10. Marginal Costing

1. Basic Quetions

Q1. A company has made a profit of ₹ 50,000 during the year 20X8-X9. If the selling price and marginal cost of the product are ₹ 15 and ₹ 12 per unit respectively, FIND OUT the amount of margin of safety.

Q2. If P/V ratio is 60% and the Marginal cost of the product is ₹ 20. CALCULATE the selling price?

Q3. You are given the following particulars CALCULATE:

(a) Break-even point

(b) Sales to earn a profit of ₹ 20,000

i. Fixed cost ₹ 1,50,000

ii. Variable cost ₹ 15 per unit

iii. Selling price is ₹ 30 per unit

Q4

		(₹)
(i)	DETERMINE profit, when sales	= 2,00,000
	Fixed Cost	= 40,000
	BEP	= 1,60,000
(ii)	DETERMINE sales,	
	when fixed cost	= 20,000
	Profit	= 10,000
	BEP	= 40,000

Q5 The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Find the capacity sales when fixed costs are ₹ 90,000. Also COMPUTE profit at 75% of the capacity sales.

Q6. A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹ 5 lakhs.

CALCULATE the following:

i. Break-even sales

ii. Total sales

iii. Total variable cost

iv. Current profit

v. New 'margin of safety' if the sales volume is increased by 7 ½ %.

Q7. (a) If margin of safety is ₹ 2,40,000 (40% of sales) and P/V ratio is 30% of AB Ltd, CALCULATE its (1) Break even sales, and (2) Amount of profit on sales of ₹9,00,000.

(b) X Ltd. has earned a contribution of ₹2,00,000 and net profit of ₹1,50,000 of sales of ₹ 8,00,000. What is its margin of safety

Q8. The following information is given by Star Ltd.:

Margin of Safety	₹1,87,500
Total Cost	₹ 1,93,750
Margin of Safety	3,750 units
Break-even Sales	1,250 units

Required:

CALCULATE Profit, P/V Ratio, BEP Sales (in ₹) and Fixed Cost.

Q9. MNP Ltd sold 2,75,000 units of its product at ₹ 375 per unit. Variable costs are ₹ 175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹3,50,00,000 (including depreciation of ₹ 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 ₹ 25,00,000.

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

Q10. A single product company sells its product at ₹ 60 per unit. In 20X8, the company operated at a margin of safety of 40%. The fixed costs amounted to ₹ 3,60,000 and the variable cost ratio to sales was 80%.

In 20X9, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

(i) FIND the selling price required to be fixed in 20X9 to earn the same P/V ratio as in 20X8.

(ii) Assuming the same selling price of ₹ 60 per unit in 20X9, FIND the number of units required to be produced and sold to earn the same profit as in 20X8.

Q11. You are given the following data:

	Sales	**Profit**
Year 20X8	₹ 1,20,000	8,000
Year 20X9	₹ 1,40,000	13,000

FIND OUT –

(i) P/V ratio,

(ii) B.E. Point,

(iii) Profit when sales are ₹1,80,000,

(iv) Sales required earn a profit of ₹12,000,

(v) Margin of safety in year 20X9.

Q12. 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: **(₹ in '000)**

	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 :

(vi) the fixed costs. (ii) break-even sales.

Q13. An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

	Total annual costs	**Percent of Total Annual**
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 rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

Q14. PQR Ltd. has furnished the following data for the two years:

	20X3	**20X4**
Sales	₹	?
Profit/Volume Ratio (P/V ratio)	50%	37.5%
Margin of Safety sales as a % of total	40%	21.875

There has been substantial savings in the fixed cost in the year 20X4 due to the restructuring process. The company could maintain its sales quantity level of 20X3 in

20X4 by reducing selling price.

You are required to CALCULATE the following:

(i) Sales for 20X4 in Value,

(ii) Fixed cost for 20X4,

(iii) Break-even sales for 20X4 in Value.

Q15. An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March, 20X9 is as under:

Budgeted Output			40,000 Units
		₹ In lakhs	₹ In lakhs
Net Realisation			2,10,000
Variable Costs:			
Materials		79,200	
Labour		15,600	
Direct expenses		37,200	1,32,000
Specific Fixed Costs		27,000	
Allocated Fixed Costs		33,750	60,750
	Total Costs		1,92,750
	Profit		17,250
	Sales		2,10,000

CALCULATE:

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

(ii) 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.

Q16. 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…… ₹5,00,000

Direct Materials…… ₹ 2,50,000

Direct Labour…….. ₹ 1,00,000

Variable Overheads…….. ₹ 40,000

Capital Employed…… ₹ 4,00,000

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

Required

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

2.Merger of Plants

Q17. A, B and C are three similar plants under the same management who want them to be merged for better operation. The details are as under

Particulars	Plant - A	Plant – B	Plant – C
Capacity Operated	100%	70%	50%
	Rs. (in lakhs)	Rs. (in lakhs)	Rs. (in lakhs)
Turnover	300	280	150
Variable cost	200	210	75
Fixed cost	70	50	62

Find out –

i. the capacity of the merged plant for break even

ii. the profit at 75 % capacity of the merged plant

iii. the turnover from the merged plant to give a profit of Rs. 28 lakhs

3.Shut Down Point

Q18. Mr. X has ₹ 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are ₹ 80,000 per year. Show COMPUTATIONS to answer the following questions:

(i) What sales volume must be obtained to break even?

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

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

4.Sales Mix

Q19. A company sales two products, J & 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.6,16,00 per month. Compute the Break Even Point?

Q20. The product mix of a Gama Ltd. is as under:

	Products	
	M	**N**
Units	54,000	18,000
Selling price	₹7.50	₹15.00
Variable cost	₹6.00	₹4.50

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 ₹ 18 and ₹ 9. Fixed Cost is ₹15,000.

Q21.. M.K. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

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

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

5.Opportunity Cost

Q22. 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.

	X	Y	Z
Selling Price (₹ / unit)	10	12	12
Variable Costs (₹ / unit)	6	9	7
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,00	3,000	900
Fixed Costs (₹)	30,000		

Required

COMPUTE the opportunity costs for each of the products.

6.Limiting factor

Q 23. A company has a limited supply of material X to the extent of 50,000 kgs. This material is used to manufacture three types of products namely — A, B and C. The cost details of these products are given below:

Particulars	A	B	C
Selling Price (Rs./ unit)	120	80	200
Variable Cost (Rs. / unit)	100	70	150
Material required (kgs./unit)	1	2	5
Market Demand (units)	15,000	20,000	5,000
Total Fixed Cost	Rs. 2,00,000		

Advise the management about the optimum utilisation of available material, to maximise the profits of the company. Also calculate such profit.

Q24. 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:

	Part A	Part B
Per unit		
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 (₹)	145	115

Total hours available Machine A 4,000 hours
Machine B 4,500 hours

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

Variable overheads per machine hours Machine A: ₹ 80
Machine B: ₹ 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 ₹ 60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

7.Indifference Point

Q25. Let's assume that we have to decide between purchase of 2 vehicles, say a Scooter and a Motorcycle. It has the following cost data –

Annual Fixed Cost for a Scooter is Rs. 15,000 and variable cost is Rs. 12 per km. whereas Annual Fixed Cost for a Motorcycle is Rs. 17,000 and variable cost is Rs. 10 per km.

Find out the range in which the two vehicles can be preferred.

Q26. The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

	A	**B**	**C**
	Manual (₹)	**Semi-Automatic (₹)**	**Fully-Automatic (₹)**
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	---	5,000	10,000
Equipment lease	---	25,000	1,00,000
Unit variable costs (per report):			
Supplies	40	80	20
Labour	200 (5 hrs x 40)	60 (1 hr x 60)	20 (0.25 hr x 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 near future, SELECT most appropriate on cost considerations?

Q27. XY Ltd. makes two products X and Y, whose respective fixed costs are F1 and F2. You are given that the unit contribution of Y is onefifth less than the unit contribution of X, that the total of F1 and F2 is ₹1,50,000, that the BEP of X is 1,800 units (for BEP of X, F2 is not considered) and that 3,000 units is the indifference point between X and Y.(i.e. X and Y make equal profits at 3,000 unit volume, considering heir 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.

8.Questions Based on Graph

Q28. You are given the following data for the year 20X7 of Rio Co. Ltd:

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

FIND OUT (a) Break-even point, (b) P/V ratio, and (c) Margin of safety.

Also DRAW a break-even chart showing contribution and profit.

Q29. (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	₹ 100
Selling price per unit	₹ 200

DRAW a break-even chart showing the break-even point.

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

9.Absorption VS Marginal

Q30 Wonder Ltd. manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	**50%**	**100%**
Sales and production (units)	400	800
	(₹)	(₹)
Sales	8,00,000	16,00,000
Production costs:		
- Variable	3,20,000	6,40,000
- Fixed	1,60,000	1,60,000
Selling and distribution costs:		
- Variable	1,60,000	3,20,000
- Fixed	2,40,000	2,40,000

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

In the first quarter, 220 units were produced and 160 units were sold. Required:

(a) COMPUTE the fixed production costs absorbed by ZEST if absorption costing is used?

(b) CALCULATE the under/over-recovery of overheads during the period?

(c) CALCULATE the profit using absorption costing?

(d) CALCULATE the profit using marginal costing?

Q31 XYZ Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilisation is reckoned as 90%. Standard variable production costs are ₹11 per unit. The fixed costs are ₹3,60,000 per year. Variable selling costs are ₹3 per unit and fixed selling costs are ₹2,70,000 per year. The unit selling price is ₹20.

In the year just ended on 30th June, 20X4, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 30th June was 20,000 units. The actual variable production costs for the year were ₹ 35,000 higher than the standard.

(i) CALCULATE the profit for the year
   (a) by absorption costing method and
   (b) by marginal costing method.

(ii) EXPLAIN the difference in the profits.

HOME WORK

Q1. MNP Ltd sold 2,75,000 units of its product at ₹37.50 per unit. Variable costs are ₹ 17.50 per unit (manufacturing costs of ₹ 14 and selling cost ₹ 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amounting to ₹ 35,00,000 (including depreciation of ₹ 15,00,000). There is no beginning or ending inventories. Required:

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

Q2. You are given the following particulars CALCULATE:

(c) Break-even point

(d) Sales to earn a profit of ₹ 20,000

i. Fixed cost ₹ 1,50,000

ii. Variable cost ₹ 15 per unit

iii. Selling price is ₹ 30 per unit

Q3 By noting "P/V will increase or P/V will decrease or P/V will not change", as the case may be, STATE how the following independent situations will affect the P/V ratio:

(i) An increase in the physical sales volume;

(ii) An increase in the fixed cost;

(iii) A decrease in the variable cost per unit;

(iv) A decrease in the contribution margin;

(v) An increase in selling price per unit;

(vi) A decrease in the fixed cost;

(vii) A 10% increase in both selling price and variable cost per unit;

(viii) A 10% increase in the selling price per unit and 10% decrease in the physical sales volume;

(ix) A 50% increase in the variable cost per unit and 50% decrease in the fixed cost.

(x) An increase in the angle of incidence

Q4 .A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. CALCULATE break-even point both in terms of rupees as well as in units.

Q5 A company had incurred fixed expenses of ₹ 4,50,000, with sales of ₹ 15,00,000 and earned a profit of ₹ 3,00,000 during the first half year. In the second half, it suffered a loss of ₹ 1,50,000.

CALCULATE:

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

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

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