculate:

i. Tonne – kms per month
ii. Operating cost per tonne km
iii. Rate per tonne -km to be charged so as to earn a profit of 50% on freight.
iv. Freight earned per outward trip
v. Freight earned per return trip

Solution:

Operating cost statement

Particulars	**Rs.**
Total Operating cost	2,00,000
Add: Profit (50% on Freight or 100% on cost)	2,00,000
Total Freight	**4,00,000**

i. Total tonne kms

Outward journey	10 tonnes x 80% x 40 kms x 4 trips x 25 days	32,000
Return journey	10 tonnes x 20% x 40 kms x 4 trips x 25 days	8,000
Total tonne kms		**40,000**

ii. Operating cost per tonne km= Total Operating Cost / Total tonne kms
= 2,00,000 / 40,000
= Rs. 5

iii. Rate per tonne -km = Total Freight/ Total tonne kms

= 4,00,000 / 40,000

= Rs. 10

iv. Freight earned per outward trip = Rs. 10 x (10 tonnes x 80%) x 40 kms
= Rs. 3,200

v. Freight earned per return trip = Rs. 10 x (10 tonnes x 20%) x 40 kms

= Rs. 800

Illustration 3:

Mr. Karodimal owns a fleet of Taxis and the following information is available from the records maintained by him.

Number of taxis	10
Cost of each taxi	Rs. 7,50,000
Salary of office staff	Rs. 15,000 p.m.
Salary of garage staff	Rs. 20,000 p.m.
Drivers Salary (per taxi)	Rs. 10,000 p.m.
Rent of garage	Rs. 4,000 p.m.
Road tax (per taxi)	Rs. 1,600 p.m.
Repairs (per taxi)	Rs. 1,000 p.m.
Insurance premium	Rs. 4% of cost p.a.

The life of a taxi is 3,00,000 kms and at the end of which it is estimated to be sold at Rs. 1,50,000. A taxi runs on an average 4,000 kms per month of which 20% it runs empty. Petrol consumption is 25 km. per litre of petrol costing Rs. 105 per litre. Oil and other sundry expenses amount to Rs. 100 per 100 km.

Calculate the effective cost of running a taxi per km. If the hire charges are Rs. 21 per Km. Find out the profit Mr. Karodimal expects to make in the first month of operation.

(M.com. May 2018, adapted)

Solution:

Statement of Operating Cost of 10 Taxis per month

Particulars	**Rs.**	**Rs.**
A. Fixed Cost		
Salary of office staff	15,000	
Salary of garage staff	20,000	
Drivers Salary (10,000 x 10)	1,00,000	
Rent of garage	4,000	
Road tax (1,600 x 10)	16,000	
Insurance premium (7,50,000 x10 x 4%) / 12	25,000	1,80,000
B. Variable Cost		
Depreciation (W.N.3)	80,000	
Petrol (W.N.4)	1,68,000	
Oil & other sundry expenses (W.N.5)	40,000	2,88,000
C. Maintenance cost		
Repairs (1,000 x 10)		10,000
Total Operating Cost		4,78,000
Add: Profit (Balancing Figure)		1,94,000
Total Revenue (32,000 kms x Rs. 21)		6,72,000

Effective cost of running a taxi per km. = Total Operating Cost / Total Effective Kms

= 4,78,000 / 32,000

= Rs. 14.9375

Working Notes:

1. Total Kms covered by 10 taxis in a month = 4,000 kms x 10 taxis = 40,000 kms

2. Total effective Kms (with passengers) covered by 10 taxis in a month = 40,000 kms x 80%
   = 32,000 kms

3. Depreciation of 10 taxis = [(Asset Value – Scrap Value) / life in Kms] x Total kms covered
   = [(7,50,000 – 1,50,000)/ 3,00,000 kms] x 40,000 kms
   = Rs. 80,000

4. Petrol cost = (Total Kms / Vehicle average per litre) x Rate per km
   = (40,000 kms / 25 km per litre) x Rs. 105
   = Rs. 1,68,000

5. Oil & other sundry expense = (Rs 100 / 100 kms) x 40,000 kms = Rs. 40,000

Illustration 4:

Ramesh Automobiles distributes its goods to regional dealer using a single lorry. The dealer's premises are 40 km. away by road. The lorry has a capacity of 10 tones and makes the journey twice a day fully loaded on the outward journeys and empty on return journey. The following information is available for a four-weekly period.

During the year 2023:

Petrol Consumption	8 km. per liter
Petrol Cost	Rs.103 per liter
Oil	Rs.1,000 per week
Driver's Wages	Rs.4,000 per week
Repairs	Rs.1,000 per week
Garage Rent	Rs.1,500 per week
Cost of lorry (excluded tires)	Rs.24,50,000
Life of lorry	1,60,000 km.
Insurance	Rs.26,000 per annum
Cost of tires	Rs.25,000
Life of tires	25,000 km.
Estimated sale value of lorry at end of its life	Rs.4,50,000
Vehicle License Cost	Rs.13,000 per annum
Other Overhead Cost	Rs. 1,56,000 per annum

The lorry operates on a five days week.

Required:

(A) A statement to show the total cost of operating the vehicle for the four-weekly period analyzed into running costs and fixed costs.

(B) Calculate vehicle cost per kilometer and per tones kilometer.

(M. Com April 2011, adapted)

Solution:

Statement of Operating Cost for four weeks

Particulars	Rs.	Rs.
A. Fixed Cost		
Garage Rent (1,500 x 4)	6,000	
Insurance (26,000 /52) x 4	2,000	
Vehicle License Cost (13,000/52) x 4	1,000	
Other Overhead Cost (1,56,000/52) x 4	12,000	21,000
B. Variable Cost		
Petrol Cost (W.N.3)	41,200	
Oil (1,000 x 4)	4,000	
Driver's Wages (4,000 x 4)	16,000	
Depreciation of Lorry (W.N.4)	40,000	1,01,200
C. Maintenance Cost		
Depreciation of tyre (W.N.5)	3,200	
Repairs (1,000 x 4)	4,000	7,200
Total Operating Cost		1,29,400

1. Cost per Km = Total Operating Cost / Total Kms

   = 1,29,400 / 3,200

   = Rs. 40.4375

2. Cost per tonne km= Total Operating Cost / Total tonne kms

   = 1,29,400 / 16,000

   = Rs. 8.0875

Working Notes:

1. Total Kms= 40 kms x 2 ways x 2 trips x 5 days x 4 weeks = 3,200 kms
2. Total tonne kms

Outward journey	10 tonnes x 40 kms x 2 trips x 5 days x 4 weeks	16,000
Return journey	0 tonnes x 40 kms x 2 trips x 5 days x 4 weeks	NIL
Total tonne kms		**16,000**

3. Petrol Cost = (Total Kms / Vehicle average per litre) x Rate per km

= (3,200 kms / 8 km per litre) x Rs. 103

= Rs. 41,200

4. Depreciation of lorry = [(Asset Value – Scrap Value) / life in Kms] x Total kms covered
= [(24,50,000 – 4,50,000) / 1,60,000 kms] x 3,200 kms
= Rs. 40,000

5. Depreciation of Tyres = [(Asset Value – Scrap Value) / life in Kms] x Total kms covered
= [(25,000 – nil) / 25,000 kms] x 3,200 kms
= Rs. 3,200

Illustration 5:

Transport Company supplies the following details in respect of a truck of 5-tonne capacity.

Cost of truck	Rs.27,00,000
Estimated Life	10 Years
Diesel, Oil, Grease, etc.	Rs. 450 per trip each day
Repairs and Maintenance	Rs.15,000 per month
Driver's Wages	Rs.15,000 per month
Cleaner's Wages	Rs. 7,500 per month
Insurance	Rs.48,000 per year
Tax	Rs.24,000 per year
General Supervision Charges	Rs.48,000 per year

The truck carries goods to and from the city covering a distance of 50 kms each way.

On outward trip, freight is available to the extent of full capacity and on return trip20% of capacity.

Assume that the truck runs on an average of 25 days a month.

Work out:

(a) Operating cost per tonne-km, and

(b) Rate per tonne per trip that the company should charge if a profit of 50% on freight is to be earned.

Solution:

Statement of Operating Cost per truck

Particulars	Rs.	Rs.
A. Fixed Cost		
Driver's Wages	15,000	
Cleaner's Wages	7,500	
Insurance (48,000 / 12)	4,000	
Tax (24,000 / 12)	2,000	
General Supervision Charges (48,000 / 12)	4,000	
Depreciation (27,00,000 / 10) x 1/12	22,500	55,000
B. Variable Cost		
Diesel, Oil, Grease, etc. (Rs 450 x 2 x 25 days)		22,500
C. Maintenance Cost		
Repairs and Maintenance		15,000
Total Operating Cost		92,500
Add: Profit (50% on Freight or 100% on Cost)		92,500
Total Revenue (Freight)		1,85,000

Freight rate per tonne km = Total Revenue / total tonne kms

= 1,85,000 / 7,500

= Rs. 24.67

Total Freight Charged

Freight Charged per trip for an outward journey	Rs. 24.67 x 5 tonnes x 50 kms	Rs. 6,167.50
Freight Charged per trip for return journey	Rs. 24.67 x 1 tonne x 50 kms	Rs. 1,233.50
Total Freight per trip for both ways		**Rs. 7,401**

Working Notes:

1. Total tonne kms

Outward journey	5 tonnes x 50 kms x 25 days	6,250
Return journey	1 tonne x 50 kms x 25 days	1,250
Total tonne kms		7,500

Illustration 6:

Mahi Transport Company operates a luxury bus which runs between Delhi and Jaipur and back for 10 days in a month. The distance from Delhi and Jaipur is 270 Kms. The bus completes the trip from Delhi and Jaipur and back on the same day. The bus goes another 10 days in a month to Agra and the distance covered being 180 Kms. The trip is also completed on the same day. For the rest of 4 days, it runs in the local city. Daily distance covered in local city is 65 kms.

The other particulars are given below:

Cost of Bus	Rs.15,00,000
Depreciation	15% per annum
Salary of Driver	Rs.9,000 per month
Salary of Conductor	Rs.8,000 per month
Salary of part time Accountant	Rs.4,500 per month
Insurance	Rs. 10,800 per quarter
Diesel	Rs. 49 per litre
Distance covered per litre	5 kms
Token Tax	Rs. 8,100 per quarter
Lubricant Oil	Rs. 300 per 100 kms
Repairs and Maintenance	Rs. 8,000 per month
Permit Fees	Rs. 13,050 per quarter
Normal capacity	50 passengers

The bus is generally occupied 90% of the capacity when it goes to Jaipur and 80% when it goes to Agra. It is always full when it runs within the city. Passenger tax is 25% of the fare.

Calculate the rate the company should charge a passenger when it wants to earn a profit of 33 1/3% on its revenue.

(M.com, Jan 2019, adapted)

Solution:

Statement of Operating Cost for a Month

Particulars	Rs.	Rs.
A. Fixed Cost		
Salary of Driver	9,000	
Salary of Conductor	8,000	
Salary of part time Accountant	4,500	
Insurance (10,800 / 3)	3,600	
Token Tax (8,100 / 3)	2,700	
Permit Fees (13,050 / 3)	4,350	
Depreciation (15,00,000 x 15% x 1/12)	18,750	50,900
B. Variable Cost		
Diesel (W.N.3)	90,748	
Lubricant Oil (W.N.4)	27,780	1,18,528
C. Maintenance Cost		
Repairs and Maintenance		8,000
Total Operating Cost		1,77,428
Add: Profit (33 1/3% on revenue or 50% on Cost)		88,714
Total Net Takings		2,66,142
Add: Passenger Tax (2,66,142 x 25%)		66,536
Total Takings		3,32,678

Rate Per Passenger- Km = Total Revenue / Total Passenger – kms

= 3,32,678 / 4,00,000

= Rs. 0.832

Ticket Charges per Passenger

Delhi – Jaipur	Rs. 0.832 x 270 Kms	Rs. 225
Delhi – Agra	Rs. 0.832 x 180 Kms	Rs. 150
Local City	Rs. 0.832 x 65 Kms	Rs. 54

Working Notes:

1. Total distance covered in a month

Delhi – Jaipur	270 kms x 2 ways x 10 days	5,400 kms
Delhi – Agra	180 kms x 2 ways x 10 days	3,600 kms
Local City	65 kms x 4 days	260 kms
Total Distance		**9,260 kms**

2. Total Passenger – Kms

Delhi – Jaipur	(50 pass x 90%) x 5,400 kms	2,43,000
Delhi – Agra	(50 pass x 80%) x 3,600 kms	1,44,000
Local City	50 pass x 260 kms	13,000
Total Passenger - Kms		**4,00,000**

3. Diesel cost = (Total Kms / Vehicle average per litre) x Rate per km
= (9,260 km / 5 kmper litre) x Rs. 49
= Rs. 90,748

4. Lubricant Oil = (Rs 300 / 100 kms) x 9,260 kms = Rs. 27,780

Illustration 7:

From the following information, calculate room days of a hotel:

Number of Rooms	200
Occupancy rate	80%
No. of days in a month	30
No. of working months in a year	8

Solution:

Room-Days = No. of Rooms x Occupancy Rate x No. of days

= 200 x 80% x (30 days x 8 months)

= 38,400 room days.

Illustration 8:

From the following information, calculate what rent should be charged for each type of suits:

Single Room Days	10,260
Double Room Days	4,560
Three Room Days	1,860
Total Room Rent Revenue	Rs. 12,49,200

Rent of a single room to be fixed as $2/3^{rd}$ of rent of double room suite. Rent of double room suit is to be fixed as $3/4^{th}$ of the rent of three-room suite.

Solution:

Let the Room rent of Three-room suite be Rs. X

Rent of Double room suite = $3/4^{th}$ of X = 3X/4

Rent of Single room suite = $2/3^{rd}$ of 3X/4 = X/2

Single room revenue + Double room revenue + Three room revenue = Total Revenue

(X/2 x 10,260) + (3X/4 x 4,560) + (X x 1,860) = 12,49,200

5,130X + 3,420X + 1,860X = 12,49,200

10,410X= 12,49,200

X = 12,49,200 / 10,410

X = Rs. 120

Three Room Rent = Rs. 120

Double Room Rent = 3X/4 = 3x120/4 = Rs. 90

Single Room Rent = X/2 = 120/2 = Rs. 60

Illustration 9:

From the following information relating to a hotel, calculate the room rent to be charged to give a profit of 25% on cost excluding interest:

(1) Salaries to Staff Rs.1,80,000 p.a.

(2) Wages of the room attendant Rs.20 per day. There is a room attendant for each room. He is paid wages when the room is occupied.

(3) Lightening, heating and power –

(a) The normal lightening expenses for a room for the whole month is Rs.500, when occupied.

(b) Power is used only in winter and the charges are Rs.200 per month for a room, when occupied.

(4) Repairs to building Rs.20,000 p.a.

(5) Linen etc. Rs.6,000 p.a.

(6) Sundries Rs.8,000 p.a.

(7) Interior decoration and furnishing Rs.20,000 p.a.

(8) Depreciation @ 5% is to be charged on building costing Rs.4,00,000 and on equipment at 10% p.a.

(9) Interest to be charged @ 20% on investment in buildings and equipment amounting to Rs.5,00,000.

(10) There are 100 rooms in the hotel. 80% of the rooms are generally occupied in summer and 30% in winter.

The period of summer and winter may be considered to be of 6 months in each case. A month may be assumed to be 30 days.

Solution:

Statement of Operating Cost for a Year

Particulars	Rs.
Salaries to Staff	1,80,000
Room attendant wages	3,96,000
Lighting, Heating and Power	3,66,000
Repairs to building	20,000
Linen	6,000
Sundries	8,000
Interior decoration and furnishing	20,000
Depreciation on Building (4,00,000 x 5%)	20,000
Depreciation on Equipment (1,00,000 x 10%)	10,000
Total Cost excluding Interest	**10,26,000**
Interest on Investment (5,00,000 x 20%)	1,00,000
Total Operating Cost	**11,26,000**
Add: Profit (25% on 10,26,000)	2,56,500
Total Revenue	**13,82,500**

Room Rent = Total Revenue / Total Room Days

= 13,82,500 / 19,800

= Rs. 70 (approx.)

Working Note:

1. Room Days

Summer	100 rooms x 80% x 30 days x 6 months	14,400
Winter	100 rooms x 30% x 30 days x 6 months	5,400
Total Room Days		**19,800**

2. Room Attended Wages = Rs 20 x 19,800 room days = 3,96,000

3. Lighting, Heating and Pow

Lighting		
Summer	Rs. 500 x 100 rooms x 80% x 6 months	2,40,000
Winter	Rs. 500 x 100 rooms x 30% x 6 months	90,000
Total lighting		**3,30,000**
Power		
Winter	Rs. 200 x 100 rooms x 30% x 6 months	**36,000**
Total		**3,66,000**

Illustration 10:

A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs. 50,000 per month along with 5% of total takings. It has three types of suites for its customers, viz, single room, double rooms and triple rooms.

Following information is given:

Types of Suits	**Number**	**Occupancy Rate**
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suit is to be fixed at 2.5 times of the single room suits and that of triple rooms suit as twice of the double room suite.

The other expenses for the year 2023 are as follows:

Particulars	**Rs.**
Staff salaries	71,25,000
Room attendants Wages	22,50,000
Lighting, heating and power	10,75,000
Repairs and renovation	6,17,500
Laundry charges	4,02,500
Interior decoration	3,70,000
Sundries	7,65,000

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.

Solution:

Statement of Operating Cost for a Year

Particulars	Rs.
Staff salaries	71,25,000
Room attendants Wages	22,50,000
Lighting, heating and power	10,75,000
Repairs and renovation	6,17,500
Laundry charges	4,02,500
Interior decoration	3,70,000
Sundries	7,65,000
Building rent (fixed component)) (50,000 x 12)	6,00,000
Total Cost excluding Building rent (variable Component)	**1,32,05,000**
Add: Building rent (Variable) 5% of takings	8,80,334
Total operating Cost	**1,40,85,334**
Add: Profit 20% of takings	35,21,333
Total Takings	**1,76,06,667**

Working note:

1. Room Days

Single room	100 rooms x 100% x 360 days	36,000
Double rooms	50 rooms x 80% x 360 days	14,400
Triple rooms	30 rooms x 60% x 360 days	6,480

2. Calculation of Building rent (variable component) and profit for the year:

Let the total takings be Rs. X

Building rent (variable) = 5% of takings

= 0.05X

Profit = 20% of takings

= 0.2X

Total Cost excluding Building rent (V) + Building rent (V) + Profit =

Total Takings

$1,32,05,000 + 0.05X + 0.2X = X$

$1,32,05,000 + 0.25X = X$

$1,32,05,000 = X - 0.25X$

$1,32,05,000 = 0.75X$

$X = 1,32,05,000/0.75$

$= 1,76,06,667$

3. **Calculation of Room Rent:**

Let the Room rent of Single room suite be Rs. X

Rent of Double room suite = 2.5 times of X = 2.5X

Rent of Three-room suite = 2 times of 2.5X = 5X

Single room revenue + Double room revenue + Three room revenue = Total Revenue

(X x36,000) + (2.5X x 14,400) + (5X x 6,480) = 1,76,06,667

36,000X + 36,000X + 32,400X = 1,76,06,667

1,04,400X= 1,76,06,667

X = 1,76,06,667 / 1,04,400

X = Rs. 168.65

Single Room Rent = Rs. 168.65

Double Room Rent = 2.5X = 2.5 x 168.65 = Rs. 421.625

Three Room Rent = 5X = 5 x 168.65= Rs. 843.25

9.3 COSTING OF HOSPITALS

Illustration 11:

New Era Health Care Centre consists of 100 beds. The hospital is open for 360 days in a year. For 200 days the unit has the full capacity of 100 patients per day and for the balance 160 days, it has an average of 50 beds only occupied per day.

Following are the expenses:

Particulars	**Rs.**
Rent	75,000 p.m.
Repairs and Maintenance	50,000
Food supplied to patients	1,40,000
Laundry Charges	1,80,000
Medicines	1,60,000
Staff Salaries:	
- 2 supervisors (each salary)	10,000 p.m.
- 4 nurses (each salary)	10,000 p.m.
- 2 ward boys (each salary)	5,000 p.m.
Other fixed expenses	7,30,000

The unit engaged two expert doctors from outside to attend the patients and the fees were paid to each of them on an average of Rs. 50,000 per month. Fees for the expert doctors are paid on the basis of number of patients attended by them.

You are required to calculate charge per day per patient to earn profit of 50% on total revenue.

Solution:

Statement of Operating Cost for a Year

Particulars	Rs.
A. Fixed Costs	
1. Rent (75,000 x 12)	9,00,000
2. Repairs and Maintenance	50,000
3. Other fixed expenses	7,30,000
4. Supervisors Salary (10,000 x 12 x 2)	2,40,000
5. Nurses Salary (10,000 x 12 x 4)	4,80,000
6. Ward Boys Salary (5,000 x 12 x 2)	1,20,000
Total fixed cost	**25,20,000**
B. Variable Costs	
1. Food supplied to patients	1,40,000
2. Laundry Charges	1,80,000
3. Medicines	1,60,000
4. Doctors Fees (50,000 x 12 x 2)	12,00,000
Total Variable Cost	**16,80,000**
Total operating Cost	**42,00,000**
Add: Profit 50% of Revenue or 100% on Cost	42,00,000
Total Revenue	**84,00,000**

1. Patient Days = (100 patients x 200 days) + (50 patients x 160 days)
   = 20,000 + 8,000
   = 28,000 patient days.

2. Charges per patient day = Total revenue / Total patient days
   = 84,00,000 / 28,000
   = Rs. 300

Illustration 12:

A Company runs a Medical Health Care Centre. For this purpose, it has hired a building at a rent of Rs. 1,00,000 per month. Health centre has three types of wards for its patients namely, General ward, Semi-Deluxe ward and Deluxe ward.

State the rent to be charged per bed-day for different types of wards on the basis of the following information:

1. The number of beds of each type are General ward 100, Semi-Deluxe ward 50, Deluxe ward 30.

2. The rent of Semi-deluxe ward bed is to be fixed at 2.5 times of the General ward bed and that of Deluxe ward bed as twice of the Semi - deluxe ward bed.

3. The occupancy of each type of ward is as follows:

   General ward 100%, Semi-deluxe ward 80% and Deluxe ward 60%. But in general ward there were occasions when beds were full and extra beds were hired at a charge of Rs. 200 per bed. The total hire charges for the extra beds incurred for the whole year amount to Rs. 1.20,000.

4. The health Centre engaged specialist doctorsfrom outside and on an average fee paid to them was Rs.1,50,000 per trip. Theymake three trips in the whole year.

5. The other expenses for the year were as under:

Particulars	Rs.
Salary of Supervisors, Nurses and Ward boys	42,50,000
Repairs and maintenance	9,00,000
Salary of doctors	1,35,00,000
Food supplied to patients	4,00,000
Laundry charges	8,05,000
Medicines supplied	7,40,000
Cost of oxygen, X-ray etc other than directly borne for treatment of patients	4,95,000
General Administration charges	6,30,000

6. Provide Profit @ 20% on total revenue

.

7. A year may be taken as 360 days.

Solution:

Statement of Operating Cost for a Year

Particulars	Rs.
A. Fixed Costs	
Salary of Supervisors, Nurses and Ward boys	42,50,000
Repairs and maintenance	9,00,000
Salary of doctors	1,35,00,000
Cost of oxygen, X-ray etc	4,95,000
General Administration charges	6,30,000
Building Rent (1,00,000 x 12)	12,00,000
Total fixed cost	2,09,75,000
B. Variable Costs	
Food supplied to patients	4,00,000
Laundry charges	8,05,000
Medicines supplied	7,40,000
Extra bed hire charges	1,20,000
Fees of Visiting doctors (1,50,000 x 3)	4,50,000
Total Variable Cost	25,15,000
Total operating Cost	2,34,90,000
Add: Profit 20% of Revenue or 25% on Cost	58,72,500
Total Revenue	2,93,62,500

Working note:

1. Bed Days

General Ward	100 beds x 100% x 360 days	36,000
Extra General Ward beds days	Total Hire charges / extra bed charges per bed 1,20,000 / 200	600
Semi – Deluxe	50 beds x 80% x 360 days	14,400
Deluxe	30 rooms x 60% x 360 days	6,480
Total Bed days		**57,480**

2. **Calculation of Room Rent:**

Let the Charges of General ward be Rs. X

Charges of Semi-deluxe ward = 2.5 times of X = 2.5X

Charges of Deluxe ward = 2 times of 2.5X = 5X

General ward revenue + Semi-deluxe ward revenue + Deluxe ward revenue = Total Revenue

(X x 36,600) + (2.5X x 14,400) + (5X x 6,480) = 2,93,62,500

36,600X + 36,000X + 32,400X = 2,93,62,500

1,05,000X= 2,93,62,500

X = 2,93,62,500 / 1,05,000

X = Rs. 279.65

General Ward Charges per bed day = Rs. 279.65

Semi-deluxe ward charges per bed day = 2.5X = 2.5 x 279.65 = Rs. 699.125

Deluxe ward charges per bed day = 5X = 5 x 279.65= Rs. 1,398.25

9.4 EXERCISE

1. Mr. Sanman Singh owns a bus which runs between Mumbai and Pune and back for 10 days in a month. The distance from Mumbai to Pune is 200 Kms. The bus completes the trip from Mumbai to Pune and back on the same day. The bus goes another 10 days in a month to Ratnagiri and the distance covered being 350 Kms. The trip is also completed on the same day. For the rest of 4 days, it runs in the local city. Daily distance covered in local city is 100 kms.

Calculate the rate Mr. Sanman Singh should charge per trip from passenger when he wants to earn a profit of 50% on cost.

The other particulars are given below:

Cost of Bus	Rs.9,00,000
Depreciation	20% per annum
Salary of Driver	Rs.6,000 per month
Salary of Conductor	Rs.5,000 per month
Salary of Accountant	Rs.2,000 per month
Diesel Consumption	6 kms. per liter costing Rs.8.00 per liter
Tax	Rs.9,600 per annum
Repairs	Rs.3,000 per annum
Normal capacity of the bus	50 passengers

The bus is generally occupied 90% of the capacity when it goes to Pune and 80% when it goes to Ratnagiri. It is always full when it runs within the city.

(M. Com May 1996, adapted)

2. Lalwani Limited is running a mini bus. You are required to calculate a suggested fare per passenger / kilometer from the following details.

Purchase price of bus	Rs.5,00,000
Length of route	40 km
Insurance	Rs.20,000 p.a.
Garage Rent	Rs.10,000 p.a.
Road tax & permit fees	Rs.5,00 p.a.
Repairs & maintenance	Rs.16,000 p.a.
Administrative Charges	Rs.4,000 p.a.
Driver wages	Rs.5,000 p.m.
Conductor wages	Rs.3,000 p.m.
Repairs of tyre-tube	Rs.4,000 p.a.
Diesel & oil per kilometer	Rs.5
Annual Interest on loan	Rs.12,000 p.a.

Effective life of vehicle is estimated at 5 years at the end of which it will have a scrap value of Rs.10,000. Minibus has 25 seats and is planned to make 5 number two-way trips for 25 days per month. Provide profit @ 20% of the total revenue.

(TYBAF Nov, 2016, adapted)

3. A transport company supplies the following details in respect of a truck of 5 tonne capacity which carries goods to and from the city covering a distance of 50 kms each way.

Particulars	Rs.
Cost of truck	18,00,000
Diesel, oil, grease (per trip each way)	300
Repairs and maintenance (per month)	15,000
Driver's (monthly) wages	15,000
Cleaner-cum-attendant's wages (monthly)	7,500
Insurance (per year)	90,000
Road license (per year)	30,000
General Supervision charges (per month)	60,000
Estimated life (years)	10

While going to the city, freight is available for a full load of the truck and on its return journey it can fetch freight only upto 20% of its capacity.

On the assumptions that the trucks run on an average 25 days a month, you are required to determine the following:

(i) Operating cost per tones-km

(ii) Rate per tones per trip that the company should charge if 50 % on cost is to be earned, and

(iii) What freight should the company charge if one wants to engage the truck for one day for a trip to the city and back?

4. A company run 100 rooms hotel in Goa. Hotel business being seasonal, 8 months are peak season months and the remaining 4 months are off-season months. Owner is expecting a profit of 20% on room tariff.

In off-season rooms are occupied at 10% and during peak season 90%.

Annual expenses incurred by hotel owner are as under:

Building	Rs.12,60,000
Furniture Repairs	3,75,000
Permanent Staff Salary	4,75,000
Food Expenses	Rs.3,81,000
Sundry Expenses	Rs.3,00,000

Cost of the Building is Rs.50,00,000 and Furniture is Rs.25,00,000. Provide depreciation at 5% on Building and 10% on Furniture. Temporary Staff is hired in peak season @ Rs.7,000 per month. Hotel requires 20 temporary staff during peak season.

Hotel consumes 12,000 units of electricity during peak season and 9,500 units during off-season. Electricity charges are Rs.4.50 per unit during peak season and Rs.3.50 during off-season.

A month may be assumed of 30 days of an average.

Prepare a statement of Operating Cost and calculate average room tariff

5. From the following information relating to a hotel, calculate the room rent to be charged to give a profit of 25% on cost excluding interest charged on Loan for the year.

1. Salaries of office staff Rs.50,000 per month.

2. Wages of the room attendant: Rs.20 per day per room when the room is occupied

3. Lighting, Heating and Power:

(a) The normal lighting expenses for a room for the full month is Rs.500, when occupied.

(b) Power is used only in winter and the charges are Rs.200 for a room, when occupied.

4. Repairs to Beds and other furniture: Rs.30,000 p.a.

5. Repairs to Hotel building: Rs.50,000 p.a.

6. License fees: Rs.12,400 p. a.

7. Sundries: Rs.10,000 per month

8. Interior decoration and furnishing: Rs.1,00,000 p.a.

9. Depreciation @ 5% p.a. is to be charged on Building costing Rs.20,00,000/- and @ 10% p.a. on Equipment costing Rs. 10,00,000.

10. There are 200 rooms in the Hotel, 80% of the rooms are generally occupied in summer, 60% in winter and 30% in rainy season.

The period of summer, winter and rainy season may be considered to be 4 months in each case.

A month may be assumed of 30 days of an average.

6. A Hospital is run by a Company. For this purpose, it has hired a building at a rent of Rs.50,000 per month.

The Hospital is having 25 beds and 5 more beds can be accommodated when the need arises.

The staff of the hospital is as follows:

1. Supervisors each at a salary of Rs.5,000 per month.

2. Nurses each at a salary of Rs.3,000 per month.

3. Ward boys each at a salary of Rs.1,500 per month.

Although the hospital is open for patients all 365 days in a year, records for the year disclose that only for 120 days in the year, the unit had the full capacity of 25 patients per day and for another 80 days, it had on an average 20 beds only occupied per day. But there were occasions when the beds were full, extra beds were hired at a charge of Rs.50 per bed per day and this did not come to more than 5 beds extra above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year were Rs.20,000.

The Unit engaged expert doctors from outside to attend on the patients and the fees was paid on the basis of number of patients attended and time spent by them which on an average worked out to Rs.1,00,000 per month.

The other expenses for the year were as under:

Repairs and maintenance	Rs. 3,6,000
Food supplied to patients	Rs.4,40,000
Sanitary and Other services for patients	Rs.1,25,000
Laundry Charges	Rs.2,80,000
Medicines supplied	Rs.3,50,000

Cost of oxygen, X – ray etc. other than directly borne for treatment of patients 5,40,000.

General Administration Charges allocated to hospital Rs.49,5,500.

If the hospital recovered an amount of Rs.1,000 per day on an average from each patient, Compute the profit per patient – day made by the hospital as per operating cost sheet for the year.

(M. Com 2006, adapted)