6. MARGINAL COSTING

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

	Sales (Rs.)	Profit (Rs.)
Year 2010	1,20,000	8,000
Year 2011	1,40,000	13,000
Difference	20,000	5,000

i) $\text{P/V Ratio} = \frac{\text{Difference in Profit}}{\text{Difference in Sales}} \times 100 = \frac{\text{Rs. 5,000}}{\text{Rs. 20,000}} \times 100 = 25\%$

	(Rs.)
Contribution in 2010 (1,20,000 × 25%)	30,000
Less: Profit	8,000
Fixed Cost*	22,000
*Contribution = Fixed cost + Profit	
Fixed cost = Contribution - Profit	

ii) $\text{Break-even point} = \frac{\text{Fixed cost}}{\text{P/V Ratio}} = \frac{\text{Rs. 22,000}}{25\%} = \text{Rs. 88,000}$

iii) Profit when sales are Rs.1,80,000

	(Rs.)
Contribution (Rs.1,80,000 x 25%)	45,000
Less: Fixed cost	22,000
Profit	23,000

iv) Sales to earn a profit of Rs.12,000

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V Ratio}} = \frac{\text{Rs.22,000} + \text{Rs.12,000}}{25\%} = \text{Rs. 1,36,000}$$

v) Margin of safety in 2011:

Margin of safety = Actual sales - Break-even sales = Rs. 1,40,000 - Rs.88,000 = Rs. 52,000.

PROBLEM NO: 2

(a) Contribution = S-V = Rs. 200 - Rs. 100 per unit.

$$\text{B.E. Point} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{40,00,000}{\text{Rs.100}} = 40,000 \text{ units.}$$

(b) When selling price is reduced

New selling price = Rs. 180

New Contribution = Rs. 180 - Rs.100 = Rs. 80 per unit

$$\text{New B.E. Point} = \frac{40,00,000}{\text{Rs.80}} = 50,000 \text{ units}$$

PROBLEM NO: 3

$$\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = [(15 - 12) / 15] \times 100 = (3/15) \times 100 = 20\%$$

Marginal of Safety = (Profit) / (P/V Ratio) = 50,000/20% = Rs. 2,50,000

PROBLEM NO: 4

We know that S - V = F + P (S - Sales, V - Variable cost, F - Fixed cost and P - Profit/loss)

∴ Suppose variable cost = x per unit

Fixed Cost = y

When sales is 8,000 units, then

15 X 8,000 - 8,000 x = y - 40,000..... (1)

When sales volume raised to 20,000 units, then

15 x 20,000 - 20,000 x = y + 80,000..... (2)

Or, 1,20,000 - 8,000 x = y - 40,000..... (3)

And 3,00,000 - 20,000 x = y + 80,000..... (4)

From (3) & (4) we get x = Rs. 5.

Variable cost per unit = Rs. 5

Putting this value in 3rd equation:

1,20,000 - (8,000 x 5) = y 40,000

or y = Rs. 1,20,000

Fixed Cost = Rs. 1,20,000

P/V ratio = $\frac{S-V}{S} = \frac{15-5}{15} \times 100 = 66\ 2/3\ \%$.

Suppose break-even sales = x

15x - 5x = 1,20,000 (at BEP, contribution will be equal to fixed cost)

x = 12,000 units.

Or Break-even sales in units = 12,000

Break-even sales in rupees = 12,000 x Rs. 15 = Rs. 1,80,000

PROBLEM NO:5

Marginal cost Statement

Particulars	2011
Sales	6,00,000
(-) Variable cost	(3,30,000)
Contribution (Sales × P/v Ratio)	**2,70,000**
(-)Fixed cost	(1,35,000)
Profit/(loss)	**1,35,000**
MOS × P/v Ratio	(3,00,000 × 45%)
MOS (Sales × % MOS)	3,00,000 (6,00,000 × 50%)

i) 2012:-

Variable cost = 3,30,000

Variable cost ratio = $\frac{\text{Variable cost}}{\text{Sales}}$

$$70\% = \frac{3,30,000}{\text{Sales}}$$

Sales = 4,71,428

ii) 2012:-

Total sales = 4,71,428

(-) MOS (20%) = (94,286)

BEP 3,77,142

$$\text{BEP} = \frac{\text{Fixed cost}}{\text{P/v Ratio}}$$

$$3,77,142 = \frac{\text{Fixed cost}}{30\%}$$

Fixed cost = 1,13,143

iii) $$\text{BEP} = \frac{\text{Fixed cost}}{\text{P/v Ratio}} = \frac{1,13,143}{30\%} = 3,77,143$$

PROBLEM NO:6

$$\frac{\text{Change in profit}}{\text{Change in Sales}} = \text{P/V Ratio}$$

$$\rightarrow \quad \text{Narth} = \frac{(200)}{(500)} \times 100 = 40\%$$

$$\rightarrow \quad \text{East} = \frac{20}{100} \times 100 = 20\%$$

$$\rightarrow \quad \text{South} = \frac{(110)}{(200)} \times 100 = 53\%$$

Marginal cost Statement

Particulars	North	East	South	Total
Sales	2000	1000	500	3500
(-) Variable cost	(1200)	(800)	(225)	(2225)
Contribution	800 (2000 × 40%)	200 (1000 × 20%)	275 (500 × 55%)	**1275**
(-) Fixed cost (b/f)	(650)	(50)	(175)	(875)
Profit/Loss	150	150	100	**400**
BEP $(\frac{\text{Fixed cost}}{\text{PV Ratio}})$	1625 $(\frac{650}{40\%})$	250 $(\frac{50}{20\%})$	318 $(\frac{175}{55\%})$	

$$\text{Combined P/V Ratio} = \frac{\text{Total Contribution}}{\text{Total sales}}$$

$$= \frac{1275}{3500} \times 100 = 36\%$$

$$\text{Total BEP} = \frac{\text{Total Fixed Cost}}{\text{Combined P/v Ratio}} = \frac{875}{36\%} = 243\%$$

Fixed cost=North=650,East=50,South=175

Break even point= North=1625,East=250,South=18

PROBLEM NO: 7

i) Contribution per unit = Selling price - Variable cost = Rs.40 - Rs.16 =Rs.24

Break-even Point = 4,80,000 / 24 =20,000 units

Percentage Margin of Safety = Actual Sales Break - even Sales / Actual Sales

Or, 60% = Actual Sales - 20,000units / Actual Sales

Actual Sales = 50,000units

Particulars	Rs.
Sales Value (50,000 units ×Rs.40)	20,00,000
Less: Variable Cost (50,000 units ×Rs.16)	8,00,000
Contribution	12,00,000
Less: Fixed Cost	4,80,000
Profit	7,20,000
Less: Income Tax @ 40%	2,88,000
Net Return	4,32,000

Rate of Net Return on Sales = Rs.4,32,000 / 20,00,000×100 = 21.6%

ii) Products

Particulars	X	Y
Selling Price per unit	40	50
Variable Cost per unit	16	10
Contribution per unit	24	40
Individual Product's Contribution Margin	60% (24/40×100)	80% (40/50×100)

Contribution Margin (X & Y): 60%× 7/10 + 80%× 3/10 = 66%

Break-even Sales = Rs.10,10,000 ×(6,66,600/66%)

Break-even Sales Mix:

X - 70% of 10,10,000 = Rs.7,07,000 i.e.17,675 units.

Y - 30% of 10,10,000 = Rs.3,03,000 i.e. 6,060 units.

PROBLEM NO: 8

i) Computation of Break-even Point (BEP) for each factory.

Sl. No.		Factory A (Rs)	Factory B (Rs)
A	Selling Price per packet	80	80
B	Variable Cost per packet	65	68
C	Contribution per packet [A - B]	15	12
D	P/V ratio [C ÷ A x 100] (%)	18.75	15
E	Fixed Cost	3,60,000	3,00,000
F	BEP (units) [E ÷ C]	24,000	25,000
G	BEP (Sales) [E ÷ D]	19,20,000	20,00,000

ii) Cash BEP (units) = $\frac{\text{Fixed Cost - Depreciation}}{\text{Contribution per unit}}$

Factory A = $\frac{\text{Rs.3,60,000 - Rs.60,000}}{\text{Rs.15}}$ = 20,000 packets

Factory B = $\frac{\text{Rs.3,00,000 - Rs.30,000}}{\text{Rs.12}}$ = 22,500 packets

iii) Computation of Combined Break-even Point (units) = $\frac{\text{CombinedFixed Cost}}{\text{CombinedContribution per unit}}$

$$= \frac{\text{Rs.3,60,000} + \text{Rs.3,00,000}}{\text{Rs.15}\frac{2}{5} + \text{Rs.12}\frac{3}{5}}$$ = Rs 6,60,000 / Rs13.20 = 50,000 packets

PROBLEM NO: 9

particulars	Amt.
Selling price	37.5

(-)variable cost	10.5
Contribution per unit	20

$$\text{Break even point} = \frac{fixed\,cost}{contribution\,per\,unit}$$

$$= \frac{35,00,000}{20}$$

=1,75,000 units

Cash depreciation=fixed cost-depriciation

=35,00,000-15,00,000

=20,00.000

$$\text{Cash BEP(in units)} = \frac{cash\ fixed\,cost}{contribution\,per\,unit}$$

$$= \frac{20,00,000}{20}$$

=1,00,000 units

PROBLEM NO: 10

Total Sales = $2,40,000 \times \frac{100}{40}$ = Rs. 6,00,000

Contribution = 6,00,000 × 30% = Rs. 1,80,000

Profit = M/S × P/V ratio = 2,40,000 × 30% = Rs. 72,000

Fixed cost = Contribution - Profit = 1,80,000 - 72,000 = Rs. 1,08,000

1. Break-even Sales = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{1,08,000}{30\%} = \text{Rs.}3,60,000$
2. Profit = (Sales × P/V ratio) - Fixed cost = (9,00,000 × 30%) - 1,08,000 = Rs. 1,62,000

PROBLEM NO.11

$$\text{Correct selling price} = \frac{6,00,00,000}{30,000} = 2,000$$

a) Marginal cost Statement

Selling Price (2000+20%)		2400
(-) Variable cost:-		
Material	(2,00,00,000/30,000)	(734) (667+10%)
Labour	(50,00,000/30,000)	(167)
Direct Expenses	(50,00,000/30,000)	(167)
Contribution		**1399**
Quantity to sold = 30,000 -5%=28,500 units		
Total contribution	(28,500 × 1399)	3,98,71,500
(-) Fixed cost (100L+50L)		(1,50,00,000)
Profit		**2,48,71,500**

b)

Selling Price	2000
(-) Variable cost:-	
Material	(734) (667+10%)
Labour	(167)

Direct Expenses	(167)
	932

$$\text{Sales required to earn desired profit} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{1,50,00,000 + 50,00,000}{932}$$

= 21,459 units

PROBLEM NO: 12

$$\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} = \frac{2,00,000}{8,00,000} = 25\%$$

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}} = \frac{1,50,000}{25\%} = \text{Rs } 6,00,000$$

Alternatively:

Fixed cost = Contribution - Profit = Rs 2,00,000 - Rs1,50,000 = Rs 50,000

B.E. Point = Rs 50,000 ÷ 25% = Rs 2,00,000

Margin of Safety = Actual sales - B.E. sales = 8,00,000 - 2,00,000 = 6,00,000

PROBLEM NO: 13

$$\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} X100 = \left(\frac{1,50,000}{3,00,000} X100\right) = 50\%$$

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

Contribution = Fixed Cost - Profit = Rs. 90,000 - Rs. 30,000 (as it is a loss) = Rs. 60,000.

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

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

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

Alternative solution of this part:

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

$$\text{Sales at profit of Rs 90,000} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{PV Ratio}} = \frac{\text{Rs.}90,000 + \text{Rs.}90,000}{50\%} = \frac{\text{Rs.}1,80,000}{50\%} = \text{Rs.}3,60,000$$

Margin of Safety = Sales - Break-even Sales = 3,60,000 - 1,80,000 = Rs 1,80,000

PROBLEM NO: 14

P/V Ratio = 50% of sales

Margin of safety (M.O.S) = 40% of sales

Sales = 1,00,000

M.O.S (in Rs.) = 40,000/-

B.E.P (in Rs.) = 60,000/-

$$\text{M.O.S (in Rs.)} = \frac{\text{Profit}}{\text{P/v Ratio}}$$

40,000 $= \frac{\text{Profit}}{0.5}$

Profit = Rs. 20,000

PROBLEM NO: 15

(i) We know that: B.E. Sales x P/V Ratio = Fixed Cost

or Rs. 1,60,000 x P/V ratio = Rs. 40,000

P/V ratio = 25%

We also know that Sales x P/V Ratio = Fixed Cost + Profit

or Rs. 2,00,000 x 0.25 = Rs. 40,000 + Profit

or Profit = Rs. 10,000

(ii) Again B.E. Sales x P/V ratio = Fixed Cost

or Rs. 40,000 x P/V Ratio = Rs. 20,000

or P/V ratio = 50 %

We also know that: Sales x P/V ratio = Fixed Cost + Profit

or Sales x 0.50 = Rs. 20,000 + Rs. 10,000

or Sales = Rs. 60,000

PROBLEM NO: 16

Margin of safety (%) $= \frac{3,750 \text{ units}}{3,750 \text{ units} + 1,250 \text{ units}} = 75\%$

Total Sales $= \frac{\text{Rs.}1,87,500}{0.75} = \text{Rs.}2,50,000$

= Total Sales - Total Cost = Rs.2,50,000 - Rs.1,93,750 = Rs.56,250

P/V Ratio $= \frac{\text{Profit}}{\text{Margin of safety (Rs.)}} \times 100 = \frac{\text{Rs.}56,250}{\text{Rs.}1,87,500} \times 100 = 30\%$

Break even Sales = Total Sales x [100 - Margin of Safety %] = Rs.2,50,000 x 0.25 = Rs.62,500

Fixed Cost = Sales x P/V Ratio - Profit = Rs.2,50,000 x 0.30 - Rs.56,250 = Rs.18,750

PROBLEM NO: 17

Contribution per unit = Selling price*p/v Ratio

= 275=40%

= 110

Variable cost per unit = Selling price- contribution per unit

= 275-110

= 165

Variable cost per unit = Direct material cost + direct wages+ variable overhead +variable over portion of semi- variable overheads 165 = 96+42+18+variable portion of semi – variable overheads

Variable portion of semi – variable overheads = 7,32,000 – (36,000*9)

= 7,32,000 – 3,24,000

= 4,08,000

No. of units at 75% capacity = Sales/ Selling price = $\frac{99,00,000}{275}$

= 36,000 units

Total fixed cost:-

Up to 80% Capacity (≤ 38,400 units) = 2881000 + 40800038, 400 units) = 2881000 + 408000 + 238500

= 35,27,500

i) **Break even point (in Units)** = Fixed cost/Contribution per unit

$= \frac{32,89,000}{110}$

= 29900 units

Activity level at break-even point = 62.3% [75%-36000] [? – 2990]

ii) **Let x be the No. of units to be sold to earn desired profit**

Sales= Variable cost + Fixed cost + Profit

X* 275 = x*165+35,27,500 + x*25

275x-165x-25x = 35,27,500

85x = 35,27,500

x = 35,27,500/85

x = 41,500

PROBLEM NO: 18

a) i)

Break-even sales = $\left[\frac{fixed\,cost}{p/v\,ratio}\right]$

P/V Ratio= $\left[\frac{change\,in\,profit}{change\,in\,sales}X100\right]$ **OR** $\left[\frac{37,50,000}{7,80,60,000-5,93,10,000}X100\right]$

$= \left[\frac{37,50,000}{1,87,50,000}X100\right]$

=20%

Break-even sales= $\left[\frac{98,50,000}{20\%}\right] = 4,92,50,000$

II) Profit/ loss =Contribution - Fixed Cost

=Rs.8,20,00,000 × 20% - Rs.98,50,000

=Rs.1,64,00,000 - Rs.98,50,000 = Rs.65,50,000

III) To earn same amount of profit in 20X8-X9 as was in 20X7-X8, it has to earn the same amount of contribution as in 20X7-X8.

Sales - Variable cost = Contribution equal to 20X7-X8 contribution

Contribution in 20X7-X8 = Sales in 20X7-X8 × P/V Ratio in 20X7-X8

= Rs.5,93,10,000 × 20% = Rs.1,18,62,000

Let the number of units to be sold in 20X8-X9 = X

Sales in 20X8-X9 – Variable cost in 20X8-X9 = Desired Contribution

90 X – 80 X = Rs.1,18,62,000

Or, 10 X = 1,18,62,000

Or, X = 11,86,200 units

Therefore, Sales amount required to earn a profit equals to 20X7-X8 profit

= Rs. 90 × 11,86,200 units = Rs. 10,67,58,000

PROBLEM NO:19

No. of units =1000 × 70% = 700 Units

i) Marginal cost statements(700 Units)

Sales (700) × (2000+200)		15,40,000
(-) Variable cost:-		
Direct material	(3,50,000)	$(\frac{5,00,000}{1,000} \times 700)$
Direct wages	(2,80,000)	$(\frac{4,00,000}{1,000} \times 700)$
Over heads	(2,10,000)	$(\frac{5,00,000 \times 60\%}{1,000} \times 700)$
Contribution		**7,00,000**
(-) Fixed Cost	(2,00,000)	(5,00,000 × 40%)
Profit		**5,00,000**

It is advised not to increase selling price, because, it decrease the profit by 1,00,000 (6,00,000-5,00,000)

ii)

Selling price		2,000
(-) Variable cost:-		
Direct Material cost	(500)	$(\frac{5,00,000}{1,000})$
Direct wages	(400)	$(\frac{4,00,000}{1,000})$
Variable over heads	(300)	$(\frac{5,00,000 \times 60\%}{1,000})$
Tie Pin		(10)
Contribution per unit		790

$$\text{Sales required to earn desired profit} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{PV Ratio}}$$

$$\text{PV Ratio} = \frac{790}{200} \times 100 = 39.5\%$$

$$\text{Sales} = \frac{2,00,000 + 30\% \text{ on sales}}{39.5\%}$$

$$0.395x = 2,00,000 + 0.3x$$

$$0.095x = 2,00,000$$

$$X = 21,05,263$$

PROBLEM NO: 20

	2012	2013	Difference
Sales Units	80,000	1,20,000	40,000
Sale Value @ Rs 40	32,00,000	48,00,000	16,00,000
Total Cost (Rs)	34,40,000	45,60,000	11,20,000

Variable Cost per unit $= \frac{\text{Change in Total Cost}}{\text{Change in sales volume}} = \frac{Rs.11,20,000}{40,000 \text{ units}}$ = Rs. 28per unit

Total Fixed Cost (Rs) = Rs 45,60,000 - (1,20,000 units × Rs28) = Rs. 12,00,000

i) Break- even point (in units) $= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{Rs.12,00,000}{(Rs.40 - Rs.28)}$ = 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 × Rs 12 - Rs 12,00,000 = Rs 6,00,000.

PROBLEM NO: 21

P/V ratio = 28%

Quarterly fixed Cost = Rs.2,80,000

Desired Profit = Rs.70,000

Sales revenue required to achieve desired profit $= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{p/v ratio}} = \frac{2,80,000 + 70,000}{28\%}$

= Rs. 12,50,000

PROBLEM NO: 22

Variable cost to sales = 70%, Contribution to sales = 30%, Or P/V Ratio 30%

We know that: BES × P/V Ratio = Fixed Cost

BES × 0.30 = Rs. 90,000

Or BES = Rs. 3,00,000

It is given that break-even occurs at 60% capacity.

Capacity sales = Rs. 3,00,000 ÷ 0.60 = Rs. 5,00,000

Computation of profit of 75% Capacity:

75% of capacity sales (i.e. Rs. 5,00,000 × 0.75) = Rs. 3,75,000

Less: Variable cost (i.e. Rs. 3,75,000 × 0.70) = Rs. 2,62,500

= Rs. 1,12,500

Less: Fixed Cost = Rs. 90,000

Profit = Rs. 22,500

PROBLEM NO:23

Particulars	Existing	Proposed	Change price and cost
a) Sales	10,00,000	12,00,000 (10,00,000+20%)	13,20,000 (12,00,000+10%)
(-) Variable cost :-			

Direct Material	(1,00,000)	(1,20,000) (1,00,000+20%)	(1,14,000) (1,20,000-5%)
Direct labour	(2,00,000)	(2,40,000) (2,00,000+20%)	2,28,000 (2,40,000-5%)
Variable over head	(4,00,000)	(4,80,000) (4,00,000+20%)	(4,56,000) (4,80,000-5%)
Contribution	**3,00,000**	**3,60,000**	**5,22,000**
(-) Fixed cost	(2,50,000)	(2,50,000)	(2,37,500)
			(2,50,000-5%)
Profit	**50,000**	**1,10,000**	**2,84,500**
	(4,00,000 × 12.5%)		

$$\% \text{ profit on Capital Employed} = \frac{\text{Profit}}{\text{Capital Employed}}$$

$$= \frac{2,84,500}{4,00,000} \times 100$$

$$= 71.125\%$$

It is advised to adopt the Proposal

PROBLEM NO: 24

Let Cx be the no of units of X= Cx

Cy be the no of units of y = Cx -0.2 Cx =0.8 Cx

F1 + F2 =3,00,000

At BEP, Contribution = Fixed Cost

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

$$100U = \frac{F1}{Cx}$$

F1=100 Cx

F1 + F2 =3,00,000

F2 =3,00,000 - F1

At indifference point

Profit of product x= Profit of product y

Contribution – fixed cost of x = Contribution – fixed cost of y

2000 Cx- F1 =2000 Cx 80% - F2

2000 Cx - 100 Cx =1600 Cx -(3,00,000+100 Cx)

200 Cx =2,00,000

Cx =1500

Contribution per unit of X=1500

Contribution per unit of y=1200

Fixed cost of X=100x1500=1,50,000

Fixed cost of y=300000-150000=150000

PROBLEM NO:25

i) Contribution = 300-200 =100

$$\text{Break even sales quantity} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$= \frac{3,00,00,000}{100}$$

= 3,00,000 Units

$$\text{Each break even sales quantity} = \frac{\text{Cash Fixed cost}}{\text{Contribution per unit}}$$

$$= \frac{1,50,00,000}{100} = 1,50,000 \text{ Units}$$

ii) $$\text{P/v Ratio} = \frac{\text{Contribution}}{\text{Selling price}} \times 100 = \frac{100}{300} \times 100 = 33\%$$

iii) No. of units that must be sold to earn income of 30,00,000

$$\frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution Margin per unit}}$$

$$= \frac{3,00,00,000 + 30,00,000}{100} = 3,30,000$$

iv) After Tax Income = 20,00,000

Tax Rate=50%

$$\text{Desired level of profit before Tax} = = \frac{20,00,000}{50} \times 100 = 40,00,000$$

$$\text{Estimated Sales Level} = \frac{\text{Fixed cost} + \text{Desired Profit}}{\text{P/v Ratio}}$$

$$= \frac{3,00,00,000 + 40,00,000}{33\%}$$

= 10,30,30,303

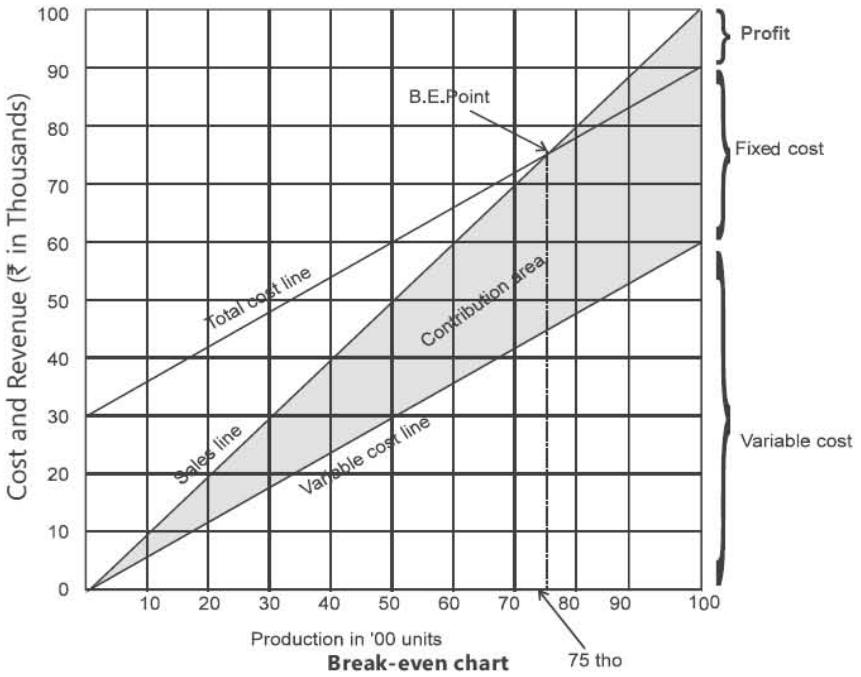
PROBLEM NO: 26

$$\text{P/V ratio} = \frac{\text{Sales - Variable Cost}}{\text{Sales}} = \frac{1,00,000 - 60,000}{1,00,000} = 40\%$$

$$\text{Break-even point} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{30,000}{40\%} = 75,000$$

Margin of safety = Actual Sales - BE point = 1,00,000 - 75,000 = Rs. 25,000

Break-even chart showing contribution is shown below:



PROBLEM NO: 27

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

$$P/V\ Ratio = \frac{Change\ in\ profit}{Change\ in\ sales\ value} x100 = \frac{Rs.3,20,000 - (-Rs.1,60,000)}{Rs.12,00,000 - Rs.4,80,000} x100 = \frac{Rs.4,80,000}{Rs.7,20,000} x100 = 66.67\%$$

Total Contribution in case of 40,000 units = Sales Value × P/V Ratio = Rs 12,00,000 × 66.67% = Rs 8,00,000

So, Fixed cost = Contribution - Profit = Rs 8,00,000 - Rs 3,20,000 = Rs 4,80,000

i) Break-even Point in Rupees $= \frac{Fixed\ Cost}{P/V\ Ratio} = \frac{Rs4,80,000}{66.67\%} = Rs\ 7,20,000$

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

= 50,000 units × Rs 30×66.67% - Rs 4,80,000 = Rs 5,20,000

iii) Minimum level of production where the company needs not to close the production, if unavoidable fixed cost is Rs 1,50,000: $\frac{Avoidable\ fixed\ cost}{Contribution\ per\ unit} = \frac{Total\ fixed\ cost - Unavoidable\ Fixed\ cost}{Contribution\ per\ unit}$

$$= \frac{Rs.4,80,000 - Rs.1,50,000}{Rs.30x66.67\%} = \frac{Rs.3,30,000}{Rs.20} = 16,500\ units.$$

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

PROBLEM NO: 28

a)Marginal cost statement:

particulars		machineA		Machine B
sales	10	1,00,000 (10,000x10)	10	1,00,000 (10,000x10)
(-)variable cost	4	40,0000	6	60,000
contribution	6	60,000	4	40,000
(-)fixed cost		(30,000)		(18,000)

profit		30,000		22,000
p/v ratio $\left[\frac{contribution}{sales}\right]$		60% $\left[\frac{60,000}{1,00,000}\right]$		40% $\left[\frac{40,000}{1,00,000}\right]$
BEP(in units)		5,000 units $\left[\frac{30,000}{6}\right]$		4500 unit $\left[\frac{18,000}{4}\right]$
BEP(in Rs.) $\left[\frac{fixed\,cost}{p/v\,ratio}\right]$		50,000 $\left[\frac{30,000}{60\%}\right]$		45,000 $\left[\frac{18,000}{40\%}\right]$

b) Indifference point(IDP)= $\left[\frac{change\ in\ fixed\,cost}{change\ in\,variable\,cost\ per\ unit}\right]$

$=\left[\frac{30,000-18,000}{6-4}\right]$ =6000units

c)

i) when no. of units to be produced are less than 6000 units then it is advised to manufacture goods in machine B because it is having less fixed cost,

ii) when no. of units to be produced are more than 6000 units then it is advised to use machine A because it is variable cost is less.

PROBLEM NO: 29

		X	Y	Z
I.	Contribution per unit (Rs.)	4	3	5
II.	Units (Lower of Production / Market Demand)	2,000	2,000	900
III.	Possible Contribution (Rs.) [I × II]	8,000	6,000	4,500
IV.	Opportunity Cost* (Rs.)	6,000	8,000	8,000

(*) Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 6,000 from Y, Rs. 4,500 from Z).

PROBLEM NO: 30

(i) Statement of Cost and Profit under Marginal Costing

for the year ending 31st March, 2014 Output = 3,20,000 units

Particulars	Amount (Rs.)	Amount (Rs.)
Sales: 3,10,000 units @ Rs. 80		2,48,00,000
Marginal cost / variable cost:		
Variable cost of production (3,20,000 x Rs. 40)	1,28,00,000	
Add: Opening stock 40,000 units @ Rs. 40	16,00,000	
	1,44,00,000	
Less: Closing Stock $\left(\frac{Rs.1,44,000}{3,60,000\,units} x 50,000\,units^*\right)$	(20,00,000)	
Variable cost of production of 3,10,000 units	1,24,00,000	
Add: Variable selling expenses @ Rs. 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 Marginal Costing

for the year ending 31st March, 2014 Output = 3,20,000 units

Particulars	Amount (Rs.)	Amount (Rs.)
Sales: 3,10,000 units @ Rs. 80		2,48,00,000
Less: Cost of Goods sold:		
Variable cost of production (3,20,000 @ Rs. 40)	1,28,00,000	
Add: Fixed cost of production absorbed 3,20,000 units @ Rs. 6 (WN 1)	19,20,000	
	1,47,20,000	
Add: Opening Stock : $\left(\frac{Rs.1,47,20,000}{3,20,000} \times 40,000\right)$	18,40,000	
	1,65,60,000	
Less: Closing Stock: $\left(\frac{Rs.1,65,60,000}{3,60,000} \times 50,000\right)$	(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: Rs. 12 x 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 = $\frac{Rs.24,00,000}{4,00,000\ units} = Rs.6$ per unit

2. Fixed production overhead under absorbed = Rs.(24,00,000 - 19,20,000) = Rs. 4,80,000

THE END