

9

Marginal Costing

Question 1

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

Required:

- Calculate sales value needed to earn a profit of 10% on sales.
- Calculate sales price per unit to bring BEP down to 1,20,000 units.
- Calculate margin of safety sales if profit is ₹ 60,000. (3 Marks, November 2007)

Answer

- (a) Suppose sales units are x then

$$S = V + F + P$$

$$S = \text{Sales}$$

$$V = \text{Variable Cost}$$

$$F = \text{Fixed Cost}$$

$$P = \text{Profit}$$

$$20x = 15x + 6,30,000 + 2x$$

$$20x - 17x = 6,30,000$$

$$\therefore x = \frac{6,30,000}{3} = 2,10,000 \text{ units}$$

$$\text{Sales value} = 2,10,000 \times 20 = ₹ 42,00,000$$

- (b) Sales price to down BEP 1,20,000 units

$$S = V + \frac{F}{\text{New BEP}} \therefore S = 15 + \frac{6,30,000}{1,20,000} \therefore ₹ 20.25.$$

- (c) MS Sales = $\frac{\text{Profit}}{\text{P/V ratio}} \therefore \frac{60,000}{\text{P/V}}$ where $\text{P/V} = \frac{C}{S} \times 100$.

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$$\therefore \frac{60,000}{25} \times 100 = 2,40,000 \quad \text{Or} \quad \frac{5}{20} \times 100 = 25\%.$$

Question 2

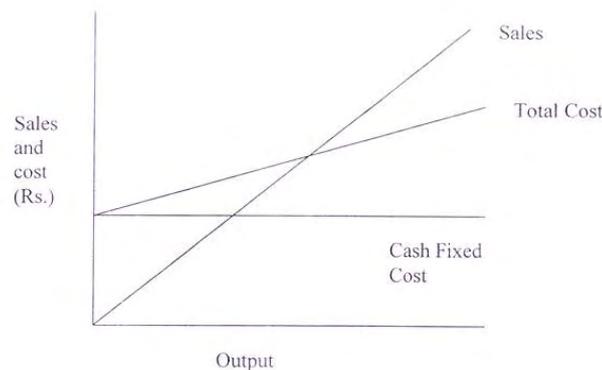
Explain and illustrate cash break-even chart.

(3 Marks, May 2008)

Answer

In cash break-even chart, only cash fixed costs are considered. Non-cash items like depreciation etc. are excluded from the fixed cost for computation of break-even point. It depicts the level of output or sales at which the sales revenue will equal to total cash outflow. It is computed as under:

$$\text{Cash BEP (Unit)} = \frac{\text{Cash Fixed Cost}}{\text{Cost per Units}}$$



Hence for example suppose insurance has been paid on 1st January, 2006 till 31st December, 2010 then this fixed cost will not be considered as a cash fixed cost for the period 1st January, 2008 to 31st December, 2009.

Question 3

A company has fixed cost of ₹ 90,000, Sales ₹ 3,00,000 and Profit of ₹ 60,000.

Required:

- (i) Sales volume if in the next period, the company suffered a loss of ₹ 30,000.*
- (ii) What is the margin of safety for a profit of ₹ 90,000?*

(3 Marks, May 2008)

Answer

$$\begin{aligned} \text{P/V ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 \\ &= \left(\frac{1,50,000}{3,00,000} \times 100 \right) = 50\% \end{aligned}$$

(i) If in the next period company suffered a loss of ₹ 30,000, then

$$\begin{aligned} \text{Contribution} &= \text{Fixed Cost} \pm \text{Profit} \\ &= ₹ 90,000 - ₹ 30,000 \text{ (as it is a loss)} \\ &= ₹ 60,000. \end{aligned}$$

$$\text{Then Sales} = \frac{\text{Contribution}}{\text{P/V ratio}} \text{ or } \frac{60,000}{0.50} = ₹ 1,20,000.$$

So, there will be loss of ₹ 30,000 at sales of ₹ 1,20,000.

$$(ii) \text{ Margin of safety} = \frac{\text{Profit}}{\text{PV ratio}} \text{ or } \frac{90,000}{0.50} = ₹ 1,80,000.$$

Alternative solution of this part:

$$\text{Break-even Sales} = \frac{\text{Fixed Cost}}{\text{PV Ratio}} = \frac{90,000}{0.5} = ₹ 1,80,000$$

$$\begin{aligned} \text{Sales at profit of ₹ 90,000} &= \frac{\text{Fixed Cost} + \text{Profit}}{\text{PV Ratio}} \\ &= \frac{90,000 + 90,000}{0.5} \\ &= \frac{1,80,000}{0.5} \\ &= ₹ 3,60,000. \end{aligned}$$

$$\begin{aligned} \text{Margin of Safety} &= \text{Sales} - \text{Break-even Sales} \\ &= 3,60,000 - 1,80,000 \\ &= ₹ 1,80,000. \end{aligned}$$

Question 4

ABC Ltd. can produce 4,00,000 units of a product per annum at 100% capacity. The variable production costs are ₹ 40 per unit and the variable selling expenses are ₹ 12 per sold unit. The budgeted fixed production expenses were ₹ 24,00,000 per annum and the fixed selling

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expenses were ₹ 16,00,000. During the year ended 31st March, 2008, the company worked at 80% of its capacity. The operating data for the year are as follows:

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

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

You are required to prepare Statements of Cost and Profit for the year ending 31st March, 2008:

- (i) On the basis of marginal costing
(ii) On the basis of absorption costing. (8 Marks, November 2008)

Answer

- (i) **Statement of Cost and Profit under Marginal Costing**
for the year ending 31st March, 2008

Output = 3,20,000 units

Particulars	Amount (₹)	Amount (₹)
Sales: 3,10,000 units @ ₹ 80		2,48,00,000
Less: Marginal cost / variable cost:		
Variable cost of production (3,20,000 × ₹ 40)	1,28,00,000	
Add: Opening stock 40,000 units @ ₹ 40	<u>16,00,000</u>	
	1,44,00,000	
Less: Closing Stock		
[(3,20,000 + 40,000 – 3,10,000) @ ₹ 40 = 50,000 units @ ₹ 40]	<u>20,00,000</u>	
Variable cost of production of 3,10,000 units	1,24,00,000	
Add: Variable selling expenses @ ₹ 12 per unit	<u>37,20,000</u>	<u>1,61,20,000</u>
Contribution (sales – variable cost)		86,80,000
Less: Fixed production cost	24,00,000	
Fixed selling expenses	<u>16,00,000</u>	<u>40,00,000</u>
Actual profit under marginal costing		<u>46,80,000</u>

(ii) **Statement of Cost and Profit under Absorption Costing**
for the year ending 31st March, 2008
Output = 3,20,000 units

Particulars	Amount (₹)	Amount (₹)
Sales: 3,10,000 units @ ₹ 80		2,48,00,000
Less: Cost of sales:		
Variable cost of production (3,20,000 @ ₹ 40)	1,28,00,000	
Add: Fixed cost of production absorbed 3,20,000 units @ ₹ 6 ⁽¹⁾	<u>19,20,000</u>	
	1,47,20,000	
Add: Opening Stock: 40,000 × $\frac{1,47,20,000}{3,20,000}$	18,40,000	
	<u>1,65,60,000</u>	
Less: Closing Stock: 50,000 × $\frac{1,47,20,000}{3,20,000}$	23,00,000	
	<u>1,42,60,000</u>	
Production cost of 3,10,000 units	1,42,60,000	
Selling expenses:		
Variable: ₹ 12 × 3,10,000 units	37,20,000	
Fixed	<u>16,00,000</u>	<u>1,95,80,000</u>
Unadjusted profit		52,20,000
Less: Overheads under absorbed: ⁽²⁾		
Fixed production overheads		<u>4,80,000</u>
Actual profit under absorption costing		<u>47,40,000</u>

Workings:

- Absorption rate for fixed cost of production = $\frac{₹ 24,00,000}{4,00,000 \text{ units}} = ₹ 6 \text{ per unit.}$
- Fixed production overhead under absorbed = ₹ (24,00,000 – 19,20,000) = ₹ 4,80,000.

Question 5

PQ Ltd. reports the following cost structure at two capacity levels:

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

If the selling price, reduced by direct material and labour is ₹ 8 per unit, what would be its break-even point?
(3 Marks, November 2008)

Answer

Computation of Break-even point in units:

	2,000 units	1,500 units
Production Overhead I: Fixed Cost (₹)	<u>6,000</u>	<u>6,000</u>
	(2,000 unit × ₹ 3 per unit)	(1,500 unit × ₹ 4 per unit)
Selling price – Material and labour (₹) (A)	<u>8</u>	<u>8</u>
Production Overhead II (Variable Overhead) (B)	2	2
Contribution per unit (A) – (B)	6	6

$$\text{Break - even point} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{6,000}{6} = 1,000 \text{ units}$$

Question 6

Product Z has a profit-volume ratio of 28%. Fixed operating costs directly attributable to product Z during the quarter II of the financial year 2009-10 will be ₹ 2,80,000.

Calculate the sales revenue required to achieve a quarterly profit of ₹ 70,000.

(3 Marks, May 2009)

Answer

P/V ratio = 28%

Quarterly fixed Cost = ₹ 2,80,000

Desired Profit = ₹ 70,000

Sales revenue required to achieve desired profit

$$= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$= \frac{2,80,000 + 70,000}{28\%} = ₹ 12,50,000$$

Question 7

A Company sells two products, J and K. The sales mix is 4 units of J and 3 units of K. The contribution margins per unit are ₹ 40 for J and ₹ 20 for K. Fixed costs are ₹ 6,16,000 per month. Compute the break-even point.. (2 Marks, November 2009)

Answer

Let 4x = No. of units of J

Then 3x = no. of units of K

$$\text{BEP in x units} = \left(\frac{\text{Fixed Cost}}{\text{Contribution}} \right) = \frac{\text{Rs.}616000}{4(40) + 3(20)}$$

$$\text{Or } \frac{616000}{220} = 2800 \text{ units}$$

Break- even point of Product J = 4 × 2,800 = 11,200 units

Break- even point of Product K = 3 × 2,800 = 8,400 units

Question 8

Mega Company has just completed its first year of operations. The unit costs on a normal costing basis are as under:

	₹
<i>Direct material 4 kg @ ₹ 4</i>	<i>= 16.00</i>
<i>Direct labour 3 hrs @ ₹ 18</i>	<i>= 54.00</i>
<i>Variable overhead 3 hrs @ ₹ 4</i>	<i>= 12.00</i>
<i>Fixed overhead 3 hrs @ ₹ 6</i>	<i>= <u>18.00</u></i>
	<i><u>100.00</u></i>

Selling and administrative costs:

<i>Variable</i>	<i>₹ 20 per unit</i>
<i>Fixed</i>	<i>₹ 7,60,000</i>

During the year the company has the following activity:

<i>Units produced</i>	<i>= 24,000</i>
<i>Units sold</i>	<i>= 21,500</i>
<i>Unit selling price</i>	<i>= ₹ 168</i>
<i>Direct labour hours worked</i>	<i>= 72,000</i>

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Actual fixed overhead was ₹ 48,000 less than the budgeted fixed overhead. Budgeted variable overhead was ₹ 20,000 less than the actual variable overhead. The company used an expected actual activity level of 72,000 direct labour hours to compute the predetermined overhead rates.

Required :

- (i) Compute the unit cost and total income under:
 - (a) Absorption costing
 - (b) Marginal costing
- (ii) Under or over absorption of overhead.
- (iii) Reconcile the difference between the total income under absorption and marginal costing. (15 Marks, November 2009)

Answer

(i) **Computation of Unit Cost & Total Income**

Unit Cost	Absorption Costing (₹)	Marginal Costing (₹)
Direct Material	16.00	16.00
Direct Labour	54.00	54.00
Variable Overhead	12.00	12.00
Fixed Overhead	<u>18.00</u>	-
Unit Cost	<u>100.00</u>	<u>82.00</u>

Income Statements

Absorption Costing	
Sales	36,12,000
(21500 × ₹ 168)	
Less: Cost of goods sold (21500 × 100)	21,50,000
Less: Over Absorption	<u>28,000</u>
	<u>21,22,000</u>
	14,90,000
Less: Selling & Distribution Expenses	<u>11,90,000</u>
Profit	<u>3,00,000</u>

Marginal Costing	
Sales	36,12,000
Less: Cost of goods sold (21500×82)	17,63,000
Add: Under Absorption	<u>20,000</u>
	17,83,000
	18,29,000
Less: Selling & Distribution Expenses	<u>4,30,000</u>
Contribution	13,99,000
Less: Fixed Factory and Selling & Distribution Overhead (38,400 + 7,60,000)	<u>11,44,000</u>
Profit	<u>2,55,000</u>

(ii) Under or over absorption of overhead:

Budgeted Fixed Overhead	₹
72,000 Hrs. × ₹ 6	4,32,000
Less: Actual Overhead was less than Budgeted Fixed Overhead	<u>48,000</u>
Actual Fixed Overhead	<u>3,84,000</u>
Budgeted Variable Overhead	
72,000 Hrs. × ₹ 4	2,88,000
Add: Actual Overhead was higher than Budgeted	<u>20,000</u>
Budgeted	<u>3,08,000</u>
Both Fixed & Variable Overhead applied	
72,000 Hrs × ₹ 10	7,20,000
Actual Overhead (3,84,000 + 3,08,000)	<u>6,92,000</u>
Over Absorption	<u>28,000</u>

(iii) Reconciliation of Profit

Difference in Profit: ₹ 3,00,000 – 2,55,000 = ₹ 45,000

Due to Fixed Factory Overhead being included in Closing Stock in Absorption Costing not in Marginal Costing.

Therefore,

Difference in Profit = Fixed Overhead Rate (Production – Sale)

18 (24,000 – 21,500) = ₹ 45,000

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Question 9

What do you understand by Key factor? Give two examples of it. (2 Marks, May 2010)

Answer

Key factor is a factor which at a particular time or over a period limits the activities of an undertaking. It may be the level of demand for the products or service or it may be the shortage of one or more of the productive resources.

Examples of key factors are:

- (a) Shortage of raw material.
- (b) Shortage of Labour.
- (c) Plant capacity available.
- (d) Sales capacity available.
- (e) Cash availability.

Question 10

Answer of the following:

Following information are available for the year 2008 and 2009 of PIX Limited:

Year	2008	2009
Sales	₹ 32,00,000	₹ 57,00,000
Profit/(Loss)	(₹ 3,00,000)	₹ 7,00,000

Calculate –(a) P/V ratio, (b) Total fixed cost, and (c) Sales required to earn a Profit of ₹ 12,00,000 (3 Marks, May 2010)

Answer

$$(a) \text{ P/V Ratio} = \frac{\text{Change in profit}}{\text{Change in sales}} \times 100$$

$$= \frac{7,00,000 + 3,00,000}{(57,00,000 - 32,00,000)} \times 100$$

$$= \frac{10,00,000}{25,00,000} \times 100 = 40\%$$

$$(b) \text{ Total fixed cost} = \text{Total contribution} - \text{Profit}$$

$$= (\text{Sales} \times \text{P/V ratio}) - \text{Profit}$$

$$= \left(₹ 57,00,000 \times \frac{40}{100} \right) - ₹ 7,00,000$$

$$= ₹ 22,80,000 - ₹ 7,00,000$$

$$= ₹ 15,80,000$$

(c) Contribution required to earn a profit of ₹ 12,00,000 = Total fixed cost + Profit required

$$= ₹ 15,80,000 + 12,00,000$$

$$= ₹ 27,80,000$$

$$\text{Required Sales} = \frac{27,80,000}{\text{P/V Ratio}} = \frac{27,80,000}{40\%}$$

$$= ₹ 69,50,000$$

Question 11

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

Required:

- (i) Estimate breakeven sales level quantity and cash breakeven sales level quantity.
- (ii) Estimate the P/V ratio.
- (iii) Estimate the number of units that must be sold to earn an income (EBIT) of ₹ 2,50,000.
- (iv) Estimate the sales level achieve an after-tax income (PAT) of ₹ 2,50,000. Assume 40% corporate Income Tax rate. **(8 Marks, November 2010)**

Answer

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{₹ 35,00,000}{₹ 20} = 175,000 \text{ units}$$

$$(i) \text{ Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{₹ 20,00,000}{₹ 20} = 1,00,000 \text{ units.}$$

$$(ii) \text{ P/V ratio} = \frac{\text{Contribution/unit}}{\text{Selling Price/unit}} \times 100 = \frac{20}{37.50} \times 100 = 53.33 \%$$

No. of units that must be sold to earn an Income (EBIT) of ₹ 2,50,000

$$(iii) = \frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{35,00,000 + 2,50,000}{20} = 187,500 \text{ units}$$

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Alternative

$$\begin{aligned}\text{Total Sales to earn an EBIT level of ₹ 2,50,000} &= \frac{\text{Required Contribution}}{\text{P/V Ratio}} \\ &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}} \\ &= \frac{\text{₹ 35,00,000} + \text{₹ 2,50,000}}{53.33\%} = \text{₹ 70,31,250}.\end{aligned}$$

$$\begin{aligned}\text{No. of units to earn an income (EBIT) level of ₹ 2,50,000 is} &= \frac{\text{Desired Sales}}{\text{Selling Price Per Unit}} \\ &= \frac{70,31,250}{37.50} = 1,87,500 \text{ units}.\end{aligned}$$

$$\begin{aligned}\text{(iv) Sales level to achieve an after tax EBIT of ₹ 2,50,000} &= \frac{\text{Fixed Cost} + \text{Desired EBIT}}{\text{P/V Ratio}} \\ &= \frac{35,00,000 + \frac{2,50,000}{1-.4}}{0.5333} = \text{₹ 73,43,750}\end{aligned}$$

Alternative:

After Tax Income (PAT) = ₹ 2,50,000

Tax rate = 40%

Desired level of Profit before tax

$$= \frac{\text{₹ 2,50,000}}{60} \times 100$$

$$= \text{₹ 4,16,667}$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$= \frac{\text{₹ 35,00,000} + \text{₹ 4,16,667}}{53.33\%}$$

$$= \text{₹ 73,43,750/-}$$

Question 12

The P/V Ratio of Delta Ltd. is 50% and margin of safety is 40%. The company sold 500 units for ₹ 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

(5 Marks, November 2011)

Answer

- (i) P/V Ratio - 50%
Margin of Safety - 40%

Sales 500 Units for ₹ 5,00,000

Sales Per Unit - ₹ 1,000

Calculation of Break Even Point (BEP)

$$\text{Margin of Safety Ratio} = \frac{\text{Sales} - \text{BEP}}{\text{Sales}} \times 100$$

$$40 = \frac{5,00,000 - \text{BEP}}{5,00,000} \times 100$$

$$\text{BEP} = ₹ 3,00,000$$

$$\text{BEP Per Unit} = 3,00,000 \div 1,000 = 300 \text{ Units}$$

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

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

Let the sales be X

$$\text{Profit} = 10\% \text{ of } X \text{ i.e. } 0.1X.$$

Thus -

$$X = \frac{1,50,000 + 0.1X}{50\%}$$

$$\text{or } X = ₹ 3,75,000$$

To find out sales in units amount of sales ₹ 3,75,000 is to be divided by Selling Price Per unit

Thus -

$$\text{Sales (in units)} = \frac{3,75,000}{1,000}$$

$$= 375 \text{ Units}$$

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Working Notes:

1. Selling price = ₹ 5,00,000 ÷ ₹ 500
= ₹ 1,000 per unit
2. Variable cost per unit
Selling Price - (Selling Price × P/V Ratio)
1,000 - (1,000 × 50%) = ₹ 500
3. Profit at present level of sales
Margin of Safety = $\frac{\text{Profit}}{\text{P/V Ratio}}$
Margin of Safety = 40% of ₹ 5,00,000 = ₹ 2,00,000
2,00,000 = $\frac{\text{Profit}}{50\%}$
Profit = ₹ 1,00,000
4. Fixed Cost
= (Sales × P/V Ratio) – Profit
= 5,00,000 × 50% – 1,00,000 = ₹ 1,50,000

Note: Alternative ways of calculation of 'Break Even Point' and required sales to earn a profit of 10% of sales' can be adopted to solve the problem.

Question 13

The following figures are related to LM Limited for the year ending 31st March, 2012 :

Sales - 24,000 units @ ₹ 200 per unit;

P/V Ratio 25% and Break-even Point 50% of sales.

You are required to calculate:

- (i) Fixed cost for the year*
- (ii) Profit earned for the year*
- (iii) Units to be sold to earn a target net profit of ₹ 11,00,000 for a year.*
- (iv) Number of units to be sold to earn a net income of 25% on cost.*
- (v) Selling price per unit if Break-even Point is to be brought down by 4,000 units.*

(8 Marks, November 2012)

Answer

Break- even point (in units) is 50% of sales i.e. 12,000 units.

Hence, Break- even point (in sales value) is $12,000 \text{ units} \times ₹ 200 = ₹ 24,00,000$

(i) We know that Break even sales = $\frac{\text{Fixed Cost}}{\text{P / V ratio}}$

or $₹ 24,00,000 = \frac{\text{Fixed Cost}}{25\%}$

or Fixed Cost = $₹ 24,00,000 \times 25\% = ₹ 6,00,000$

So Fixed Cost for the year is $₹ 6,00,000$

(ii) Contribution for the year = $(24,000 \text{ units} \times ₹ 200) \times 25\% = ₹ 12,00,000$

Profit for the year = Contribution – Fixed Cost

= $₹ 12,00,000 - ₹ 6,00,000 = ₹ 6,00,000$

(iii) Target net profit is $₹ 11,00,000$

Hence, Target contribution = Target Profit + Fixed Cost

= $₹ 11,00,000 + ₹ 6,00,000 = ₹ 17,00,000$

Contribution per unit = 25% of $₹ 200 = ₹ 50$ per unit

No. of units = $\frac{₹ 17,00,000}{₹ 50 \text{ per unit}} = 34,000 \text{ unit}$

So, 34,000 units to be sold to earn a target net profit of $₹ 11,00,000$ for a year.

(iv) Net desired total Sales (Number of unit x Selling price) be X, then desired profit is 25% on Cost or 20% on Sales i.e. 0.2 X

Desired Sales = $\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$

$X = \frac{6,00,000 + 0.2X}{25\%}$

or, $0.25 X = 6,00,000 + 0.2 X$

or, $0.05 X = 6,00,000$

or, $X = ₹ 1,20,00,000$

No. of units to be sold = $\frac{1,20,00,000}{200} = 60,000 \text{ units}$

(v) If Break- even point is to be brought down by 4,000 units then Break-even point will be $12000 \text{ units} - 4000 \text{ units} = 8000 \text{ units}$

Fixed Cost = $₹ 6,00,000$

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$$\text{Required Contribution per unit} = \frac{6,00,000}{8,000 \text{ unit}} = ₹ 75$$

$$\text{Selling Price} = \frac{\text{Contribution per unit}}{P / V \text{ ratio}} = \frac{₹ 75}{25\%} = ₹ 300 \text{ per unit}$$

Hence, selling price per unit shall be ₹ 300 if Breakeven point is to be brought down by 4,000 units.

Question 14

MFN Limited started its operation in 2011 with the total production capacity of 2,00,000 units. The following data for two years is made available to you:

	2011	2012
Sales units	80,000	1,20,000
Total cost (₹)	34,40,000	45,60,000

There has been no change in the cost structure and selling price and it is expected to continue in 2013 as well. Selling price is ₹ 40 per unit.

You are required to calculate:

- Break-Even Point (in units)
 - Profit at 75% of the total capacity in 2013
- (5 Marks, May 2013)

Answer

	2011	2012	Difference
Sales Units	80,000	1,20,000	40,000
Sale Value @ ₹ 40	32,00,000	48,00,000	16,00,000
Total Cost (₹)	34,40,000	45,60,000	11,20,000

$$\begin{aligned} \text{Variable Cost per unit} &= \frac{\text{Change in Total Cost}}{\text{Change in sales volume}} \\ &= \frac{₹ 11,20,000}{40,000 \text{ units}} = ₹ 28 \text{ per unit} \end{aligned}$$

$$\text{Total Fixed Cost (₹)} = ₹ 45,60,000 - (1,20,000 \text{ units} \times ₹ 28) = ₹ 12,00,000$$

$$(i) \text{ Break-even point (in units)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{₹ 12,00,000}{(₹ 40 - ₹ 28)} = 1,00,000 \text{ units}$$

(ii) Profit at 75% Capacity in 2013.

$$\begin{aligned} &= (2,00,000 \text{ units} \times 75\%) \times \text{Contribution per unit} - \text{Fixed Cost} \\ &= 1,50,000 \text{ units} \times ₹ 12 - ₹ 12,00,000 = ₹ 6,00,000. \end{aligned}$$

Question 15

Elaborate the practical application of Marginal Costing. (4 Marks, November 2013)

Answer

Practical applications of Marginal costing:

- (i) **Pricing Policy:** Since marginal cost per unit is constant from period to period, firm decisions on pricing policy can be taken particularly in short term.
- (ii) **Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc
- (iii) **Ascertaining Realistic Profit:** Under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.
- (iv) **Determination of production level:** Marginal costing helps in the preparation of break-even analysis which shows the effect of increasing or decreasing production activity on the profitability of the company.

Question 16

What is the meaning of Margin of Safety (MOS)? State the relationship between Operating Leverage and Margin of Safety Ratio. (4 Marks, November 2013)

Answer

Margin of Safety (MoS) is the excess of total sales over the Break even sales. MoS defines the amount upto which level sales can decline before occurring loss. Therefore $MoS = Total\ Sales - Break\ even\ sales$ and $MoS\ ratio = \frac{Sales - Break\ even\ sales}{Sales}$

Break even sales (BE sales) will depend on contribution margin ($BE\ sales = \frac{Fixed\ Cost}{Contribution\ margin}$). Contribution margin is related to operating leverage also. Operating leverage is calculated as $\frac{Contribution}{Operating\ profit}$ and contribution margin plays an important role in it. If sales are expected to increase, higher operating leverage will result in higher profit. When sales are expected to decrease, lower operating leverage will result in higher profit. Higher variable cost and lower fixed cost will result into higher MoS and risk will be lower and vice versa.

So like Operating leverage, MoS is a measure of risk as to what extent an organisation is exposed to change in sales volume.

9.18 Cost Accounting

Question 17

SHA Limited provides the following trading results:

Year	Sale	Profit
2012-13	₹ 25,00,000	10% of Sale
2013-14	₹ 20,00,000	8% of Sale

You are required to calculate:

- Fixed Cost
- Break Even Point
- Amount of profit, if sale is ₹ 30,00,000
- Sale, when desired profit is ₹ 4,75,000
- Margin of Safety at a profit of ₹ 2,70,000

(4 Marks, May, 2014)

Answer

Workings:

Profit in year 2012-13 = ₹ 25,00,000 × 10% = ₹ 2,50,000

Profit in year 2013-14 = ₹ 20,00,000 × 8% = ₹ 1,60,000

$$\begin{aligned}\text{So, P/V Ratio} &= \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100 \\ &= \frac{\text{₹ 2,50,000} - \text{₹ 1,60,000}}{\text{₹ 25,00,000} - \text{₹ 20,00,000}} \times 100\end{aligned}$$

$$= \frac{\text{₹ 90,000}}{\text{₹ 5,00,000}} \times 100 = 18\%$$

- Fixed Cost = Contribution (in year 2012-13) – Profit (in year 2012-13)
= (Sales × P/V Ratio) – ₹ 2,50,000
= (₹ 25,00,000 × 18%) – ₹ 2,50,000
= ₹ 4,50,000 – ₹ 2,50,000
= ₹ 2,00,000

- Break-even Point (in Sales) = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$
 $= \frac{\text{₹ 2,00,000}}{18\%} = \text{₹ 11,11,111 (Approx)}$

(iii) Calculation of profit, if sale is ₹ 30,00,000

$$\begin{aligned} \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\ &= (\text{Sales} \times \text{P/V Ratio}) - \text{Fixed Cost} \\ &= (\text{₹ } 30,00,000 \times 18\%) - \text{₹ } 2,00,000 \\ &= \text{₹ } 5,40,000 - \text{₹ } 2,00,000 = \text{₹ } 3,40,000 \end{aligned}$$

So profit is ₹ 3,40,000, if Sale is ₹ 30,00,000.

(iv) Calculation of Sale, when desired Profit is ₹ 4,75,000

$$\begin{aligned} \text{Contribution Required} &= \text{Desired Profit} + \text{Fixed Cost} \\ &= \text{₹ } 4,75,000 + \text{₹ } 2,00,000 = \text{₹ } 6,75,000 \end{aligned}$$

$$\text{Sales} = \frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{\text{₹ } 6,75,000}{18\%} = \text{₹ } 37,50,000$$

Sales is ₹ 37,50,000 when desired profit is ₹ 4,75,000.

(v) Margin of Safety = $\frac{\text{Profit}}{\text{P/V Ratio}}$

$$= \frac{\text{₹ } 2,70,000}{18\%} = \text{₹ } 15,00,000$$

So Margin of Safety is ₹ 15,00,000 at a profit of ₹ 2,70,000

Question 18

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

You are required to calculate:

- (i) Break Even Point in Rupees.
- (ii) Profit if the sale volume is 50,000 units.
- (iii) Minimum level of production where the company needs not to close the production if unavoidable fixed cost is ₹ 1,50,000. (4 Marks, November, 2014)

Answer

Units sold	Sales value (₹)	Profit/ (loss) (₹)
16,000 units	4,80,000 (₹ 30 × 16,000 units)	(1,60,000) (₹ 10 × 16,000 units)
40,000 units	12,00,000 (₹ 30 × 40,000 units)	3,20,000 (₹ 8 × 40,000 units)