UNIT-III Break even Analysis :-

Break even point :-

→ Break even analysis refers to where the intersection of total revenue = total cost. Break even analysis is also known as no profit no loss. It also refered as profit cost value. Volume

→ Break even analysis determining the practical appliations of cost functions. It is a function of three factors i.e., Sales Volumes, cost and profit.

→ It aim at classifying the dynamic relationship existing between the total cost and sales volume of a Company.

Keyterms used in Break even analysis :-

1. Fixed Cost :-
   fixed cost remain fixed in the short run.
   Eg Rent, Insurance, Salaries etc
   depreciations.

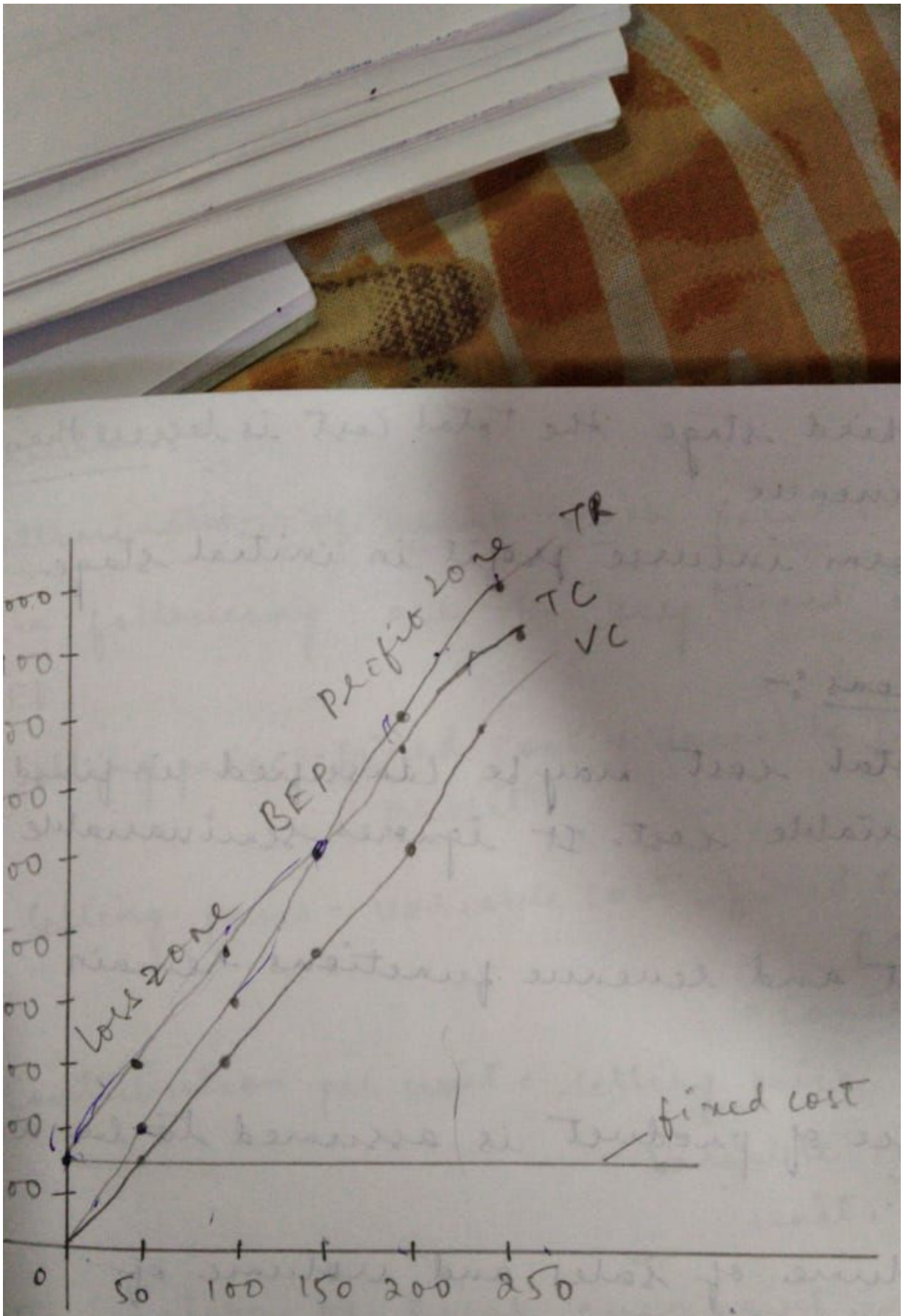
The total of fixed and variable cost

4. Total revenue :-
This sales proceeds (selling price per unit x no of units sold).

5. Profit :-
Contribution - fixed cost

6. Contribution margin :-
The contribution margin is the difference between the selling per unit and variable cost per unit.

Output	TR	Fc	VC	TC
0	0	150	0	150
50	200	150	150	300
100	400	150	300	450
150	600	150	450	600
200	800	150	600	750
250	1000	150	750	900



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Explanation of the above graph :-

In the above graph OX axis rep-

Formulae :-

Determination of Break even point :-

The following are the key terms used in BEP

1) Selling price = fixed cost + Variable cost + profit.

2) Selling price - Variable cost = fixed cost + profit.
= Contribution

3) Contribution per unit = selling price per unit - Variable cost per unit.

Determination of Break even point in units :-

1) $\frac{\text{fixed cost}}{\text{Contribution margin per unit}}$ = BEP (units) where Contribution margin per unit = S.P.PU - V.C.PU

Determination of BEP in Values :-

$\frac{\text{fixed cost}}{\text{Contribution margin ratio}}$: BEP (Values) where Contribution margin ratio is the ratio of contribution margin per unit to selling price per unit.

Pb

① A farm has fixed cost rupees 10,000/-, selling price per unit is 5/-, variable cost per unit is 3/-

(i) Determine BEP (value) and sales value.

(ii) Calculate the margin of safety considering that the actual production is 8000 units.

Sol:- (i) $BEP(units) = \frac{\text{fixed cost}}{\text{Cont margin per unit}}$

Cont marg per unit = SP − VC

= 5 − 3

= 2

$BEP(units) = \frac{10,000}{2}$

= 5000/-

$BEP(Values) = \frac{FC}{\text{Cost margin ratio}}$

$\text{Cont margin ratio} = \frac{S.P - VC}{S.P}$

$= \frac{5-3}{5} = 2/5$

$= \frac{10,000}{2/5} = 25,000$

(ii) Margin per unit = No of units sold − BEP(units)

= 8000 − 5000

= 3000

② A hitech rail can carry a max of 36,000 passenger per annum at a fair of ₹=400 Variable cost per passenger is 150/-, while the fixed cost is 25 lakhs/- per year. Find BEP (in terms of no of passengers and also in terms of fair collection)

Sol: No of passengers = 36,000

fixed cost = 25,000,000

fair = ₹=400

Variable cost = ₹ 150/-

$$BEP = \frac{\text{fixed cost}}{\text{fair} - \text{V.C}}$$

$$= \frac{25,00,000}{400-150}$$

$$= \frac{25,00,000}{250} = \frac{10000}{\cancel{25}000}$$

BEP = 10,000 in terms of passenger

$$BEP = \frac{F.C}{\text{Cont margin ratio}}$$ in term of money

$$\text{Cont margin ratio} = \frac{400-150}{400} = \frac{250}{400}$$

$$BEP = \frac{5000000}{\cancel{25,00,000}} \times 8 = 40,00,000$$

③ Srikanth Enterprises deals with supply of hardware parts of computer. This following cost data is available for two successive periods.

Sol:

Particular	year-1	year-2
Sales	50,000	1,20,000
fixed cost	10,000	20,000
Variable cost	30,000	60,000

Determine (i) a break even point
(ii) Margin of safety.

Sol:

Contribution = Sales - Variable cost

year I = 50,000 - 30,000 = 20,000

year II = 1,20,000 - 60,000 = 60,000

Particular	year I	year 2
sales	50,000	1,20,000
variable	30,000	60,000
Contribut	20,000	60,000
fixed	10,000	20,000
Net profit	10,000	40,000

As per unit data is not available we use the formula P/V ratio to find out BEP-

P/V ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100$

year I $= \frac{20,000}{50,000} \times 100$

$= \frac{200}{5} = 40$

year II $\frac{60,000}{1,20,000} \times 100$

$= \frac{600}{12} = 50$

BEP = $\frac{\text{fixed cost}}{\text{P/V ratio}}$

year I (BEP) = $\frac{10,000}{40} = 250$

year II (BEP) = $\frac{20,000}{80} = 400$

(ii) **Margin = $\frac{\text{net Profit}}{\text{P/V ratio}}$**

Margin (y-I) = $\frac{10,000}{40} = 250$.

Margin (y-II) = $\frac{40,000}{50} = 800$

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Q A firm has fixed cost ₹ 50,000, selling price per unit, ₹ 50 and variable cost P.P.U is ₹ 25. Present level of production is 3500 units

(i) Determine BEP (~~values~~ Volume & sales value)

(ii) Calculate margin of safety

(iii) what is change in BEP and margin of safety if fc increases 50k to 60k

Sol: $BEP(units) = \frac{FC}{\text{Cont Margin per unit}}$

Cont. Margin per unit = S.P.P − V.C.P.U

= 50 − 25

= 25

$BEP(units) = \frac{50,000}{25}$

= 2000

$BEP(Values) = \frac{FC}{\text{Cont margin ratio per unit}}$

Cont margin ratio PU = $\frac{SP}{S.P-VC}$ $\frac{SP-VC}{SP}$

$= \frac{50}{25} = 2 \Rightarrow \frac{50-25}{50} = \frac{1}{2}$

$BEP(Values) = \frac{50,000}{1/2}$

= 2~~5000~~ 1,00,000

Margin of safety = no of units sold − BEP(units)

= 3500 − 2000

= 1500

When FC changes from 50,000 to 60,000

$$BEP(units) = \frac{60,000}{250} = 2400$$

$$BEP(values) = \frac{60,000}{1/2} = 1,20,000$$

Margin of safety = 3500 − 2400

= 1100

The above calculations show that the firm has to produce 1100 more units (2400 − 1

In the event of increase of fixed co by 10,000 this reduces margin of so by 400 units (1500 − 1100)

① A firm has two products B & C. The particulars of the price per unit, V.C per unit, percentage of the share in total sales volume are given in table

Products	SP	VC	% of share
B	40	16	40%
C	50	20	60%

The total fixed cost during the year amount rupees 1,00,000. The total volume of sales is ₹ 8,00,000.

The company wants to drop product B as it is yielding less contribution per unit. Instead it wants add product D. If D is added the new fixed cost is likely to be ₹ 1,25,000 and the sales volume is likely increased to ₹ 9,00,000. The new scenario will be given below

Particulars	SP	VC	% of share
C	50	20	70%
D	60	24	30%

Q4: (solution for B & C)

Contribution ratio = $\frac{\text{Selling price} - \text{Variable cost}}{\text{selling price}} \times$ 100 % of share

CR for B = $\frac{40-16}{40} \times 100$ 0.4

$= \frac{40-16}{40} \times \frac{4}{10}$

$= \frac{24}{100}$

$= 0.24$

CR for C = $\frac{50-20}{50} \times 0.6$

$= \frac{30}{50} \times \frac{6}{10}$ $= \frac{30}{50} \times \frac{6}{10}$

$= \frac{18}{50}$ $= \frac{18}{50}$

$= 0.9$ $= 0.36$

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Total of the contribution of B & C

$= 0.24 + 0.36$

$= 0.6$

Total Contribution = Sales × Contribution / Sales

$= 8,00,000 \times \frac{6}{10}$

$= 4,80,000$

net profit = Contribution - fixed cost

= 4,80,000 - 1,00,000

NPA = 3,80,000

Now for C & D

Cont ratio for C = $\frac{50-30}{50} \times 0.7$

$= \frac{30}{50} \times \frac{7}{10}$ 0.2

$= \frac{21}{50}$ $= \frac{21}{5} \times 0.1$

$= 0.42$

0.42
0.18
0.6

Cont ratio for D = $\frac{60-24}{60} \times \frac{3}{10}$

$= \frac{36}{60} \times \frac{3}{10}$ 18

$= \frac{36}{200}$ $= \frac{36}{2} \times 0.01$

$= 0.018$

0.42
0.018
0.438

Total Contribution = Sales x Cont ratio

$= 9,00,000 \times$ ~~0.1280~~ 6

$= 9,00,000 \times \frac{6}{10}$

$= 5,40,000$

net prof = 5,40,000 - 1,25,000

= 4,15,000