

Subject: Financial & Management Accounting

Class: BBA II Sem

Topic Name: Break Even Point & Ratio Analysis

Formulas:

$$1) \text{B.E.P.} = \frac{\text{Fixed cost} \times \text{Sales}}{\text{Sales} - \text{V.C}} \quad \text{OR} \quad \frac{\text{Fixed cost} \times \text{Sales}}{\text{Contribution}} \quad \text{OR} \quad \text{BEP} = \frac{\text{Fixed cost}}{1 - \frac{\text{Variable cost per unit}}{\text{Sales per unit}}} \quad \text{OR} \quad \frac{\text{Fixed cost}}{\text{PVR}}$$

$$2) \text{B.E.P. in unit} = \frac{\text{Fixed cost}}{\text{Contribution Per unit}} \quad \text{OR} \quad \frac{\text{Fixed cost}}{\text{SP per unit} - \text{VC per unit}}$$

$$3) \text{Profit Volume Ratio} = \frac{\text{Sale} - \text{VC}}{\text{Sale}} \times 100 \quad \text{OR} \quad \frac{\text{Contribution}}{\text{Sale}} \times 100 \quad (\text{Contribution} = \text{Sale} - \text{VC})$$

$$\text{OR P/V Ratio when two profits are given} = \frac{\text{Difference between two year P \&L}}{\text{Difference between two year sale}} \times 100$$

$$4) \text{Margin of Safety} = \text{Total Sale} - \text{B.E.P. Sale}$$

$$5) \text{Desired profit if sale is given} = \text{New sale} \times \text{PVR} - \text{fixed Cost}$$

$$6) \text{Desired sale if profit is given} = \frac{\text{New profit} + \text{FC (New Contribution)}}{\text{PVR}}$$

$$7) \text{Desired sale in units} = \frac{\text{New Profit} + \text{FC}}{\text{Contribution per unit (Sale} - \text{VC per unit)}}$$

$$8) \text{B.E.P. on profit} \dots = \frac{\text{Profit}}{\text{PVR}}$$

$$9) \text{B.E.P. on new PVR given} = \frac{\text{Contribution}}{\text{New PVR}}$$

Q1. Given data :-

Selling Price ` 8,00,000

Variable cost `6,00,000

Profit volume Ratio--- 25%

Unit sold 40,000

Net profit ` 1,80,000

Find out :

- (i) Break Even point in Rs`
- (ii) Break even point in Units
- (iii) Margin of safety
- (iv) Sales on a desired profit of `50,000
- (v) Profit on the desired sales of ` 6,00,000
- (vi) Break Even point if selling price is reduced by 10%

Ans:-		
<p>Selling Price per unit =8,00,000/40,000=20</p> <p>VC per unit =6,00,000/40,000=15</p> <p>Fixed cost not given =Sale –VC-Profit</p> <p>8,00,000-6,00,000-1,80,000=20,000</p>		
1) Break Even Point	$= \frac{\text{Fixed Cost}}{1 - \frac{\text{VC Per unit}}{\text{Sale per unit}}}$	$= \frac{20,000}{1 - \frac{15}{20}} = \frac{20,000}{1 - 0.75} = \frac{20,000}{0.25}$ <p>=` 80,000</p>
2) Break Even Point (in Unit)	$= \frac{\text{Fixed Cost}}{\text{Sale PU} - \text{VC}} \text{ PU}$	$= \frac{20,000}{20 - 15} = \frac{20,000}{5} = 4,000 \text{ Unit}$
3) Margin of Safety	Sale – BEP Sale	8,00,000- 80,000 =7,20,000
4) Sales on desired profit `50,000	$= \frac{\text{Desired Profit} + \text{Fixed Cost}}{\text{PVR}}$	$= \frac{50,000 + 20,000}{25\%} = 2,80,000$
PVR not given PVR	$= \frac{\text{Sales} - \text{VC}}{\text{Sale}} \times 100$	$= \frac{8,00,000 - 6,00,000}{8,00,000} \times 100 = 25\%$

<p>5) Profit on desired sales are ₹6,00,000</p>	<p>=New sale x PVR – fixed cost</p>	<p>=6,00,000 x 25% – 20,000 =1,30,000</p>
<p>6).BEP if selling price is reduced by 10%</p> <p>Selling Price PU =20 -10%=2 20-2=18</p>	$= \frac{\text{Fixed Cost}}{1 - \frac{\text{VC Per unit}}{\text{Sale per unit}}}$ <p>OR = $\frac{\text{Fixed Cost} \times \text{Sale}}{\text{Sale} - \text{VC}}$</p>	$= \frac{20,000}{1 - \frac{15}{18}} = \frac{20,000}{1 - 0.8333} = \frac{20,000}{0.1667}$ <p>= ₹ 1,20,000 Rounded off</p> <p>Or may be solved by second formula</p>

Q2. Rahul Company submitted following information :

Year	Sales	Profit ₹
2002	4,80,000	36,000
2003	5,60,000	52,000

Find out :

- 1) Profit Volume Ratio.
- 2) Break Even Point
- 3) Profit on sales of ₹4,20,000
- 4) Amount of Sales for the profit of ₹84,000

Ans;-

<p>i) Profit Volume Ratio = $\frac{\text{Change in Profit}}{\text{Change in Sale}} \times 100$ Or</p> $\frac{\text{Diff in Profit}}{\text{Diff in Sale}} \times 100$ $= \frac{16,000}{80,000} \times 100 = 20\%$	<p>ii) Break Even Point</p> <p>= Fixed cost = Sale x pvr – Profit</p> <p>= (4,80,000 x 20%) – 36,000</p> <p>= ₹ 60,000</p>
<p>BEP for 2002 =</p> $\text{BEP} = \frac{\text{Fixed cost} \times \text{Sale}}{\text{Sale} - \text{VC}}$ $\text{BEP} = \frac{60,000 \times 4,80,000}{4,80,000 - 3,84,000}$ <p>= ₹ 3,00,000</p>	<p>BEP for 2003</p> $\text{BEP} = \frac{\text{Fixed cost} \times \text{Sale}}{\text{Sale} - \text{VC}}$ $\text{BEP} = \frac{60,000 \times 5,60,000}{5,60,000 - 4,48,000} \times$ <p>= ₹ 3,00,000</p>

<p>iv) Profit if sales are ₹4,20,000=</p> $\begin{aligned} \text{Contribution} &= \text{New sale} \times \text{PVR} \\ &= ₹4,20,000 \times 20\% \\ &= ₹84,000 \\ \text{Profit} &= \text{Contribution} - \text{Fixed costs} \\ &= ₹84,000 - ₹60,000 \\ &= ₹24,000 \end{aligned}$	<p>iv) Sales for desired profit ₹84,000</p> $\begin{aligned} \text{New Sale} &= \frac{\text{Desired Profit} + \text{Fixed cost}}{\text{PVR}} \\ \text{New Sale} &= \frac{₹84,000 + ₹60,000}{20\%} \\ \text{New Sale} &= \frac{₹1,44,000 \times 100}{20} \\ &= ₹7,20,000 \end{aligned}$
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Note:- if Both year profit will be given under such condition difference of profit will take for calculation

But if in 1 year profit given and in 2 year loss given under such condition total of both year profit & loss will be taken for Calculation for the PVR

For Ex:

	2006 `	2007 `
Sales	2,40,000	4,40,000
Profit	-	30,000
Loss	20,000	-

PVR= Difference in profit / difference between sales *100

$$50000 / 200000 * 100 = 25\%$$

Ratio Analysis

Formulas:

- Related to P & L account:
- 1) Gross profit Ratio
 - 2) Net Profit ratio
 - 3) Operating Net Profit ratio
 - 4) Operating Ratio
 - 5) Expenses ratio

(all items should be divided by net sale and multiplied by 100)

Ratios related to B/S:

$$1) \text{Current ratio} = \frac{\text{Current assets}}{\text{Current Liability}} \quad (\text{current assets} = \text{Cash} + \text{Debtors} + \text{Stock} + \text{Prepaid})$$

$$(\text{current lia.} = \text{Creditors} + \text{O.D.} + \text{O.Exp.})$$

$$2) \text{Liquidity Ratio} = \frac{\text{Liquid or quick assets}}{\text{Liquid or quick Liability}} \quad \text{LA} = \text{Current assets} - \text{stock} \quad \text{LL} = \text{Current liabilities} - \text{O.D}$$

$$3) \text{Acid test ratio} = \frac{\text{Current assets} - \text{stock}}{\text{Current liabilities} - \text{Bank O.D}}$$

$$4) \text{Operating Ratio} = \frac{\text{Cost of Goods sold} + \text{Operating Expenses}}{\text{Net Sale}} \times 100$$

$$\text{COGS} = \text{Sale} - \text{Gross Profit} \quad \text{Or} \quad \text{Op. Stock} + \text{Purchase} + \text{Direct wages} + \text{Dir. exp} - \text{Cl. Stock}$$

$$\text{Or All expenses debited to Trading A/c} - \text{Cl. Stock}$$

$$5) \text{Debtors Turnover ratio} = \frac{\text{Net credit sale}}{\text{Average debtors or closing debtors}} \quad (\text{Debtors} = \text{Debtors} + \text{BR})$$

$$6) \text{Debts equity ratio} = \frac{\text{Debts (long term loan + Debenture)}}{\text{Equity (Internal liabilities)}}$$

$$7) \text{Fixed assets Turnover Ratio} = \frac{\text{Cost of goods sold}}{\text{Net fixed assets (after Depr.)}}$$

$$8) \text{Stock turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average stock}}$$

$$(\text{Op. stock} + \text{Purchase} + \text{Direct exp} - \text{Cl. Stock}) \text{Average Stock} = \frac{\text{Opening stock} + \text{Closing Stock}}{2}$$

$$9) \text{Working capital turnover ratio} = \frac{\text{COGS}}{\text{Working Capital (current assets - current liabilities)}}$$

$$10) \text{ Stock working capital ratio} = \frac{\text{Closing stock}}{\text{Working Capital}}$$

$$11) \text{ Average Collection Period} = \frac{\text{Average Debtors}}{\text{Net Credit Sale}} \times \text{No. of Working days}$$

Q1. From the following statement of x Ltd. for the year ending 31st March 2001, You are required to re-arrange the items in the form of financial statement and calculate the following ratios:

- (a) Current Ratio
- (b) Acid test ratio
- (c) Operating ratio
- (d) Net profit ratio
- (e) Stock turnover ratio
- (f) G.P. Ratio
- (g) Stock to working Capital ratio

Balance Sheet

As on 31st March 2001

Liabilities	₹	Assets	₹
Share Capital	5,00,000	Land & Building	5,00,000
5,00,000 shares issued @ ₹1 per share		Plant & Machinery	2,00,000
P/L Account	1,50,000	Stock	1,50,000
Sundry Creditors	2,00,000	Sundry Debtors	2,50,000
General Reserve	4,00,000	Cash & Bank Balance	1,50,000
	12,50,000		12,50,000

Profit & Loss account

For the year ended on 31st March 2001

Particulars	₹	Particulars	₹
To Stock	2,50,000	By Sales	18,00,000
To Purchase	10,50,000	By Closing Stock	1,50,000
To G.P.	6,50,000		
	19,50,000		19,50,000
To Selling &Distri.Ex.	1,00,000	By G.P.	6,50,000
To Administrative Exp.	2,30,000	By profit on sale of fixed assets	50,000
To Financial Exp.	20,000		
To Net Profit	3,50,000		
	7,00,000		7,00,000

Ans:-

(1) Current Ratio (Stock+Debtors+Cash+Misc.Assets) (Creditors+B.P.+Other Current Lia.)	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{5,50,000}{2,00,000} = 2.75:1$
(2) Quick/Liquidity/Acid Test Ratio (Current assets-Stock & Prepaid exp) (Current Lia.- Overdraft)	$\frac{\text{Quick Assets}}{\text{Quick Liabilities}}$	$\frac{40,000}{2,00,000} = 2:1$
(3) Operating Ratio	$\frac{\text{COGS} + \text{Op.expenses}}{\text{Sale}} \times 100$	$\frac{15,00,000}{18,00,000} \times 100 = 83.33\%$
(4) Net Profit Ratio	$\frac{\text{Net Profit}}{\text{Sale}} \times 100$	$\frac{3,50,000}{18,00,000} \times 100 = 19.44\%$
(5) Inventory/Stock Turnover Ratio	$\frac{\text{COGS}}{\text{Average Stock}}$	$\frac{11,50,000}{2,00,000} = 5.75 \text{ Times}$
(6) Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Sale}} \times 100$	$\frac{6,50,000}{18,00,000} \times 100 = 36.11\%$
(4) Stock to working capital Ratio	$\frac{\text{Closing stock}}{\text{Working Capital}}$ (W.C.=Current Assets- Current Liabilities)	$\frac{1,50,000}{3,50,000} = 0.43\%$