12 Marginal Costing

Basic Concepts

Marginal Cost	This is the variable cost of one unit of product or a service.
Marginal Costing	It is a principle whereby variable cost are charged to cost units and fixed cost attributable to the relevant period is written off in full against contribution for that period.
Absorption Costing	A method of costing by which all direct cost and applicable overheads are charged to products or cost centres for finding out the total cost of production. Absorbed cost includes production cost as well as administrative and other cost.
Direct Costing	This is a principle under which all costs which are directed related are charged to products, processes, operations or services, of which they form an integral part.
Differential Costing	It is a technique used in the preparation of ad-hoc information in which only cost and income differences in between alternative courses of action are taken into consideration.
Marginal Contribution	This is the difference between selling price and variable cost of production.
Break-even Chart	A mathematical or graphical representation, showing approximate profit or loss of an enterprise at different levels of activity within a limited range.
Break-even Point	This is the level of activity there is neither a profit nor a loss.
Cash Break-even Point	It is the level of activity where there is neither a cash profit nor a cash loss.
Cost Break-even Point	It is the level of activity where the total cost under two alternatives are the same. It is also known as Cost indifference point.
Profit Volume Chart	It is a diagram showing the expected relationship between costs, revenue at various volumes with profit being the residual.
Profit Volume Ratio or P/V Ratio	It is the ratio establishing the relationship between the contribution and the sales value.
Margin of Safety	This is the difference between the expected level of sales and the break even sales

Basic Formulae

1. **Sales – Variable Cost = Contribution**

   Or, **Contribution** = Fixed Cost ± Profit/ loss

   Or, Sales – (Fixed Cost + Variable Cost) = Profit

   By multiplying and dividing L.H.S. by S

2. $\dfrac{S*(S - V)}{S*} = F + P$

3. Sales × P/V Ratio = Fixed Cost + Profit   or   Contribution

   $P/V\ Ratio = \dfrac{Sales - Variable\ Cost}{Sales}$

4. Break-even Sales × P/V Ratio = Fixed Cost   (∵ at BEP profit is zero)

5. **Contribution** = Sales × P/V Ratio

6. **P/V Ratio** $= \dfrac{Contribution}{Sales}$

7. **P/V Ratio** $= \dfrac{Change\ in\ profit}{Change\ in\ sales}$

8. **P/V Ratio** $= \dfrac{Change\ in\ contribution}{Change\ in\ sales}$

9. **P/V Ratio** $= \dfrac{Fixed\ Cost}{BES}$

10. **Break-even Sales (BES)** $= \dfrac{Fixed\ Cost}{P/V\ Ratio}$ Or,

    B.E.P (in units) $= \dfrac{Fixed\ Cost}{Contribution\ per\ unit}$

11. **(Break-even Sales + Margin of Safety) × P/V Ratio** = Contribution

12. **Total Sales** = Break-even Sales + Margin of Safety)

13. (Break-even Sales × P/V Ratio) + (Margin of Safety × P/V Ratio) = Fixed Cost + Profit

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14. **Margin of Safety × P/V Ratio** = Profit

15. **Margin of Safety** = Total Sales – Break-even Sales or $\dfrac{\text{Profit}}{\text{P/V Ratio}}$

16. **Break-even Sales** = Total Sales – Margin of Safety

17. **P/V Ratio** = $\dfrac{\text{Profit}}{\text{Margin of Safety Ratio}}$

18. **Margin of Safety Ratio** = $\dfrac{\text{Total Sales - Break - even Sales}}{\text{Total Sales}}$

19. **Profit** = (Sales × P/V Ratio) – Fixed Cost   Or, P/V Ratio × Margin of Safety

   (P/V Ratio to be multiplied by 100 to express it in percentage)

SECTION-A

Question-1

Explain and illustrate cash break-even chart.

Solution:

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:

$$\text{Cash BEP (Units)} = \frac{\text{Cash Fixed Cost}}{\text{Contribution per Units}}$$
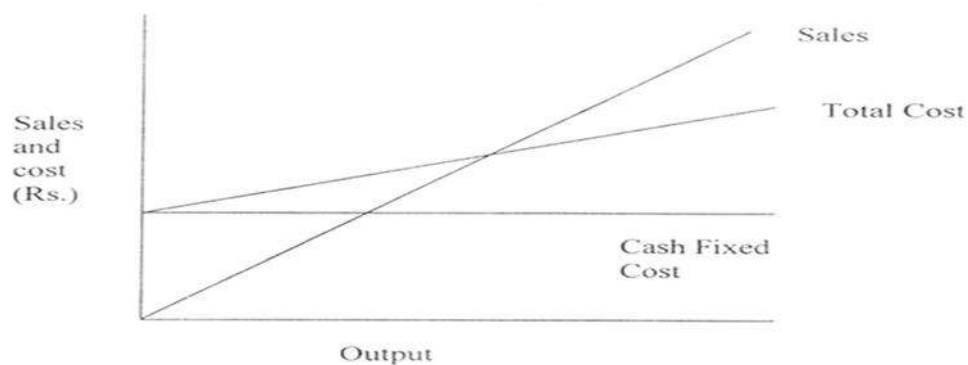
Question-2

Write short notes on Angle of Incidence.

Solution:

This angle is formed by the intersection of sales line and total cost line at the break- even point. This angle shows the rate at which profits are being earned once the break-even point has been reached. The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favourable position.

Question-3

Discuss basic assumptions of Cost Volume Profit analysis.

Solution:

CVP Analysis:-Assumptions

(i)   Changes in the levels of revenues and costs arise only because of changes in the number of products (or service) units produced and sold.

(ii)   Total cost can be separated into two components: Fixed and variable

(iii)   Graphically, the behaviour of total revenues and total cost are linear in relation to output level within a relevant range.

(iv)   Selling price, variable cost per unit and total fixed costs are known and constant.

(v) All revenues and costs can be added, sub traded and compared without taking into account the time value of money.

Question-4

Elaborate the practical application of Marginal Costing.

Solution:

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.

SECTION- B

Computation of Break-even Point, Margin of Safety, Sales Volume, Profit, Contribution, P/V Ratio etc.

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:

(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 ` 60,000.

Solution:

(a) Suppose Sales units are x then

S = V + F + P

(S = Sales ; V = Variable Cost; F = Fixed Cost; P = Profit)

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

` $20x$ – `$17x$ = ` 6,30,000

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

Sales value = 2,10,000 units $\times$ `  20 = ` 42,00,000 to earn a profit of 10% on sales.

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

B.E.P (Units) = $\dfrac{FixedCost}{Contribution\ per\ unit}$

Or, Contribution per unit = $\dfrac{`6,30,000}{1,20,000 units}$ = ` 5.25

So, Sales Price = `  15 + ` 5.25 = ` 20.25

(c) Margin of Safety Sales = $\dfrac{Pr\ ofit}{P/\ VRatio}$ Or, $\dfrac{`\ 60,000}{P/\ VRatio}$

where, P/V Ratio = $\dfrac{\text{Contribution per unit}}{\text{Sales Price}} \times 100$ Or, $\dfrac{\text{₹}5}{\text{₹}20} \times 100 = 25\%$

Margin of Safety Sales = $\dfrac{\text{₹}60{,}000}{25\%} = \text{₹}\ 2{,}40{,}000$

So if profit is ₹ 60,000, margin of safety sale will be ₹ 2,40,000.

Question 2

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?

Solution:

P/V Ratio = $\dfrac{\text{Contribution}}{\text{Sales}} \times 100$ = $\left(\dfrac{\text{₹}1{,}50{,}000}{\text{₹}3{,}00{,}000} \times 100 \right) = 50\%$

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

Contribution = Fixed Cost ± Profit

= ₹ 90,000 – ₹ 30,000 (as it is a loss) = ₹ 60,000.

Then Sales = $\dfrac{\text{Contribution}}{\text{P/V ratio}}$ or $\dfrac{60{,}000}{50\%}$ = ₹ 1,20,000

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

(ii) Margin of Safety = $\dfrac{\text{Profit}}{\text{P/V Ratio}}$ Or, $\dfrac{\text{₹}90{,}000}{50\%} = \text{₹}1{,}80{,}000$

Alternative solution of this part:

Break-even Sales = $\dfrac{\text{Fixed Cost}}{\text{PV Ratio}} = \dfrac{\text{₹}90{,}000}{50\%} = \text{₹}\ 1{,}80{,}000$

Sales at profit of ₹ 90,000 = $\dfrac{\text{Fixed Cost} + \text{Profit}}{\text{PV Ratio}}$

$= \dfrac{\text{₹}90{,}000 + \text{₹}90{,}000}{50\%} = \dfrac{\text{₹}1{,}80{,}000}{50\%} = \text{₹}\ 3{,}60{,}000.$

Margin of Safety   = Sales – Break-even Sales

= 3,60,000 – 1,80,000 = ₹ 1,80,000

Question 3

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

	(100% capacity)	*(75% 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?*

Solution:

Computation of Break-even point in units:

	2,000 units	**1,500 units**
Production Overhead I: Fixed Cost (`)	6,000	6,000
	(2,000 unit × ` 3)	(1,500 unit × ` 4)
Selling price – Material and labour (`) (A)	8	8
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 4

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 2013-14 will be ` *2,80,000.*

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

Solution:

P/V ratio   = 28%

Quarterly fixed Cost   = ` 2,80,000

Desired Profit   = ` 70,000

Sales revenue required to achieve desired profit

$$= \frac{\text{Fixed Cost + Desired Profit}}{\text{P/ V Ratio}} = \frac{`2,80,000 + `70,000}{28\%} = ` \ 12,50,000$$

Question 5

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.

Solution:

Let $4x$ = No. of units of J

Then $3x$ = no. of units of K

BEP in x units = $\left(\dfrac{\text{Fixed Cost}}{\text{Contribution}}\right)$ = $\dfrac{`\,6,16,000}{(4x\times`\,40)+3x\times`\,20)}$

Or $x=\dfrac{`\,6,16,000}{`\,220}$ = 2,800 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 6

Following informations are available for the year 2013 and 2014 of PIX Limited:

Year	2013	2014
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.

Solution:

(a) P/V Ratio = $\dfrac{\text{Change in profit}}{\text{Change in sales}}\times100$

$=\dfrac{`\,7,00,000-(-`\,3,00,000)}{(`\,57,00,000-`\,32,00,000)}\times\dfrac{`\,10,00,000}{`\,25,00,000}\times100 = 40\%$

(b) Total Fixed cost = Total Contribution - Profit

         = (Sales × P/V Ratio) – Profit

         = (` 57, 00,000 × $\dfrac{40}{100}$ ) = ` 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

Required Sales = $\dfrac{27,80,000}{P/V\,Ratio} = \dfrac{27,80,000}{40\%}$ = ` 69, 50,000

Question 7

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 are 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.

Solution:

(i)   Contribution = ` 37.50 - ` 17.50 = ` 20 per unit.

Break even Sales Quantity = $\dfrac{\text{Fixed cost}}{\text{Contribution margin per unit}}$ = $\dfrac{`\,35,00,000}{`\,20}$ =1,75,000 units

Cash Break even Sales Qty= $\dfrac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}}$ = $\dfrac{`\,20,00,000}{`\,20}$ =1, 00,000 units.

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

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

$\dfrac{\text{Fixed cost + Desired EBIT level}}{\text{Contribution margin per unit}}$ = $\dfrac{35,00,000+2,50,000}{20}$ = 1,87,500 units

(iv)   After Tax Income (PAT) = `2, 50,000

Tax rate = 40%

Desired level of Profit before tax   = $\dfrac{`\,2,50,000}{60} \times 100$ = `4,16,667

Estimate Sales Level = $\dfrac{\text{FixedCost + DesiredProfit}}{P/V\,ratio}$

Or, $\left(\dfrac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \right)$

$= \dfrac{`35,00,000 + ` 4,16,667}{53.33\%} = `73,43,750$

Question 8

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

Solution:

(i)   P/V Ratio   - 50%

Margin of Safety   - 40%

Sales 500 Units for ` 5,00,000

Selling price per Unit   - ` 1,000

Calculation of Break Even Point (BEP)

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

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

BEP (in sales)   = ` 3,00,000

BEP (in Unit)   = ` 3,00,000 ÷ ` 1,000 = 300 Units

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

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

Let the Sales be x

Profit   = 10% of x i.e. $0.1\,x$

Thus -

x $= \left(\dfrac{1,50,000 + 0.1X}{50\%} \right)$

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 -

Sales (in units)   = $\dfrac{`3,75,000}{`1,000}$ =   375 Units

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 x 50%) = ` 500

3.   Profit at present level of sales

         Margin of Safety   = $\dfrac{\text{Profit}}{\text{P/ V Ratio}}$

         Margin of Safety   = 40% of ` 5,00,000 = ` 2,00,000

         ` 2,00,000   = $\dfrac{\text{Pr ofit}}{50\%}$

         Profit   = ` 1,00,000

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

         =   (`5,00,000 x 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 9

The following figures are related to LM Limited for the year ending 31st March, 2014 :

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.

Solution:

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

Hence, Break- even point (in sales value) is 12,000 units x ` 200 = ` 24,00,000

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

Or, ` 24,00,000 = $\dfrac{\text{Fixed Cost}}{25\%}$

Or, Fixed Cost = ` 24,00,000 x 25%

= ` 6,00,000

So Fixed Cost for the year is ` 6,00,000

(ii) Contribution for the year = (24,000 units × ` 200) × 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 = $\dfrac{`17,00,000}{`50 \text{ per unit}}$ = 34,000 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 × Selling price) be x then desired profit is 25% on Cost or 20% on Sales i.e. 0.2 x

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

x = $\dfrac{6,00,000 + 0.2\,x}{25\%}$

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 - $\dfrac{`1,20,00,000}{`200}$ = 60,000 units

(v) If Break- even point is to be brought down by 4,000 units then Break-even point will be

12,000 units – 4,000 units = 8,000 units

Let Selling price be `  $x$ and fixed cost and variable cost per unit remain unchanged i.e. ` 6,00,000 and ` 150 respectively.

Break even point: Sales revenue = Total cost

8,000 x = 8,000 × ` 150 + ` 6,00,000

Or, 8,000 x = ` 12,00,000 + ` 6,00,000

Or, x = $\dfrac{`\ 18,00,000}{8,000}$ = ` 225

∴ Selling Price should be ` 225

Hence, selling price per unit shall be ` 225 if Break-even point is to be brought down by 4,000 units.

Question 10

MFN Limited started its operation in 2012 with the total production capacity of 2,00,000 units. The following data for two years is made available to you:

	2012	2013
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 2014 as well. Selling price is ` 40 per unit.

You are required to calculate:

(i)   Break-Even Point (in units)

(ii)   Profit at 75% of the total capacity in 2014

Solution:

	2012	**2013**	**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

Variable Cost per unit $= \dfrac{\text{Change in Total Cost}}{\text{Change in sales volume}}$

$= \dfrac{`11,20,000}{40,000\text{units}} = `28 \text{per unit}$

Total Fixed Cost (`) = ` 45,60,000 – (1,20,000 units × `28) = `12,00,000

(i)   Break- even point (in units) $= \dfrac{\text{Fixed Cost}}{\text{Contribution per unit}}$

$= \dfrac{`12,00,000}{(`40 - `28)}$ = 1,00,000 units

(ii)   Profit at 75% Capacity in 2014.

= (2,00,000 units × 75%) × Contribution per unit – Fixed Cost

= 1,50,000 units × ` 12 - ` 12,00,000 = ` 6,00,000.

Question 11

Arnav 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	` 2,30,000
General & Administration Overhead	2% of Cost of Goods Sold	` 71,000
Selling & Distribution Overhead	4% of Cost of Sales	` 68,000

Last Year 5,000 units were sold at `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.

Solution:

Working Notes:

(i)   Calculation of Cost of Goods Sold (COGS):

COGS = {(DM- 0.3 COGS) + (DL- 0.15 COGS) + (FOH- 0.10 COGS + ` 2,30,000) + (G&AOH- 0.02 COGS + ` 71,000)}

Or   COGS = 0.57 COGS + ` 3,01,000

Or   COGS = $\dfrac{\text{`} 3,01,000}{0.43}$ = ` 7,00,000

(ii)   Calculation of Cost of Sales (COS):

COS = COGS + (S&DOH- 0.04 COS + ` 68,000)

Or   COS = ` 7,00,000 + (0.04 COS + ` 68,000)

Or   COS = $\dfrac{\text{`} 7,68,000}{0.96}$ = ` 8,00,000

(iii)   Calculation of Variable Costs:

Direct Material-	(0.3 × ` 7,00,000)	` 2,10,000
Direct Labour-	(0.15 × ` 7,00,000)	` 1,05,000
Factory Overhead-	(0.10 × ` 7,00,000)	` 70,000
General & Administration OH-	(0.02 × ` 7,00,000)	` 14,000
Selling & Distribution OH	(0.04 × ` 8,00,000)	` 32,000
		` 4,31,000

(iv)   Calculation of total Fixed Costs:

Factory Overhead-	` 2,30,000
General & Administration OH-	` 71,000
Selling & Distribution OH	` 68,000
	` 3,69,000

(v)   Calculation of P/V Ratio:

$$\text{P/V Ratio} = \dfrac{\text{Contribution}}{\text{Sales}} \times 100 = \dfrac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100$$

$$= \dfrac{(\text{`} 185 \times 5,000 \text{ units}) - \text{`} 4,31,000}{\text{`} 185 \times 5,000 \text{ units}} \times 100 = 53.41\%$$

(a)   Break-Even Sales = $\dfrac{\text{Fixed Costs}}{\text{P/V Ratio}}$ = $\dfrac{\text{`} 3,69,000}{53.41\%}$ = ` 6,90,882

(b)   Profit earned during the last year

      = (Sales – Total Variable Costs) – Total Fixed Costs

      = (` 9,25,000 - ` 4,31,000) - ` 3,69,000

      = ` 1,25,000

(c)   Margin of Safety (%) = $\dfrac{\text{Sales–Breakeven sales}}{\text{Sales}} \times 100$

      = $\dfrac{`9,25,000 - `6,90,882}{`9,25,000} \times 100 = 25.31\%$

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

  Profit   = 90% (` 9,25,000 - ` 4,31,000) - ` 3,69,000

       = ` 4,44,600 - ` 3,69,000 = ` 75,600

Question 12

Maxim 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:

	(`)
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 2014 has been carried out by the General manger of Maxim Ltd. As per the forecast, price of direct material and variable overhead will be increased by 10% and 5% respectively.

Required to calculate:

(i)   *Number of units to be sold to maintain the same quantum of profit that made in August 2014.*

(ii)   *Margin of safety in the month of August 2014 and September 2014.*

Solution:

Calculation of Profit made in the month of August 2014 by selling 14,000 units.

	Amount per unit (`)	Amount (`)
Sales Revenue	18.00	2,52,000
Less: Variable Costs:		

-	Direct Material	8.00	1,12,000
-	Direct Labour	3.50	49,000
-	Variable Overhead	2.50	35,000
Contribution		4.00	56,000
Less: Fixed Overhead		2.00	28,000
Profit		2.00	28,000

(i)   To maintain the same amount of profit i.e. ` 28,000 in September 2014 also, the company needs to maintain a contribution of ` 56,000.

Let, number of units to be sold in September 2014 is 'x', then the contribution will be

$$` 18\, x - [(`8 \times 1.10) + `\, 3.5 + (`\, 2.5 \times 1.05)]\, x \quad = `\, 56,000$$

$$` 18\, x - (`\, 8.8 + `\, 3.5 + `\, 2.625)\, x \qquad\qquad = `\, 56,000$$

Or, $x = \dfrac{`56,000}{`3.075}$ =18,211.38 units or 18,212 units.

(ii)   Margin of Safety

	August 2014	September 2014
Profit	` 28,000	` 28,000
P/V Ratio	$\dfrac{`4}{`18} \times 100$	$\dfrac{`3.075}{`18} \times 100$
	` 1,26,000	` 1,63,902.44
Margin of Safety $\left(\dfrac{\text{Pr ofit}}{P/V\,Ratio} \times 100\right)$	$\left(\dfrac{28,000}{400} \times 18 \times 100\right)$	$\left(\dfrac{28,000}{307.5} \times 18 \times 100\right)$

Question 13

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

Break-even Sales   ` 400 crores

P/V Ratio   30 %

Margin of Safety   ` 120 crores

Maryanne's management has decided to increase production to 95 % capacity level with the following modifications:

(a)   The selling price will be reduced by 10%.

(b)   The variable cost will be increased by 2% on sales

(c) The fixed costs will increase by ` 50 crores, including depreciation on additions, but excluding interest on additional capital.

Additional capital of ` 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 ` 20 crores over and above the present profit and also meet 15% interest on the additional capital.*

(ii) *What will be the revised*

    (a)   *Break-even Sales*

    (b)   *P/V Ratio*

    (c)   *Margin of Safety*

Solution:

Working Notes:

1. Total Sales   = Break -even Sales + Margin of Safety

                            = ` 400 crores + ` 120 crores

                            = ` 520 crores

2. Variable Cost   = Total Sales × (1- P/V Ratio)

                            = ` 520 crores × (1 – 0.3)

                            = ` 364 crores

3. Fixed Cost   = Break-even Sales × P/V Ratio

                            = ` 400 crores × 30%

                            = ` 120 crores

4. Profit   = Total Sales – (Variable Cost + Fixed Cost)

                            = ` 520 crores – (` 364 crores + ` 120 crores)

                            = ` 36 crores

(i) Revised Sales figure to earn profit of ` 56 crores (i.e. ` 36 crores + ` 20 crores)

Revised Sales $= \dfrac{\text{Revised FixedCost * + DesiredProfit}}{\text{Revised P / VRatio * *}}$

                    $= \dfrac{`185 \text{ crores} + `56 \text{crores}}{28\%}$

                    = ` 860.71 Crores

*Revised Fixed Cost = Present Fixed Cost + Increment in fixed cost + Interest on additional Capital

= ` 120 crores + ` 50 crores + 15% of ` 100 crores

= ` 185 crores

**Revised P/V Ratio : Let current selling price per unit be ` 100.

Therefore, Reduced selling price per unit = ` 100 × 90% = ` 90

Revised Variable Cost on Sales = 70%+ 2% = 72%

Variable Cost per unit   = ` 90 × 72% = ` 64.80

Contribution per unit = ` 90 - ` 64.80 = ` 25.20

Revised P/V Ratio = $\dfrac{\text{Contribution}}{\text{Sales}}\times100$ = $\dfrac{`25.2}{`90}\times100 = 28\%$

(ii)   (a)   Revised Break-even Sales   = $\dfrac{\text{FixedCost}}{\text{P/V Ratio}}\times100$ = $\dfrac{`185\ \text{crores}}{28\%}$ =` 660.71 crores

(b)   Revised P/V Ratio   = 28 % (as calculated above)

(c)   Revised Margin of safety   = Total Sales – Break-even Sales

= ` 860.71 crores - ` 660.71 crores

= ` 200 crores.

Question 14

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:

(i)   Fixed Cost

(ii)   Break Even Point

(iii)   Amount of profit, if sale is ` 30,00,000

(iv)   Sale, when desired profit is ` 4,75,000

(v)   Margin of Safety at a profit of ` 2,70,000

Solution:

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

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

$= \dfrac{`2,50,000 - `1,60,000}{`25,00,000 - `20,00,000} \times 100 = \dfrac{`90,000}{`5,00,000} \times 100 = 18\%$

(i)   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

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

                       $= \dfrac{`2,00,000}{18\%} = `\ 11,11,111$ (Approx)

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

         Profit   = Contribution – Fixed Cost

                         = (Sales × P/V Ratio) – Fixed Cost

                         = (` 30,00,000 × 18%) - ` 2,00,000

                         = ` 5,40,000 – ` 2,00,000

                         = `3,40,000

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

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

         Contribution Required   = Desired Profit + Fixed Cost

                                   = ` 4,75,000 + ` 2,00,000

                                   = ` 6,75,000

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

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

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

$= \dfrac{`\,2,70,000}{18\%} = `\ 15,00,000$

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

Question 15

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.

Solution:

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)

P/V Ratio $= \dfrac{Change\,in\,profit}{Change\,in\,sales\,value} \times 100 = \dfrac{`\,3,20,000 - (-`\,1,60,000)}{`\,12,00,000 - `\,4,80,000} \times 100$

$= \dfrac{`\,4,80,000}{`\,7,20,000} \times 100 = 66.67\%$

Total Contribution in case of 40,000 units   = Sales Value × P/V Ratio

= ` 12,00,000 × 66.67%

= ` 8,00,000

So, Fixed cost   = Contribution – Profit

= ` 8,00,000 – ` 3,20,000

= ` 4,80,000

(i) Break-even Point in Rupees

$$= \frac{FixedCost}{P/VRatio}$$

$$= \frac{₹\ 4,80,000}{66.67\%} = ₹\ 7,20,000$$

(ii) If sales volume is 50,000 units, then profit = Sales Value × P/V Ratio – Fixed Cost

$$= (50,000\ units×\ ₹\ 30×66.67\% - ₹\ 4,80,000)$$

$$= ₹\ 5,20,000$$

(iii) Minimum level of production where the company needs not to close the production, if unavoidable fixed cost is ₹ 1,50,000:

$$= \frac{Avoidable\ fixedcost}{Contributionper\ unit}$$

$$= \frac{Total\ fixed\ cost - Unavoidable\ fixedcost}{Contributionper\ unit}$$

$$= \frac{₹\ 4,80,000 - ₹\ 1,50,000}{₹\ 30×66.67\%}$$

$$= \frac{₹\ 3,30,000}{₹\ 20} = 16,500\ units.$$

At production level of ≥ 16,500 units, company needs not to close the production.

Question 16

ABC Limited started its operation in the year 2013 with a total production capacity of 2,00,000 units. The following information, for two years, are made available to you:

	Year 2013	Year 2014
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 anticipated that it will remain unchanged in the year 2015 also.

Selling price is ₹ 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.

Solution:

(i)   Variable Cost per unit

$$= \frac{\text{Change in total cost}}{\text{Change in sales volume}}$$

$$= \frac{`45,60,000 - `34,40,000}{1,20,000 \text{ units} - 80,000 \text{ units}}$$

$$= \frac{`11,20,000}{40,000 \text{ units}} = `28$$

(ii)   Profit Volume Ratio

$$= \frac{\text{Contribution per unit}}{\text{Selling price per unit}} \times 100$$

$$= \frac{`40 - `28}{`40} \times 100 = 30\%$$

(iii)   Break-Even Point (in units)

$$= \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

Fixed Cost = Total Cost in 2013 – Total Variable Cost in 2013

= `34,40,000 – (`28 × 80,000 units)

= `34,40,000 – `22,40,000

= `12,00,000

Therefore, Break-Even Point = $\frac{`12,00,000}{`12}$ = 1,00,000 units

(iv)   Profit if the firm operates at 75% of the capacity:

Number of units to be produced and sold = 2,00,000 units × 75% = 1,50,000 units

Profit	= Total contribution – Fixed Cost
Or,	= ` 12 × 1,50,000 units – ` 12,00,000
Or,	= ` 18,00,000 – ` 12,00,000
Or, Profit	= ` 6,00,000

Question 17

Maximum Production capacity of KM (P) 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	` 12,80,000	` 14,40,000	` 16,00,000
Direct labour	` 17,60,000	` 19,80,000	` 22,00,000
Total factory overheads	` 22,00,000	` 23,70,000	` 25,40,000

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

Solution:

Computation of Overheads:

Variable Overhead per unit $= \dfrac{\text{Change in Factory Overheads}}{\text{Change in activity level}}$

$$= \dfrac{23,70,000 - 22,00,000}{18,000 - 16,000} \text{ or } \dfrac{25,40,000 - 23,70,000}{20,000 - 18,000}$$

$$= \dfrac{1,70,000}{2000} = ` \; 85 \text{ per unit}$$

Fixed Overhead

Activity level = 16,000 units

Particulars	Amount (`)
Total factory overheads	22,00,000
Less : Variable overheads 16,000 units @ `85 per unit	13,60,000
Fixed Overhead	8,40,000

Computation of Costs at Activity Level 24,000 units

	Per Unit (`)	Amount (`)
Direct Material (12,80,000/16,000)	80.00	19,20,000
Direct Labour (17,60,000/16,000)	110.00	26,40,000
Variable Overhead (As calculated above)	85.00	20,40,000
Fixed Overhead		8,40,000
Total Cost		74,40,000

Computation of Selling Price at activity level 24,000 units

Profit required is 25% on selling price, hence cost will be 75%.

Therefore desired profit $= \dfrac{25 \times 74,40,000}{75} = $ ` 24,80,000

Cost of 24,000 units	74,40,000
Desired Profit	24,80,000
Total Sales	99,20,000

Selling Price Per Unit $= \dfrac{\text{Total Sales}}{\text{No of Units}} = \dfrac{99,20,000}{24,000} = $ `413.33 or ` 413

Question 18

SK Lit. is engaged in the manufacture of tyres. Analysis of income statement indicated a profit of ` 150 lakhs on a sales volume of 50,000 units. The fixed costs are ` 850 lakhs which appears to be high. Existing selling price is ` 3,400 per unit. The company is considering to revise the profit target to ` 350 lakhs. You are required to compute –

(i)   Break- even point at existing levels in units and in rupees.

(ii)   The number of units required to be sold to earn the target profit.

(iii)   Profit with 15% increase in selling price and drop in sales volume by 10%.

(iv)   Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 8% in the variable costs and ` 85 lakhs in the fixed cost is envisaged.

Solution:

Sales Volume 50,000 Units

Computation of existing contribution

Particulars	Per unit (`)	Total (` In lakhs)
Sales	3,400	1,700
Fixed Cost	1,700	850
Profit	300	150
Contribution	2,000	1,000
Variable Cost	1,400	700

(i)   Break even sales in units $= \dfrac{\text{Fixed Cost}}{\text{Contribution per unit}} = \dfrac{8,50,00,000}{2,000} = $ 42,500 units

Break even sales in rupees = 42,500 units × ` 3,400 = ` 1,445 lakhs

OR

$$P/V \text{ Ratio} = \frac{2,000}{3,400} \times 100 = 58.82\%$$

$$\text{B.EP (Rupees)} = \frac{FC}{P/VRatio} = \frac{8,50,00,000}{58.82\%} = ` 1,445 \text{ lakhs (approx.)}$$

(ii) Number of units sold to achieve a target profit of `350 lakhs:

Desired Contribution   = Fixed Cost + Target Profit

= 850 L + 350 L = 1,200L

$$\text{Number of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{12,00,00,000}{2,000} = 60,000 \text{ units}$$

(iii) Profit if selling price is increased by 15% and sales volume drops by 10%:

Existing Selling Price per unit = ` 3,400

Revised selling price per unit = `  3,400 x 115% = ` 3,910

Existing Sales Volume = 50,000 units

Revised sales volume = 50,000 units – 10% of 50,000 = 45,000 units.

Statement of profit at sales volume of 45,000 units @ ` 3910 per unit

Particulars	Per unit (`)	Total (` In lakhs)
Sales	3,910.00	1,759.50
Less: Variable Costs	1,400.00	630.00
Contribution	2,510.00	1,129.50
Less: Fixed Cost		850.00
Profit		279.50

(iv) Volume to be achieved to earn target profit of `350 lakhs with revised selling price and reduction of 8% in variable costs and `85 lakhs in fixed cost:

Revised selling price per unit = ` 3,910

Variable costs per unit existing = `1,400

Revised Variable Costs

Reduction of 8% in variable costs = ` 1,400 – 8% of 1,400

= `  1,400 – `112

= `1,288

Total Fixed Cost (existing)   = ` 850 lakhs

Reduction in fixed cost	= ` 85 lakhs
Revised fixed cost	= ` 850 lakhs – ` 85 lakhs = `765 lakhs
Revised Contribution (unit)	= Revised selling price per unit – Revised Variable Costs per units
Revised Contribution per unit	= ` 3,910 – ` 1,288 = ` 2,622
Desired Contribution	= Revised Fixed Cost + Target Profit
	= ` 765 lakhs + `350 lakhs = `1,115 lakhs
No. of units to be sold	$= \dfrac{\text{Desired Contribution}}{\text{Contribution per unit}} = \dfrac{`1,115\ \text{lakh}}{`2,622} = 42,525\ \text{units}$

Question 19

A company gives the following information:

Margin of Safety	` 3,75,000
Total Cost	` 3,87,500
Margin of Safety (Qty.)	15,000 units
Break Even Sales in Units	5,000 units

You are required to calculate:

(i)   Selling price per unit

(ii)   Profit

(iii)   Profit/ Volume Ratio

(iv)   Break Even Sales (in Rupees)

(v)   Fixed Cost

Solution:

(i) Selling Price per unit $= \dfrac{\text{Margin of Safety in Rupee value}}{\text{Margin of Safety in Quantity}}$

$= \dfrac{`3,75,000}{15,000\ \text{units}} = ` 25$

(ii) Profit = Sales Value – Total Cost

= Selling price per unit × (BEP units + MoS units) – Total Cost

= ` 25 × (5,000 + 15,000) units – ` 3,87,500

= ` 5,00,000 – ` 3,87,500 = ` 1,12,500

(iii) Profit/ Volume (P/V) Ratio $= \dfrac{\text{Profit}}{\text{Margin of Safety in Rupee value}} \times 100$

$= \dfrac{`1,12,500}{`3,75,000} \times 100 = 30\%$

(iv) Break Even Sales (in Rupees) = BEP units × Selling Price per unit

= 5,000 units × ` 25 = ` 1,25,000

(v) Fixed Cost = Contribution – Profit

= Sales Value × P/V Ratio – Profit

= (` 5,00,000 × 30%) – ` 1,12,500

= `1,50,000 – ` 1,12,500 = ` 37,500

Computation of Profit under Marginal Costing Method and under Absorption Costing Method and Reconciliation of Profit.

Question 20

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

		(`)
Direct material 4 kg @ ` 4	=	*16.00*
Direct labour 3 hrs @ ` 18	=	*54.00*
Variable overhead 3 hrs @ ` 4	=	*12.00*
Fixed overhead 3 hrs @ ` 6	=	*18.00*
		100.00

Selling and administrative costs:

Variable	*` 20 per unit*
Fixed	*` 7,60,000*

During the year the company has the following activity:

Units produced	=	*24,000*
Units sold	=	*21,500*
Unit selling price	=	*` 168*
Direct labour hours worked	=	*72,000*

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 predetermine 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.

Solution:

(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 + `20,000/24,000)	12.83	12.83
Fixed Overhead	18.00	--
Unit Cost	100.83	82.83

Income Statements

Absorption Costing	(`)
Sales (21,500 units × `168)	36,12,000
Less: Cost of goods sold (Refer the working note)	(21,19,917)
	14,92,083
Less: Selling & Distribution Expenses	(11,90,000)
Profit	3,02,083
Marginal Costing	**(`)**
Sales (as above)	36,12,000
Less: Cost of goods sold (Refer the working note)	(17,80,917)
	18,31,083
Less: Selling & Distribution Expenses	(4,30,000)
Contribution	14,01,083
Less: Fixed Factory and Selling & Distribution Overhead (` 3,84,000 + ` 7,60,000)	(11,44,000)
Profit	2,57,083

(ii)   Under or over absorption of overhead:

	(`)
Fixed Overhead:	
Budgeted (`6 × 72,000 hours)	4,32,000
Actual (`4,32,000 – `48,000)	3,84,000
Over-absorption	48,000
Variable Overhead:	
Budgeted (`4 × 72,000 hours)	2,88,000
Actual (`2,88,000 + `20,000)	3,08,000
Under-absorption	20,000

(iii) Reconciliation of Profit:

Difference in Profit: ` 3,02,083 – ` 2,57,083 = ` 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)

$$= `18 (24,000 – 21,500) = `45,000$$

Working Note:

Calculation of Cost of Goods Sold

	Absorption Costing	Marginal Costing
Direct Materials (`16 × 24,000)	3,84,000	3,84,000
Direct labour (`54 × 24,000)	12,96,000	12,96,000
Variable OH (`12 × 24,000 + `20,000)	3,08,000	3,08,000
Fixed Overhead (`18 × 24,000)	4,32,000	--
	24,20,000	19,88,000
Add: Opening stock	--	--
Less: Closing Stock (24,000 – 21,500)	(2,52,083) $\left(\frac{`24,20,000}{24,000 units} × 2,500 units\right)$	(2,07,083) $\left(\frac{`19,88,000}{24,000 units} × 2,500 units\right)$
Cost of Goods Produced	21,67,917	17,80,917
Add: Adjustment for over/ under absorption	(48,000)	--
Cost of Goods Sold	21,19,917	17,80,917

Question 21

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 expenses were ` 16,00,000. During the year ended 31st March, 2014, 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, 2014:

(i)   On the basis of marginal costing

(ii)   On the basis of absorption costing

Solution:

(i)   Statement of Cost and Profit under Marginal Costing
for the year ending 31st March, 2014

Output = 3,20,000 units

Particulars	Amount (`)	Amount (`)
Sales: 3,10,000 units @ ` 80		2,48,00,000
Marginal cost / variable cost:		
Variable cost of production (3,20,000 × ` 40)	1,28,00,000	
Add: Opening stock 40,000 units @ ` 40	16,00,000	
	1,44,00,000	
Less: Closing Stock $\left(\dfrac{`1,44,00,000}{3,60,000\ units} \times 50,000\ units *\right)$	(20,00,000)	
Variable cost of production of 3,10,000 units Add:	1,24,00,000	
Variable selling expenses @ ` 12 per unit	37,20,000	1,61,20,000
Contribution (sales – variable cost)		86,80,000
Less: Fixed production cost	24,00,000	
Fixed selling expenses	16,00,000	(40,00,000)
Actual profit under marginal costing		46,80,000

* Closing stock = 40,000 + 3,20,000 – 3,10,000 = 50,000 units

(ii)   **Statement of Cost and Profit under Absorption Costing**
                             for the year ending 31st March, 2014

Output = 3,20,000 units

Particulars	Amount (`)	Amount (`)
Sales: 3,10,000 units @ ` 80		2,48,00,000
Less: Cost of Goods sold:		
Variable cost of production (3,20,000 @ ` 40)	1,28,00,000	
Add: Fixed cost of production absorbed 3,20,000 units @ ` 6 [1]	19,20,000	
	1,47,20,000	
Add: Opening Stock:$\left(\dfrac{`1,47,20,000}{3,20,000}\times40,000\right)$	18,40,000	
	1,65,60,000	
Less: Closing Stock:$\left(\dfrac{`1,65,60,000}{3,60,000}\times50,000\right)$	(23,00,000)	
Production cost of 3,10,000 units	1,42,60,000	
Adjustment for Over/ under-absorption:		
Under absorption of fixed production overheads [2]	4,80,000	
Cost of Goods Sold	1,47,40,000	
Selling expenses:		
Variable: ` 12 × 3,10,000 units	37,20,000	
Fixed	16,00,000	(2,00,60,000)
Actual profit under absorption costing		47,40,000

Workings:

1.   Absorption rate for fixed cost of production = $\dfrac{`\ 24,00,000}{4,00,000\ \text{units}}$ = ` 6 per unit

2.   Fixed production overhead under absorbed = ` (24,00,000 – 19,20,000)

      = ` 4,80,000.