10. MARGINAL COSTING

NO. OF PROBLEMS IN 41.5E OF CA INTER: CLASS ROOM - 20, ASSIGNMENT - 39.

NO. OF PROBLEMS IN 41E OF CA INTER: CLASS ROOM - 29, ASSIGNMENT - 34.

NO. OF PROBLEMS IN 42.5E OF CA INTER: CLASS ROOM - 24, ASSIGNMENT - 25.

MODEL WISE ANALYSIS OF PAST EXAM PAPERS OF IPCC & CA INTER

S. No	MODEL NAME	N - 09	M-10	N-10	M-11	N-11	M-12	N-12	M-13	N-13	M-14	N-14	M-15	N-15	M-16	N -16	M - 17	N - 17	M - 18(O)	M - 18(N)	N - 18(O)	N - 18(N)	M- 19(N)	M- 19(O)	N - 19(0)	N - 19(N)
1.	Marginal Cost Sheet	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5	5
2.	P/V Ratio, BEP, MOS, Profit	2	3	8	-	5	-	-	5	-	5	3	5	5	5	13	8	8	8	15	5	10	-	-	-	-
3.	Shut Down Point	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Indifference Point	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Limiting Factor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Absorption VS. Marginal	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SIGNIFICANCE OF EACH PROBLEM COVERED IN THIS MATERIAL

Problem No. in this material	Problem No. in NEW SM	Problem No. in OLD SM	Problem No. in OLD PM	RTP	MTP	Previous Exams	Remarks
CR 1	-	-	-	-	MAY18(N)	-	
CR 2	ILL-7	ILL-8	-	-	-	-	
CR 3	PQ-7	ILL-10	-	-	-	-	
CR 4	-	-	Q.NO.5	-	-	-	
CR 5	-	-	-	-	-	MAY18(O)	
CR 6	PQ-12	ILL-18	-	-	-	-	
CR 7	PQ-15	ILL-21	-	-	-	-	
CR 8	-	-	Q.NO.19	-	-	NOV15	
CR 9	-	-	-	MAY17	NOV15	-	
CR 10	-	-	Q.NO.9	-	-	NOV-12	
CR 11	-	-	-	-	-	MAY18(N)	
CR 12	-	-	-	-	-	NOV 16	
CR 13	-	-	-	-	-	MAY16	
CR 14	PQ-19	-	-	-	-	-	
CR 15	-	-	-	MAY-19	-	-	
CR 16	-	-	-	-	N-19(N,O)	-	
CR 17	-	-	-	-	N-19(N,O)	-	
CR 18	-	-	-	-	-	N-19(O)	
CR 19	-	-	-	-	-	N-19 (N)	
CR 20	PQ-2	ILL-4	-	-	-	-	
CR 21	PQ-3	ILL-13	-	-	-	-	
CR 22	PQ-18	-	-	-	-	-	
CR 23	-	-	-	-	-	-	
CR 24	PQ-1	ILL-12	-	-	-	-	
ASG 1	PQ-11	ILL-17	-	-	-	-	
ASG 2	PQ-17	ILL-25	-	-	-	-	
ASG 3	-	-	Q.NO.10	-	-	MAY15	
ASG 4	-	-	-	-	-	-	

ASG 5	-	-	-	-	-	-	
ASG 6	-	-	Q.NO.10	-	-	-	
ASG 7	ILL-7	-	-	-	-	-	
ASG 8	-	-	-	-	MAY-14	-	
ASG 9	-	ILL-9	-	-	-	-	
ASG 10	-	-	-	-	M-19	-	
ASG 11	-	-	Q.NO.2	-	-	-	
ASG 12	-	-	-	-	-	-	
ASG 13	PQ-16	ILL-22	-	-	-	-	
ASG 14	-	-	-	-	-	M-19(O)	
ASG 15	PQ-14b	ILL-20b	-	-	-	-	
ASG 16	-	-	-	-	-	-	
ASG 17	ILL-2	-	Q.NO.7	-	-	-	
ASG 18	-	-	-	-	-	-	
ASG 19	-	-	-	-	-	May19(N)	
ASG 20	ILL-6	ILL-24	-	MAY16	-	-	
ASG 21	-	-	Q.NO.15	-	-	NOV14	
ASG 22	-	-	-	-	-	-	
ASG 23	ILL-11	-	-	-	-	-	
ASG 24	ILL-6	ILL-24	-	MAY16	-	-	
ASG 25	-	-	-	-	NOV18(N)	-	

BASIC PRINCIPLE OF THE THEORY OF MARGINAL COSTING

Marginal Cost: Marginal cost as understood in economics is the incremental cost of production which arises due to one-unit increase in the production quantity. Marginal cost is measured by the total variable cost attributable to one unit.

Marginal Costing: It is a costing system where products or services and inventories are valued at variable costs only. It does not take consideration of fixed costs. Costs are classified on the basis of behavior of cost (i.e. fixed and variable)

DETERMINATION OF COST AND PROFIT UNDER MARGINAL COSTING

Cost and Profit Statement under Marginal Costing

Particulars	Amount (Rs.)	Amount (Rs.)
Revenue (A)		**xxx**
Product Cost:		
- Direct Materials	xxx	
- Direct employee (labour)	xxx	
- Direct expenses	xxx	
- Variable manufacturing overheads	xxx	
Product (Inventorial) Costs (B)	xxx	**xxx**
Product Contribution Margin {A - B}		**xxx**
- Variable Administration overheads	XXX	
- Variable Selling & Distribution overheads	XXX	**xxx**
Contribution Margin (C)		**xxx**
Period Cost: (D)		
Fixed Manufacturing expenses	xxx	
Fixed non-manufacturing expenses(Fixed Administrative O.H & Selling and Distribution O.H)	xxx	**xxx**
Profit/ (loss) {C - D}		**xxx**

MARGINAL COST EQUATION: SALES - V.C = CONTRIBUTION = F.C + PROFIT

What do you mean by Contribution?: Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.

CONTRIBUTION(C) = SALES REVENUE(S) - TOTAL VARIABLE COST (V)

What is the relationship between Profit and Contribution?: Once Fixed Costs are fully recovered, such excess Contribution is termed as Profits.

ABSORPTION COSTING

Absorption Costing is a procedure of cost recognition wherein costs are classified on the basis of functions (not based on nature). All costs of production, both Fixed and Variable, are included in inventory valuation. The presentation of profits under Traditional Absorption Costing System is as under:

Income Statement (Absorption costing)

	(Rs.)
Sales	xxxxx
Production Costs:	
Direct material consumed	xxxxx
Direct labour cost	xxxxx
Variable manufacturing overhead	xxxxx
Fixed manufacturing overhead	xxxxx
Fixed manufacturing overhead	xxxxx
Cost of Production	xxxxx
Add: Opening stock of finished goods	xxxxx
(Value at cost of previous period's production)	
	xxxxx
	xxxxx
Less: Closing stock of finished goods (Value at production cost of current period)	xxxxx
Cost of Goods Sold	xxxxx
Add: (or less) Under (or over) absorption of fixed	
Manufacturing overhead	xxxxx
Add: Administration costs XXXXX	
Selling and distribution costs XXXXX	xxxxx
Total Cost	xxxxx
Profit (Sales - Total cost)	xxxxx

DISTINGUISH BETWEEN MARGINAL COSTING AND ABSORPTION COSTING

PARTICULARS	MARGINAL COSTING	ABSORPTION COSTING
Cost Recognition	Only Variable manufacturing OH Costs are considered for product costing & inventory valuation.	Both Fixed and Variable manufacturing OH costs are considered for product costing and inventory valuation.
Classification	Classification of expenses is based on nature, i.e. Fixed and Variable.	Classification of expenses is based on function, i.e. Production, Administration, Selling and Distribution
Fixed Costs	Fixed manufacturing OH Costs are regarded as a Period Cost.	Fixed manufacturing OH Costs are charged to cost of production.
Presentation	Cost data presented highlight the Total Contribution and Contribution of each product.	Cost data are presented on conventional pattern. Net Profit of each product is determined after subtracting Fixed Cost along with their variable costs.
Variance Reporting	In Variance Reporting, FOH Expenditure Variance only can be computed. There is no Volume Variance since Fixed Overheads are not "**absorbed**".	In Variance Reporting, FOH Expenditure and Volume variance can be computed. Volume variance can also be sub - classified into Capacity, Efficiency and Calendar variance.

DECISION MAKING INDICATORS

List the basic decision making indicators in Marginal Costing.

a) Profit Volume Ratio (PV Ratio).
b) Break Even Point (BEP).
c) Margin of Safety. (MOS).
d) Indifference Point.
e) Shut Down Point

PV RATIO

The Profit Volume Ratio (PV Ratio) is the relationship between Contribution and Sales Value (C/S). It is also termed as Contribution to Sales Ratio (CSR).

Alternative Formula: $\text{PV Ratio} = \frac{\text{Change in Contribution}}{\text{Change in Sales}} x100 = \frac{\text{Change in Profit}}{\text{Change in Sales}} x100$

BREAK EVEN POINT (BEP)

1. **Meaning:** It is the level of Sales at which there is neither a Profit nor a Loss to the Firm (Total Revenue = Total Costs). In other words, at this point, the Total Contribution equals Fixed Costs.
2. **Assumption underlying Break Even Analysis:**
   - **a)** Total Costs can be easily **classified** into Fixed and Variable categories.
   - **b)** **Selling Price** per unit remains constant, irrespective of quantity sold.
   - **c)** **Variable Costs** per unit remain constant. However Total Variable Costs increases with increase in output levels.
   - **d)** **Fixed Costs** remain the same irrespective of output.
   - **e)** **Productivity** of the factors of production will remain the same.
   - **f)** The state of **technology**, process of production and quality of output will remain unchanged.
   - **g)** The Company manufactures and sells a single product. In the case of a multi - product Company, the **sales - mix** remains unchanged.

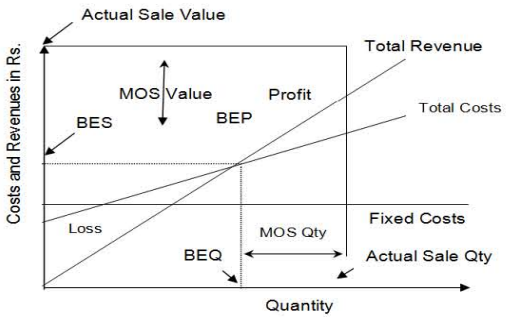
Formula:

a) Break Even Point (in Rs.) $= \frac{\text{Fixed Costs}}{\text{PV Ratio}}$

This is denoted as BES (Break Even Sales Value)

b) Break Even Point (Qty) $= \frac{\text{Fixed Costs}}{\text{Contribution per unit}}$

This is denoted as BEQ (Break Even Quantity)



Significance of BEP: BEP represents the cut off Point for Profit or Loss of the business. At the BEP, the Profit or Loss equals zero. The significance of BEP may be summarized as:

LEVEL OF SALES	IMPACT ON PROFITS
Less than BEP	Firm incurs Losses (Contribution < Fixed Cost)
Equal to BEP	No Profit & No Loss (Contribution = Fixed Cost)
Greater than BEP	Firms earns Profits (Contribution > Fixed Cost)

MARGIN OF SAFETY

It represents the difference between the Sales at Break Even Point and the Total Sales.

Formulae:

a) Margin of Safety (in Rs.) = Total Sales of Less BE Sales (OR) Profit/P V Ratio

b) Margin of Safety (Qty) = Total sales (Q) - BEP (Q) (Or) Profit/Contribution per unit

Significance:

a) Up to BEP, the Contribution earned is sufficient only to recover Fixed Costs. However, beyond the BEP, the Contribution is called Profit (since Fixed Costs are fully recovered by then)

b) Profit is nothing but Contribution earned out of Margin of Safety Sales.

c) The size of the Margin of Safety shows the strength of the business.

d) A low Margin of Safety indicates that the Firm has large Fixed Expenses and is more Vulnerable to changes in Sales.

e) A high Margin of Safety implies that a slight fall in may not affect the business very much.

Improvement in Margin of Safety: The possible steps to improve the Margin of Safety are:

a) Increase in selling Price, provided the demand is inelastic so as to absorb the increase.

b) Reduction in Fixed Expenses.

c) Reduction in Variable Expenses.

d) Increasing the Sales Volume provided capacity is available.

SHUT DOWN POINT

Shut Down Point indicates the level of operations (Sales), below which it is not justifiable to pursue production.

For this purpose, Fixed Costs of a business are classified into - (a) Avoidable or Discretionary Fixed Costs and (b) Unavoidable or Committed Fixed Costs. A Firm has to close down if its Contribution is insufficient to recover even the Avoidable Fixed Costs.

Formulae:

Shut Down Point (in Rs.) $= \frac{\text{Avoidable Fixed Costs}}{\text{P V Ratio}}$

Shut Down Point (Quantity) $= \frac{\text{Avoidable Fixed Costs}}{\text{Contribution per unit}}$

Where Avoidable Fixed Costs = Total Fixed Costs Less Minimum (Unavoidable) Fixed Costs.

INDIFFERENCE POINT

Indifference Point is the level of sales at which Total Costs/Total Profits of two options are equal. The decision maker is indifferent as to option chosen, since both option will result in the same amount of profit/cost.

Formulae:

a) Indifference Point (in Rs.) : $\frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost Ratio}}$ OR $\frac{\text{Difference in Fixed Cost}}{\text{Difference in P V Ratio}}$

b) Indifference Point (in units): $\frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost p. u.}}$ OR $\frac{\text{Difference in Fixed Cost}}{\text{Difference in Contribution p. u.}}$

DISTINGUISH BETWEEN INDIFFERENCE POINT AND BEP

PARTICULARS	INDIFFERENCE POINT	BREAK EVEN POINT
Definition	Indifference Point is the level of Sales at which Total Costs and Profits of two options are equal.	BEP is the level of Sales at which there is neither a Profit nor a Loss to the Firm.
Formula	Indifference Point (in Rs.) $= \frac{\text{Difference in Fixed Cost}}{\text{Diff. in VC Ratio PVR}}$	Break Even Point (in Rs.) $= \frac{\text{Fixed Costs}}{\text{P V Ratio}}$
Significance	It is the activity level at which Total Cost under 2 alternatives are equal.	It is activity level at which the Total Revenue is equal to its Total Cost.
Purpose	Used to choose between two alternative options for achieving the same objective (Decision making)	Used for Profit planning.

KEY FACTOR / LIMITING FACTOR

Key Factor represents a resource whose availability is less than its requirement. It denotes the resource constraint situation it is a factor, which at a particular time or over a period limits the activities of a Firm. It is also called Critical Factor (since it is vital or critical to the Firm's success) and Budget Factor (since budgets are formulated by reference to such limitations or restraints). Some examples are Shortage of Raw Material, Labour Shortage, Restrictions in Plant Capacity, Demand or Sales Expectancy, Cash availability, etc.

In case of Key Factor situation, the procedure for decision-making is as under:

STEP	DESCRIPTION
1	Identify the Key Factor.
2	Compute Total Contribution or Contribution per unit of the product.
3	Compute Contribution Per Unit of the Key Factor, i.e. Contribution per Direct Labour Hour, Contribution per kg of Raw Material, etc.
4	Rank the products based on Contribution per unit of the Key Factor.
5	Allocate the key resources based on Ranks given above

FACTORS TO BE CONSIDERED IN MARGINAL COSTING DECISIONS

a) **Contribution:** Whether the product or option under consideration makes a Contribution or not, is the basic consideration. If there is No Contribution or Negative Contribution, the proposal is not acceptable.

b) **Specific Fixed Cost, if any:** Where a choice is to be made between two courses of action, the additional Fixed Overhead, if any, should be taken into account.

c) **Incremental Contribution:** Where additional quantities can be sold only at reduced prices, Incremental Contribution will be more effective in decision making, as it takes into account the Additional Sale Quantity and Additional Contribution per unit.

d) **Capacity:** Whether acceptance of the incremental order, or additional product line is within the Firm's capacity or whether Key Factor comes into play, should be analysed.

e) **Non-Cost Factors:** Non-Cost Factors should also be considered, wherever applicable.

PROBLEMS FOR CLASSROOM DISCUSSION

MODEL 1: P/V RATIO, BEP, MOS, PROFIT

PROBLEM 1: Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (Rs.)	Profit/Loss (Rs.)
2016-17	4,00,000	15,000 (Loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:

i) Profit Volume Ratio

ii) Fixed Costs

iii) Break Even Point

iv) Sales required to earn a profit of Rs. 45,000

v) Margin of safety in Financial Year 2017-18

(M18 (N)-5M) (ANS.: I. 30%, II. RS.1,35,000, III. RS.4,50,000, IV. 6,00,000, V. RS.50,000)

(SOLVE PROBLEM NO 1, 2, 3 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, If p/v ratio increased by 50% on BEP & MOS.

PROBLEM 2: PQR Ltd. has furnished the following data for the two years:

	2011	2012
Sales	Rs.8,00,000	?
Profit/Volume Ratio (P/V ratio)	50%	37.5%
Margin of Safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 2012 due to the restructuring process. The company could maintain its sales quantity level of 2011 in 2012 by reducing selling price.

You are required to calculate the following:

i) Sales for 2012 in Rs.

ii) Fixed cost for 2012

iii) Break-even sales for 2012 in Rupees. *(NEW SM, OLD SM) (ANS.: I) 6,40,000; II)1,87,500; III)5,00,000)*

(SOLVE PROBLEM NO 4 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question if p/v ratio in 2012 is 40%

Note:_____

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PROBLEM 3: A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period.

	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

Calculate for each factory and for the company as a whole for the period:

(i) The fixed costs. (ii) Break -Even Sales.

(NEW SM, OLD SM) (ANS.:(i) NORTH - 360; EAST - 660; SOUTH - 330; TOTAL FIXED COST -1350; II) BES - 2,500)

(SOLVE PROBLEM NO 5, 6 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, If actual sales of North division is 1500.

Note:_____

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PROBLEM 4: A Company sells two products, J and K. The sales mix is 4 units of J and 3 units of K. The contribution margins per unit are Rs. 40 for J and Rs.20 for K. Fixed costs are Rs. 6,16,000 per month. Compute the break-even point. *(OLD PM) (ANS.: J - 11,200 UTS; K - 8,400 UTS.)*

(SOLVE PROBLEM NO 7 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if fixed cost 7,00,000

Note:_____

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PROBLEM 5: (PRINTED SOLUTION AVAILABLE) A company is producing an identical products in two factories. The following are the details in respect of both factories:

	Factory X	Factory Y
Selling price per unit (Rs.)	50	50
Variable cost per unit (Rs.)	40	35
Fixed cost (Rs.)	2,00,000	3,00,000

Depreciation included in above fixed cost (Rs.)	40,000	30,000
Sales in units	30,000	20,000
Production capacity (units)	40,000	30,000

You are required to determine:

i) Break Even Point (BEP) each factory individually.

ii) Cash breakeven point for each factory individually.

iii) BEP for company as a whole, assuming the present product mix is in sales ratio.

iv) Consequence on profit and BEP if product mix is changed to 2:3 and total demand remain same

(M18 (O)-8M) (ANS.: I. X- 20,000 ,Y-20,000, II. X-16,000 ,Y-18,000, III. 41,667)

(SOLVE PROBLEM NO 8 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if a production capacity are 30000 & 20000 U.

Note:_____

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PROBLEM 6: A single product company sells its products at Rs.60 per unit. In 2013, the company operated at a margin of safety of 40%. The fixed costs amounted to Rs. 3,60,000 and the variable cost ratio to sales was 80%. In 2014, it is estimated that the variable cost will go up by 10% and the fixed costs will increase by 5%.

a) Find the selling price required to be fixed in 2014 to earn the same p/v ratio as in 2013.

b) Assuming the same selling price of Rs. 60 per unit in 2014. Find the number of units required to be produced and sold to earn the same profit as in 2013.

(NEW SM,OLD SM) (ANS.: A) SELLING PRICE = RS. 66; B) 85,834 UTS)

(SOLVE PROBLEM NO 9 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if selling price is Rs. 50

Note:_____

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PROBLEM 7: A company had incurred fixed expenses of Rs. 4,50,000, with sales of Rs. 15,00,000 and earned a profit of Rs. 3,00,000 during the first half year. In the second half, it suffered a loss of Rs. 1,50,000.

Calculate:

i) The profit-volume ratio, break-even point and margin of safety for the first half year.

ii) Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.

iii) The break-even point and margin of safety for the whole year.

(NEWSM, OLD SM) (ANS.: I. 50%, RS.9 LAKHS, RS.6 LAKHS, II. 6 LAKHS, III. RS.18 LAKHS, RS.3 LAKHS)

(SOLVE PROBLEM NO 10 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if expenses are Rs.300000

Note:_____

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PROBLEM 8: A company gives the following information:

Margin of safety	:	Rs. 3,75,000
Total cost	:	Rs. 3,87,500
Margin of safety (Qty)	:	15,000 units
Break even sales in units	:	5,000 units

You are required to calculate:

i) Selling price per unit

ii) Profit

iii) Profit/volume ratio

iv) Break even sales(in Rupees)

v) Fixed cost *(N15 - 5M) (ANS.: (I) RS. 25 (II) RS.1,12,500 (III) 30% (IV)RS.1,25,000 (V)RS.37,500)*

(SOLVE PROBLEM NO 11,12,13 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if total cost were4,00,000

Note:_____

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PROBLEM 9: (PRINTED SOLUTION AVAILABLE) A Company manufactures a product, currently utilising 80% capacity with a turnover of Rs. 8,00,000 at Rs. 25 per unit. The cost data are as under:

Material cost Rs. 7.50 per unit, Labour cost Rs. 6.25 per unit Semi-variable cost (Including variable cost of Rs. 3.75) per unit Rs.1, 80,000. Fixed cost Rs. 90, 000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

Calculate:

i) Activity level at Break-Even-Point

ii) Number of units to be sold to earn a net income of 8% of sales

iii) Activity level needed to earn a profit of Rs. 95,000

iv) What should be the selling price per unit, if break-even point is to be brought down to 40% activity level? *(MTP N15, RTP M17) (ANS.: (I) 50%; (II) 27,273 UNITS; (III) 88.33%; (IV) RS. 26.875)*

(SOLVE PROBLEM NO 14 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if the selling price is Rs.20

Note:_____

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PROBLEM 10: The following figures are related to LM Limited for the year ending 31st March, 2012: Sales - 24,000 units @ Rs. 200 per unit; P/V Ratio 25% and Break-even Point 50% of sales. You are required to calculate:

i) Fixed cost for the year

ii) Profit earned for the year

iii) Units to be sold to earn a target net profit of Rs. 11,00,000 for a year.

iv) Number of units to be sold to earn a net income of 25% on cost.

v) Selling price per unit if Break-even Point is to be brought down by 4,000 units.

(OLD PM, N12 - 8M) (ANS.: I. RS.6 LAKHS, II. RS.6 LAKHS, III. 34,000 UNITS, IV. 60,000 UNITS, V. RS.225)

(SOLVE PROBLEM NO 15 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, If p/v ratio is 30%.

Note:_____

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PROBLEM 11: PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The cost Accountant has presented following information for the year to the management:

Particulars	Amount (Rs.)	Amount (Rs.)
Sales 1,500 pieces @ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,200

Evaluate following options:

i) If selling price is increased by Rs. 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?

ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with readymade suit. The cost of each TIEPIN is Rs. 18. Calculate the sales to earn a profit of 20% on sales.

(M18 (N)-10M) (ANS.: (I) PROFIT:RS. 5,17,200; (II) 34,20,000)

(SOLVE PROBLEM NO 16 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if selling price is 2100

Note:_____

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PROBLEM 12: A company has introduced a new product and marketed 20,000 units. Variable cost of the product is Rs. 20 per units and fixed overheads are Rs. 3,20,000.

You are required to:

i) Calculate selling price per unit to earn a profit of 10% on sales value, BEP and Margin of Safely?

ii) If the selling price is reduced by the company by 10%, demand is expected to increase by 5,000 units, then what will be its impact on Profit, BEP and Margin of Safety?

iii) Calculate Margin of Safety if profit is Rs.64,000.

(N16 - 8M) (ANS:(I)PRICE - 40;(II)PROFIT DECREASED FROM 10% TO 8.89% , B.E.P INCREASED BY RS.80,000 (OR) BY 4,000 UNITS , M.O.S INCREASE BY RS.20,000 (OR) BY 1,000 UNITS;(III)RS.1,28,000 (OR) 3,200 UNITS)

Concept question: What will be the impact on the question, If variable cost per unit is Rs.15

Note:_____

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PROBLEM 13: A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

i) On 1st January, 2016, the company has an opening stock of 20,000 packets whose variable cost is Rs. 180 per packet.

ii) In 2015, production was 1,20,000 packets and the expected production in 2016 is 1,50,000 packets. Expected sales for 2016 is 1,60,000 packets.

iii) In 2015, fixed cost per unit was Rs. 60 and it is expected to increase by 10% in 2016. The variable cost is expected to increase by 25%. Selling price for 2016 has been fixed at Rs. 300 per packet.

You are required to calculate the Break-even, volume in units for 2016. *(M16) (ANS.: i)93,600)*

Concept question: What will be the impact on the question, if opening stock is atRs. 250

Note:_____

_____

PROBLEM 14: XY Ltd. makes two products X and Y, whose respective fixed costs are F_1 and F_2. You are given that the unit contribution of Y is one fifth less than the unit contribution of X, that the total of F_1 and F_2 is Rs. 1,50,000, that the BEP of X is 1,800 units (for BEP of X F_2 is not considered) and that 3,000 units is the in difference point between X and Y. (i.e. X and Y make equal profits at 3,000 unit volume, considering their respective fixed costs). There is no inventory buildup as whatever is produced is sold.

Required: Find out the values F1 and F2 and units contributions of X and Y.

(NEW SM) (ANS.:F1=RS.90,000; F2=RS.60,000 ; X=RS.50 ; Y= RS.40)

Concept question: What will be the impact on the question

Note:_____

_____

PROBLEM 15: (PRINTED SOLUTION AVAILABLE) MNP Ltd sold 2,75,000 units of its product at Rs. 375 per unit. Variable costs are Rs 175 per unit (manufacturing costs of Rs. Rs 140 and selling cost Rs.35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs. 3,50,00,000 (including depreciation of Rs.1,50,00,000). There are no beginning or ending inventories.

Required:

i) Compute breakeven sales level quantity and cash breakeven sales level quantity.

ii) Compute the P/V ratio.

iii) Compute the number of units that must be sold to earn an income (EBIT) of Rs. 25,00,000.

iv) Compute the sales level achieve an after-tax income (PAT) of Rs. 25,00,000. Assume 40% corporate Income Tax rate.

(RTP M19 (N&O)) (ANS.: i) 1,75,000 UNITS, 1,00,000 UNITS. ii) 53.33% iii) 1,87,500 UNITS iv) 7,34,42,091)

(SOLVE PROBLEM NO 17, 18 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if selling price is 325

Note:_____

_____

PROBLEM 16: PVC Ltd sold 55,000 units of its product at Rs. 375 per unit. Variable costs are Rs. 175 per unit (manufacturing costs of Rs. 140 and selling cost Rs. 35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs. 65,00,000 (including depreciation of Rs. 15,00,000). There is no beginning or ending inventories.

Required:

i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

ii) COMPUTE the P/V ratio.

iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of Rs.5,00,000.

iv) COMPUTE the sales level achieve an after-tax income (PAT) of Rs.5,00,000, assume 40% corporate tax rate. *(RTP NOV 19) (ANS.: I) 32,500 U, 25,000 U II) 53.33%; III) 35,000 U; IV) 1,37,50,859)*

Concept question: What will be the impact on the question, if fixed cost is 75,00,000

Note:_____

_____

PROBLEM 17:C.T. Ltd. manufactures and sells a single product X whose selling price is Rs. 100 per unit and the variable cost is Rs. 60 per unit.

i) If the Fixed Costs for this year are Rs. 24,00,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%.

ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 150 per unit and the variable cost Rs. 100 per unit. The total fixed costs are estimated at Rs. 28,00,000. The sales mix of X : Y would be 5 : 3. COMPUTE the break- even sales in units for both the products. *(MTP N19 (N&O))*

Concept question: What will be the impact on the question, if selling price is Rs.80

Note:_____

_____

PROBLEM 18: Following details are related to M/s XYZ Limited :

Total Cost	56,78,000
Margin of Safety	48,18,450
Margin of safety (in units)	6500units
Break even sales	3500 units

You are required to calculate:

(i) Profit

(ii) Profit volume ratio

(iii) Break even sales in rupees

(iv) Fixed costs **(Nov19 Old 5M)**

Note:_____

PROBLEM 19: When volume is 4000 units, average cost is 3.75 per unit. When Volume is 5000 units, average cost is 3.5 per unit. The Break - Even point is 6000 units.

Calculate:- (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio. **(Nov 19 New, 5M)**

(SOLVE PROBLEM NO19 OF ASSIGNMENT PROBLEMS AS REWORK)

Note:_____

MODEL 2: MARGINAL COST SHEET

PROBLEM 20: A Indian soft drink Company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

Particulars	Total annual costs	Percent of Total Annual Cost which is variable
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary. You are required to

i) Compute the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.

ii) Calculate the break-even point in Rupee sales as also in number of bottles for the Indian subsidiary on the assumption that the sale price is Rs. 14 per bottle. *(NEW SM, OLD SM)*

(ANS.: I) RS. 15/- II) BEP: RS. 4,48,000 (OR) 32,000 BOTTLES)

(SOLVE PROBLEM NO 20 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if sales commission is 10%.

Note:_____

MODEL 3: SHUT DOWN POINT

PROBLEM 21: (PRINTED SOLUTION AVAILABLE) Mr. X has Rs.2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales; his fixed costs are Rs.80,000 per year. Show computations to answer the following problems:

a) What sales volume must be obtained to break even?

b) What sales volume must be obtained to get 15 per cent return on investment?

c) Mr. X estimates that even if he closed the doors of his business, he would incur Rs. 25,000 as expenses per year. At what sales would he be better off by locking his business up?

(NEW SM, OLD SM) (ANS: A)2,00,000,B) 2,75,000,C) 1,37,500)

(SOLVE PROBLEM NO 21 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if investment in the business is Rs.15,000

MODEL 4: INDIFFERENCE POINT

PROBLEM 22: The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

	A Manual (Rs.)	B Semi-Automatic (Rs.)	C Fully-Automatic (Rs.)
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	---	5,000	10,000
Equipment lease	---	25,000	1,00,000
Unit variable costs (per report):			
Supplies	40	80	20
Labour	Rs. 200 (5 hrs. × Rs.40)	Rs.60 (1 hr. × Rs.60)	Rs.20 (0.25 hr. × Rs.80)

Required:

i) Calculate cost indifference points. Interpret your results.

ii) If the present case load is 600 cases and it is expected to go up to 850 cases in ear future, which method is most appropriate on cost considerations?

(NEW SM) (ANS.: (I) INDIFFERENCE POINT B/W A AND B IS 300 CASES , A AND C IS 550 CASES , B AND C IS 800 CASES; (II)ALTERNATIVE C IS MOST APPROPRIATE) (SOLVE PROBLEM NO 22 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if fixed cost are 20,000; 50,000; 1,50,000.

Note:_____

MODEL 5 : LIMITING FACTOR

PROBLEM 23: X Ltd. Which produces two products using the same raw-material and production facilities, provides you the following information.

Particulars	Product A (Rs.)	Product B (Rs.)
Selling price per unit	100	80
Material @ Rs.2 per Kg	20	10
Labour @ Rs. 3 per hour	15	30
Variable overheads @ Rs. 4 per machine hour	40	16
Total fixed overheads: Rs. 6,00,000		

Required: comment on the profitability of each product when:

a) Sales quantity is limited;

b) Sales value is limited;

c) Raw-material is in short supply;

d) Labour hours are limited;

e) Production capacity (in terms of machine hours) is limited;

f) There are heavy demand conditions;

g) There are low demand conditions.

(ANS.: IN THE CASES OF (A),(D),(G) PRODUCT A IS MORE PROFITABLE; WHILE IN (B),(C) ,(F) PRODUCT B IS MORE PROFITABLE) (SOLVE PROBLEM NO 23 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if fixed cost is Rs.50000

Note:_____

MODEL 6: ABSORPTION VS MARGINAL COSTING

PROBLEM 24: (PRINTED SOLUTION AVAILABLE) XYZ Ltd. Has a production capacity of 2,00,000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are Rs.11 per unit. The fixed costs are Rs.3,60,000 per year. Variable selling costs are Rs.3 per unit and fixed selling costs are Rs.2,70,000 per year. The unit selling price is Rs.20.In the year just ended on 30th June, 2006, the production was 1,60,000 units and sales were1,50,000 units. The closing inventory on 30th June was 20,000 units. The actual variable production costs for the year were Rs. 35,000 higher than the standard.

a) Calculate the profit for the year

i) by absorption costing method and

ii) by marginal costing method

b) Explain the difference in profit

(NEW SM, OLD SM) (ANS: (A) (I) 2,59,375; (II) 2,39,375; (B) OPENING VALUE OVERVALUED: RS. 20,000; CLOSING VALUE OVERVALUED: RS. 40,000;) (SOLVE PROBLEM NO 24, 25 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: What will be the impact on the question, if variable production cost per unit is Rs. 15

Note:_____

_____

PRINTED SOLUTIONS TO SOME SELECTIVE PROBLEMS

PROBLEM NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 5,9,15,21,24

PROBLEM NO: 5

i

Particulars	Factor X	Factor y
Selling price	50	50
Less: Variable cost per unit	40	35
Contribution per unit	10	15
P/V ratio= coat per unit/selling price	20% (10/20)	30%(15/50)
Fixed cost	2,00,000	3,00,000
Less: Depreciation	(40,000)	(30,000)
Cash fixed cost	1,60,000	2,70,000
BEP(in units)	20,000 units	20,000 units
(Fixed cost/cost per unit)	(2,00,000/10)	(3,00,000/15)
BEP (in Rs.)	10,00,000	10,00,000
(Fixed cost/P/v ratio)	(2,00,000/20%)	(3,00,000/30%)
Cash BEP (in units)	16,000 units	18,000 units
(Cash fixed cost/cost per unit)	(1,60,000/10)	(2,70,000/15)
Cash BEP (in Rs.)	8,00,000	9,00,000
(Cash fixed cost/p/v ratio)	(1,60,000/20%)	

(ii) Current sales mix = 30,000:20,000

3:2

$$\text{Total BEP (in units)} = \frac{\text{Total fixed cost}}{\text{Combined cost per unit}}$$

$$= \frac{2,00,000 + 3,00,000}{\left[\frac{Rs.10 \times 3 + Rs.15 \times 2}{5(3+2)}\right]} = \frac{5,00,000}{12} = 41,667 \text{ units}$$

(iii) New sale mix 2:3

$$\text{Total BEP (in units)} = \frac{\text{Total fixed cost}}{\text{Combined Cost per unit}}$$

$$= \frac{2,00,000 + 3,00,000}{\left[\frac{Rs.10 \times 3 + Rs.15X2}{5(3+2)}\right]}$$

$$= \frac{5,00,000}{13} = 38,462 \text{ units}$$

Change in sales mix leads to declare in BEP by 3,205 units (41667-38462)

Profit = Contribution - Fixed Cost

Profit if sales mix is 2:3 = (50,000 unitsX13)-5,00,000 = 1,50,000

Profit if sales mix is 3:2 = 50,000X12-5,00,000 = 1,00,000

Change in sales mix leads to income in profit

Rs.50,000(Rs.1,50,000-Rs.1,00,000)

PROBLEM NO. 9

Particulars	Amt.
sales	25
Less: variable cost :	
-Material cost	(7.5)
-labour cost	(6.25)
-variable portion of semi variable cost	(3.75)
Contribution per unit	7.5

% of current capacity=80%

Current no of units sold = 8,00,000/25 =32,000Units

particulars	Amt.
Semi variable cost	1,80,000
(-)variable portion	(1,20,000) (32000Unitsx3.75)
Fixed portion of semi variable	60,000

Fixed cost	≤80% (≤ 32,000 units)	>80% (> 32000 units)
Fixed portion of semi variable cost	60,000	60,000
Fixed cost	90,000	90,000
Additional fixed cost	-	20,000
Total fixed cost	1,50,000	1,70,000

No of units at 100% capacity=40,000units $\begin{bmatrix} 80\% & 32,000 \\ 100\% & ? \end{bmatrix}$

i) $\text{BEP(in rupees)} = \frac{\text{Fixed cost}}{\text{contribution per unit}} = \frac{1,50,000}{7.5} = 20,000\text{Units}$

The level of capacity to be operated to get break even =50% $\begin{bmatrix} 100\% & 20,000U \\ ? & 40,000U \end{bmatrix}$

(100%_____40,000U,20,000U____?)

ii) Let X be the no of units to be sold to earn a profit 8% on sales.

Total sales=Variable cost + Fixed cost + profit

25x-17.5x-2x = 1,50,000

5.5x = 1,50,000

x = 27,273 units

iii) Sales required to earn the desired profit(in units)=

$$= \frac{\text{Total cost} + \text{Desired profit}}{\text{Cost per unit}} = \frac{1,50,000 + 95,000}{7.5} = 32,667 \text{units}$$

When no of units are more than 32,000 than fixed cost to be taken as RS.1,70,000 instead of Rs.1,50,000

Therefore the above units are not correct

$$= \frac{1,70,000 + 95,000}{7.5} = 35,333 \text{units}$$

The capacity to be operated to earn a profit of 95,000 =83.33%
$\begin{bmatrix} 100\% & 40,000U \\ ? & 35,3333U \end{bmatrix}$

iv) **New BEP = 40% of total capacity**

= 40%(40,000 units)

= Rs. 16,000 units

$$\text{New BEP} = \frac{\text{Fixed Cost}}{\text{Cost per unit}}$$

$$= 16000 = \frac{1,50,000}{\text{Cost per unit}}$$

Cost per unit = 9.375

Add: Variable cost = 17.5

Selling price = 26.875

PROBLEM NO:15

Selling price = 37.5

Less: variable cost = 17.5

Cost per unit = 20

$$\text{Break even point(in units)} = \frac{\text{Fixed cost}}{\text{Cost per unit}}$$

$$= \frac{35,00,000}{20}$$

= 1,75,000 units

Cash Depreciation = Fixed Cost- Depreciation

= 35,00,000-15,00,000

= 20,00,000

$$\text{Cash BEP (in units)} = \frac{\text{Cash fixed cost}}{\text{Cost per unit}}$$

$$\frac{20,00,000}{20}$$

= 1,00,000 units

PROBLEM NO. 21

a) Variable Cost Ratio = 60%

P/V Ratio = 1 - VC Ratio

= 1 - 60%

= 40%

$$\text{Break-even Point (in Rupees)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{8,000}{40\%} = 2,00,000/-$$

b) Desired Profit = Investment x Rate of Return

= 2,00,000 x 15%

= 30,000

Sales required to earn the desired profit (in rupees)

$$= \frac{\text{FixedCost} + \text{desired profit}}{\text{P/V Ratio}} = \frac{80{,}000 + 30{,}000}{40\%} = 2{,}75{,}000$$

c) Avoidable fixed cost = Total fixed cost -un avoidable fixed cost

= 80,000-25,000

= 55,000

Shut down point= $\frac{\text{avoidable fixed cost}}{\text{p/v ratio}} = \frac{55{,}000}{40\%} =$ 1,37,500

When are less than 1,37,500 then it is better to close the business

PROBLEM NO:24

Production unit:

Variable cost p.u = Rs.11

Fixed cost = 3,60,000

Non production cost (Se &di)

Variable cost p.u = Rs. 3

Fixed cost = 2,70,000

No of units sold = Opening stock production -closing stock

1,50,000 = Opening stock + 1,60,000 -20,000

Opening stock = 10,000 units

Over head recovery rate (fixed production cost) = Estimated Fixed production cost/Estimated units

= 3,60,000/1,80,000 [2,00,000 X90%]

= Rs. 2 p.u

a) (i) S S Profit or loss as per absorption costing

Particulars	Amount Rs.	Amount Rs.
Sales (1,50,000X20)		30,00,000
Production cost:		
Variable (11X1,60,000)+35,00	17,95,000	
Fixed cost (2X1,60,000)	3,20,000	
1,60,000 units	21,15,000	
Add: Opening stock (10,000 unitsX13)	1,30,000	
Less: Closing stock (21,15,000/1,60,000X20,000)	2,64,375	
Production cost of units sold	19,80,625	
Non production cost(AOH&S&DOH) Variable (3X1,50,000)	4,50,000	
Fixed selling cost	2,70,000	(27,00,625)
Under recovery of fixed production cost(3,60,000-3,20,000)		(40,000)
Profit		2,59,375

a) (ii) SS profit or loss as per marginal costing

Particulars	Amount Rs.	Amount Rs.
Sales (1,50,000X25)		30,00,000
Less: Variable cost (11X1,60,000)+35,000	(17,95,000)	

Add: Opening stock (10,000X11)	1,10,000	
Less: Closing Stock (17,95,000/1,60,000X20,000)	(2,24,375)	
1,50,000	16,80,625	
Add: variable cost S & DOH (3X1,50,000)	4,50,000	(21,30,625)
contribution		8,69,375
Fixed cost:		
Production cost		3,60,000
Non production (S&DOH)		2,70,000
Profit		2,39,375

b) SS difference in profit

Particulars	Absorption Costing	marginal Costing	impact on marginal Costing
Opening stock	1,30,000	1,10,000	20,000
Closing stock	2,64,379	2,24,375	(40,000)
Decrease in profit as per marginal costing (2,39,372 - 2,59,375)			20,000

ASSIGNMENT PROBLEMS

MODEL 1 : P/V RATIO, BEP, MOS, PROFIT

PROBLEM 1: You are given the following data:

Year	Sales	Profit
2010	Rs. 1,20,000	Rs. 8,000
2011	Rs. 1,40,000	Rs. 13,000

Find out - **(i)** P/V ratio, **(ii)** B.E. Point, **(iii)** Profit when sales are Rs.1,80,000, **(iv)** Sales required to earn a profit of Rs.12,000, **(v)** Margin of safety in year 2011.

(NEW SM, OLD SM) (ANS.: I. 25%, II. RS.88,000, III. RS.23,000, IV. 1,36,000, V. RS.52,000)

PROBLEM 2:

a) You are given the following data for the coming year for a factory.

Budgeted output	8,00,000 units
Fixed expenses	40,00,000
Variable expenses per unit	Rs. 100
Selling price per unit	Rs. 200

Calculate BEP

b) If price is reduced to Rs. 180, what will be the new break-even point?

(NEW SM, OLD SM) (ANS.: (A) 40,000 UNITS (B) 50,000UNITS)

PROBLEM 3: ABC Limited started its operations in the year 2013 with a total production capacity of 2,00,000 units. The following information, for two years, is made available to you:

	Year 2013	Year 2014
Sales (units)	80,000	1,20,000
Total Cost(Rs.)	34,40,000	45,60,000

There has been no change in the cost structure and selling price and it is anticipated that it will remain unchanged in the year 2015 also. Selling price is Rs.40 per unit

Calculate:

i) Variable cost per unit.

ii) Profit volume Ratio.

iii) Break-even Point(in units)

iv) Profit if the firm operates at 75% of the capacity.

(M15 - 5M) (ANS.: (I) RS. 28; (II)30%; (III) 1,00,000 UNITS; (IV) RS. 6,00,000.)

PROBLEM 4: PQR Ltd. has furnished the following data for the two years:

	2011	2012
Sales	Rs.6,00,000	?
Profit/Volume Ratio (P/V ratio)	45%	30%
Margin of Safety sales as a % of total sales	50%	20%

There has been substantial savings in the fixed cost in the year 2012 due to the restructuring process. The company could maintain its sales quantity level of 2011 in 2012 by reducing selling price.

You are required to calculate the following:

i) Sales for 2012 in Rs.

ii) Fixed cost for 2012

iii) Break-even sales for 2012 in Rupees. *(ANS.: i)4,71,428 ii)1,13,143 iii) 3,77,143)*

PROBLEM 5: A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period.

	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	2000	(500)	150	(200)
East	1000	100	150	20
South	500	(50)	100	(10)

Calculate for each factory and for the company as a whole for the period:

i) The fixed costs. (ii) Break -Even Sales.

(ANS: i) NORTH-650, EAST-50, SOUTH-175 II) NORTH -1625, EAST-250, SOUTH-318)

PROBLEM 6: MFN Limited started its operation in 2012 with the total production capacity of 2,00,000 units. The following data for two years is made available to you:

	2012	2013
Sales units	80,000	1,20,000
Total cost (Rs.)	34,40,000	45,60,000

There has been no change in the cost structure and selling price and it is expected to continue in 2014 as well. Selling price is Rs.40 per unit.

You are required to calculate:

a) Break-Even Point (in units)

b) Profit at 75% of the total capacity in 2014 *(OLD PM, M13 - 5M) (ANS.: 1,00,000 UNITS, RS. 6,00,000)*

PROBLEM 7: M.K. Ltd. Manufactures and sells a single product X whose selling price is Rs.40 per unit and the variable cost is Rs.16 per unit

i) If the Fixed Costs for this year are Rs.4,80,000 and the annual sales are at 60% margin of safety, calculate the rate of net return on sales, assuming an income tax level of 40%

ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 50 per unit and the variable cost Rs.10 per unit. The total fixed costs are estimated at Rs.,6,66,600. The sales mix of X : Y would be 7 : 3. At what level of sales next year, would M.K. Ltd. Break even? Give separately for both X and Y the breakeven sales in rupee and quantities.

(NEW SM) (ANS.: (I) 21.6%, (II) BREAKEVEN SALES IN RUPEE FOR X AND Y RS.7,07,000; RS.3,03,000 AND IN QUANTITIES 17,675 UNITS,6,060 UNITS)

PROBLEM 8: Baby Care Ltd. Has two factories for producing baby diapers of identical quality. The figures of year 2013-14 are as follows:

	Factory - A	Factory - B
Selling price per packet (Rs.)	80	80
Variable cost per packet (Rs.)	65	68
Fixed cost (Rs.)	3,60,000	3,00,000
Sales (packets)	70,000	80,000
Production capacity (packets)	80,000	90,000

Fixed cost includes depreciation on plant and machinery in factory A and factory B Rs. 60,000 and Rs. 30,000 respectively. You are required to calculate:

i) Break-even Point (BEP) in sales and units for each factory separately.

ii) Cash BEP in units for each factory separately.

iii) BEP in units for company as a whole. Current product mix of factory A and factory B is 2:3.

(MTP M14) (ANS: (I) SALES-19,20,000, 20,00,000; UNITS-24000,25000; (II) CASH BEP- 20,000, 22,500; (III) COMBINED BEP- 50,000 PACKETS)

PROBLEM 9:

a) Ascertain profit, when sales = Rs.2,00,000, Fixed Cost =Rs.40,000, BEP = Rs.1,60,000.

b) Ascertain sales, when fixed cost = Rs. 20,000, Profit =Rs.10,000, BEP = Rs.40,000.

(NEW SM, OLD SM) (ANS.: A. RS.10,000, B. RS.60,000)

PROBLEM 10:MLtd.has an annual fixed cost of Rs. 98,50,000. In the year 20X8-X9, sales amounted to Rs.7,80,60,000 as compared to Rs.5,93,10,000 in the preceding year 20X7-X8. Profit in the year 20X8-X9 is Rs.37,50,000 more than that in 20X7-X8.

Required:

(i) Calculate Break-even sales of the company;

(ii) DETERMINE profit/ loss on a forecasted sales volume of Rs.8,20,00,000.

(iii) If there is a reduction in selling price by 10% in the financial year 20X8-X9 and company desires to earn the same amount of profit as in 20X7-X8, COMPUTE the required sales amount?

(mtp,may19,s-i)(ans: i) Rs.4,92,50,000 ii) Rs.65,50,000 iii) Rs. 10,67,58,000)

PROBLEM 11: A company has fixed cost of Rs. 90,000, Sales Rs. 3,00,000 and Profit of Rs. 60,000.

Required:

i) Sales volume if in the next period, the company suffered a loss of Rs. 30,000.

ii) What is the margin of safety for a profit of Rs. 90,000? *(OLD PM) (ANS.: I. RS.1,20,000, II. RS.1,80,000)*

PROBLEM 12: The profit volume ratio of X Ltd. Is 50% and the margin of 'safety is 40%. You are required to calculate the net profit if the sales value is Rs. 1,00,000 *(ANS.: PROFIT = RS. 20,000)*

PROBLEM 13: The following information is given by Star Ltd.:

Margin of Safety : Rs 1,87,500

Total Cost : Rs 1,93,750

Margin of Safety : 3,750 units

Break-even Sales : 1,250 units

Required:

Calculate Profit, P/V Ratio, BEP Sales (in Rs) and Fixed Cost.

(NEW SM, OLD SM) (ANS.: 56,250;30%; 62,500; 18,750;)

PROBLEM 14: Omega Manufacturing a product, Currently utilizing 75% capacity with a turnover of Rs.99,00,000 at Rs.275 per unit. The cost data is as under:

	Amount (Rs.)
Direct material per unit	96
Direct wages per unit	42
Variable overhead per unit	18
Semi variable overheads	7,32,000
P/V ratio	40%

Fixed overheads cost is Rs.28,81,000 upto 80%level of Activity ,beyond this level, an additional Rs.2,38,500 will be incurred.

i) Break- even point in units and activity level at a break- even point.

ii) Number of units to be sold to earn profit of RS.25 per unit. *((may19old) (ans: i)29900units ii) =41,500)*

PROBLEM 15: X Ltd. Has earned a contribution of Rs.2,00,000 and net profit of Rs.1,50,000 of sales of Rs.8,00,000. What is its margin of safety? *(NEW SM) (ANS.:6,00,000)*

PROBLEM 16: PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 1,000 pieces. The cost Accountant has presented following information for the year to the management:

Particulars	Amount (Rs.)	Amount (Rs.)
Sales 1,000 pieces @ 2,000 per piece		20,00,000
Direct Material	5,00,000	
Direct Labour	4,00,000	
Overheads (40% Fixed)	5,00,000	14,00,000
Net Profit		6,00,000

Evaluate following options:

(i) If selling price is increased by Rs. 200, the sales will come down to 70% of the total annual capacity. Should the company increase its selling price?

(ii) The company can earn a profit of 30% on sales if the company provide TIEPIN with readymade suit. The cost of each TIEPIN is Rs. 10. Calculate the sales to earn a profit of 30% on sales.

(ANS.: I) NO II) 21,05,263)

PROBLEM 17: MNP Ltd sold 2,75,000 units of its product at Rs. 37.50 per unit. Variable costs are Rs. 17.50 per unit (manufacturing costs of Rs. 14 and selling cost Rs. 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs. 35,00,000 (including depreciation of Rs.15,00,000). There is no beginning or ending inventories.

Required: Estimate breakeven sales level quantity and cash breakeven sales level quantity.

(NEW SM, OLD PM) (ANS.: I. 1,75,000 UNITS, 1,00,000 UNITS)

PROBLEM 18: MNP Ltd sold 2,00,000 units of its product at Rs. 300 per unit. Variable costs are Rs 200per unit (manufacturing costs of Rs 150 and selling cost 50 per unit). Fixed costs are incurred uniformly throughout the year and amount to 3,00,00,000 (including depreciation of 2,00,00,000). There are no beginning or ending inventories.

Required:

i) Compute breakeven sales level quantity and cash breakeven sales level quantity.

ii) Compute the P/V ratio.

iii) Compute the number of units that must be sold to earn an income (EBIT) of 30,00,000.

iv) Compute the sales level achieve an after-tax income (PAT) of 20,00,000. Assume 50% corporate Income Tax rate. *(ANS.: i)1,50,000 U ii)33% iii)3,30,000U iv)103030303)*

PROBLEM 19: M/s Gaurav Private Limited is manufacturing and selling two products BLACK and WHITE at Rs 20 and Rs 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

(i) Sales planned for the year will be Rs 81,00,000 in the case of BLACK and 54,00,000 in the case of WHITE

(ii) The selling price of BLACK will be reduced by 10% and that WHITE by 20%

(iii) Break-even is planned at 70% of the total sales of each product

(iv) Profit for the year to be maintained at Rs 8,26,200 in the case of BLACK and 7,45,200 in the case of WHITE. This would be possible by reducing the present annual fixed cost of Rs 42,00,000 allocated as 22,00,000 to BLACK and Rs 20,00,000 to WHITE.

You are required to calculate:

(i) Number of units of BLACK and WHITE to be sold to breakeven during financial tear 2019-20

(ii) Amount of reduction in fixed cost - product wise to achieve desired profit mentioned at (iv) above

(M19 (N) - 10M) (ANS.: I) 3,15,000 (UNITS); 1,57,500 (UNITS); II) RS. 2,72,200, RS. 2,61,200)

MODEL 2: MARGINALCOST SHEET

PROBLEM 20: You are given the following data for the year 2015 of Rio Co. Ltd:

Variable cost	60,000	60%
Fixed cost	30,000	30%
Net profit	10,000	10%
Sales	1,00,000	100%

Find out (a) Break-even point, (b) P/V ratio, and (c) Margin of safety. Also draw a breakeven chart showing contribution and profit. *(NEW SM, OLD SM, RTP M16)*

(ANS.: (A).BREAK - EVEN POINT? RS. 75,000 (B). P/V RATIO 40% (C). MARGIN OF SAFETY RS. 25,000)

MODEL 3: SHUT DOWN POINT

PROBLEM 21: Zed Limited sells its product at 30 per unit. During the quarter ending on 31st March, 2014, it produced and sold 16,000 units and' suffered a loss of 10 per unit. If the volume of sales is raised to 40,000 units; it can earn a profit of Rs. 8 per unit.

You are required to calculate:

i) Break Even Point in Rupees.

ii) Profit if the sale volume is 50,000 units.

iii) Minimum level of production where the company needs not to close the production if unavoidable fixed cost is 1,50,000. *(OLD PM, N14 - 5M) (ANS.: (I) RS.7,20,000 (II)RS.5,20,000(III)16,500 UNITS)*

MODEL 4: INDIFFERENCE POINT

PROBLEM 22: Y Company has just been incorporated and plans to produce a product that will sell for Rs. 10 per unit. Preliminary market surveys show that demand will be around 10,000 units per year. The company has the choice of buying one of two machines, each of which has a capacity of 10,000 units per year. Machine A' would have fixed costs of 30,000 per year and would yield a profit of Rs. 30,000 per year on the sale of 10,000 units. Machine B' would have fixed costs of Rs. 18,000 per year and would yield a profit of Rs. 22,000 per year on the sale of 10,000 units. Variable Costs behave linearly for both machines.

Required:

a) Break-even sales for each machine.

b) Sales level where both machines are equally profitable.

c) Range of sales where one machine is more profitable than the other.

(ANS.: A) A - 5,000 UTS; B - 4,500 UTS; B) 6,000 UTS, C) UP TO 6,000 UTS - MACHINE B; MORE THAN 6,000 UTS - MACHINE)

MODEL 5 : LIMITING FACTOR

PROBLEM 23: A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

Particulars	X	Y	Z
Selling Price (Rs./unit)	10	12	12
Variable Costs(Rs./unit)	6	9	7
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (Rs)		30,000	

Required: Compute the opportunity costs for each of the products.

(NEW SM) (ANS.: OPPORTUNITY COSTS FOR PRODUCT X, Y, Z IS RS.6,000; RS.8,000;RS.8,000)

MODEL 6: ABSORPTION VS MARGINAL COSTING

PROBLEM 24: ABC Ltd. Can produce 4,00,000 units of a product per annum at 100% capacity. The variable production costs are Rs. 40 per unit and the variable selling expenses are Rs. 12 per sold unit.

The budgeted fixed production expenses were Rs. 24,00,000 per annum and the fixed selling expenses were Rs.16,00,000. During the year ended 31st March, 2014, the company worked at 80% of its capacity. The operating data for the year are as follows:

Production	3,20,000 units
Sales @ 80 per unit	3,10,000 units
Opening stock of finished goods	40,000 units

Fixed production expenses are absorbed on the basis of capacity and fixed selling expenses are recovered on the basis of period.

You are required to prepare Statements of Cost and Profit for the year ending 31st March, 2014:

i) On the basis of marginal costing

ii) On the basis of absorption costing. *(OLD PM) (ANS.: (I) 46,80,000 (II) 47,40,000)*

PROBLEM 25: A manufacturing company is producing a product 'A' which is sold in the market at Rs. 45 per unit. The company has the capacity to produce 40,000 units per year. The budget for the year 2018 - 19 projects a sale of 30,000 units.

The costs of each unit are expected as under:

	Rs.
Materials	12
Wages	9
Overheads	6

Margin of safety is Rs.4,12,500

You are required to:

i) Calculate fixed cost and break-even point.

ii) Calculate the volume of sales to earn profit of 20% on sales.

iii) If management is willing to invest Rs.10,00,000 with an expected return of 20%. Calculate units to be sold to earn this profit.

iv) Management expects additional sales if the selling price is reduced to Rs.44. Calculate units to be sold to achieve the same profit as desired in above (iii). *(N18 (N) - 10M)*

ADDITIONAL PROBLEMS FOR STUDENTS SELF PRACTICE

PROBLEM 1: A company has a P/V ratio of 40%. By what percentage must sales be increased to offset 20% reduction in selling price?

PROBLEM 2: Y Company has just been incorporated and plans to produce a product that will sell for Rs. 10 per unit. Preliminary market surveys show that demand will be around 10,000 units per year. The company has the choice of buying one of two machines, each of which has a capacity of 10,000 units per year. Machine A' would have fixed costs of 30,000 per year and would yield a profit of Rs. 30,000 per year on the sale of 10,000 units. Machine B' would have fixed costs of Rs. 18,000 per year and would yield a profit of Rs. 22,000 per year on the sale of 10,000 units. Variable Costs behave linearly for both machines.

Required:

a) Break-even sales for each machine.

b) Sales level where both machines are equally profitable.

c) Range of sales where one machine is more profitable than the other.

PROBLEM 3: WONDER LTD. Manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	50%	100%
Sales and production (units)	400	800
	Lakhs	Lakhs
Sales	8.00	16.00
Production costs:		
Variable	3.20	6.40
Fixed	1.60	1.60
Selling & distribution costs:		
Variable	1.60	3.20
Fixed	2.40	2.40

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year. In the first quarter, 220 units were produced and 160 units were sold.

Required:

a) What would be the fixed production costs absorbed by ZEST if absorption costing is used?

b) What would be the under/over-recovery of overheads during the period?

c) What would be the profit using absorption costing?

d) What would be the profit using marginal costing?

PROBLEM 4: The product mix of a Gama Ltd. is as under:

Particulars	Products	
	M	N
Units	54,000	18,000
Selling price	Rs7.5	Rs 15
Variable cost	Rs 6	Rs 4.5

Find the break-even points in units, if the company discontinues product 'M' and replace with product 'O'. The quantity of product 'O' is 9,000 units and its selling price and variable costs respectively are Rs. 18 and Rs. 9. Fixed Cost is Rs. 15,000.

PROBLEM 5: Maxim Ltd. manufactures a product "N-joy". In the month of August 2014, 14,000 units of the product "N-joy" were sold, the details are as under:

Particulars	(Rs.)
Sale Revenue	2,52,000
Direct Material	1,12,000
Direct Labour	49,000
Variable Overheads	35,000
Fixed Overheads	28,000

A forecast for the month of September 2014 has been carried out by the General manger of Maxim Ltd. As per the forecast, price of direct material and variable overhead will be increased by 10% and 5% respectively.

Required to calculate:

a) Number of units to be sold to maintain the same quantum of profit that made in August 2014.

b) Margin of safety in the month of August 2014 and September 2014.

PROBLEM 6: A manufacturing concern was operating at a margin of safety of 40% in the year 2018 and was selling its product at Rs. 75 per unit. Variable Cost ratio to sales was 80% and fixed costs amounted to Rs. 5,40,000.

In the year 2019, the concern anticipates an increase in the variable costs and fixed costs by 15% and 5% respectively.

You are required to:

Find out the selling price to be fixed in the year 2019 keeping in view that concern is willing to maintain the same P/V ratio as it was in the year 2018.

PROBLEM 7: A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of Rs.15 lacs in the proportion of the numbers of units sold. The budget for 2018 indicates:

Particulars	A	B
Profit (Rs.)	1,50,000	30,000
Selling Price / unit (Rs.)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by 7½ %.

ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

PROBLEM 8:

Fixed Cost	Rs. 1,20,000
Variable costs	Rs. 3 per unit
Selling price	Rs. 7 per unit
Output	Rs. 50,000 units

CALCULATE the profit for each of the following situation with the above data:

i) With the data above

ii) With a 10% increase in output & sales.

iii) With a 10% increase in fixed costs.

iv) With a 10% increase in variable costs.

v) With a 10% increase in selling price.

vi) Taking all the above situations.

PROBLEM 9: Kevin Ltd. produces a product 'C123', the cost structure of product C123 is as follows:

Amount	Per Unit (Rs.)
Direct Material	1,650
Direct Labour	925
Variable overheads	315
Total Variable cost	2,890

Selling price of C123 is Rs. 3,400 per unit and quantity of sales is 55,000 units per annum. Total fixed cost per annum is Rs. 1, 80, 00,000.

You are required to calculate:

i) Break - even sales in units.

ii) Margin of safety in units

iii) If the total variable cost increased by 10% and fixed cost increased by Rs.20,00,000 how many additional units of C123 should be sold in order to obtain the present profit while selling price per unit remains unchanged.

PROBLEM 10: ABC Baggage Ltd. Sells different styles of laptop bags with identical purchase costs and selling prices. The company is trying to find out the profitability of opening another store which will have the following expenses and revenues:

Particulars	Amount per piece (Rs.)
Selling Price	600
Variable costs:	
Material cost	410
Salesmen's commission	60
Total variable cost	470
Annual fixed expenses are:	(Rs.)
- Rent	6,00,000
- Office and administrative expenses	20,00,000
- Advertising	8,00,000
Other fixed expenses	2,00,000

For the each following independent situation, you are required to:

i) Calculate the annual break-even point in units and in value. Also determine the profit or loss if 35,000 units of bags are sold.

ii) The sales commissions are proposed to be discontinued, but instead a fixed amount of Rs.9,00,000 is to be incurred in fixed salaries. A reduction in selling price of 5% is also proposed. What will be the break-even point in units?

iii) It is proposed to pay the store manager Rs. 5 per piece as further commission. The selling price is also proposed to be increased by 5%. What would be the break-even point in units?

PROBLEM 11: X Ltd. Supplies spare parts to an air craft company Y Ltd. The production capacity of X Ltd. facilitates production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different spare parts A and B:

Per unit	Part A	Part B
Alloy usage.....	1.6 kgs.	1.6 kgs.
Machine Time: Machine A.....	0.6 hrs.	0.25 hrs.
Machine Time: Machine B.....	0.5 hrs.	0.55 hrs.

Target Price (Rs.)..... 145 115

Total hours available: ....Machine A 4,000 hours

Machine B 4,500 hours

Alloy available is 13,000 kgs. @ Rs. 12.50 per kg.

Variable overheads per machine hours:.....

Machine A: Rs. 80

Machine B: Rs. 100

Required:

i) Identify the spare part which will optimize contribution at the offered price.

ii) If Y Ltd. reduces target price by 10% and offers Rs. 60 per hour of unutilized Machine hour, what will be the total contribution from the spare part identified above?

PROBLEM 12: An automobile manufacturing companies produce different models of Cars. The budget in respect of model 007 for the month of March, 2013 is as under:

Budgeted Output 40,000 Units		
	Rs. In lakhs	**Rs. In lakhs**
Net Realization		700
Variable Costs:		
Materials	264	
Labor	52	
Direct expenses	124	440
Specific Fixed Costs	90	
Allocated Fixed Costs	112.50	202.50
Total Costs		642.50
Profit		57.50
Sales		700.00

Calculate:

a) Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.

b) Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit. *(NEW SM, OLD SM)(ANS.:94.5 LAKHS, 44,521 UNITS)*

PROBLEM 13: The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales	Rs. 5,00,000
Direct Materials	Rs. 2,50,000
Direct Labour	Rs.1,00,000
Variable Overheads	Rs.40,000
Capital Employed	Rs.4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required: Find out by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted. *(NEW SM) (ANS.: PROFIT OF RS.92,780 IS MORE THAN 23.19% OF CAPITAL EMPLOYED)*

THE END