Problem No. 1

<table>
<thead>
<tr>
<th></th>
<th>BES</th>
<th>Desired sales</th>
<th>E</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Sales</td>
<td>20</td>
<td>(2000)</td>
<td>4500</td>
<td>6000</td>
</tr>
<tr>
<td>60% V.C</td>
<td>12</td>
<td>1200</td>
<td>2700</td>
<td>(3600)</td>
</tr>
<tr>
<td>40% Contribution</td>
<td>8</td>
<td>800</td>
<td>1800</td>
<td>2400</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>-</td>
<td>(800)</td>
<td>(800)</td>
<td>(800)</td>
</tr>
<tr>
<td>Profit</td>
<td>-</td>
<td>-</td>
<td>1000</td>
<td>1600</td>
</tr>
</tbody>
</table>

a. Profit volume ratio = \( \frac{\text{contribution}}{\text{sales}} \) \times 100 = \( \frac{8}{20} \) \times 100 = 40%

b. BES = Rs. 2000

c. BES (Quantity) = \( \frac{2000}{20 \text{ p.u.}} \) = 100 units

d. Sales value to earn profit of Rs.1000 = 4500

e. Profit at sales of Rs. 6000 = Rs. 1600

f. Margin of sales = total sales - break even sales
   i. Mos of (d) = 4500 – 2000 = 2500
   ii. Mos of (e) = 6000 – 2000 = 4000

g. Sales volume to earn profit of Rs. 2000 = \( \frac{7000}{20 \text{ p.u.}} \) = 350 units.

Problem No. 2

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Rs. Per unit</th>
<th>Total Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Less: variable cost</td>
<td>(12)</td>
<td></td>
</tr>
<tr>
<td>Contribution</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Fixed costs</td>
<td>Rs.9,000 X 4quarters</td>
<td>36,000</td>
</tr>
</tbody>
</table>

1. PV Ratio = \( \frac{\text{contribution per unit}}{\text{sales per unit}} \) \times 100 = \( \frac{Rs.8}{Rs.20} \) \times 100 = 40%

2. Break even point(in Rs.) = \( \frac{\text{Fixed costs}}{\text{PV Ratio}} \) = \( \frac{Rs.36,000}{40\%} \) = Rs.90,000

3. Break even quantity = \( \frac{\text{Fixed costs}}{\text{Contribution per unit}} \) = \( \frac{Rs.36,000}{Rs.8} \) = 4,500 units.

4. Required sales for profit of Rs. 12,000:
   \( \frac{\text{Desired Contribution}}{\text{PV Ratio}} \) = \( \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{PV Ratio}} \) = \( \frac{Rs.36,000 + Rs.12,000}{40\%} \) = Rs.1,20,000

5. Profit at sales of Rs.2,00,000 = Contribution less fixed cost = (Rs.2,00,000 X 40%) – Rs.36,000 = Rs.44,000.
6. **Margin of safety:**

For (4) above, margin of safety = total sales - breakeven sales = 1,20,000 – 90,000 = Rs.30,000.

For (5) above, margin of safety = total sales – breakeven sales = 2,00,000 – 90,000 = Rs.1,10,000.

**Problem No. 3**

a. **Calculation of profit:**

<table>
<thead>
<tr>
<th></th>
<th>BES</th>
<th>%</th>
<th>Calculation of Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>160000</td>
<td>100%</td>
<td>2,00,000</td>
</tr>
<tr>
<td>V.C</td>
<td>1,20,000</td>
<td>75%</td>
<td>1,50,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>40,000</td>
<td>25%</td>
<td>50,000</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>(40,000)</td>
<td></td>
<td>(40,000)</td>
</tr>
<tr>
<td>Profit</td>
<td></td>
<td></td>
<td>10,000</td>
</tr>
</tbody>
</table>

P/v ratio = \(\frac{40,000}{160,000}\) x 100 = 25%, Profit = Rs. 10,000

b. **Calculation of sales:**

<table>
<thead>
<tr>
<th></th>
<th>BES</th>
<th>Calculation of Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>40,000</td>
<td>60,000 100%</td>
</tr>
<tr>
<td>V.C</td>
<td>20,000</td>
<td>30,000 50%</td>
</tr>
<tr>
<td>Contribution</td>
<td>20,000</td>
<td>30,000 50%</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>(20,000)</td>
<td>(20,000)</td>
</tr>
<tr>
<td>Profit</td>
<td></td>
<td>10,000</td>
</tr>
</tbody>
</table>

P/v ratio = \(\frac{30,000}{60,000}\) x 100 = 50%, Sales = Rs. 60,000

**Problem No. 4**

**Note.1:** Present selling price per unit = \(\frac{150,000}{15,000}\) = Rs.10 per unit.

**Note.2:** present contribution per unit = selling price per unit – variable cost per unit = Rs.10 – Rs.6 = Rs.4 per unit.

**Note.3:** in the following calculations

\[
PVR = \frac{\text{Contribution per unit}}{\text{Sales price per unit}} \times 100
\]

\[
\text{BEQ} = \frac{\text{Fixed Costs}}{\text{Contribution Per Unit}}
\]

Computation of PVR, BEP, and MOS

<table>
<thead>
<tr>
<th>Particulars</th>
<th>PVR = see note</th>
<th>BEQ = see note</th>
<th>BES = BEQ X SP p.u.</th>
<th>MOS(Qty) = Total Sales - BEQ</th>
<th>MOS (Rs.) = MOS X SP p.u.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data given</td>
<td>10 – 6 (\frac{10}{6}=40)%</td>
<td>(\frac{34,000}{\text{Rs.4}}) units</td>
<td>8,500 (\text{Rs.8,500})</td>
<td>15,000 – 8,500 = 6,500 units</td>
<td>6,500 X 10 = Rs.65,000</td>
</tr>
<tr>
<td>10% decrease in selling price</td>
<td>9 – 6 (\frac{9}{6}=33.33)%</td>
<td>(\frac{34,000}{\text{Rs.3}}) units</td>
<td>11,333 X 9 = Rs.1,01,997</td>
<td>15,000 – 11,333 = 3,667 units</td>
<td>3,667 X 9 = Rs.33,003</td>
</tr>
</tbody>
</table>
Problem No. 5

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Present</th>
<th>Proposed</th>
<th>Selling price to earn same Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (let)</td>
<td>100</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td>Less: Variable cost</td>
<td>(60)</td>
<td>(60)*</td>
<td>(120)</td>
</tr>
<tr>
<td>Contribution</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

Therefore if selling price is reduced by 20% selling price has to be increased by 60% i.e. from Rs. 100 to Rs. 160.

* Variable cost will not change for change in selling price.

Problem No. 6

a)  
1. \[ \% \text{ of margin of safety} = \frac{\text{Margin of safety}}{\text{Total sales}} \]
\[ \text{Total sales} = \frac{2,40,000}{40\%} = 6,00,000 \]
Break even sales = Total sales – Margin of Safety sales
\[ = 6,00,000 - 2,40,000 \]
\[ = 3,60,000 \]

2. \[ \text{Profit} = (9,00,000 - 3,60,000) \times 30\% \]
\[ = 1,82,000 \]

b) Fixed cost = Contribution – Profit
\[ = 2,00,000 - 1,50,000 \]
\[ = 50,000 \text{ Rs.} \]

\[ \text{P/V Ratio} = \frac{\text{Contribution}}{\text{sales}} = \frac{2,00,000}{8,00,000} = 25\% \]

\[ \text{BEP} = \frac{\text{Fixed cost}}{\text{P/V Ratio}} = \frac{50,000}{25\%} = 2,00,000 \]

Margin of safety = Total sales – BEP
\[ = 8,00,000 - 2,00,000 \]
\[ = 6,00,000 \]
**Problem No. 7**

\[
\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \left( \frac{150,000}{3,00,000} \times 100 \right) = 50\%
\]

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

\[\text{Contribution} = \text{Fixed Cost} - \text{Profit}\]

\[= Rs. 90,000 - Rs. 30,000 \text{ (as it is a loss)}\]

\[= Rs. 60,000.\]

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

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

ii. \[\text{safety} = \frac{\text{Profit}}{\text{PV Ratio}} = \frac{90,000}{0.50} = Rs. 180,000\]

**Problem No. 8**

i. In the First half year:

\[\text{Contribution} = \text{Fixed cost} + \text{Profit} = 4,50,000 + 3,00,000 = Rs. 7,50,000\]

\[\text{P/V ratio} = \frac{\text{Contribution}}{\text{sales}} \times 100 = \left( \frac{3,00,000}{3,00,000} \times 100 \right) = 50\%\]

\[\text{Break-even point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{4,50,000}{50\%} = Rs. 9,00,000\]

Margin of safety = Actual sales – Break-even point = 15,00,000 – 9,00,000 = Rs. 6,00,000

ii. In the second half year:

\[\text{Contribution} = \text{Fixed cost} - \text{Loss} = 4,50,000 - 1,50,000 = Rs. 3,00,000\]

\[\text{Expected sales volume} = \frac{\text{Fixed cost} - \text{loss}}{\text{P/V ratio}} = \left( \frac{3,00,000}{50\%} \right) = Rs. 6,00,000\]

iii. For the whole year:

\[\text{B.E. point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{4,50,000 \times 2}{50\%} = Rs. 18,00,000\]

\[\text{Margin of safety} = \frac{\text{PROFIT}}{\text{P/V ratio}} = \left( \frac{3,00,000 \times 1,50,000}{50\%} \right) = Rs. 3,00,000.\]

**Problem No. 9**

1. Marginal cost sheet for the given data is prepared as under –

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (given)</td>
<td>3,00,000</td>
</tr>
<tr>
<td><strong>Less</strong>: variable cost (balancing figure)</td>
<td>1,20,000</td>
</tr>
<tr>
<td>Contribution (fixed cost + profit)</td>
<td>1,80,000</td>
</tr>
<tr>
<td><strong>Less</strong>: fixed cost (given)</td>
<td>90,000</td>
</tr>
<tr>
<td>Profit (given)</td>
<td>90,000</td>
</tr>
</tbody>
</table>
2. PV Ratio = \( \frac{\text{Total Contribution}}{\text{Total sales value}} \times 100 = \frac{Rs.1,80,000}{Rs.3,00,000} \times 100 = 60\% \)

3. Required sales if loss is Rs.30,000

\[
\frac{\text{Desired Contribution}}{\text{PV Ratio}} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{PV Ratio}} = \frac{Rs.90,000 + (Rs.30,000)}{60\%} = Rs.1,00,000
\]

4. When profit = Rs.90,000, margin of safety = \( \frac{\text{Profit}}{\text{PV Ratio}} = \frac{Rs.90,000}{60\%} = Rs.150,000. \)

**Problem No. 10**

i. P/V Ratio - 50%
Margin of Safety - 40%
Sales 500 Units for Rs. 5,00,000
Sales Per Unit - Rs. 1000
Calculation of Break Even Point (BEP)

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

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

BEP = Rs. 3,00,000
BEP (Qty) = 3,00,000/1000 = 300 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 \( x \)
Profit = 10% of \( x \) i.e. 0.1\( x \).
Thus -

\[
x = \left[ \frac{1,50,000 + 0.1x}{50\%} \right]
\]

or \( x = Rs. 3,75,000 \)

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

\[
\text{Sales (in units)} = \frac{3,75,000}{1,000} = 375 \text{ Units}
\]

**Working Notes:**

1. Selling price = Rs. 5,00,000/Rs. 500 = Rs. 1000 per unit

2. Variable cost per unit
Selling Price - (Selling Price x P/V Ratio)
1000 – (1000 x 50%) = Rs. 500

3. Profit at present level of sales
Margin of Safety = PROFIT / V ratio

Margin of Safety = 40% of Rs. 5,00,000 = Rs. 2,00,000

2,00,000 = PROFIT / 50%
Profit = Rs. 1,00,000

4. Fixed Cost
= (Sales x P/V Ratio) – Profit
= 5,00,000 x 50% – 1,00,000 = Rs. 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.

**Problem No. 11**

i. P/V Ratio = Difference in profit / Difference in sales x 100 = 5,000 / 20,000 x 100 = 25%

<table>
<thead>
<tr>
<th>Particulars</th>
<th>(Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution in 2010 (1,20,000 x 25%)</td>
<td>30,000</td>
</tr>
<tr>
<td><strong>Less</strong>: Profit</td>
<td>8,000</td>
</tr>
<tr>
<td>Fixed Cost*</td>
<td>22,000</td>
</tr>
</tbody>
</table>

*Contribution = Fixed cost + Profit

\[ \therefore \text{Fixed cost} = \text{Contribution} - \text{Profit} \]

ii. Break-even point = Fixed Cost x P/V Ratio = 22,000 x 25% = Rs. 88,000

iii. **Profit when sales are Rs. 1,80,000:**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>(Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution (Rs. 1,80,000 x 25%)</td>
<td>45,000</td>
</tr>
<tr>
<td><strong>Less</strong>: Fixed cost</td>
<td>22,000</td>
</tr>
<tr>
<td>Profit</td>
<td>23,000</td>
</tr>
</tbody>
</table>

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

\[ \text{Fixed Cost} + \text{Desired Profit} = \frac{22,000 + 12,000}{P/V \text{Ratio}} = \frac{34,000}{25} = Rs. 136,000 \]

v. Margin of safety in 2011:

\[ \text{Margin of safety} = \text{Actual sales} - \text{Break-even sales} = 1,40,000 - 88,000 = Rs. 52,000. \]

**Problem No. 12**

a) Variable cost ratio = Change in Total cost / Change in sales

\[ = \frac{456,000 - 344,000}{112,000} = \frac{112,000}{32,000} = \frac{160,000}{160,000} = 70\% \]

\[ P/V \text{ Ratio} = 1 - \text{Variable cost ratio} \]
= 1 – 70%
= 30%

Fixed cost = Total Cost – Variable (Sales x Variable cost Ratio)
= 34,40,000 – (3200000 x 70%)
= 34,40,000 – 22,40,000
= 12,00,000

Contribution per unit = Selling Price x PL Ratio
= 40 x 30%
= 12

BEP(in units) = \frac{Fixed cost}{Contribution per unit}
= \frac{12,00,000}{12}
= 1,00,000 units

b) Profit at 75% of Total capacity
Profit = Contribution – Fixed cost
= 2,00,000 x 75% x 12 – 12,00,000 = 6,00,000

Problem No. 13

i) a) Variable cost per unit = \frac{T.Variable Cost}{No. of units}
= \frac{112,000 + 49,000 + 35,000}{14000 units}
= Rs.14

Selling Price = \frac{Rs.252,000}{14000 units} = Rs.18

Revised Variable cost/ P.4 = 14 + \frac{12,000}{14,000} + \frac{35,000}{14,000} x 10% + x 5%
= 14 + 0.8 + 0.125
= 14.925

Let x be the no. of units to be sold to maintain same profit
Total sales = Variable cost + Fixed cost + Profit
(No. of units x SP)

X \times 18 = X \times 14.925 + 28,000 + 28,000
18x = 14.925x + 56000
X = \frac{56000}{3.075}
X = 18211 units

b) Margin of safety

<table>
<thead>
<tr>
<th>Particulars</th>
<th>August 2014</th>
<th>September 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit</td>
<td>28,000</td>
<td>28,000</td>
</tr>
<tr>
<td>P/V ratio = \frac{\text{C.Profit}}{\text{SP}}</td>
<td>\frac{4}{18} = 22.22%</td>
<td>\frac{3.075}{18} = 17.08%</td>
</tr>
</tbody>
</table>
Problem No. 14

P/V ratio = 28%
Quarterly fixed Cost = Rs.2,80,000
Desired Profit = Rs.70,000
Sales revenue required to achieve desired profit

\[ \frac{\text{Fixed cost} + \text{Desired profit}}{P/V \text{ ratio}} = \frac{2,80,000 + 70,000}{28\%} = \text{Rs. 12, 50,000} \]

Problem No. 15

a) Contribution per unit = Selling Price – Variable cost
   = 200 – 100
   = 100
   BEP = \[ \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{40,00,000}{100} = 40,000 \]

b) Contribution per unit = 180 – 100
   = 80
   New BEP = \[ \frac{40,00,000}{80} = 50,000 \text{ units} \]

Problem No. 16

<table>
<thead>
<tr>
<th>Particulars</th>
<th>%</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Less: Variable cost</td>
<td>(40)</td>
<td>(20)</td>
</tr>
<tr>
<td>Contribution</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

40% = Rs. 20, 100% = ?

Problem No. 17

i. Contribution Per Unit = 20-14 = 6

ii. F.C
    a. BEP = 7,92,000/6 = 1,32,000 units
    b. Desired sales level = (60,000+7,92,000)/6 = 1,42,000 units
    c. Profit before tax = 100% = 1,50,000
       (-) tax = 40% = (60,000)
       PAT = 60% = 90,000
       Desired sales level = (1,50,000+7,92,000)/6 = 1,57,000 units
    d. Variable labour cost = (14 X 50%) X 110% = 7.70
Fixed labour cost = (7,92,000X20%)X110% = 1,74,240
Total variable manufacturing cost = (14 X 50%) + 7.70 = 14.70
Total fixed manufacturing cost = (7,92,000X80%)+1,74,240 = 8,07,840
Contribution P.U. = 20-14.70 = 5.3
BEP = 8,07,840 / 5.3 = 1,52,423 units

Problem No. 18

7. Total sales = BEP + MOS
   = 400 crores + 120 crores
   = 520 crores
Variable Cost Ratio = 1 – P/V Ratio
   = 1 – 30%
   = 70%
Fixed cost = BEP x P/V Ratio
   = 400 x 30%
   = 120 crores
Current profit = MOS x P/V Ratio
   = 120 x 30%
   = 36 crores

a) Sales required to earn desired profit = \( \frac{\text{Fixed cost} + \text{Desired Profit}}{\text{P/V Ratio}} \)
   Fixed cost = 120 + 50 + (100 x 15%)
   = 185 crores

   P/V Ratio
   Def current selling price = 100
   Variable cost = 100 x 70% = 70
   Revised selling price = 100 – 10% = 90
   Revised variable cost = 90 x (70% + 2%)
   = 64.80
   Revised P/V ratio = 64.80/90 = 28%
   Sales required to earn desired profit = \( \frac{185 + 56}{28} \) = 860.71 crores

b) i) Revised BEP = \( \frac{\text{FixedCost}}{\text{P/V Ratio}} \)
   = \( \frac{185 \text{ crores}}{28\%} \) = 660.71 crores
ii) Revised P/V Ratio = 28%

iii) Revised MOS = Total sales – BEP
   = 860.71 – 660.71
   = 200 crores

Problem No. 19

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 Rs. 200 = Rs. 24,00,000

i. We know that Break even sales = \( \frac{\text{FixedCost}}{\text{P/V ratio}} \)

or Rs. 24,00,000 = \( \frac{\text{FixedCost}}{25\%} \)

or Fixed Cost = Rs. 24,00,000 x 25% = Rs. 6,00,000

So Fixed Cost for the year is Rs. 6,00,000

ii. Contribution for the year = (24,000 units x Rs. 200) x 25% = Rs. 12,00,000

Profit for the year = Contribution – Fixed Cost = Rs. 12,00,000 - Rs. 6,00,000 = Rs. 6,00,000

iii. Target net profit is Rs. 11,00,000

Hence, Target contribution = Target Profit + Fixed Cost = Rs. 11,00,000 + Rs. 6,00,000 = Rs. 17,00,000

Contribution per unit = 25% of Rs. 200 = Rs. 50 per unit

No. of units = \( \frac{17,00,000}{50} \) = 34,000 units

So, 34,000 units to be sold to earn a target net profit of Rs. 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 = \( \frac{\text{FixedCost} + \text{Desired Profit}}{\text{P/V ratio}} \)

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

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

or, 0.05 X = 6,00,000

or, X = Rs. 1,20,00,000

No. of units to be sold = \( \frac{120,00,000}{200} \) = 60,000 units

v. If Break even point is to be brought down by 4,000 units then Breakeven point will be 12000 units – 4000 units = 8000 units

Let selling price be Rs. X and fixed cost and variable cost per unit remain unchanged i.e. Rs. 6,00,000 and Rs. 150 respectively.

Break even point: Sales revenue = Total cost

8,000 X = 8,000 x Rs. 150 + Rs. 6,00,000

Or, 8,000 X = Rs. 12,00,000 + Rs. 6,00,000

Or, X = \( \frac{18,00,000}{8,000} \) = Rs.225

::: Selling Price should be Rs. 225

Hence, selling price per unit shall be Rs. 225 if Breakeven point is to be brought down by 4000 units.
Problem No. 20

a) BEP = \( \frac{Fixed \ cost}{P/V \ Ratio} = \frac{30,000}{0.40} = 75,000 \)

b) P/V ratio = 1 – Variable Cost Ratio
   = 1 – 60%
   = 40%

c) Margin of safety = Total sales - BEP
   = 1,00,000 – 75,000 = 25,000 (or)
   Profit + P/V Ratio = 10,000 ÷ 40% = 25,000

Problem No. 21

Profit = Sales – cost of sales
Cost of sales = COGs + Selling & distribution expenses
COGs = Cost of sales - Selling & distribution expenses
COGs = Variable cost of goods sold + Fixed COGs
COGs = 0.57 COGs + 3,01,000
   = 0.57
   = Rs.7,00,000 /
COS = COGs + S & DOH
COS = COGs + (COS x 4% + 68,000)
COS = 7,00,000 + 0.04 Cos + 68,000
   = 7,68,000
   = 8,00,000
Variable cost = 0.57 COGs + 0.04 COS
   = 0.57 x 7,00,000 + 0.04 x8,00,000
   = 43,10,000
Total fixed cost = 3,69,000 (2,30,000 + 71,000 + 68,000)

a) P/N ratio = \( \frac{Contribution}{Sales} = \frac{925000 – 431000}{925000} = 53.41\% \)

b) Profit earned in Last Year = sales – Cost of sales
   = 9,25,000 – 8,00,000
   = 1,25,000

c) Margin of safety (in %)
MOS = \( \frac{Profit}{P/V \ Ratio} = \frac{125,000}{53.41\%} = 2,34,039 \)
   % of MOS = \( \frac{MOS}{T.sales} = \frac{234039}{925000} = 25.30\% \)

d) Profit = Sales – Variable – Fixed cost
   = 90%(925000 – 431000) – 369000
   = Rs.75,600

Problem No. 22

a, b, f, g → will not change
c, e, h, j → Will increase
d, i → will decrease
Problem No. 23

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2,000 Units</th>
<th>1,500 Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Selling price – prime cost</td>
<td>18 (Rs.36,000/2,000)</td>
<td>18 (Rs.27,000/1,500)</td>
</tr>
<tr>
<td>B. Variable overheads II</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Variable overheads III</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>C. Contribution (A-B)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>D. Fixed overheads I</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Fixed overheads I</td>
<td>(2,000xRs.3)</td>
<td>(2,000xRs.3)</td>
</tr>
<tr>
<td></td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>18,000</td>
<td>18,000</td>
</tr>
<tr>
<td>E. Break even point = ( \frac{Fixed \text{ cost}}{Contribution \text{ per unit}} )</td>
<td>= ( \frac{18,000}{15} ) = 1200 units</td>
<td>= ( \frac{18,000}{15} ) = 1200 units</td>
</tr>
</tbody>
</table>

Working notes:

i. Variable overheads III per unit = Change in amount of overheads / Change in activity level
   = \( \frac{(2,000xRs.7) - (1,500xRs.3)}{2,000 - 1,500} \) = Rs.1 per unit

ii. Fixed Overheads III = Rs.14,000 - (2,000xRs.1) = Rs.12,000

Problem No. 24

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Rs.5,00,000</td>
<td>Rs.6,00,000</td>
</tr>
<tr>
<td>Less: variable cost</td>
<td>Rs.4,00,000</td>
<td>Rs.4,00,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>Rs.1,00,000</td>
<td>Rs.2,00,000</td>
</tr>
<tr>
<td>Less: fixed Costs</td>
<td>Rs.30,000</td>
<td>Rs.70,000</td>
</tr>
<tr>
<td>Profit</td>
<td>Rs.70,000</td>
<td>Rs.1,30,000</td>
</tr>
<tr>
<td>PV Ratio = ( \frac{Total \text{ Contribution}}{Total \text{ Sales Value}} \times 100 )</td>
<td>20%</td>
<td>33.33%</td>
</tr>
<tr>
<td>Breakeven sales = ( \frac{Fixed \text{ costs}}{PV \text{ Ratio}} )</td>
<td>Rs.1,50,000</td>
<td>Rs.2,10,000</td>
</tr>
</tbody>
</table>

Indifference point (Qty) = \( \frac{Difference \text{ in Fixed Costs}}{Difference \text{ in PV Ratio}} \) = \( \frac{Rs.70,000 - Rs.30,000}{33.33\% - 20\%} \) = Rs.3,00,000(approx.)

Conclusion:

<table>
<thead>
<tr>
<th>Sales demand</th>
<th>Nature</th>
<th>Firm with higher profits</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; Rs.3,00,000</td>
<td>Low demand</td>
<td>A ltd.</td>
<td>Lower fixed costs</td>
</tr>
<tr>
<td>= Rs.3,00,000</td>
<td>Indifference point</td>
<td>Either A ltd. Or B ltd.</td>
<td>Equal profits</td>
</tr>
<tr>
<td>&gt; Rs.3,00,000</td>
<td>Heavy demand</td>
<td>B ltd.</td>
<td>Higher PV Ratio</td>
</tr>
</tbody>
</table>

Problem No. 25
(i) Statement of Cost and Profit under Marginal Costing
for the year ending 31st March, 2008
Output = 3,20,000 units

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

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

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Amount (Rs.)</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>2,48,00,000</td>
<td></td>
</tr>
<tr>
<td>Less: Cost of sales:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost of production (3,20,000 @ Rs. 40)</td>
<td>1,28,00,000</td>
<td></td>
</tr>
<tr>
<td>Add: Fixed cost of production absorbed 3,20,000 units @ Rs. 6 (1)</td>
<td>19,20,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,47,20,000</td>
<td></td>
</tr>
<tr>
<td>Add: Opening Stock: 40,000 X (\frac{147,20,000}{3,20,000})</td>
<td>18,40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,65,60,000</td>
<td></td>
</tr>
<tr>
<td>Less: Closing Stock: 50,000 X (\frac{147,20,000}{3,20,000})</td>
<td>23,00,000</td>
<td></td>
</tr>
<tr>
<td>Production cost of 3,10,000 units</td>
<td>1,42,60,000</td>
<td></td>
</tr>
<tr>
<td>Selling expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable: Rs. 12 X 3,10,000 units</td>
<td>37,20,000</td>
<td></td>
</tr>
<tr>
<td>Fixed</td>
<td>16,00,000</td>
<td>1,95,80,000</td>
</tr>
<tr>
<td>Unadjusted profit</td>
<td>52,20,000</td>
<td></td>
</tr>
<tr>
<td>Less: Overheads under absorbed: (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed production overheads</td>
<td>4,80,000</td>
<td></td>
</tr>
<tr>
<td>Actual profit under absorption costing</td>
<td>47,40,000</td>
<td></td>
</tr>
</tbody>
</table>

Workings:

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

THE END