Marginal Costing and Cost Volume – Profit Analysis

Marginal cost – the amount at any given volume of output by which aggregate cost or changed if the volume of output is increased or decreased by one unit. In practice that is measured bye total variable cost attributable to one unit.

Therefore, marginal cost is the additional cost incurred for increase in one additional unit of output or decrease in cost for decrease in one unit of output.

Cost –Fixed Cost and Variable Cost.

Fixed Cost –unchanged with change in output in the short run.

Variable Cost –changes with change in output.

Change in cost by change in output is nothing but change in variable cost.

Hence, marginal cost is nothing but variable cost.

Marginal cost –technique of ascertaining cost of products manufactured or services rendered.

C.I.M.A., London – ascertaining marginal cost and the effects on profit of changes in volume or types of output by differentiating between fixed and variable cost.

<u>Method of segregation of semi-variable cost</u>

Methods

A. High and low point method

Take highest and lowest values in a data set and compare to find out the rate of cost of change.

$$\text{Variable cost per unit} = \frac{\text{Change in semi variable cost}}{\text{Change in production level}}$$

(Fixed cost constant for two products)

Fixed cost = Total semi-variable cost - Total variable cost

Example

From the following information in respect of semi variable cost - obtain fixed and variable cost and find out the semi variable cost (probable) for the month of July –when production would be 200 units.

Month	*Production units*	*Semi-variable cost*
January	100	500
February	175	650
March	115	530
April	90	480
May	150	600
June	130	560

<u>**Solution**</u>

Month	*Production units*	*Semi variable cost (Rs.)*
February (Highest)	175	650
April (Lowest)	90	480
Change	85	170

Variable cost per unit = 170/85 = Rs. 2 per unit.

Therefore, **Fixed cost**

Semi variable cost in February = 650

Output = 175

Therefore, variable cost = 175 × 2 = 350

Fixed cost = 650-350 = 300

July – Production = 200

Variable cost = 200 × 2 = Rs. 400

Fixed cost = Rs. 300

Semi variable cost = Rs. 700

B. Simultaneous equation method

<u>Assumption</u>: Linear equation between output and variable cost.

The question is represented by a straight line on a graph denoted by

Y = MX + C.

Where, Y = total semi variable cost, M = variable cost per unit, X = volume of output, and C = fixed cost.

Solution

For January, production = 100, semi variable cost = 500

For February, production = 175, semi variable cost = 650

Now, for January $500 = M \times 100 + C$ (i)

And, for February $650 = M \times 175 + C$ (ii)

Subtracting (i) from (ii) we get, $150 = M \times 75$

Or, $M = 150/75 = 2$

That is, variable cost = Rs. 2 per unit.

To calculate fixed cost, we substitute the value of M in the 1st equation.

Therefore, $500 = 2 \times 100 + C$

Or, $C = 500 – 2 \times 100 = 300$

That is, fixed cost = Rs. 300 per unit.

The remaining part of the problem can be solved as in the earlier example.

P/V Ratio

The relation between contribution to sales.

This ratio is also known as contribution to sales ratio or C/S ratio.

P/V ratio = contribution/ sales = C/S

Different formulae for P/V ratio

a. $\frac{\text{S-V}}{\text{Sales}} = \text{P/V Ratio}$

b. $\frac{\text{Fixed Cost + Profit (Loss)}}{\text{Sales}} = \text{P/V Ratio}$

c. $\frac{\text{Change in contribution}}{\text{Change in Sales}} = \text{P/V Ratio}$

d. $\frac{\text{Change in Profit (Loss)}}{\text{Change in Sales}} = \text{P/V Ratio}$

Utilities of P/V ratio

1. $\text{BEP} = \dfrac{\text{Fixed cost}}{\text{P/V ratio}}$
2. Volume of sale x P/V ratio = Contribution

   Contribution - Fixed cost = Profit
3. $\text{Sales volume} = \dfrac{\text{Desired Profit + Fixed Cost}}{\text{P/V Ratio}}$
4. Profit = Margin of sales x P/V ratio
5. $\text{Selling price per unit} = \dfrac{\text{Variable Cost}}{\text{1 - P/V Ratio}}$

<u>Break Even Analysis</u>

Volume of output at which total cost equals sales revenue.

$$\text{BEP (in units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$\text{BEP (in Rupees)} = \frac{\text{Fixed cost}}{\text{P/V ratio}}$$

$$\text{BEP (in Rupees)} = \frac{\text{Fixed cost} \times \text{sales}}{\text{Fixed cost + profit}}$$

$$\text{BEP (in Rupees)} = \frac{\text{Fixed cost}}{1 - \left(\frac{\text{Variable cost}}{\text{Sales}}\right)}$$

To determine BEP after additional fixed cost owing to Plant expansion.

$$\boxed{\text{BEP (in units)} = \frac{\text{Present Fixed cost+ Additional Fixed cost}}{\text{Contribution per unit}}}$$

BEP in a multi-product firm.

$$\text{BEP (in Rupees)} = \frac{\text{Total Fixed cost}}{\text{Overall P/V ratio}}$$

$$\text{Where, Overall P/V ratio} = \frac{\text{Total contribution from different products}}{\text{Total sales revenue from different products}}$$

$$\text{Shut down point (in units)} = \frac{\text{Fixed cost - Shut down cost}}{\text{P/V ratio}}$$

To determine BEP when there is a change in selling price.

$$\text{BEP (in units)} = \frac{\text{Fixed cost}}{1 - \left(\frac{\text{Variable cost per unit}}{\text{New Selling Price per unit}}\right)}$$

To determine BEP when there is a change in variable cost.

$$\text{BEP (in units)} = \frac{\text{Fixed cost}}{1 - \left(\frac{\text{New Variable cost per unit}}{\text{Selling Price per unit}}\right)}$$

Margin of safety

Difference between actual sales and BEP sales.

Margin of safety = Actual Sales – BEP Sales

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

Marginal costing equation,

Sales = Total Cost + Profit

Sales = Fixed cost + Variable cost + Profit

Contribution = Sales - Variable cost

Contribution = Fixed cost + Profit

Contribution: Excess of sales over Variable cost

C = axis of sales over Variable cost

C = S – V

Again, from the Marginal cost equation, we get

S – V = FC + P

Therefore, C = FC + P

Q.1. From the following information, calculate

a) Profit Volume Ratio;

b) Break-even point

Year	Sales (₹)	Profit (₹)
2004	4,80,000	32,000
2005	5,60,000	52,000

Solution

(a) P/V Ratio $= \dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

$= \dfrac{(52{,}000 - 32{,}000)}{(5{,}60{,}000 - 4{,}80{,}000)} \times 100 = \dfrac{20{,}000}{80{,}000} \times 100 = 25\%$

(b) Taking figures of 2004, Contribution = Sales x P/V Ratio = ₹ 4,80,000 x 25% = **₹ 1,20,000**

Fixed Cost = Contribution – Profit = ₹ 1,20,000 – ₹ 32,000 = **₹ 88,000**

Alternatively, figures of 2005 can also be taken.

Break-Even Point (Sales Revenue) = $\dfrac{80{,}000}{25\%}$ = **₹ 3,52,000**

Q.2. From the following details find out break-even sales and fixed cost and required sales to earn a profit of ₹ 3,00,000:

Sales – ₹ 9,00,000; Margin of Safety – 40%; P/V ratio – 2/3

Solution

Break-even Sales = Total Sales – Margin of Safety

= ₹ 9,00,000 – (40% of ₹ 9,00,000) = ₹ 9,00,000 – ₹ 360,000 = **₹ 5,40,000**

We know,

Break-even Point (Sales Revenue) = $\dfrac{\text{Fixed Cost}}{\text{P/V Ratio}}$

Or, Fixed Cost = Break-even Point (Sales Revenue) x P/V Ratio = ₹ 540,000 x 2/3 = **₹ 3,60,000**

Sales request to earn a profit of ₹ 3,00,000:

Required Sales = $\dfrac{\text{Fixed Cost + Target Profit}}{\text{P/V Ratio}} = \dfrac{3{,}60{,}000 + 3{,}00{,}000}{2/3} = \dfrac{6{,}60{,}000}{2} \times 3$ = **₹ 9,90,000**

Q.3. 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.

Solution

Contribution = Fixed Cost + Profit = ₹ 4,50,000 + ₹ 3,00,000 = **₹ 7,50,000**

(i) $$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7{,}50{,}000}{15{,}00{,}000} \times 100 = \mathbf{50\%}$$

$$\text{Break-even Point (Sales Revenue)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{4{,}50{,}000}{50\%} = \mathbf{₹\ 9{,}00{,}000}$$

Margin of Safety = Actual Sales – Break-even Point Sales = ₹ 15,00,000 – ₹ 9,00,000 = **₹ 6,00,000**

(ii) Expected Contribution of second half-year (*assuming selling price and fixed cost remained unchanged*)

= Fixed Cost – Loss = ₹ 4,50,000 – ₹ 1,50,000 = ₹ 3,00,000

We know,

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}}$$

OR,

$$\text{Sales Volume} = \frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{3{,}00{,}000}{50\%} = \mathbf{₹\ 600{,}000}$$

(iii) Break-even Point and Margin of Safety for the whole year

$$\text{Break-even Point (Sales Revenue)} = \frac{\text{Fixed Cost for Full year}}{\text{P/V Ratio}}$$

$$= \frac{4{,}50{,}000 + 4{,}50{,}000}{50\%} = \mathbf{₹\ 18{,}00{,}000}$$

Margin of Safety = Total Sales for the year – Break-even Point (Sales Revenue)
= [(₹ 15,00,000 + ₹ 6,00,000 (See (ii) above) – ₹ 18,00,000)]
= ₹ 21,00,000 – ₹ 18,00,000 = **₹ 3,00,000**

Q.4. The following costs and sales of a manufacturing company for the first half and second half of 2009-10 are given below (all figures in Rupees):

	First Half	Second Half
Sales	24,00,000	30,00,000
Total Costs	21,80,000	26,00,000

You are asked to determine:

(i) Contribution/Sales ratio of the firm
(ii) Annual fixed costs
(iii) Break-even Point
(iv) Margin of safety as percentage of sales

Solution

(i) Contribution/ Sales Ratio

$$\text{Or, P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

Particulars	First Half (₹)	Second Half (₹)	Change (₹)
Sales	24,00,000	30,00,000	6,00,000
Less: Total Cost	21,80,000	26,00,000	4,20,000
Profit	2,20,000	4,00,000	1,80,000

Contribution/Sales Ratio = $\frac{1,80,000}{6,00,000}$ x 100 = 30%

(ii) Annual Fixed Costs:

(a) Total sales for the year 2009-10 = ₹ 24,00,000 + ₹ 30,00,000 = ₹ 54,00,000

(b) Total profit for the year 2009-10 = ₹ 2,20,000 + ₹ 4,00,000 = ₹ 6,20,000

(c) Total contribution (30% of ₹ 54,00,000) = ₹ 16,20,000

Annual Fixed Cost = Total Contribution – Total Profit = ₹ 16,20,000 – ₹ 6,20,000 = **₹ 10,00,000**

(iii) Break-even Point (Sales Revenue) = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{10,00,000}{30\%}$ = **₹ 33,33,333**

(iv) Margin of Safety as a percentage of Sales

Margin of Safety = $\frac{\text{Profit}}{\text{P/V Ratio}} = \frac{6,20,000}{30\%}$ = ₹ 20,66,667

MOS = Total Sales – BEP Sales = ₹ 54,00,000 – ₹ 33,33,333 = **₹ 20,66,667**

(v) Margin of Safety as a percentage of Sales = $\frac{\text{Margin of Safety}}{\text{Total Sales}}$ x 100

= $\frac{20,66,667}{54,00,000}$ x 100 = **38.27%**

Q.5. A company sells its products at ₹ 15 per unit. In a period, of 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 units.

Solution

Average Cost at 8,000 units volume:

= Selling Price per unit + Loss component per unit = ₹ 15 + ₹ 5 = **₹ 20**

Total Cost at 8,000 units volume = 8,000 x ₹ 20 = ₹ 1,60,000

Average Cost at 20,000 units volume

= Selling price per unit – Profit Component per unit = ₹15 – ₹4 = **₹11**

Total Cost at 20,000 units volume = 20,000 x ₹ 11 = ₹ 2,20,000

Variable Cost per unit = $\frac{\text{Change in Total Cost}}{\text{Change in Volume of Production}}$

= $\frac{2,20,000 - 1,60,000}{20,000 - 8,000} = \frac{60,000}{12,000}$ = ₹ 5 per unit

Total Fixed Cost = Total Cost – Variable Cost = ₹ 1,60,000 – (8,000 x ₹ 5) = **₹ 1,20,000**

P/V Ratio = $\frac{S-V}{S}$ = $\frac{15-5}{15}$ x 100 = 66 $\frac{2}{3}$% or 2/3

Where,
S = Selling price per unit
V = Variable cost per unit

(1) Break-even Point (₹) = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$ = (1,20,000 x 3)/2 = ₹1,80,000

(2) Break-even Point (units) = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}}$ = $\frac{1,20,000}{15 - 5}$ = 12,000 units

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Q.6. 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.

Solution

40% of Sales = ₹ 2,40,000. Therefore, Total Sales = $\frac{2,40,000}{40\%}$ = ₹ 6,00,000

(1) Break-even Sales = Total Sales – Margin of Safety = ₹ 6,00,000 – ₹ 2,40,000 = ₹ 3,60,000

(2) **Amount of Profit on Sales of 9,00,000**

Expected Profit = P/V Ratio x (Expected Sales – Break-even Sales)
= 30% x (₹ 9,00,000 – ₹ 3,60,000) = ₹ 1,62,000

Alternatively,

Expected Profit = (Sales x P/V Ratio) – Fixed Cost
= (₹ 9,00,000 x 30%) – ₹ 1,08,000 (Note 1) = ₹ 2,70,000 – ₹ 1,08,000 = ₹ 1,162,000

Working Note:

Break-even Point (Sales) = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

Therefore,

Fixed Cost = Break-even Point (Sales) x P/V Ratio
= ₹ 3,60,000 (See 1 above) x 30% (Given) = ₹ 1,08,000

■ **Problem 1:**

X Ltd. Sells 8,000 units of its products at a loss of ₹16,000.

Variable cost per unit is ₹ 12 and total fixed cost is ₹ 48,000. Calculate (i) Profit Volume Ratio, (ii) The number of units to be sold to earn a profit of ₹ 10,000, (iii) The amount of profit from a sale of 20,000 units.

[C.U. B.Com. (Hons.) 1998, 1999]

- **Solution:**

(i) Total Contribution (C) = Total Fixed Cost (F) – Loss (L)

= ₹ 48,000 – ₹ 16,000 = ₹ 32,000

$$\text{Contribution per unit (c)} = \frac{\text{Total Contribution (C)}}{\text{No. of units (R)}} = \frac{₹\,32{,}000}{8{,}000} = ₹4$$

Again, Contribution per unit (c)

= Selling Price per unit (s) – Variable Cost per unit (v)

Or, ₹ 4 = s - ₹ 12.

Or, s = ₹ 4 + ₹ 12 = ₹ 16

So, Selling Price per unit is ₹ 16.

$$\therefore \text{Profit Volume (P/V) Ratio} = \frac{s - v}{s} \times 100 = \frac{16 - 12}{16} \times 100 = \frac{4}{16} \times 100 = \mathbf{25\%}$$

(ii) To earn a profit of ₹ 10,000, required Total Contribution (C) = Fixed Cost (F) + Profit (P) = ₹ 48,000 + ₹ 10,000 = ₹ 58,000.

$$\text{So, the number of units to be sold} = \frac{\text{Total Contribution (C)}}{\text{Contribution per unit (c)}}$$

$$= \frac{₹\,58{,}000}{₹\,4} = \mathbf{14{,}500\ units}$$

(iii) From sale of 20,000 units of the product, available Total Contribution (C) = No. of units (U) x Contribution per unit (c) = 20,000 x ₹ 4 = ₹ 80,000.

∴ Amount of Profit (P) to be earned
= Total Contribution (C) + Total Fixed Cost (F)
= ₹ 80,000 - ₹ 48,000 = **₹ 32,000**

■ **Problem 2:**

Rainbow Ltd. Sold goods for ₹ 30,00,000 in a year. In that year, the variable costs were ₹ 6,00,000 and fixed costs were ₹ 8,00,000.
Find out:

(i) P/V Ratio.
(ii) Break-even sales.
(iii) Break-even sales if selling price was reduced by 10% and fixed costs were increased by ₹ 1,00,000.

[C.U. B.Com. (Hons.) 2000]

● **Solution:**

(i) P/V Ratio = $\frac{S - V}{S}$ x 100, where S = Selling Price and V = Variable Cost

∴ Here, P/V Ratio = $\frac{30,00,000 - 6,00,000}{30,00,000}$ x 100 = **80%**

(ii) Again, at Break-even point –

P/V Ratio = $\frac{F}{\text{BEP Sales}}$ x 100

where F = Fixed Cost and BEP Sales = Break-even Point sales

Here, 80 = $\frac{8,00,000}{\text{BEP Sales}}$ x 100

Or, BEP Sales = $\frac{8,00,000}{80}$ x 100

∴ Break-even Sales = **₹ 10,00,000**

P/V Ratio remains the same as it was, because neither selling per unit nor the variable cost per unit changes.

∴ In this case P/V Ratio = 80%

(iii) In this case, selling price per unit decreases by 10%, consequently P/V Ratio will be changed and now new P/V Ratio is to be computed.

∴ New total Selling Price = ₹ 30,00,000 – 10% of ₹ 30,00,000 = ₹ 27,00,000

New Total Fixed Cost = ₹ 8,00,000 + ₹ 1,00,000 = ₹ 9,00,000

New P/V Ratio = $\frac{S - V}{S}$ x 100 = $\frac{27,00,000 - 6,00,000}{27,00,000}$ x 100 = 77.7777%

Note: As the number of units produced remains the same and the variable cost per unit also remains the same, total variable cost also remains same i.e., ₹ 6,00,000.

We know at BEP –

$$\text{P/V Ratio} = \frac{F}{\text{BEP Sales}} \times 100$$

$$\text{Or, } 77.7777 = \frac{9,00,000}{\text{BEP Sales}} \times 100$$

$$\text{Or, BEP Sales} = \frac{9,00,000}{77.7777} \times 100 = ₹\ 11,57,144$$

∴ New Break-even Sales = **₹ 11,57,144**

■ **Problem 3:**

On the basis of the following information, you are required to ascertain: (a) sales to break-even and (b) sales to earn a profit of ₹ 60,000, if selling price per unit is reduced by Re. 1:

Sales (10,000 units)	₹ 1,60,000
Variable Cost	₹ 96,000
Fixed Cost	₹ 48,000

[C.U. B.Com. (Hons.) 2001]

● **Solution:**

a)

Sales for 10,000 units =	₹ 1,60,000
Less: Variable Cost for 10,000 units	₹ 96,000
Contribution for 10,000 units	₹ 64,000

$$\text{Contribution per unit} = \frac{\text{Total Contribution}}{\text{No. of units}} = \frac{64,000}{10,000} = ₹\ 6.40$$

We know,

$$\text{BEP Sales (in units)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$\text{Or, BEP Sales (in units)} = \frac{48,000}{6.40} = 7,500 \text{ units}$$

$$\text{Again, Selling Price per unit} = \frac{₹\ 1,60,000}{10,000 \text{ units}} = ₹\ 16$$

∴ Break-even sales (in value) = BEP Sales (in units) x Selling Price per unit

= 7,500 units x ₹ 16 = **₹ 1, 20,000**

b) If Selling Price per unit is reduced by Re.1 then contribution per unit will be

₹ (6.40 – 1) = ₹ 5.40

Sales required to earn a profit of ₹ 60,000 will be

$$= \frac{\text{Fixed Cost + Profit}}{\text{Contribution per unit}}$$

$$= \frac{48,000 + 60,000}{5.40} = 20,000 \text{ units}$$

Sales volume will be 20,000 x ₹ 15 = **₹ 3,00,000**.

■ **Problem 4:**

From the following information calculate profit:

Sales	₹ 8,00,000
Variable Cost	₹ 6,00,000
Break-even Sales	₹ 6,00,000

[C.U. B.Com. (Hons.) 2002]

● **Solution:**

P.V. Ratio $= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{S - V.C.}}{\text{S}} \times 100$

$= \frac{₹\ 8,00,000 - ₹\ 6,00,000}{₹\ 8,00,000} \times 100 = 25\%$

Profit = Margin of Safety x P.V. Ratio

= (Sales – BEP Sales) x P.V. Ratio

$= ₹\ (8,00,000 - 6,00,000) \times \frac{25}{100} = ₹\ 50,000$

Answer. Required amount of Profit = **₹ 50,000**.

■ **Problem 5:**

The operating results of a company for the last two years are as follows:

YEAR	SALES ₹	PROFIT ₹
2000	2,70,000	6,000
2001	3,00,000	15,000

Assuming that the cost structure and selling price remain the same in both the years, find out:

(i) P/V Ratio; (ii) Fixed Cost; (iii) Break-even point; (iv) Margin of safety at a profit of ₹ 24,000.

[CU. B.Com. (Hons.) 2003]

- **Solution:**

(i) $\text{P/V Ratio} = \dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100 = \dfrac{₹\ 9{,}000}{₹\ 30{,}000} \times 100 = \mathbf{30\%}$

(ii) Fixed Cost = (Sales x P/V Ratio) – Profit

= ₹ (2,70,000 x 30%) - ₹ 6,000 = ₹ 81,000 – ₹ 6,000 = **₹ 75,000**

(iii) $\text{Break-even Point} = \dfrac{\text{Fixed Cost}}{\text{P/V Ratio}} \times 100 = \dfrac{₹\ 75{,}000}{30\%} \times 100 = \mathbf{₹\ 2{,}50{,}000}$

(iv) $\text{Margin of Safety} = \dfrac{\text{Profit}}{\text{P/V Ratio}} \times 100 = \dfrac{₹\ 24{,}000}{30\%} \times 100 = \mathbf{₹\ 80{,}000}$

■ **Problem 6:**

Alpha Ltd. furnished the following information:

Selling Price – ₹ 10 per unit.

Variable Cost – ₹ 6 per unit.

It is expected that variable cost will increase by 20%. What will be the selling price per unit if the company wishes to maintain the same P/V ratio.

[CU. B.Com. (Hons.) 2004]

- **Solution:**

$$\text{P/V Ratio} = \frac{\text{Sales - Variable Cost}}{\text{Sales}} \times 100$$

$$= \frac{₹\ (10 - 6)}{₹\ 10} \times 100 = 40\%$$

Let Selling Price = ₹ X

$$\text{Revised Variable Cost} = \frac{120}{100} \times ₹\ 6 = ₹\ 7.20$$

$$\text{Now, } \frac{\text{Contribution}}{\text{Sales}} \times 100 = 40 \text{ (P/V Ratio)}$$

$$\text{Or, } \frac{X - 7.20}{X} = \frac{40}{100}$$

Or, 60X = 720

Or, X = 12

∴ Revised Selling price to maintain the same rate of P/V Ratio = **₹ 12**

■ **Problem 7:**

M/s M Ltd., made sales of ₹ 2,50,000 during a certain period. The net profit for the same period was ₹ 24,000 and the fixed overhead were ₹ 38,000.

Find out:
i. Break-even point (B/E) sales and
ii. Volume of sales to earn a profit of ₹ 40,000.

[CU. B.Com. (Hons.) 2005]

● Solution:

Contribution = Fixed Cost + Profit = ₹ 38,000 + ₹ 24,000 = ₹ 62,000

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{₹\ 62{,}000}{₹\ 2{,}50{,}000} \times 100 = 24.8\%$$

(i) $$\text{Break-even Point Sales} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{₹\ 38{,}000}{24.8\%} = \mathbf{₹\ 1{,}53{,}226}$$

(ii) Volume required to earn a profit of ₹ 40,000

$$\text{Required Sales} = \frac{\text{Fixed Cost + Required Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\ 38{,}000 + ₹\ 40{,}000}{24.8\%} = \mathbf{₹\ 3{,}14{,}516}$$