13. MARGINAL COSTING

Question 1

Following information are available for the year 2020 and 2021 of PEG Limited:

Year	2020	2021
Sales	Rs.32,00,000	Rs.57,00,000
Profit/(Loss)	(Rs. 3,00,000)	Rs.7,00,000

Calculate - (a) P/V ratio, (b) Total fixed cost, and (c) Sales required to earn a Profit of Rs 12,00,000.

Question 2

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 Rs.90,000. Also compute profit at 75% of the capacity sales

Question 3

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

Question 4 (Nov 2007)

A company produces single product which sells for Rs. 20 per unit. Variable cost is Rs. 15 per unit and Fixed overhead for the year is Rs. 6,30,000

Required:

(a) Calculate sales value needed to earn a profit of 10% on sales.

(b) Calculate sales price per unit to bring BEP down to 1,20,000 units.

(c) Calculate margin of safety sales if profit is Rs. 60,000

Question 5

L Lalit Ltd. reports the following cost structure at capacity levels:

	(100% capacity)	(75% capacity)
	2,000 units	1,500 units
Production overhead I	Rs. 3 per unit	Rs. 4 per unit
Production overhead II	Rs.2 per unit	Rs.2 per unit

If the selling price, reduced by direct material and labour is Rs. 8 per unit, what unit, would be its break-even point?

Question 6

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 & 10% decrease in the physical sales volume
(ix) A 50% increase in the variable cost per unit and 50% decrease in cost.

Question 7

The following information is given by Guddu 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 Selling Price Per unit, Profit, P/V Ratio, BEP Sales (in Rs.) and Fixed Cost

Question 8

You are given the following data:

	Sales	Profit
Year 2020	Rs. 1,20,000	Rs.8,000
Year 2021	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 earn a profit of Rs. 12,000,

(v) Margin of safety in year 2014.

Question 9

Jethalal Ltd maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to Rs. 5 lakhs.

Calculate the following:

i. Break-even sales

ii. Total sales

iii. Total variable cost

iv. Current profit

v. New margin of safety in Rs. if the sales volume is increased by 7 1/2%.

Question 10

Majnu 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

(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.

Question 11 HOMEWORK SUM Date:

1. If margin of safety is Rs. 2,40,000 (40% of sales) and P/V ratio is 30% of Shila Ltd, calculate its
(i) Break even sales, and (ii) Amount of profit on sales of Rs.9,00,000
2. Saffron 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?

Question 12 HOMEWORK SUM Date:

Tripathi company earned a profit of Rs. 30,000 during the year 2021. If the marginal cost and selling price of the product are Rs. 8 and Rs. 10 per respectively, find out the amount of margin of safety.

Question 13 HOMEWORK SUM Date:

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

Question 14 (MAY 2008) HOMEWORK SUM Date:

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?

Question 15 HOMEWORK SUM Date:

You are given the following data for the year 2021 of Gotya& 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.

Question 16 HOMEWORK SUM Date:

You are given the following particulars calculate:

(a) Break-even point

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

i. Fixed cost Rs. 1,50,000

ii Variable cost Rs. 15 per unit

iii. Selling price is Rs. 30 per unit

Question 17 HOMEWORK SUM Date:

The P/V Ratio of Babli Ltd. is 50% and margin of safety is 40%. The company sold 500 units for Rs. 5,00,000. You are required to calculate:

(i) Break-even point, and

(ii) Sales in units to earn a profit of 10% on sales

Question 18 HOMEWORK SUM Date:

Lootera 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

	(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 2021 has been carried out by the General manger of Lootera 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 2021

(b) Margin of safety in the month of August 2021 and September 2021.

Question 19 HOMEWORK SUM Date:

If P/V ratio is 60% and the Marginal cost of the product is Rs. 20.What will be the selling price?

Question 20

Baburao Ltd is having a proposal to purchase two machines X and Y, the cost structure for the products with these two machines is as follows:-

Particular	Machine X	Machine Y
Variable Cost per unit	Rs. 6.00	Rs. 4.00
Fixed Cost	Rs. 2,00,000	Rs. 3,00,000
Selling Price per unit	Rs. 10	Rs. 10

What is cost indifference point? Which machine should be preferred and when ?

Question 21

Two firms Lala& Co. and Lalli& Co. sell the same product in the same market. Their budgeted profit and loss account for the year ending 31st march, 2021 are as follows:-

Particulars	Lala & Co. (Rs.)	Lalli& Co. (Rs.)
Sales	5,00,000	6,00,000
Variable Costs	4,00,000	4,00,000
Fixed Costs	30,000	70,000
Net Profit	70,000	1,30,000

Required:

1. Calculate at which sales volume both the firms will earn equal profit.
2. State which firm is likely to earn greater profits in condition of:
   a Heavy demand for the product
   b. Low demand for the product. Give reasons

Question 22

Coke, Pepsi and Slice are three similar plants under the same management who want them to be merged for better operation. The details are as under:

Particulars	Plant Coke at 100% (Rs. in Lakhs)	Plant Pepsi at 70% (Rs. in Lakhs)	Plant Slice at 50% (Rs. in Lakhs)
Turnover	300	280	150
Variable Cost	200	210	75
Fixed Cost	70	50	62

Required:-
a) Compute the capacity of the merged plant for break-even
b) Compute the profit of the merged plant at 75% capacity
c) Compute the capacity utilization of the merged plant to earn a profit of Rs.28 lakhs

Question 23 HOMEWORK SUM Date:

There are two similar plants under the same management. The management desires to merge these plants.

The following particulars are available:-

Particulars	Factory 1	Factory 2
Capacity operation	100%	60%
Sales	Rs. 300 Lakhs	Rs. 120 Lakhs
Variable Costs	Rs. 220 Lakhs	Rs. 90 Lakhs
Fixed Costs	Rs. 40 Lakhs	Rs. 20 Lakhs

You are required to calculate:-
What would be capacity of the merged plant to be operated for the purpose of break-even and
What would be the profitability on working at 75% of the merged capacity ?

Question 24

BBC 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 are no beginning or ending inventories.

Required:
a) Estimate breakeven sales level quantity and cash breakeven sales level Quantity.
b) Estimate the P/V ratio.
c) Estimate the number of units that must be sold to earn an income (EBIT) of Rs. 2,50,000
d) Estimate the sales level achieve an after-tax income (PAT) of Rs. 2,50,000, Assume 40% corporate Income Tax rate.

Question 25

Kukoo Ltd. Manufactures and sells four products A.B.C and D. The total budgeted sales (100%) are Rs. 6,00,000 per month. The Fixed Costs are Rs. 1,59,000 per month

Sales mix in value comprises of :

Product	Present %	Proposed %
A	33.33%	25%
B	41.67%	40%
C	16.67%	30%
D	8.33%	5%

The operating cost as a % of selling prices are:-
A-60%, B-68%, C-80% and D-40%
Calculate break even sales for the company for both these periods.

Question 26

MMC Ltd. Manufactures three products P, Q and R. The unit selling prices of these products are Rs.100, Rs.80 and Rs.50 respectively. The corresponding unit variable cost are Rs.50, Rs.40 and Rs.20 the proportions (quantity wise) in which these products are manufactured and sold are 20%, 30% and 50% respectively. Total fixed cost are Rs.14,80,000.
Given the above information, you are required to work out the overall break-even quantity and the product-wise break-up of such quantity.

Question 27 HOMEWORK SUM Date:

The product mix of a Bhopa Ltd. is as under:

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

Find the break-even points in units, if the company discontinues product M and replace with product 0. 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

Question 28 HOMEWORK SUM Date:

A Company sells two products, Barfi and Heroine. The sales mix is 4 units of Barfi and 3 units of Heroine. The contribution margins per unit are Rs. 40 for Barfi and Rs. 20 for Heroine. Fixed costs are Rs. 6,16,000 per month. Compute the break-even point.

Question 29

Mogambo Limited sells its product at Rs. 30 per unit. During the quarter ending on 31 March, 2021, it produced and sold 16,000 units and suffered a loss of Rs. 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.

(ii) Minimum level of production where the company needs not to close the production if unavoidable fixed cost is Rs. 1,50,000.

Question 30 HOMEWORK SUM Date:

Mr. Selmon 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 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 Salman 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?

Question 31 HOMEWORK SUM Date:

Maximum Production capacity of Munni Ltd. is 28000 units per month. Output at different levels along with cost data is furnished below:

Particulars of Costs	Activity Level		
	16,000 units	18,000 units	20,000 units
Direct Material	Rs.12,80,000	Rs.14,40,000	Rs.16,00,000

Direct labour	Rs.17,60,000	Rs.19,80,000	Rs.22,00,000
Total factory overheads	Rs.22,00,000	Rs.23,70,000	Rs.25,40,000

You are required to work out the selling price per unit an activity level of 24,000 units by considering profit at the rate of 25% on sales.

Question 32 HOMEWORK SUM Date:

An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March, 2015 is as under:

Budgeted Output 40,000 Units

	Rs. In lakhs	Rs.In lakhs
Net Realization		700
Variable Cost		
Materials	264	
Labour	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

(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.

Question 33 HOMEWORK SUM Date:

Laila Limited started its operation in the year 2021 with total production capacity of 2,00,000 units. The following information, for two years are made available to you:

	Year 2020	Year 2021
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.

Question 34 – Deleted as per new syllabus

Question 35 – Deleted as per new syllabus

Question 36 – Deleted as per new syllabus

Question 37 HOMEWORK SUM DATE:

Bala Ltd. is operating at 80 % capacity and presents the following information:

Break-even Sales	Rs.400 crores
P/V Ratio	30 %
Margin of Safety	Rs. 120 crores

Management has decided to increase production to 95 % capacity level with the following modifications:
(i) The selling price will be reduced by 10%.
(ii) The variable cost will be increased by 2% on sales
(iii) The fixed costs will increase by Rs. 50 crores, including depreciation on additions, but excluding interest on additional capital.
Additional capital of Rs. 100 crores will be needed for capital expenditure and working capital.
Required:
(i) Indicate the sales figure, with the working, that will be needed to earn Rs. 20 crores over and above the present profit and also meet 15% interest on the additional capital.
(ii) What will be the revised Break-even Sales, P/V Ratio and Margin of Safety.

Question 38 – Deleted as per new syllabus

Question 39– Deleted as per new syllabus

Question 40 – Deleted as per new syllabus

Question 41 – Deleted as per new syllabus

Question 42– Deleted as per new syllabus

Question 43

Guddu Ltd, manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	-
Direct Labour	15% of Cost of Goods Sold	-
Factory Overhead	10% of Cost of Goods Sold	Rs.2,30,000
Administration Overhead production activity	2% of Cost of Goods Sold	Rs 71,000
Selling & Distribution Overhead	4% of Cost of Sales	Rs.68,000

Last Year 5,000 units were sold at Rs.185 per unit. From the given data find the followings:

(a) Break-even Sales (in rupees)

(b) Profit earned during last year

(c) Margin of safety (in %)

(d) Profit if the sales were 10% less than the actual sales.

7B – TRANSFER PRICING

Question 44

A manufacturing company has two divisions-X and Y. Division X is mainly engaged in production of an electronic devices and Division Y packs and labels the Product and sells it in market. Division X supplies 25,000 units of the product per month to Y for packing and labelling. Division X incurs Rs.16 as the variable cost for the product fixed cost of Rs.8,40,000 per year. Investment in fixed assets is Rs.9,60,000. The division plans to have 12% return on fixed assets as normal profits. Division Y incurs Rs.10 per product as variable expenses for packaging and marketing .

(i) Find the Transfer Price per unit of the product that Division X can charge for Transfer to Y.

(ii) What will be profit of Division Y if it can sell all the products in the market at Rs.80 per unit?

(iii) If Division Y can sell only 15,000 units of the product per month and asks Division X to supply only 15,000 units, what will be the effect on the Transfer Price and the profits of the divisions?

Solution 44

(i) Computation of Transfer Price:

To be charged by 'X' to 'Y'

Variable Cost per unit	16
Fixed Cost per Unit (8,40,000/3,00,000)	2.80
Return per Unit (9,60,000 x 12%)/3,00,000	0.384
	19.184

(ii) Computation of Profit of Division 'Y'

Transfer Price	19.184
Variable cost	10
	29.184
Contribution and Profit per Unit	= (80 – 29.184)
	= 50.815
Monthly Profit	= 25,000 x 50.186
	= 12,70,400
and	
Yearly Profit	= 3,00,000 x 50.186

	= Rs.1,52,44,800

Transfer Price :

Variable cost per unit	16
Fixed Cost per Unit (8,40,000/ 1,80,000)	4.67
Return per Unit (9,60,000 x 12%)/1,80,000	0.64
	21.31
Variable Cost for Packaging and Marketing	10
	31.31
Contribution and Profit per Unit	48.69
	(80 – 31.31)

Question 45

A company has two divisions, manufacturing and assembly. At a normal volume of component YPY per year, production cost per unit are:

Direct materials	40
Direct labour	20
Variable factory overhead	12
Fixed factory overhead	42

The manufacturing division has been manufacturing and selling 2,50,000 components per year to outside buyers for Rs.136 each. However, the division can manufacture 3,50,000 components per year. The assembly division has been buying the components from outside suppliers for Rs.130 each. The assembly division has offered to purchase 90,000 units of component YPY from the manufacturing division at the rate of Rs.104 per unit. Should the manager of Electrical Division accept the offer? Will an interval transfer be of any benefit to the company?

Solution 45

There is surplus capacity in manufacturing division. So, the relevant cost for production will be variable cost only amounting to Rs.72 per unit (40 +20 + 12). This will result in a profit Rs.28,80,000 [(104 – 72) x 90,000].

Therefore, manufacturing division should accept the offer. Internal transfer will be beneficial to the company. The company is paying Rs.130 for the component which can be made internally at an incremental cost Of Rs.72.

The company will save Rs.52,20,000. [(130 – 72) x 90,000].

Question 46

Material costs, labour costs and variable overhead costs and Rs.125, Rs.150 and Rs.50 per unit respectively. If the fixed expenses for 20000 units are Rs.6,40,000 and required rate of return is 25% on transfer price, then find out the transfer price per unit.

Solution 46

Adding Desired return 25% on transfer price (1/3 of cost) = 357 x 4/3 = 476

Particulars	Rs.
Per unit variable cost (125 + 150 + 50)	325
Add : Fixed expenses per unit (Rs.6,40,000/20,000	32
Total cost per unit	357

Question 47

The following information relates to budgeted operations of Division P of a Manufacturing company.

Particulars	Amount in Rs.
Sales- 50,000 units @ Rs 8	4,00,000
0Less: Variable Costs @ Rs.6 per unit	3,00,000
Contribution margin	1,00,000
Less: Fixed Costs	75,000
Divisional Profits	25,000

The amount of divisional investments is Rs.1,50,000 and the minimum desired rate of return on the investments is the cost of capital of 20%.

Calculate

(i) Divisional expected ROI and

(ii) Divisional expected RI

Solution 47

(i)ROI = Rs.25,000/1,50,000 x 100 = 16.7%

(ii)RI = Divisional Profits – Minimum desired rate of return

= 25,000 – 20% of 1,50,000 = (Rs.5000)

Question 48

A company fixes the inter- divisional transfer prices for its products on the basis of costs plus an estimated return on investment in its divisions. The relevant portion of the budget for the Division X for the year 2015-16 is given below :

Particulars	Amount in Rs.
Fixed Assets	5,00,000
Current Assets (other than debtors)	3,00,000
Debtors	2,00,000
Annual fixed cost for the division	8,00,000
Variable cost per unit of product	10
Budgeted volume of production per year (units)	4,00,000
Desired Return on Investment	28%

You are required to determine the transfer price for Division X.

Solution 48

Computation of Transfer Price per unit for division X

Particulars	Amount in Rs.
Variable cost	10
Fixed cost (8,00,000/ 4,00,000)	2
Total cost	12
Add: Desired return (10,00,000 x 28%) ÷ 4,00,000	0.70
Transfer Price	12.70

Question 49

XYZ Ltd has a system of assessment of Divisional Performance on the basis of residual income has two Divisions, Alfa and Beta. Alfa has annual capacity to manufacture 15,00,000 numbers of special components that is sells to outside customers, but has idle capacity. The budgeted residual income of Beta is Rs.1,20,00,000 while that of Alfa is Rs.1,00,00,000. Other relevant details extracted from the budget of Alfa for the current years were as follows:

Particulars	
Sale (outside customers)	12,00,000 units @ 180 per unit
Variable cost per unit	Rs.160
Divisional fixed cost	Rs.80,00,000
Capital employed	Rs.7,50,00,000
Cost of capital	12%

Beta has just received a special order for which it requires components similar to the ones made by Alfa. Fully aware of the idle capacity of Alfa, beta has asked Alfa to quote for manufactures and supply of 3,00,000 numbers of the components with a slight modification during final processing. Alfa and Beta agree that this will involve an extra variable cost of Rs.5 per unit.

You are required to calculate,

The transfer price which Alfa should quote to Beta to achieve its budgeted residual income.

Solution 49

Computation of contribution per labour from external hour from external sales:

	X	Y	Z
Market price (Rs.)	48	46	40
Variable cost (Rs.)	33	24	28
Contribution	15	22	12
Labour hours required	3	4	2
Contribution per labour hour (Rs.)	5	5.50	6
Priority	III	II	I

Computation of transfer price when

The capacity is 3800 hours

Hours required for Z=300 x 2 = 600

Y = 500 x 4 = 2000

X = 800 x 3 = 2400

= 5000

The existing capacity is not sufficient to produce the units to meet the external Sales. In order to transfer 300 units of Y, 1200 hours are required in which Division A will give up the production of X to this extent.

	Rs.
Variable cost of Y	24
(+) contribution lost by giving up production of X to the Extent of 1200 hours = 1200 x 5 = Rs.6000	
∴ Opportunity cost per unit = (6000/300)	20
Required transfer price	44

(c) If the capacity is 5600 hours:

	Rs.
Variable cost	24
(+) contribution lost by giving up X to the Extent of 600 hours (being opportunity cost) = 600 x 5 = Rs.3000	
∴ Opportunity cost per unit = (3000/300)	10
Required transfer price	34

Question 50

The following is the statement of a Radical Co. for the month of June

Particulars	Products		Total (₹)
	L	M	
Sales	60,000	60,000	1,20,000
Less: Variable Costs	42,000	30,000	72,000
Contribution	18,000	30,000	48,000
Less: Fixed Cost			36,000
Net Income			12,000

You are required to compute the P/V Ratio for each product and then compute the P/V Ratio, Break Even Point and Net Income for the following assumption:

(i) Sales revenue divided as 60% to Product L & 40% to Product M

(ii) Sales revenue divided as 40% to Product L & 60% to Product M

	Product L (₹)	Product M (₹)	Total (₹)
P/V Ratio = Contribution/Sales ×100	= 18,000/60,000 ×100 = 30%	= 30,000/60,000 ×100 = 50%	= 48,000/1,20,000 ×100 = 40%

Solution 50

(i) Sales revenue divided 60% to Product L & 40% to Product M

Statement showing computation of P/V Ratio, Break Even Point and Net Income

	Product L (₹)	Product M (₹)	Total (₹)
Sales	1,20,000 × 60% = 72,000	1,20,000 × 40% = 48,000	1,20,000
Less: Variable Cost (Sales × Variable Cost Ratio)	72,000 × 70% = 50,400	48,000 × 50% = 24,000	74,400
Contribution (Sales × P/V Ratio)	72,000 × 30% = 21,600	48,000 × 50% = 24,000	45,600
Less: Fixed Cost			36,000
Net Income			9,600
P/V Ratio = Contribution/Sales × 100	21,600/72,000 × 100 = 30%	24,000/48,000 × 100 = 50%	45,600/1,20,000 × 100 = 38%
Break Even Sales			= 36,000/38%

= Fixed Cost / P/V Ratio			= 94,737

(ii) Sales revenue divided 40% to Product L & 60% to Product M

Statement showing computation of P/V Ratio, Break Even Point and Net Income

	Product L (₹)		Product M (₹)		Total (₹)
Sales	1,20,000 × 40%	48,000	1,20,000 × 60%	72,000	1,20,000
Less: Variable Cost (Sales × Variable Cost Ratio)	48,000 × 70%	33,600	72,000 × 50%	36,000	69,600
Contribution (Sales × P/V Ratio)	48,000 × 30%	14,400	72,000 × 50%	36,000	50,400
Less: Fixed Cost					36,000
Net Income					14,400
P/V Ratio = Contribution/Sales × 100	14,400/48,000 × 100 = 30%		36,000/72,000 × 100 = 50%		50,400/1,20,00 × 100 = 42%
Break Even Sales = Fixed Cost / P/V Ratio					= 36,000/42% = 85,714

Question 51

Accelerate Co. Ltd manufactures and sells four types of products under the brand name of A, B, C and D. The Sales Mix in value comprises 33⅓ %, 41⅔ %, 16⅔ % and 8⅓ %, of products A, B, C and D respectively. The total budgeted sales at 100% are ₹ 60,000 p.m. Operating Costs are:

Variable Costs:

Product A 60% of selling price

Product B 68% of selling price

Product C 80% of selling price

Product D 40% of selling price

Fixed Costs: ₹ 14,700 p.m.

(a) Calculate the break-even point for the products on overall basis

(b) Also calculate break-even point, if the sales mix is changed as follows the total sales per month remaining the same. Mix: A – 25%, B – 40%, C – 30%, D – 5%.

Solution 51

Calculation of Contribution of the Products

Particulars	Product A (₹)	Product B (₹)	Product C (₹)	Product D (₹)	Total (₹)
Sales	60,000 × 33⅓ % = 20,000	60,000 × 41⅔ % = 25,000	60,000 × 16⅔ % = 10,000	60,000 × 8⅓ % = 5,000	60,000
Less: Variable Cost	60% × 20,000 = 12,000	68% × 25,000 = 17,000	80% × 10,000 = 8,000	40% × 5,000 = 2,000	39,000
Contribution	8,000	8,000	2,000	3,000	21,000
Less: Fixed Cost					14,700
Profit					6,300
P/V Ratio = Contribution /Sales × 100	8,000 /20,000 × 100 = 40%	8,000 /25,000 × 100 = 32%	2,000 /10,000 × 100 = 20%	3,000/5,000 × 100 = 60%	21,000 /60,000 × 100 = 35%

(a) Break Even Sales = Fixed Cost / P/V Ratio = 14,700/35% = ₹ 42,000

Calculation of Contribution of the Products

Particulars	Product A (₹)	Product B (₹)	Product C (₹)	Product D (₹)	Total (₹)
Sales	60,000 × 25% = 15,000	60,000 × 40% = 24,000	60,000 × 30% = 18,000	60,000 × 5% = 3,000	60,000
Less: Variable Cost	60% × 15,000 = 9,000	68% × 24,000 = 16,320	80% × 18,000 = 14,400	40% × 3,000 = 1,200	40,920
Contribution	6,000	7,680	3,600	1,800	19,080
Less: Fixed Cost					14,700
Profit					4,380
P/V Ratio = Contribution /Sales × 100	6,000 /15,000 × 100 = 40%	7,680 /24,000 × 100 = 32%	2,600/18,000 × 100 = 20%	1,800/3,000 × 100 = 60%	19,080 /60,000×100 = 31.80%

(b) Break Even Sales = Fixed Cost / P/V Ratio = 14,700/31.80% = ₹ 46,226

Question 52

Present the following information to show to management:

(i) The marginal product cost and the contribution per unit

(ii) The total contribution and profits resulting from each of the following sales mix results:

Particulars	Product	Per unit
Direct Materials	A	10
Direct Materials	B	9
Direct Wages	A	3
Direct Wages	B	2

Fixed Expenses - ₹ 800

Variable expenses are allotted to products at 100% of Direct Wages

Sales Price A ₹ 20 Sales Price B ₹ 15

Sales Mixtures:

(a) 100 units of Product A and 200 units of Product B

(b) 150 units of Product A and 150 units of Product B

(c) 200 units of Product A and 100 units of Product B

Solution 52

Statement showing Marginal Product Cost and Contribution per unit

NO	Particulars	Product A (₹)	Product B (₹)
1.	Selling Price per unit	20.00	15.00
2.	Variable Cost		
	Direct Material cost per unit	10.00	9.00
	Direct Wages cost per unit	3.00	2.00
	Variable Expenses (100% of Direct Wages)	3.00	2.00
	Marginal Product Cost	16.00	13.00
3.	Contribution per unit (1. – 2.)	4.00	2.00

Computation of Profit under Sales Mix (a)

NO	Particulars	Product A (₹)	Product B (₹)	Total (₹)
1.	No. of units	100	200	
2.	Contribution per unit	4.00	2.00	
3.	Total Contribution (i. × ii.)	400	400	800
4.	Fixed Cost			800
5.	Profit (iii. – iv.)			Nil

Computation of Profit under Sales Mix (b)

NO	Particulars	Product A (₹)	Product B (₹)	Total (₹)
1.	No. of units	150	150	
2.	Contribution per unit	4.00	2.00	
3.	Total Contribution (i. × ii.)	600	300	900
4.	Fixed Cost			800
5.	Profit (iii. – iv.)			100

Computation of Profit under Sales Mix (c)

NO	Particulars	Product A (₹)	Product B (₹)	Total (₹)
1.	No. of units	200	100	
2.	Contribution per unit	4.00	2.00	
3.	Total Contribution (i. × ii.)	800	200	1,000
4.	Fixed Cost			800
5.	Profit (iii. – iv.)			200

Question 53

The following particulars are extracted from the records of a company:

Particulars	Per unit	
	Product A	Product B
Sales	100	120
Consumption of Material	2 kg	3 kg
Material cost	10	15
Direct wages cost	15	10
Direct expenses	5	6
Machine hours used	3 hours	2 hours
Overhead expenses		
Fixed	5	10
Variable	15	20
Direct wages per hour is ₹ 5		

(a) Comment on profitability of each product (both use the same raw material) when:

1. Total sales potential in units is limited;
2. Total sales potential in value is limited;
3. Raw material is in short supply;
4. Production capacity (in terms of machine hours) is the limiting factor.

(b) Assuming raw material as the key factor, availability of which is 10,000 kgs and each product cannot be sold more than 3,500 units, find out the product mix which will yield the maximum profit.

Solution 53

(a) Statement showing computation of contribution per unit of different factors of production and determination of profitability

NO	Particulars	Product A (₹)	Product B (₹)
1.	Selling price per unit	100	120
2.	Variable Cost per unit		
	Material	10	15
	Labour	15	10
	Direct expenses	5	6
	Variable overhead	15	20
3.	Total Variable Cost per unit	45	51

4.	Contribution per unit (1. – 3.)	55	69
5.	P/V Ratio = Contribution per unit/Selling Price per unit	55%	57.50%
6.	Contribution per kg of material	₹ 55/2 kg = ₹ 27.50	₹ 69/3 kg = ₹ 23
7.	Contribution per machine hour	₹ 55/3 hours = ₹ 18.33	₹ 69/2 hours = ₹ 34.50

From the above computation, we may comment upon the profitability in the following manner:

1. If total sales potential in units is limited, Product B is more profitable, it has more contribution per unit.
2. If total sales potential in value is limited, Product B is more profitable, because it has higher P/V Ratio.
3. If the raw material is in short supply, Product A is more profitable, because it has more contribution per kg of material.
4. If the production capacity is limited, Product B is more profitable, because it has more contribution per machine hour.

(b) Statement showing optimum product mix – when raw material is a limiting factor

NO	Particulars	Product A (₹)	Product B (₹)	Total (₹)
1.	No. of units	3,500	1,000	
2.	Contribution per unit	55	69	
3.	Total Contribution	1,92,500	69,000	2,61,500
4.	Fixed Cost	3,500 × 5 = 17,500	# 3,500 × 10 = 35,000	52,500
5.	Profit (3. – 4.)			2,09,000

Fixed cost is taken at maximum capacity

Working Notes

Available Material		10,000 kgs
Less: Utilized for Product A	3,500 units × 2 kg/unit	7,000 kgs
Balance quantity available for Production of Product B		3,000 kgs

Number of units of Production of Product B = 3000 kg/3 kg per unit = 1,000 units

Question 54

A company has a capacity of producing 1 lakh units of a certain product in a month. The sales department reports that the following schedule of sales price is possible:

Volume of Production (%)	Selling Price per unit (₹)
60	0.90
70	0.80
80	0.75
90	0.67
100	0.61

The variable cost of manufacture between these levels is 15 paise per unit and fixed cost ₹ 40,000. Prepare a statement showing incremental revenue and differential cost at each stage. At which volume of production will the profit be maximum?

Solution 54

Statement showing computation of differential cost, incremental revenue and determination of capacity at which profit is maximum:

Capacity %	Units	Sales (₹)	Variable Cost @ ₹ 0.15 per unit (₹)	Fixed cost (₹)	Total Cost (₹)	Profit (₹)	Differential Cost (₹)*	Incremental Revenue (₹)#
1.	2.	3.	4.SS	5	6 = 4 + 5	7 = 3 - 6	8.	9.
60	60,000	54,000	9,000	40,000	49,000	5,000	-	-
70	70,000	56,000	10,500	40,000	50,500	5,500	1,500	2,000
80	80,000	60,000	12,000	40,000	52,000	8,000	1,500	4,000
90	90,000	60,300	13,500	40,000	53,500	6,800	1,500	300
100	1,00,000	61,000	15,000	40,000	55,000	6,000	1,500	700

*Differential Cost is the change in total cost with respect to previous year.
#Incremental Revenue is the change in the value of sales over previous year.
The incremental revenue is more than incremental cost up to 80% capacity, the profit is maximum at that capacity.

Question 55

A company is at present working at 90% of its capacity and producing 13,500 units per annum. It operates a flexible budgetary control system. The following figures are obtained from its budget:

	90% Amount (₹)	100% Amount (₹)
Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	97,500	1,00,500
Variable expenses	1,45,000	1,49,500
Units made	13,500	15,000

Labour and material costs per unit are constant under present conditions. Profit margin is 10%.

(a) You are required to determine the differential cost of producing 1,500 units by increasing capacity to 100%.

(b) What would you recommend for an export price for these 1,500 units taking into account that overseas prices are much lower than indigenous prices?

Solution 55

Computation of Material and Labour cost

Particulars	Amount (₹)	Amount (₹)
Sales at present		15,00,000
Less: Profit @ 10%		1,50,000
Total Cost		13,50,000
Less: All costs other than material and labour		
Fixed expenses	3,00,500	
Semi fixed expenses	97,500	
Variable expenses	1,45,000	5,43,000
Material and Labour Cost		8,07,000

(a) Statement showing differential cost of producing 1,500 units

Particulars	Amount (₹)
Material and Labour Cost = $\left(₹\ 8{,}07{,}000 \times \frac{1{,}500\ units}{13{,}500\ units}\right)$	89,667
Fixed expenses (3,00,600 – 3,00,500)	100
Semi-fixed expenses (1,00,500 – 97,500)	3,000
Variable expenses (1,49,500 – 1,45,000)	4,500
Differential cost	97,267

(b) Differential cost per unit = $\frac{₹97{,}267}{1{,}500\ units}$ = ₹ 64.84

The minimum price for these 1,500 units should not be less than ₹ 64.84 for export.

Question 56

A company manufactures scooters and sells it at ₹ 3,000 each. An increase of 17% in cost of materials and of 20% of labour cost is anticipated. The increased cost in relation to the present sales price would cause at 25% decrease in the amount of the present gross profit per unit.

At present, material cost is 50%, wages 20% and overhead is 30% of cost of sales.

You are required to:

(a) Prepare a statement of profit and loss per unit at present

(b) Compute the new selling price to produce the same percentage of profit to cost of sales as before.

Solution 56

Let the total cost per unit at present be ₹ X and Profit per unit be ₹ Y

Particulars	Present Cost Structure (₹)	Percentage increase/decrease	Anticipated Cost Structure (₹)
Material	0.50X	17% increase = 0.50X × 117%	0.585X
Labour	0.20X	20% increase = 0.20X × 120%	0.24X
Overhead	0.30X		0.30X
Total (Cost of Sales)	X		1.125X

Profit	Y	25% decrease = Y × 75%	0.75Y
Sales	3,000		3,000

So, two equations are $X + Y = 3,000$..... (i)

and $1.125X + 0.75Y = 3,000$..... (ii)

Multiplying equation (i) by 1.125 and subtracting equation (ii) from (i)

$1.125X + 1.125Y = 3,375$

$(-)\ 1.125X + 0.75Y = 3,000$

$0.375Y = 375$

or, Y = 1,000 or, Profit = ₹ 1,000

by putting the value of Y = 1,000 in equation (i)

or, X + 1,000 = 3,000

or, X = 2,000

or Total Cost = ₹ 2,000

(a) Statement showing Profit or Loss per unit at present

Particulars	Workings	(₹)
Material	0.50 × 2,000	1,000
Labour	0.20 × 2,000	400
Overheads	0.30 × 2,000	600
Total Cost		2,000
Profit		1,000
Selling Price per unit		3,000

Percentage of Profit on Sales = $\frac{Profit}{Sales} \times 100 = \frac{₹1,000}{₹3,000} \times 100 = 33\ 1/3\% = 1/3^{rd}$ of Sales

(b) Computation of New Selling Price to get same percentage of profit on sales

Particulars	Workings	(₹)
Material	0.585 × 2,000	1,170
Labour	0.24 × 2,000	480
Overheads	0.30 × 2,000	600
Total Cost		2,250
Profit	Bal. fig. on Sales × 1/3	1,125
Selling Price per unit	(Working Note)	3,375

Working Note

Cost + Profit = Sales

or, 2,250 +1/3 × Sales = Sales

or,1/3 × Sales = 2,250

or Sales = 3,375

Question 57

Mr. Young has ₹ 1,50,000 investment in a business. He wants a 15% profit on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60% of sales; his fixed costs are ₹ 75,000 per year.

Show supporting computations for each Solution:

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

(b) What sales volume must be obtained to his 15% return of investment?

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

Solution 57

Variable Cost Ratio = 60% (given)

P/V Ratio = 1 – Variable Cost Ratio = 1 – 60% = 40%

(a) Break Even Point (in ₹) = $\frac{Fixed\ Cost}{P/V\ Ratio} = \frac{75,000}{40\%}$ = ₹ 1,87,500

(b) Desired Profit = 1,50,000 × 15% = ₹ 22,500

Expected Sales = $\frac{Fixed\ Cost + Desired\ Profit}{P/V\ Ratio} = \frac{75,000 + 22,500}{40\%}$ = ₹ 2,43,750

(c) Shut Down Sales = $\frac{Fixed\ Cost - Shut\ Down\ Cost}{P/V\ Ratio} = \frac{75,000 - 25,000}{40\%}$ = ₹ 1,25,000