

**Problems on BEA****Formulas:**

(1) **Contribution (C)** = Sales (S) – Variable Cost (VC) **or** Fixed Cost (FC) + Profit (P) **or**
Sales x Profit Volume (PV) Ratio

(2) **Profit Volume (PV) Ratio** = $\frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100$ **or** $\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

(3) **Break-even Point (BEP)**

(a) **BEP [in units/in volume]** = $\frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}}$

(b) **BEP [in Sales/in Value/in Rupees]** = $\frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}}$

(4) **Margin of Safety (MOS)** = Real Sales – BEP Sales **or** $\frac{\text{Profit (P)}}{\text{Pv Ratio}}$ **or** Sales x % of MOS

(5) **Desired Profit/ Desired Sales**

S = $\frac{\text{Fixed Cost (FC)} + \text{Profit (P)}}{\text{Contribution (C)/Pv Ratio}}$

(6) **Actual Sales for the Year** = $\frac{\text{BEP Sales} \times 100}{100 - \% \text{ of MOS}}$

Model-I

(Q-1) Determine BEP if Fixed Cost is Rs.10.00 Lakhs, Contribution Margin per Unit is Rs.20/-.

Sol: Given data FC = 10,00,000 and C = Rs.20

$$\begin{aligned} \text{BEP (in units/ in volume)} &= \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \\ &= \frac{10,00,000}{20} = 50,000 \text{ units} \end{aligned}$$

(Q-2) A company makes a single product with sales price of Rs. 10, variable cost of Rs. 6 and fixed cost of Rs. 60,000. Find (a) Number of units to break even (b) Sales at break-even (c) Contribution to sales ratio.

Sol: Given SP=Rs.10, VC = Rs.6 and FC = Rs.60,000

$$C = SP - VC \Rightarrow 10 - 6 = \text{Rs.4}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{4}{10} \times 100 \Rightarrow 40\% \text{ or } 0.40$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{60,000}{4} \Rightarrow 15,000 \text{ units}$$



$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{60,000}{0.40} \Rightarrow \text{Rs.1,50,000}$$

(Q-3) A firm has a fixed cost of Rs.600000/-; selling price per unit is Rs.600/- and variable cost per unit is Rs.350/- present level of production is 42000 units, calculate BEP in terms of volume and sales value.

Sol: Given SP=Rs.600, VC = Rs.350, FC = Rs.6,00,000 and present level of production = 42,000 units.

$$C = SP - VC \Rightarrow 600 - 350 = \text{Rs.250}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{250}{600} \times 100 \Rightarrow 41.67\% \text{ or } 0.4167$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{6,00,000}{250} \Rightarrow 2,400 \text{ units}$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{6,00,000}{0.4167}$$

$$\Rightarrow \text{Rs.14,39,884.81}$$

(Q-4) XYZ Company has a fixed cost of Rs. 24,000; selling price per unit at Rs. 12 and variable cost per unit is Rs. 8. Find (a) BEP in terms of volume and value and (b) the margin of safety at 18,000 units of production.

Sol: Given SP=Rs.12, VC = Rs.8, FC = Rs.24,000 and margin of safety at 18,000 units of production.

$$C = SP - VC \Rightarrow 12 - 8 = \text{Rs.4}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{4}{12} \times 100 \Rightarrow 33.33\% \text{ or } 0.3333$$

$$(a) (i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{24,000}{4} \Rightarrow 6,000 \text{ units}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{24,000}{0.3333}$$

$$\Rightarrow \text{Rs.72,007.20}$$

(c) Margin of Safety (MOS) = Real Sales – BEP Sales

$$\Rightarrow \text{Real Sales} = \text{Production (in units)} \times \text{Selling Price per unit}$$

$$\Rightarrow 18,000 \times 12 = \text{Rs.2,16,000}$$

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$2,16,000 - 72,007.20 \Rightarrow \text{Rs.1,43,992.80}$$

$$\text{MOS} = \text{Rs.1,43,992.80}$$



(Q-5) ABC firm has a fixed cost of Rs.500000/-; selling price per unit is Rs.500/- and variable cost per unit is Rs.250/- present level of production is 35000 units, calculate BEP in terms of volume and sales value and also Margin of safety.

Sol: Given SP=Rs.500, VC = Rs.250, FC = Rs.5,00,000 and present level of production = 35,000 units.

$$C = SP - VC \Rightarrow 500 - 250 = \text{Rs.}250$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{250}{500} \times 100 \Rightarrow 50\% \text{ or } 0.50$$

$$\text{(i) BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{5,00,000}{250} \Rightarrow 2,000 \text{ units}$$

$$\begin{aligned} \text{(ii) BEP [in Sales/in Value/in Rupees]} &= \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{5,00,000}{0.50} \\ &\Rightarrow \text{Rs.}10,00,000 \end{aligned}$$

$$\text{(iii) Margin of Safety (MOS)} = \text{Real Sales} - \text{BEP Sales}$$

$$\Rightarrow \text{Real Sales} = \text{Production (in units)} \times \text{Selling Price per unit}$$

$$\Rightarrow 35,000 \times 500 = \text{Rs.}1,75,00,000$$

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$1,75,00,000 - 10,00,000 \Rightarrow \text{Rs.}1,65,00,000$$

$$\text{MOS} = \text{Rs.}1,65,00,000$$

(Q-6) Consider the following data of a company:

Sales = Rs. 40,000;

Fixed cost = Rs. 7500;

Variable cost = Rs. 17,500;

Find the following: (a) Contribution (b) Profit (c) BEP (d) M.S.

Sol: (a) $C = S - VC \Rightarrow 40,000 - 17,500 = \text{Rs.}22,500$

(b) $C = \text{Fixed Cost (FC)} + \text{Profit (P)} \Rightarrow 22,500 = 7,500 + P$

$$P = 22,500 - 7,500$$

$$\Rightarrow \text{Profit (P)} = \text{Rs.}15,000$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{22,500}{40,000} \times 100 \Rightarrow 56.25\% \text{ or } 0.5625$$

$$\begin{aligned} \text{(c) BEP [in Sales/in Value/in Rupees]} &= \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{7,500}{0.5625} \\ &\Rightarrow \text{Rs.}13,333.33 \end{aligned}$$



(d) Margin of Safety (MOS) = Real Sales – BEP Sales

$$40,000 - 13,333 \Rightarrow \text{Rs.}26,667$$

$$\text{MOS} = \text{Rs.}26,667$$

(Q-7) Calculate from the following information:

Particulars	2019 (Rs.)	2020 (Rs.)
Sales	5,00,000	7,50,000
Fixed Costs	1,00,000	1,25,000
Variable Costs	2,75,000	4,50,000

Find out (a) P/V ratio (b) B.E.P (c) Margin of Safety

Sol: Contribution (C) = Sales (S) – Variable Cost (VC)

$$\text{2019} \Rightarrow 5,00,000 - 2,75,000 = \text{Rs.}2,25,000$$

$$\text{2020} \Rightarrow 7,50,000 - 4,50,000 = \text{Rs.}3,00,000$$

$$(a) \text{ PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100$$

$$\text{2019} \Rightarrow \frac{2,25,000}{5,00,000} \times 100 \Rightarrow 45\% \text{ or } 0.45$$

$$\text{2020} \Rightarrow \frac{3,00,000}{7,50,000} \times 100 \Rightarrow 40\% \text{ or } 0.40$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}}$$

$$\text{2019} \Rightarrow \frac{1,00,000}{0.45} \Rightarrow \text{Rs.}2,22,222$$

$$\text{2020} \Rightarrow \frac{1,25,000}{0.40} \Rightarrow \text{Rs.}3,12,500$$

(c) Margin of Safety (MOS) = Real Sales – BEP Sales

$$\text{2019} \Rightarrow 5,00,000 - 2,22,222 \Rightarrow \text{Rs.}2,77,778$$

$$\text{2020} \Rightarrow 7,50,000 - 3,12,500 \Rightarrow \text{Rs.}4,37,500$$

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Model-II

(Q-8) Determine P/V Ratio %, Fixed Cost and BEP with the help of following Information:

Description	2014-15	2015-16
Sales (Rs.)	10,00,000	40,00,000
Profit (Rs.)	2,00,000	12,00,000

Sol: (a) Profit-Volume (PV) Ratio = $\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

$$= \frac{12,00,000 - 2,00,000}{40,00,000 - 10,00,000} \times 100 \Rightarrow = \frac{10,00,000}{30,00,000} \times 100 \Rightarrow 33.33\% \text{ or } 0.3333$$

(b) Calculation of Fixed Cost (FC)

Using 3 formula of Contribution (C) = Sales x PV Ratio

Note: Choose either first year or second sales and profit. Don't take first sales and second year profit and vice-versa.

$$\text{Let us select 2014-15} \quad = 10,00,000 \times 0.3333 \Rightarrow \text{Rs.}3,33,300$$

Using 2 formula of Contribution (C) = Fixed Cost (FC) + Profit (P)

$$3,33,300 = \text{FC} + 2,00,000$$

$$\Rightarrow \text{FC} = 3,33,300 - 2,00,000 \Rightarrow \text{Rs.}1,33,300$$

$$\text{(c) BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{1,33,300}{0.3333}$$

$$\Rightarrow \text{Rs.}1,33,939.99$$

(Q-9) Determine Margin of Safety for two periods and BEP with the help of following Information:

Description	2014-15	2015-16
Sales (Rs.)	20,00,000	80,00,000
Profit (Rs.)	5,00,000	20,00,000

Sol: (a) Profit-Volume (PV) Ratio = $\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

$$= \frac{20,00,000 - 5,00,000}{80,00,000 - 20,00,000} \times 100 \Rightarrow = \frac{15,00,000}{60,00,000} \times 100 \Rightarrow 25\% \text{ or } 0.25$$

(b) Calculation of Fixed Cost (FC)

Using 3 formula of Contribution (C) = Sales x PV Ratio



Note: Choose either first year or second sales and profit. Don't take first sales and second year profit and vice-versa.

$$\text{Let us select 2015-16} \quad = 80,00,000 \times 0.25 \Rightarrow \text{Rs.}20,00,000$$

Using 2 formula of Contribution (C) = Fixed Cost (FC) + Profit (P)

$$20,00,000 = \text{FC} + 20,00,000$$

$$\Rightarrow \text{FC} = 20,00,000 - 20,00,000 \Rightarrow \text{Rs.}0$$

$$(c) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{0}{0.25} \Rightarrow \text{Rs.}0$$

Check above results with using Alternative formulas, calculation of BEP

$$\text{Using MOS 2 formula, MOS} = \frac{\text{Profit}}{\text{PV Ratio}}$$

$$\text{Let us select 2014-15 year} \Rightarrow \frac{5,00,000}{0.25} \Rightarrow \text{Rs.}20,00,000$$

Now, using 1 formula of MOS = Real Sales – BEP Sales

$$20,00,000 = 20,00,000 - \text{BEP Sales}$$

$$\text{BEP Sales} = 20,00,000 - 20,00,000$$

$$\text{BEP Sales} = \text{Rs.}0$$

(Q-10) Following records are available from the accounting records of Praveen Ltd.:

Year	Sales (Rs.)	Profit/Loss (Rs.)
2019	25,000	5000 (loss)
2020	75,000	5000 (profit)

Find out:

(a) P/V Ratio (b) Fixed Cost (c) Marginal Cost for 2019 and 2020 (d) B.E.P (e) Margin of safety for the profit of Rs.10,000.

$$\text{Sol: (a) Profit-Volume (PV) Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

$$= \frac{5,000 - (-5,000)}{75,000 - 25,000} \times 100 \Rightarrow = \frac{10,000}{50,000} \times 100 \Rightarrow 20\% \text{ or } 0.20$$

(b) Calculation of Fixed Cost (FC)

Using 3 formula of Contribution (C) = Sales x PV Ratio

Note: Choose either first year or second sales and profit. Don't take first sales and second year profit and vice-versa.



Let us select 2020 data $= 75,000 \times 0.20 \Rightarrow \text{Rs.}15,000$

Using 2 formula of Contribution (C) = Fixed Cost (FC) + Profit (P)

$$15,000 = \text{FC} + 5,000$$

$$\Rightarrow \text{FC} = 15,000 - 5,000 \Rightarrow \text{Rs.}10,000$$

$$(c) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{10,000}{0.20} \Rightarrow \text{Rs.}50,000$$

$$(d) \text{ Margin of Safety (MOS) (2 formula,)} \text{ MOS} = \frac{\text{Profit}}{\text{PV Ratio}}$$

$$\text{Let us select 2020 data} \Rightarrow \frac{5,000}{0.20} \Rightarrow \text{Rs.}50,000$$

(Q-11) A company reported the following results for two periods

Period	Sales (Rs.)	Profit (Rs.)
I	20,00,000	2,00,000
II	25,00,000	3,00,000

Ascertain B.E.P, P/V Ratio, Fixed Cost and Margin of Safety.

$$\text{Sol: (a) Profit-Volume (PV) Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

$$= \frac{3,00,000 - (2,00,000)}{25,00,000 - 20,00,000} \times 100 \Rightarrow = \frac{1,00,000}{5,00,000} \times 100 \Rightarrow 20\% \text{ or } 0.20$$

(b) Calculation of Fixed Cost (FC)

Using 3 formula of Contribution (C) = Sales x PV Ratio

Note: Choose either first year or second sales and profit. Don't take first sales and second year profit and vice-versa.

Let us select I Year data $= 20,00,000 \times 0.20 \Rightarrow \text{Rs.}4,00,000$

Using 2 formula of Contribution (C) = Fixed Cost (FC) + Profit (P)

$$4,00,000 = \text{FC} + 2,00,000$$

$$\Rightarrow \text{FC} = 4,00,000 - 2,00,000 \Rightarrow \text{Rs.}2,00,000$$

$$(c) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{2,00,000}{0.20} \Rightarrow \text{Rs.}10,00,000$$

(d) Margin of Safety (MOS) using 1st Formula MOS = Real Sales – BEP Sales

$$= 20,00,000 - 10,00,000 \Rightarrow \text{Rs.}10,00,000$$

**Model-III**

(Q-12) If sales are 20,000 units and selling price is Rs. 12 per unit, variable cost Rs. 7 per unit and fixed cost is Rs. 90,000. Find out BEP in units and sales revenue. What should be the sales for earning a profit of Rs. 50,000/-.

Sol: Given SP=Rs.12, VC = Rs.7, FC = Rs.90,000 and present level of Sales = 20,000 units.

$$C = SP - VC \Rightarrow 12 - 7 = \text{Rs.}5$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{5}{12} \times 100 \Rightarrow 41.67\% \text{ or } 0.4167$$

$$\text{(i) BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{90,000}{5} \Rightarrow 18,000 \text{ units}$$

$$\begin{aligned} \text{(ii) BEP [in Sales/in Value/in Rupees]} &= \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{90,000}{0.4167} \\ &\Rightarrow \text{Rs.}2,15,982.72 \end{aligned}$$

(iii) Margin of Safety (MOS) = Real Sales – BEP Sales

$$\Rightarrow \text{Real Sales} = \text{Production (in units)} \times \text{Selling Price per unit}$$

$$\Rightarrow 20,000 \times 12 = \text{Rs.}2,40,000$$

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$2,40,000 - 2,15,982.72 \Rightarrow \text{Rs.}24,017.28$$

$$\text{MOS} = \text{Rs.}24,017.28$$

(iv) What should be the sales for earning a profit of Rs. 50,000/-.

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \Rightarrow \frac{90,000 + 50,000}{0.4167} \Rightarrow \text{Rs.}3,35,973.12$$

(Q-13) ABC Company has supplied the following information.

No. of units sold 20,000 units,

Fixed cost: Rs. 2, 00, 000

Variable cost per unit Rs. 10

Selling price per unit. Rs. 20

Find out:

- BEP in units
- Margin of safety
- Sales to get a profit of Rs. 1,00,000
- Verify the results in all the above cases

Sol: Given SP=Rs.20, VC = Rs.10, FC = Rs.2,00,000 and No. of units sold 20,000 units

$$C = SP - VC \Rightarrow 20 - 10 = \text{Rs.}10$$



$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{10}{20} \times 100 \Rightarrow 50\% \text{ or } 0.50$$

$$(i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{2,00,000}{10} \Rightarrow 20,000 \text{ units}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{2,00,000}{0.50} \\ \Rightarrow \text{Rs.4,00,000}$$

$$(iii) \text{ Margin of Safety (MOS)} = \text{Real Sales} - \text{BEP Sales}$$

$$\Rightarrow \text{Real Sales} = \text{Production (in units)} \times \text{Selling Price per unit}$$

$$\Rightarrow 20,000 \times 20 = \text{Rs.4,00,000}$$

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$4,00,000 - 4,00,000 \Rightarrow \text{Rs.0}$$

$$\text{MOS} = \text{Rs.0}$$

$$(iv) \text{ Sales to get a profit of Rs. 1,00,000}$$

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \Rightarrow \frac{2,00,000 + 1,00,000}{0.50} \Rightarrow \text{Rs.6,00,000}$$

(Q-14) Information regarding Sanjeev Ltd. Are available as follows:

Particulars	Amount (in Rs.)
Sales	6,00,000
Less: Variable Cost	4,50,000
Contribution	1,50,000
Less: Fixed Cost	90,000
Profit	60,000

You calculate:

(a) P/V ratio

(b) BEP in sales revenue

(c) Margin of safety

(d) Profit on the sales of Rs.9,00,000

(e) Required sales to earn a net profit of Rs.90,000

$$\text{Sol: (i) PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{1,50,000}{6,00,000} \times 100 \Rightarrow 25\% \text{ or } 0.25$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{90,000}{0.25} \\ \Rightarrow \text{Rs.3,60,000}$$

$$(iii) \text{ Margin of Safety (MOS)} = \text{Real Sales} - \text{BEP Sales}$$



$$6,00,000 - 3,60,000 \Rightarrow \text{Rs.} 2,40,000$$

$$\text{MOS} = \text{Rs.} 2,40,000$$

(iv) Profit on the sales of Rs.9,00,000

$$\text{Desired Profit } S = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}}$$

$$\Rightarrow 9,00,000 = \frac{90,000 + \text{Profit}}{0.25} \Rightarrow \text{Profit} = (9,00,000 \times 0.25) - 90,000$$

$$\Rightarrow \text{Profit} = 2,25,000 - 90,000 = \text{Rs.} 1,35,000$$

(v) Required sales to earn a net profit of Rs.90,000

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \Rightarrow \frac{90,000 + 90,000}{0.25} \Rightarrow \text{Rs.} 7,20,000$$

(Q-15) From the following data calculate the break-even volume:

Fixed cost Rs. 10,000

Selling price ----Rs. 7 per unit

Variable cost ---Rs. 3 per unit

Suppose the price reduces by Rs. 2 per unit, what would you say about the break-even position?

Sol: $C = SP - VC \Rightarrow 7 - 3 = \text{Rs.} 4$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{4}{7} \times 100 \Rightarrow 57.14\% \text{ or } 0.5714$$

$$(i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{10,000}{4} \Rightarrow 2,500 \text{ units}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{10,000}{0.5714}$$

$$\Rightarrow \text{Rs.} 17,500$$

(iii) If selling is reduced by Rs.2, find the new BEP

$$\text{New SP} = \text{Previous SP} - \text{Reduced SP}$$

$$\Rightarrow 7 - 2 = \text{Rs.} 5$$

$$\text{New SP} = \text{Rs.} 5, \text{ VC} = \text{Rs.} 3 \text{ and FC} = \text{Rs.} 10,000$$

$$C = SP - VC \Rightarrow 5 - 3 = \text{Rs.} 2$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{2}{5} \times 100 \Rightarrow 40\% \text{ or } 0.40$$

$$(i) \text{ New BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{10,000}{2} \Rightarrow 5,000 \text{ units}$$



$$(ii) \text{ New BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{10,000}{0.40} \\ \Rightarrow \text{Rs.25,000}$$

(Q-16) Rahim sells 500 kg of sweets per hour at a rate of Rs 100 per kg. The fixed overhead is Rs 7000 and the variable cost is Rs 25 per kg. There is a proposal to reduce the price by 10%. Calculate the present PV and present BEP both in units and in Rupees; present level of profit and future PV ratio and BEP both in units and in Rupees. How many kilograms must be sold to earn present level of profit?

Sol: (A) Given SP=Rs.100, VC = Rs.25, FC = Rs.7,000 and No. of units sold 500 Kgs

$$C = SP - VC \Rightarrow 100 - 25 = \text{Rs.75}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{75}{100} \times 100 \Rightarrow 75\% \text{ or } 0.75$$

$$(i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{7,000}{75} \Rightarrow 93.33 \text{ Kgs}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{7,000}{0.75} \\ \Rightarrow \text{Rs.9,333}$$

(iii) Present level of Profit, using 2nd formulation of Contribution

$$\text{Contribution (C)} = \text{Fixed Cost (FC)} + \text{Profit (P)}$$

$$\text{Contribution (in Rs.)} = 500\text{Kgs} \times \text{Contribution per unit}$$

$$\Rightarrow 500 \times 75 = \text{Rs.37,500}$$

$$\Rightarrow 37,500 = 7,000 + \text{Profit}$$

$$\Rightarrow \text{Profit} = 37,500 - 7000 = \text{Rs.30,500}$$

(B) If a proposal to reduce the price by 10%.

$$\text{New SP} = \text{Previous SP} - \text{Reduced SP}$$

$$\Rightarrow 100 - (100 - 10\%) \Rightarrow 100 - 10 \Rightarrow \text{Rs.90}$$

New SP = Rs.90, VC= Rs.25 and FC= Rs.7,000

$$C = SP - VC \Rightarrow 90 - 25 = \text{Rs.65}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{65}{90} \times 100 \Rightarrow 72.22\% \text{ or } 0.7222$$

$$(i) \text{ New BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{7,000}{65} \Rightarrow 107.69 \text{ Kgs}$$



$$(ii) \text{ New BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{7,000}{0.7222} \\ \Rightarrow \text{Rs.9,692.60}$$

(iii) Present level of Profit, using 2nd formulation of Contribution

$$\text{Contribution (C)} = \text{Fixed Cost (FC)} + \text{Profit (P)}$$

$$\text{Contribution (in Rs.)} = 500\text{Kgs} \times \text{Contribution per unit}$$

$$\Rightarrow 500 \times 65 = \text{Rs.32,500}$$

$$\Rightarrow 32,500 = 7,000 + \text{Profit}$$

$$\Rightarrow \text{Profit} = 32,500 - 7000 = \text{Rs.25,500}$$

(Q-17) A company produces a single article and sells it at Rs.10 each. The marginal cost of production is Rs.6 each and total fixed cost of the concern is Rs.400 per annum.

Find out:

(i) Breakeven point

(ii) Margin of safety at sale of Rs.1500

(iii) Increase in selling price if break-even point is reduced to 80 units.

Sol: Given, SP=Rs.10, VC (Marginal Cost) = Rs.6, FC = Rs.400

$$C = SP - VC \Rightarrow 10 - 6 = \text{Rs.4}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{4}{10} \times 100 \Rightarrow 40\% \text{ or } 0.40$$

$$(i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{400}{4} \Rightarrow 100 \text{ units}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{400}{0.4} \\ \Rightarrow \text{Rs.1,000}$$

(iii) Margin of safety at sale of Rs.1500

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$\Rightarrow 1,500 - 1,000 \Rightarrow \text{Rs.500}$$

$$\text{MOS} = \text{Rs.500}$$

(iii) Increase in selling price if break-even point is reduced to 80 units.

$$\text{BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}}$$

$$\Rightarrow 80 = \frac{400}{C} \Rightarrow \text{Contribution} = \frac{400}{80} \Rightarrow \text{Rs.5 per unit}$$



Using 1st formula of Contribution, find the Selling Price (SP)

$$C = SP - VC$$

$$5 = SP - 6 \Rightarrow SP = 5 + 6 \Rightarrow \text{Rs.11}$$

$$SP = \text{Rs.11}$$

(Q-18) The following information are available:

Fixed Expenses- Rs.50,000

Variable Expenses- Rs.40 per unit

Selling Price- Rs.60 per unit

Calculate the following:

(a) B.E.P in units

(b) Sales volume to earn a profit of Rs.50,000

(c) What additional units would be necessary to increase the profit by Rs.5,000?

Sol: $C = SP - VC \Rightarrow 60 - 40 = \text{Rs.20}$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{20}{60} \times 100 \Rightarrow 33.33\% \text{ or } 0.3333$$

$$(i) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{50,000}{20} \Rightarrow 2,500 \text{ units}$$

$$(ii) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{50,000}{0.3333}$$

$$\Rightarrow \text{Rs.1,50,015}$$

(iii) Sales volume to earn a profit of Rs.50,000

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}}$$

$$= \frac{50,000 + 50,000}{0.3333} \Rightarrow \text{Rs.3,00,030}$$

(iv) What additional units would be necessary to increase the profit by Rs.5,000?

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Contribution (C)}} \Rightarrow \frac{50,000 + 5,000}{20} \Rightarrow 2,750 \text{ units}$$

(Q-19) Pepsi Company produces a single article. Following cost data is given about its product: Selling price per unit Rs.40, Marginal cost per unit Rs.24, Fixed cost per annum Rs. 16000.

Calculate:

(a) P/V ratio

(b) Break even sales

(c) Sales to earn a profit of Rs. 2,000

(d) Profit at sales of Rs. 60,000

(e) New break even sales, if price is reduced by 10%.



Sol: Given, SP=Rs.40, VC (Marginal Cost) = Rs.24, FC = Rs.16,000

$$C = SP - VC \Rightarrow 40 - 24 = \text{Rs.}16$$

$$(a) \text{ PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{16}{40} \times 100 \Rightarrow 40\% \text{ or } 0.40$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{16,000}{0.4} \Rightarrow \text{Rs.}40,000$$

(c) Sales volume to earn a profit of Rs.2,000

$$\begin{aligned} \text{Desired Sales} &= \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \\ &= \frac{16,000 + 2,000}{0.40} \Rightarrow \text{Rs.}45,000 \end{aligned}$$

(d) Profit on the sales of Rs.60,000

$$\begin{aligned} \text{Desired Profit} \Rightarrow S &= \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \\ \Rightarrow 60,000 &= \frac{16,000 + \text{Profit}}{0.40} \Rightarrow \text{Profit} = (60,000 \times 0.40) - 16,000 \\ \text{Profit} &= 24,000 - 16,000 = \text{Rs.}8,000 \end{aligned}$$

(e) New break even sales, if price is reduced by 10%.

New SP = $[40 - (40 \times 10\%)] = 32$, VC (Marginal Cost) = Rs.24, FC = Rs.16,000

$$C = SP - VC \Rightarrow 32 - 24 = \text{Rs.}8$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{8}{32} \times 100 \Rightarrow 25\% \text{ or } 0.25$$

$$\text{New BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{16,000}{0.25} \Rightarrow \text{Rs.}64,000$$

(Q-20) Raju & Co., has supplied you the following information. Fixed Cost Rs. 2,40,000; Variable Cost per Unit Rs.15; Selling Price per Unit Rs.30 Find out: (a) BEP Units (b) BEP in Rupees (c) Margin of Safety at a sales of Rs.6,00,000 (d) Sales to get a profit of Rs.2,00,000.

Sol: Given, SP=Rs.30, VC = Rs.15, FC = Rs.2,40,000

$$C = SP - VC \Rightarrow 30 - 15 = \text{Rs.}15$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{15}{30} \times 100 \Rightarrow 50\% \text{ or } 0.50$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{2,40,000}{15} \Rightarrow 16,000 \text{ units}$$



$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{2,40,000}{0.5} \Rightarrow \text{Rs.4,80,000}$$

(c) Margin of safety at sale of Rs.6,00,000

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$\Rightarrow 6,00,000 - 4,80,000 \Rightarrow \text{Rs.1,20,000}$$

$$\text{MOS} = \text{Rs.1,20,000}$$

(d) Sales to get a profit of Rs.2,00,000.

$$\begin{aligned} \text{Desired Sales} &= \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \\ &= \frac{2,40,000 + 2,00,000}{0.50} \Rightarrow \text{Rs.8,80,000} \end{aligned}$$

(Q-21) If Sales are 10,000 Units and selling price is Rs.15 per unit, Variable cost is Rs.8 per unit and fixed cost is Rs.70,000. Find out BEP in terms of Rupees and Units. What is the profit Earned? What should be the sales for earning a profit of Rs.50,000.

Sol: Given, SP=Rs.15, VC = Rs.8, FC = Rs.70,000 and Sales = 10,000 units

$$C = SP - VC \Rightarrow 15 - 8 = \text{Rs.7}$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{7}{15} \times 100 \Rightarrow 46.67\% \text{ or } 0.4667$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{70,000}{7} \Rightarrow 10,000 \text{ units}$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{70,000}{0.4667} \Rightarrow \text{Rs.1,49,989}$$

(c) What is the profit Earned?

$$\text{Contribution (in Rs.)} = \text{Sales (units)} \times \text{Contribution per unit}$$

$$10,000 \times 7 = \text{Rs.70,000}$$

Using contribution 2nd formula, find Profit

$$C = FC + P \Rightarrow 70,000 = 70,000 + P$$

$$\Rightarrow P = 70,000 - 70,000 = \text{Rs.0}$$

(d) What should be the sales for earning a profit of Rs.50,000.

$$\begin{aligned} \text{Desired Sales} &= \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}} \\ &= \frac{70,000 + 50,000}{0.4667} \Rightarrow \text{Rs.1,77,135} \end{aligned}$$



(Q-22) A manufacturer sells his product at Rs. 5 each. Variable costs are Rs.2 per unit and the fixed costs amount to Rs. 60,000.

- i. Calculate the break-even point.
- ii. What would be the profit if the firm sells 30,000 units?
- iii. What would be the BEP if the firm spends Rs.3,000 on advertising?
- iv. How much should be the manufacturer sell to make a profit of Rs.30,000 after spending Rs.3,000 for advertisement?

Sol: Given, SP=Rs.5, VC = Rs.2, FC = Rs.60,000.

$$C = SP - VC \Rightarrow 5 - 2 = \text{Rs.}3$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{3}{5} \times 100 \Rightarrow 60\% \text{ or } 0.60$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{60,000}{3} \Rightarrow 20,000 \text{ units}$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{60,000}{0.60} \Rightarrow \text{Rs.}1,00,000$$

(c) What would be the profit if the firm sells 30,000 units?

$$\text{Sales units} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Contribution (C)}}$$

$$30,000 = \frac{60,000 + \text{Profit (P)}}{5}$$

$$\text{Profit (P)} = (30,000 \times 5) - 60,000$$

$$\text{Profit (P)} = 1,50,000 - 60,000 \Rightarrow \text{Rs.}90,000$$

(d) What would be the BEP if the firm spends Rs.3,000 on advertising?

$$\text{BEP [in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{60,000 + 3,000}{0.60} \Rightarrow \text{Rs.}1,05,000$$

(e) How much should be the manufacturer sell to make a profit of Rs.30,000 after spending Rs.3,000 for advertisement?

$$\text{Desired Sales} = \frac{\text{Fixed Cost (FC)} + \text{Profit}}{\text{Pv Ratio}}$$

$$= \frac{63,000 + 30,000}{0.60} \Rightarrow \text{Rs.}1,55,000$$

(Q-23) An enterprise has a fixed cost of Rs. 63,000; selling price per unit is Rs. 60 and variable cost per unit is Rs. 30. The present level of output is 4000 units. (i) Find BEP in terms of volume and value. (ii) Calculate margin of safety. (iii) What is the change in BEP and margin of safety if fixed cost increases to Rs. 72,000.

Sol: Given, SP=Rs.60, VC = Rs.30, FC = Rs.63,000 and present level of output = 4000 unit



$$C = SP - VC \Rightarrow 60 - 30 = \text{Rs.}30$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{30}{60} \times 100 \Rightarrow 50\% \text{ or } 0.50$$

$$(a) \text{ BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{63,000}{30} \Rightarrow 2,100 \text{ units}$$

$$(b) \text{ BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{63,000}{0.50} \Rightarrow \text{Rs.}78,750$$

(c) Margin of safety

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$\text{Real Sales} = \text{Present level of Production} \times \text{Selling Price}$$

$$4,000 \times 60 = \text{Rs.}2,40,000$$

$$\Rightarrow 2,40,000 - 78,750 \Rightarrow \text{Rs.}1,61,250$$

$$\text{MOS} = \text{Rs.}1,61,250$$

(d) What is the change in BEP and margin of safety if fixed cost increases to Rs. 72,000.

$$SP=\text{Rs.}60, VC = \text{Rs.}30, FC = \text{Rs.}72,000 \text{ and present level of output} = 4000 \text{ units}$$

$$C = SP - VC \Rightarrow 60 - 30 = \text{Rs.}30$$

$$\text{PV Ratio} = \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 \Rightarrow \frac{30}{60} \times 100 \Rightarrow 50\% \text{ or } 0.50$$

$$\text{New BEP [in units/in volume]} = \frac{\text{Fixed Cost (FC)}}{\text{Contribution (C)}} \Rightarrow \frac{72,000}{30} \Rightarrow 2,400 \text{ units}$$

$$\text{New BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{72,000}{0.50} \Rightarrow \text{Rs.}1,44,000$$

New Margin of safety

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$\text{Real Sales} = \text{Present level of Production} \times \text{Selling Price}$$

$$4,000 \times 60 = \text{Rs.}2,40,000$$

$$\Rightarrow 2,40,000 - 1,44,000 \Rightarrow \text{Rs.}96,000$$

$$\text{MOS} = \text{Rs.}96,000$$

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**Model-IV**

(Q-24) The following information are concerned with a company:

- (i) Margin of Safety ratio- 20%
- (ii) P/V Ratio – 40%
- (iii) Fixed Costs – Rs.1,50,000

Find out:

- (a) Sales at B.E.P
- (b) Actual Sales for the year.
- (c) Profit for the year
- (d) Variable Cost for the year.

Sol: (a) Sales at B.E.P

$$(a) \text{ New BEP [in Sales/in Value/in Rupees]} = \frac{\text{Fixed Cost (FC)}}{\text{Pv Ratio}} \Rightarrow \frac{1,50,000}{0.40} \Rightarrow \text{Rs.3,75,000}$$

$$(b) \text{ Actual Sales for the Year} = \frac{\text{BEP Sales} \times 100}{100 - \% \text{ of MOS}} \Rightarrow \frac{3,75,000 \times 100}{100 - 20} \Rightarrow \frac{3,75,00,000}{80} \Rightarrow \text{Rs.4,68,750}$$

(c) Profit for the year (using contribution 3 formula and 2 formula)

$$C = \text{Sales} \times \text{PV Ratio (3d Formula)}$$

$$4,68,750 \times 0.40 \Rightarrow \text{Rs.1,87,500}$$

$$C = \text{FC} + \text{P (2nd Formula)}$$

$$1,87,500 = 1,50,000 - \text{Profit (P)}$$

$$\text{Profit (P)} = 1,87,500 - 1,50,000 = \text{Rs.37,500}$$

(d) Variable Cost for the year (using 1st formula of Contribution)

$$C = S - \text{VC (1st Formula)}$$

$$1,87,500 = 4,68,750 - \text{VC}$$

$$\text{VC} = 4,68,750 - 1,87,500 \Rightarrow \text{Rs.2,81,250}$$

(Q-25) The P/V Ratio of Bansal Bros. is 40% and percentage of margin of safety is 30%. You are required to calculate B.E.P and profit if sales volume is Rs. 4,50,000.

Sol: MOS = Sales x % of MOS

$$4,50,000 \times 0.30 \Rightarrow \text{Rs.1,35,000}$$

(i) B.E.P Sales (using 1st formula of MOS)

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$1,35,000 = 4,50,000 - \text{BEP Sales}$$



$$\text{BEP Sales} = 4,50,000 - 1,35,000 \Rightarrow \text{Rs.} 3,15,000$$

(ii) Profit for the Year (using 2nd formula of MOS)

$$\text{MOS} = \frac{\text{Profit (P)}}{\text{Pv Ratio}}$$

$$1,35,000 = \frac{\text{Profit (P)}}{0.40}$$

$$\text{Profit (P)} = 1,35,000 \times 0.40 \Rightarrow \text{Rs.} 54,000$$

(Q-26) The P/V Ratio of Matrix Books Ltd is 40% and percentage of margin of safety is 30%. You are required to work out the B.E.P and profit if sales volume is Rs. 14,000.

Sol: MOS = Sales x % of MOS

$$14,000 \times 0.30 \Rightarrow \text{Rs.} 4,200$$

(i) B.E.P Sales (using 1st formula of MOS)

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$4,200 = 14,000 - \text{BEP Sales}$$

$$\text{BEP Sales} = 14,000 - 4,200 \Rightarrow \text{Rs.} 9,800$$

(ii) Profit for the Year (using 2nd formula of MOS)

$$\text{MOS} = \frac{\text{Profit (P)}}{\text{Pv Ratio}}$$

$$4,200 = \frac{\text{Profit (P)}}{0.40}$$

$$\text{Profit (P)} = 4,200 \times 0.40 \Rightarrow \text{Rs.} 1,680$$

(Q-27) From the following information's find out:

a. P/V Ratio b. Sales & c. Margin of Safety

Fixed Cost = Rs. 40,000

Profit = Rs. 20,000

B.E.P. = Rs. 80,000

Solution:

(a) Find PV Ratio (using BEP Sales formula)

$$\text{BEP (in Sales)} = \frac{40,000}{\text{PV Ratio}}$$

$$80,000 = \frac{40,000}{\text{PV Ratio}} \Rightarrow \text{PV Ratio} = \frac{40,000}{80,000} \Rightarrow 0.50$$

(b) Find Margin of Safety (using MOS 2nd Formula)



$$\text{MOS} = \frac{\text{Profit (P)}}{\text{PV Ratio}} \Rightarrow \frac{20,000}{0.50} \Rightarrow \text{Rs.}40,000$$

(c) Find Actual Sales (using 1st formula of MOS)

$$\text{MOS} = \text{Real Sales} - \text{BEP Sales}$$

$$40,000 = \text{Real Sales} - 80,000$$

$$\text{Real Sales} = 40,000 + 80,000 \Rightarrow \text{Rs.}1,20,000$$

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