

## Unit - III

production, cost, market structure & pricing

production Analysis:-

Q1. Define production and what are the factors of production?

Ans: production is the activity which transforms inputs into outputs. It is the process of combining various material and immaterial inputs in order to make something for consumption (product / services)

Material Inputs:-

planning, Using innovative ideas, thoughts, how to utilise the things,  
In simple, production is the transformation of output (product / services)

Example:- production is harvesting the corn to eat.

Factors of production

Factors of production are the inputs needed for creation of a good/service. They are.

1. Land
2. Labour
3. Capital
4. Machinery / Technology
5. Organisation.

## 1. Land :-

Land is the original and primary factor of production, without land the production process cannot exceed further. All the natural resources that are available, which are used in the production process is called land.

1) Land is free gift of nature.

2) The supply of land is perfectly Inelastic.

3) Land is subject to law of diminishing returns.

## 2) Labour :-

Economic activity of man with head and hand labour is human factor of any kind.

Manufacturing material skilled or Unskilled, Scientific or artistic Undertakings with a view of creating or adding Utility.

1) Labour is human factor

2) Active factor

3) It can not be stored.

4) No two labours are identical.

## 3) Capital :-

Capital is man-made resource of production used to produce further wealth. It refers to the stock of Capital assets.

Example:- Factories, machines, tools and equipment.

transport, vehicles etc.

Supply of capital is elastic.

- 1) Supply of capital is elastic.
- 2) It has mobility.
- 3) All Capital is wealth but all wealth is not Capital.

#### 4) Machinery / Technology :-

The application of scientific knowledge for practical purposes especially in industry.

#### 5) Organisation :-

Organisation is a group of people who work together to achieve common goals and objectives.

Production Function; production Function  
With One Variable Input    Two Variable Inputs

Q2) Define production function. How can a producer find it useful? Illustrate?

Ans:-

Production Function is defined as a technical relationship between a given set of inputs and the possible output from it. It defines that maximum amount of output that can be produced with a given set of inputs.

Production function is expressed as

$$Q = f(L_1, L_2, C, O, T)$$

$Q$  is the quantity of production

$f$  is the function explains

$L_1$  is Land

$L_2$  is labour

$C$  is Capital

$O$  - Organisation

$T$  - Technology.

In real reality, materials also included in a set of inputs.

A manufacturer has to select the factor of production considering lower cost of inputs for

## Q3. Production Function with One-Variable Input

The law of return states When at least one factor of production is fixed and all other factors are varied, the total output at initial stage will increase at an increasing rate, and after reaching certain level of output the total output will increase at declining rate.

The law of return is also called the law of Variable or the law diminishing return. This law holds good only for short run period.

The following tables give the details of Labour (Variable Input), Total product (TP), Marginal (MP) Average product (AP) & stages.

Labour	Total (0.0 units)	Marginal product	Average product	stages product (0.0 ton)
1	20	-	20	Increasing returns
2	50	30 (50-20)	25	
3	90	40 (90-50)	30	
4	120	30 (120-90)	30	Diminishing returns
5	140	20 (140-120)	28	
6	150	10 (150-140)	25	
7	150	0 (150-150)	21.4	
8	130	-20 (130-150)	16.25	Negative returns
9	100	-30 (100-130)	11.1	

$MP = TP \text{ of Labour}_1 / TP \text{ of Labour}_2$

$$= \frac{\Delta L_1}{\Delta L_2}$$

$TP = \text{Total production}$

$AP = TP/\text{Labour}$

The three stages in law of Variable Proportion.

Stage I: Increasing return to stage:

It starts from '0' Unit of variables input to the level where AP of Labour or  $A^*$  is maximum. Here all are increasing  $TP$  &  $MP$  also, so it is called increasing returns to stage.

Stage II: Diminishing / Decreasing Return to Stage.

Stage II follows Stage I and proceeds to the point where  $MPL$  of Labour is zero

(i.e.  $TPL$  is maximum) it is the stage, where  $AP$  is decreasing,  $MP$  is zero & it is decreasing returns to stage.

Stage III :- It starts from stage II. Here TP is decreasing, AP is also decreasing & MP becomes negative showing that it comes bring negative returns to stage.

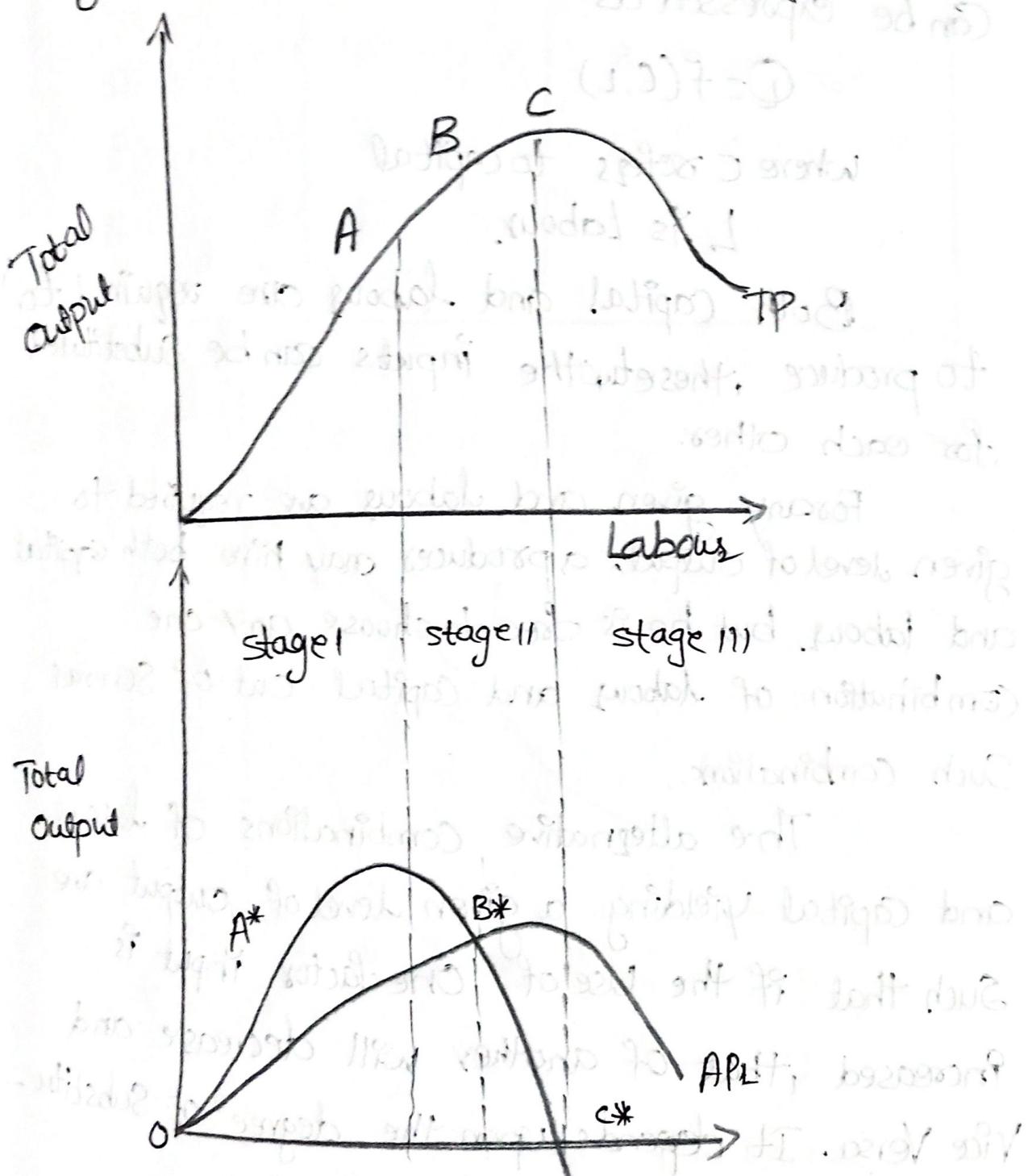


Figure: Total, Average and Marginal product curves

## ① Production Function with Two-variable Inputs?

A production function based on two inputs

Can be expressed as.

$$Q = f(C, L)$$

where C refers to capital

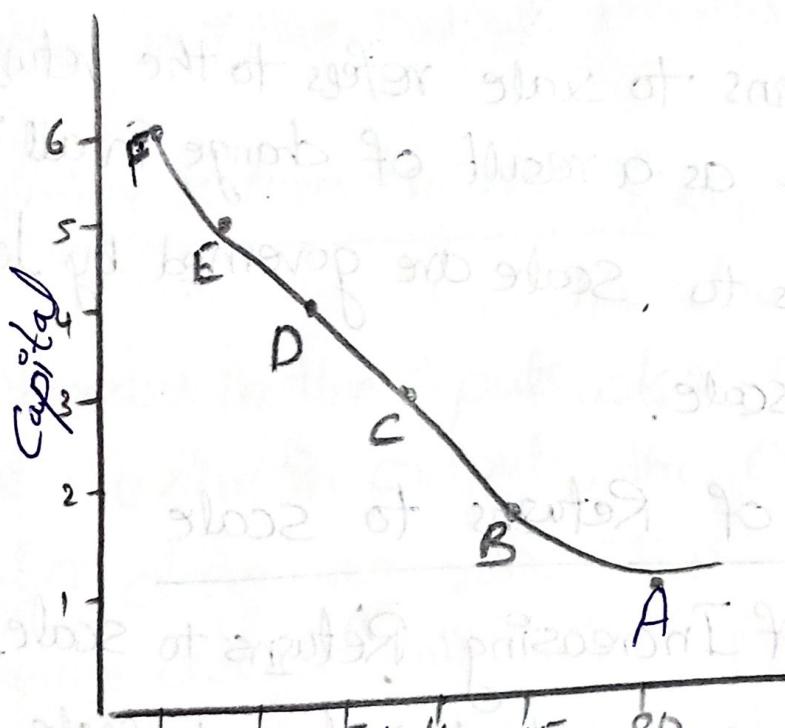
L is Labour.

Both Capital and labour are required to produce, these two inputs can be substituted for each other.

For any given level of output, a producer may hire both Capital and Labour but he is free to choose any one combination of Labour and Capital out of several such combinations.

The alternative combinations of Labour and Capital yielding a given level of output are such that if the use of one factor input is increased, that of another will decrease and vice versa. It depends upon the degree of substitutability between the two input factors.

Combinations	Capital	No. of Labourers
A	1	20
B	2	15
C	3	11
D	4	8
E	5	6
F	6	5



## Returns to scales

Q.

- 5) Explain the law of returns with appropriate examples.

(OR)

Explain the long run production function with all variable inputs?

(OR)

Explain returns to scale?

Ans:-

Returns to scale refers to the returns enjoyed by the firm as a result of change in all inputs. The returns to scale are governed by law of returns to scale.

### Law of Returns to Scale

- 1). Law of Increasing Returns to Scale.
- 2). Law of Constant return to scale.
- 3). Law of decreasing return to scale.

- 1). Increasing Returns to Scale :-

This law states that the Volume of output increasing with every increase in puts. A given Increase in inputs leads to a more proportional increase in output.

Example:- If division of labour and other technological means to increase production, the total product increases at an increasing rate.

### 2) Constant Returns to Scale:-

The law state that the rate of increase/decrease in volume of output is same to that of rate of increase/decrease in inputs.

Example:- When division of labour restricted, the rate of increase in the output remains constant.

### 3) Decreasing Returns to Scale:-

This law state the rate of increase in the inputs does not lead to equivalent increase in output, the output increase at a decreasing rate. This results in higher average cost per unit.

## Types of production Functions

Q6.) Explain the different types of production Functions?

Ans:- There are three types of production.

They are

- 1). Cobb-Douglas production Function.
2. Leontief production Function
3. CES production Function.

1). Cobb-Douglas production Function :-

Cobb-Douglas production was proposed.

by Charles C. Cobb & Paul H. Douglas by doing extensively studies in American Manufacturing Industries for 22 years (1899-1922)

The C-D production Function.

$$Q = A \times L^b \times K^{1-b}$$

Where Q = total output

L = Units of labour

K = Units of capital

A = a constant, b

1-b = elasticities of production.

2). Leontief production Function or Fixed proportion :-

Constant Elasticity of 8

It is based on the condition that there is a fixed proportion in which the various factors are to be used in the production process.

$$X = \min \left[ \frac{K}{a}, \frac{L}{b} \right]$$

Where  $K$  &  $L$  represents units of capital & labour respectively,  $a$  &  $b$  are constants, & the word minimum implies that output ' $X$ ' depends upon the smaller of the two ratios.

3). CES production Function:-

Constant Elasticity of Substitution production introduced by Arrow, Chenery, Minhas & Solow (also known as ACMS Function) The general form CES Function.

$$X = Y [KC^{-\alpha} + (1-K)L^{-\alpha}]^{\frac{1}{\alpha}}$$

Where ' $X$ ' refers to Output, ' $C$ ' to Capital Input  $L$  to Labour Input. The function consist of three variables ( $XCL$ ) and four parameters ( $YK\&\alpha$ ).  $Y$  is the efficiency parameter & shows the scale effect, like ' $A$ ', a constant in Cobb-Douglas production Function. ' $K$ ' is the capital intensity

and  $(1-k)$  is the labour intensity co-efficient  
 $V$  represents the degree of returns to scale.

## COST Analysis : Types of Costs,

Short RUN LONG RUN COST  
FUNCTIONS

Q7:- Define cost explain the different cost concepts used in the process of cost analysis.

(OR)

Explain different types of cost.

Ans:- Cost is the expenditure incurred to produce a particular product or service. All cost involve a sacrifice of some kind or other to acquire some benefit. Different business proposals are evaluated in terms of their cost and revenue.

Example:- If a person is feeling hungry or want to eat food, he should be prepared to sacrifice money to buy food in hotel or cook vegetables, for bread etc.

The cost of production normally includes the cost of raw-materials, labour, other expenses. This cost is known as total cost.

The following are the possible variations in the concept of cost.

- Long-run Vs short-run costs
- Fixed Vs Variables cost.
- Semi-Fixed or semi-variables cost.
- Marginal cost
- Controllable Vs Non-controllable costs
- opportunity Vs Outlay costs.
- Incremental Vs Sunk costs.
- Explicit Vs Implicit cost [out of pocket cost Vs Book costs]
- Historical cost Vs Replacement cost:-

- past cost Vs Future cost.
- separable cost Vs joint costs (or)  
[Direct Vs Indirect cost]
- Accounting cost Vs Economic costs'
- Urgent Vs postponable costs.
- Escapable Vs Unavoidable costs
- Basis of Distinction Among cost concepts

## → Long Run Vs Short - Run costs:-

Long-run is defined as the period any time beyond the short-run over which all factors are variables. None of the factors of production are fixed in their supply.

Example :- purchase of machinery, land and building etc.

Short-run is defined as the period relatively shorter when at least some of the factors of production can be considered as fixed.

Example :- purchase of raw-materials, supplies etc.

## → Fixed Vs Variables cost:-

Fixed cost are those costs that are fixed in the short-run; whether production is taken up or not, we have to incur certain expenses.

Example :- Rent for Factory, office, building Insurance, telephone etc.

Variable cost are those cost that vary with volume of production.

Example :- wages paid to labour, cost of raw-materials.

→ Semi - Fixed OR Semi - Variable cost:-

If refers to such costs that are fixed to some extent beyond which they are variable.

Example:- Telephone or electricity charges this is fixed charge, the more you use the facility, the more you have to pay, is semi - fixed.

→ Marginal cost:-

Marginal cost refers to the additional cost incurred for producing an additional unit. It equals the change in the variable cost per unit.

Controllable Vs Non - Controllable costs:-

controllable implies that they are assignable to some executive for control responsibility.

Example:- R&D costs, advertising, salaries of top executives are controllable. Some costs are Non controllable at the shop level since they depend on the decision at higher level

Example:-

Q 8:- Explain how the short-run and long-run influence the costs  
(OR)

Explain how cost-output relationship helps the entrepreneurs in expansion decision

Ans:- The cost and output are related to each other. The cost of production depends upon several factors such as volume of production, relationship between cost and output, prices and productivity of inputs. The cost-output relationship significantly differs in the short run and in the long run.

Cost Output relationship facilitates many managerial decisions, such as:

- 1) Formulating a rational policy on plant size and the standard of operation.
- 2) Expense control.
- 3) profit prediction
- 4) pricing
- 5) promotion

Cost in the short run

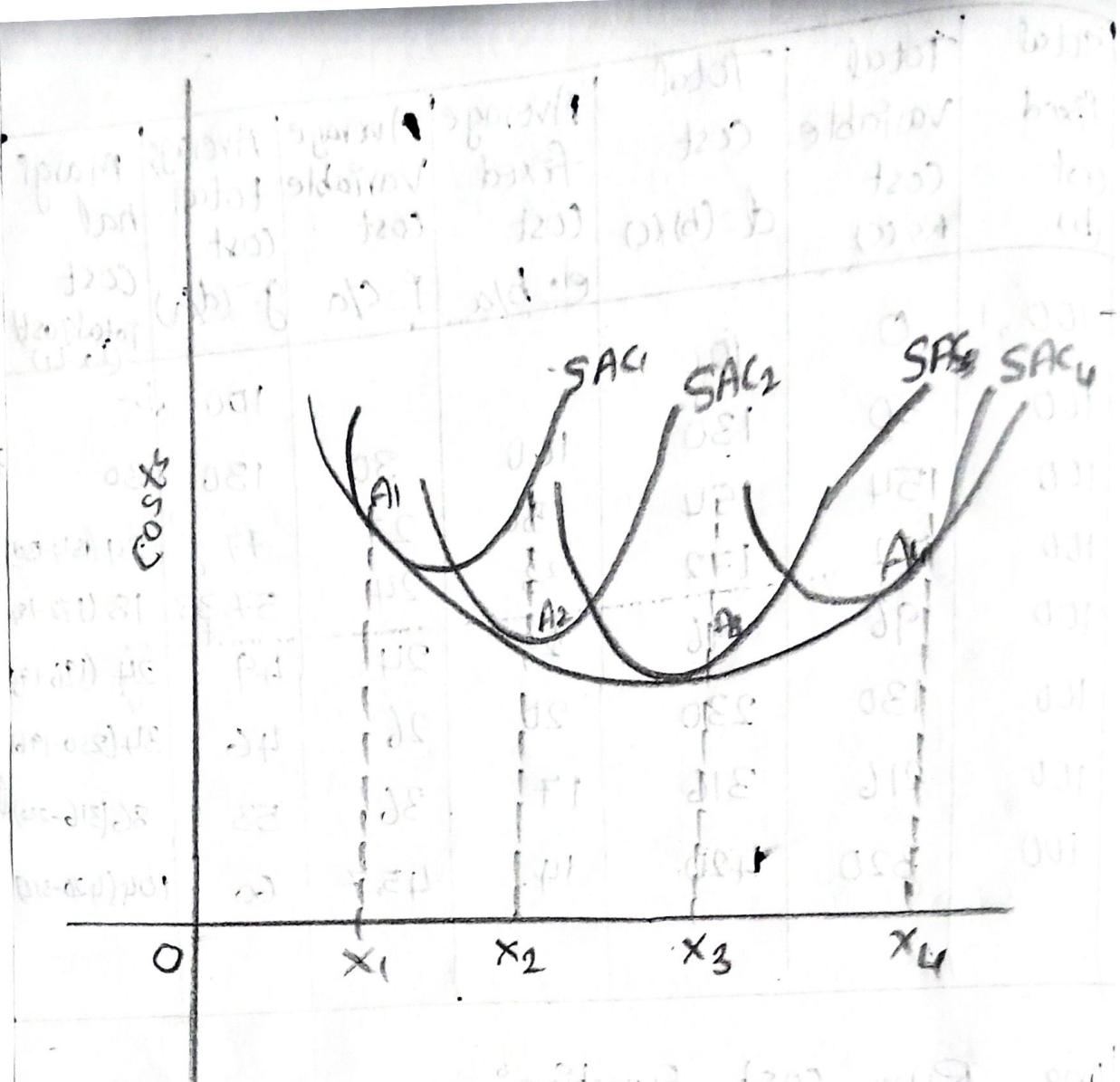
\* In the short run, costs are classified as fixed cost and variable costs. The fixed is classified as total fixed cost & average fixed cost per unit. The variable cost as average variable cost. Total marginal cost is also mentioned

Monthly output units (a)	Total fixed cost (b)	Total variable cost Rs (c)	Total cost $d = (b) + (c)$	Average fixed cost $e = b/a$	Average Variable cost $f = c/a$	Average total cost $g = (d/a)$	Marginal Cost Total cost $(d-a)$
0	100	0	100	-	-	100	-
1	100	30	130	100	30	130	30
2	100	54	154	50	27	77	24 (154-130)
3	100	72	172	33	24	57.33	18 (172-154)
4	100	96	196	25	24	49	24 (196-172)
5	100	130	230	20	26	46	34 (230-196)
6	100	216	316	17	36	53	86 (316-230)
7	100	320	420	14.	45.7	60	104 (420-316)

### Long Run cost functions-

Long run refers to the time period where all the factors are variable.

A long run average cost curve (LAC) is flat U shaped curve enveloping series of short run average cost curve (SAC). It is tangential to all the SACs. The LAC touches SACs only at certain points. The point where SAC & LAC intersect is the least cost is the considered as cost in the long run.

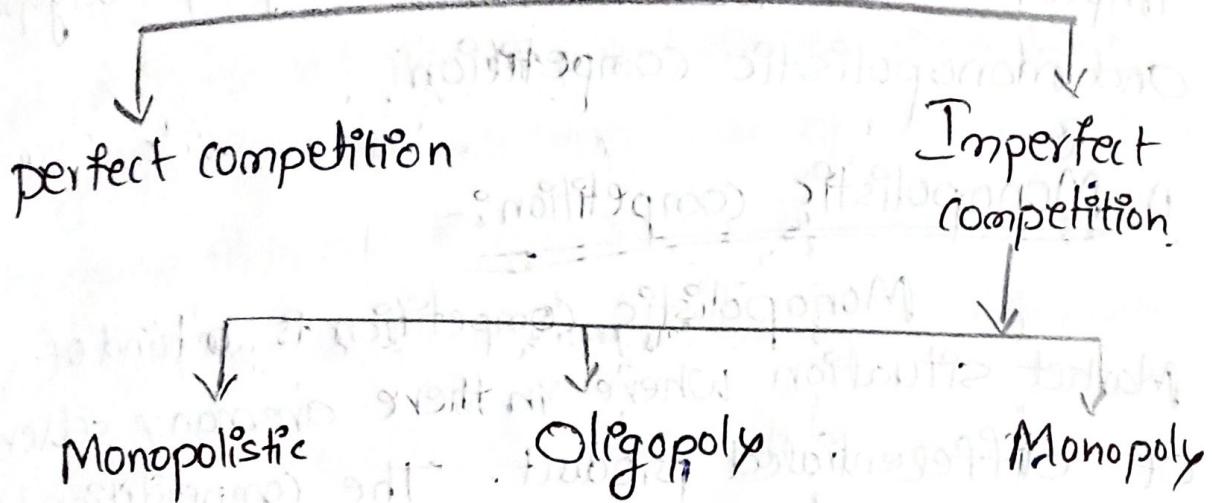


In the above figure it shows how  $AC$  curve envelopes several short-run average cost ( $SAC$ ) curves. Suppose the firm is producing an output of  $OX_1$  units on a plant of  $SAC_1$ .  
 →  $OX_2$  units either it can operate on  $SAC_1$ , or by acquiring a bigger size plant  $SAC_2$ . It is less costly to operate on  $SAC_2$  if wants to produce.

$OX_3$  units of Output - can operate at  $SAC_3$  with less cost.

$X_3 A_3$  is the least cost at the output  $OX_3$  it is clearly observed in the figure. If the firm want to produce short run, the cost will be prohibitively high than in Long run.

Q9. Market structures: perfect competition, monopoly, oligopoly, monopolistic competition.



### Perfect competition

A market structure in

which all firms in an industry are price takers and in which there is freedom of entry to and exit from the industry is called perfect competition.

→ Large no. of buyers and sellers

→ Large no. of competition

→ Homogeneous products or services

### Imperfect competition

→ Large less no. of buyers and sellers

→ Less no. of firms

→ Less no. of competition

Imperfect competition prevails in an industry whenever individual sellers can affect the price of their output. The major kinds of imperfect competition are monopoly, oligopoly, and monopolistic competition.

### I) Monopolistic competition:-

Monopolistic competition is a kind of market situation where there are many sellers of differentiated products. The competition under monopolistic market is not perfect but is keen and is among many firms marketing similar products that are close, but not perfect substitutes to each other. As the products are differentiated each firm can independently frame price, output policies. The firms operate relatively on a small scale.

#### Features:-

- Large Number of sellers.
- No entry or exit Barries.
- Differentiated product / product differentiation.
- Higher Elasticity of Demand.
- Profit maximization.
- Imperfect knowledge.
- Selling cost.

## Oligopoly :-

Oligopoly was defined as that form of market organisation where there are a few sellers of a homogenous and differentiated product two or more firms existing in an industry, each with a significant market share, can be called Oligopoly. In the real world Oligopoly industry exists in the developed and developing countries, prevail both in developed and developing countries. Example:- steel, oil, automobiles.

- Homogeneous Oligopoly
- Differentiated Oligopoly

## Features of oligopoly

- Only a few sellers
- Inter-Dependence
- Price Rigidity
- Price Leadership
- Advertising and selling costs
- Innovation
- Non-price competition
- E:

## Monopoly

- Extreme market situation where there is only one seller. He has no competition and controls supply and price.
- Only one seller and practically all buyers depend on him. Hence, he has absolute control over the market.
  - Supply from only one seller. Hence absolute control over the company.
  - Demand is in elastic. Demand curve slopes downward.
  - Homogeneous product.
  - No competition at all. No price or product competition.
  - Small output fixed by the sole seller.
  - Excess profit monopoly gain.
  - pure monopoly is rare but elements of monopoly are there in market.
  - Higher price higher than all competitive price  $P > MR = MC$ .

# Pricing : Types of pricing, product life cycle Based pricing

Q. 10:- Different pricing methods?

or  
Types of pricing?

Answer:- There are four methods of pricing and these four are sub-divided into many types they are

- 1) Cost-based
- 2) Competition.
- 3) Demand.
- 4) Strategy.

I) cost-based pricing Methods :-

(a) Cost-plus pricing:-

This is also called 'full cost' or mark-up pricing. Cost-plus pricing is one where the profit margin is added to the total or full cost to arrive at the selling price.

(b) Marginal cost pricing:-

Here selling price is fixed in such away that it covers fully the variable marginal cost and contributes towards the recovery of fixed cost fully or partly, depending

Upon the market situation.

### (c) Social Cost - Based pricing:

charging based on social cost.

System of charging extra for the users of a transport network during peak hours to reduce traffic congestion.

II

### Competition:

Here the price of a product is decided on the basis of what the competitor charges for a similar product.

#### (a) Going-Rate pricing:-

It refers to pricing the products and services as per the rates prevailing in the market. Normally market leaders keep announcing the prevailing price at given point of time based on supply and demand positions.

#### (b) Limit pricing:-

A limit price set by monopolist with a view to discourage others from entering into market and price is often lower than the average cost of production or just enough to making entering non-profitable.

### III) Demand Oriented pricing:

Here cost is not consideration, the higher the demand, the higher maybe the price. Demand for products and services call for higher investment and latest technology.

#### (a) Price Discrimination or Differential Pricing:-

Price discrimination refers to the practice of charging different prices to customers for the same good. Customers of different profiles can be separated in various ways, such as on the basis of consumer requirements.

#### (b) Perceived Value Pricing:-

Perceived value pricing refers to fixing the price on the basis of a buyer's perception of the value of the product.

#### (c) Priority Pricing:-

Priority pricing is more visible in securities trading. In securities trading the first bid or offer price is executed before the next bid or offer price.

#### IV) Strategy-Based pricing:-

##### (a) Market Skimming:-

When a new product introduced in the market, for the first time the company fixes a very high price. Initially everyone can not afford to buy it. When price comes down and more people can afford to buy. This method is followed when the demand for the product, there is no competition. High price results high profits.

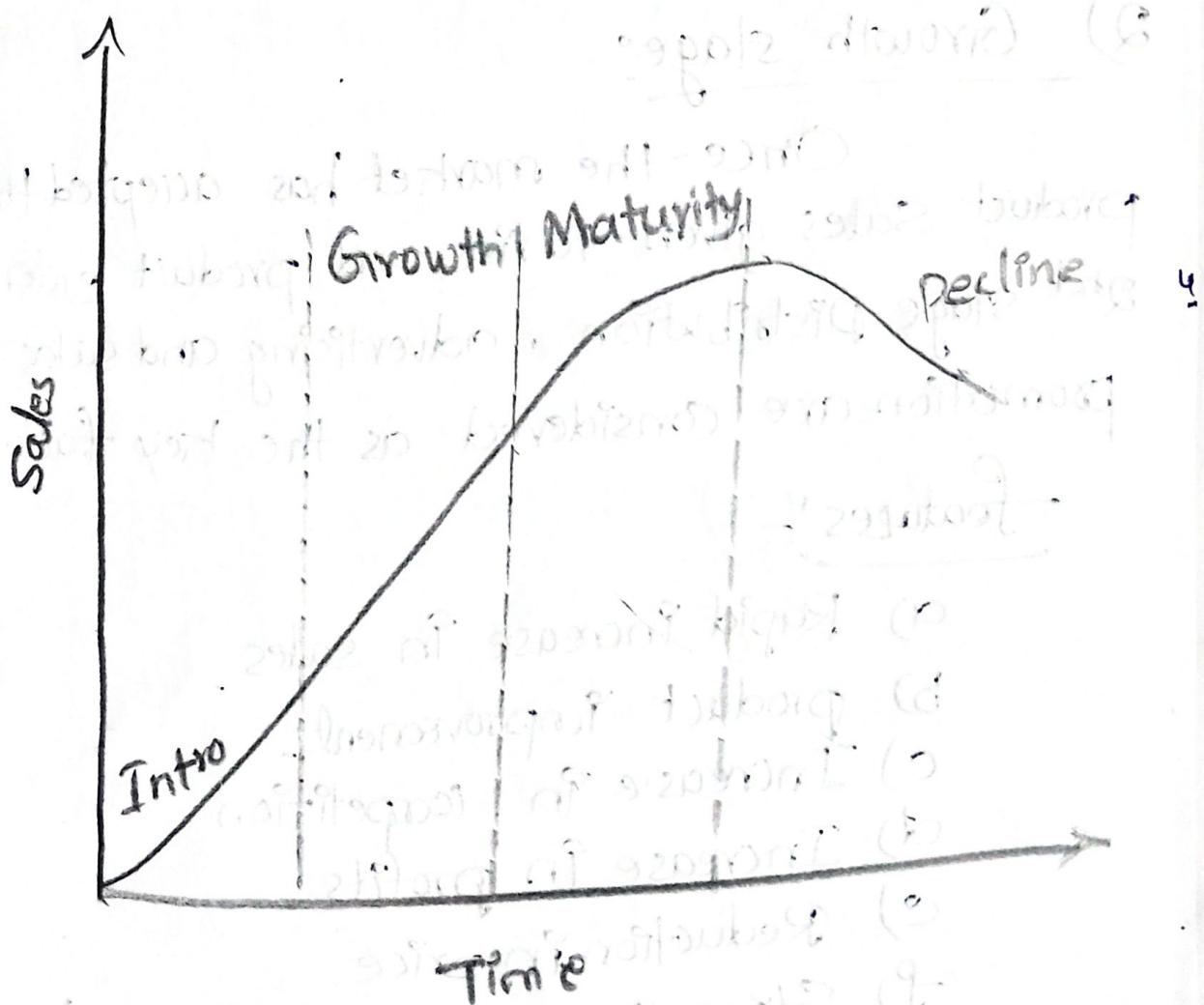
##### (b) Market penetration:-

It is quite opposite to market skimming, the price of the products is fixed so low that a company can increase its market share, perhaps to familiarize the product in the market and as it picks up, the price also goes up slowly.

Q11. Explain product life cycle based pricing  
(OR)

Explain PLC? What are the stages in product life cycle segmentation?

Ans:- The product life cycle concept is used by management and marketing professionals as a factor in deciding when it appropriate to increase advertising, reduce prices, expand to new markets or redesign packaging. PLC refers to the redesign packaging. PLC refers to the different stages a product goes through into four stages.



## 1) Introduction stage :-

The first stage in PLC, where the product is launched in the market with full scale production and marketing programme.

### Features:-

- a) Low and slow sales.
- b) High product price.
- c) Heavy promotional expenses.
- d) Lack of knowledge.
- e) Low profits.
- f) Narrow product lines.

## 2) Growth stage:-

Once the market has accepted the product sales given to rise and product enters 2<sup>nd</sup> stage Distribution, advertising and sales promotion are considered as the key factors.

### Features:-

- a) Rapid increase in sales.
- b) Product improvement.
- c) Increase in competition.
- d) Increase in profits.
- e) Reduction in price.
- f) Strengthening the distribution channel.

3) Maturity stage:- Market becomes saturated because the household demand is satisfied and distribution channels are full. The product has to face keen competition which brings pressure on price. Though the sales of the product rise but at lower rate.

Features:-

- a) Sales increases at decreasing rate.
- b) Normal promotional expenses.
- c) Uniform and lower prices.
- e) Dealer's support
- f) profit margin decreases.

4) Decline stage:-

This is the final stage. Actual sales begin to fall under the impact of new product competition and changing consumer behavior. The sales and profit fall down and promotional expenditure has to be down drastically.

## Break Even Analysis And Cost Volume Profit Analysis

Q. 12) Define Break even Analysis. How do you determine it, shown graphical presentation of BEFA.

[OR]

What is break even Analysis (BEP)? Illustrate graphically the concept of CVP (cost-volume profit) analysis?

[OR]

Explain BEP and what are the terms used in BEP.

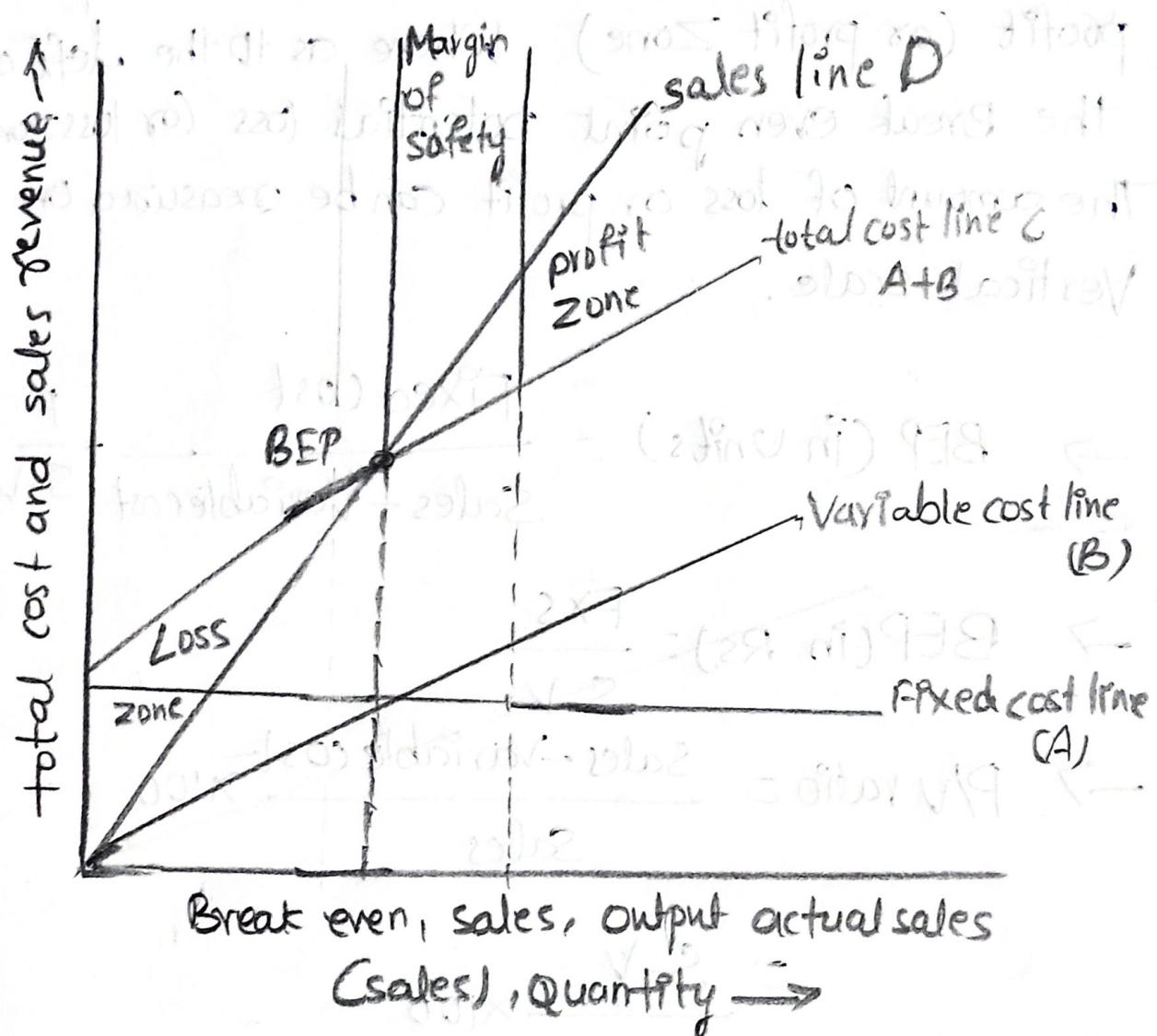
Ans:

The break even Analysis is a very important and useful tool of management. A business is said to break even when its income is equal to its expenditure.

The BEP helps in finding out the relationship of cost and revenues to output. This analysis is usually presented on a break even chart.

BEP is the level of output or sales at which no profit or loss is achieved.

It indicates the position at which marginal profit or contribution is just sufficient to cover fixed overheads. This analysis is also called cost - volume & ratio (CVP) analysis.



Line A represents the fixed cost (A)

Line (B) represents the Variable cost (B)

Line C represents the total cost or total expenses (A+B)

While Line D represents the Sales revenue and indicates income at various levels of output.

The point where lines C and D represent each other is Break even point (BEP)

The space between lines C (cost) and D (to the right of the BEP) represents potential profit (or profit zone). Whereas as to the left of the Break even point potential loss (or loss zone). The amount of loss or profit can be measured on vertical scale.

$$\rightarrow \text{BEP (in units)} = \frac{\text{Fixed cost}}{\text{Sales} - \text{Variable cost}} = \frac{F}{S-V}$$

$$\rightarrow \text{BEP (in Rs)} = \frac{F \times S}{S-V}$$

$$\rightarrow \text{P/V ratio} = \frac{\text{Sales} - \text{Variable cost}}{\text{Sales}} \times 100$$

$$= \frac{S-V}{S} \times 100$$

$$\rightarrow \text{Contribution} = \text{Sales} - \text{Variable cost}$$

$$\rightarrow \text{MOS (Margin of Safety)} = \text{Actual sales} - \text{Break even sales}$$

$$\text{ratio} = \frac{\text{MOS} \times 100}{\text{Sales}}$$

## Q12. Explain the difference between monopoly and monopolistic competition?

**Answer :**

<b>Features</b>	<b>Monopoly</b>	<b>Monopolistic competition</b>
<b>1. Description</b>	Extreme market situation where here is only one seller. He has no competition and so controls supply and price	A mixture of monopoly and competition.
<b>2. Buyers and Sellers</b>	Only one seller and practically all buyers depend on him. Hence, he has absolute control over the market.	Slightly large number of sellers i.e., competing monopolists.
<b>3. Supply</b>	Supply from only one seller Hence, absolute control over the supply	Supply from large number of sellers but subject to control and competition
<b>4. Demand</b>	Demand is in elastic Demand curve slopes downward.	Demand may be elastic or in elastic according to the nature of competition
<b>5. Product</b>	Homogeneous product.	Differentiated products purposely differentiated
<b>6. Nature of Competition</b>	No competition at all No price or product competition	Fairly good competition Competition between competing monopolists is product differentiation and selling costs
<b>7. Price</b>	Higher price higher than all competitive price $P > MR = MC$	Highest price as cost of product differentiation and selling cost is added to the price.
<b>8. Output</b>	Small output fixed by the sole seller.	Output varies with product differentiation and selling costs
<b>9. Profit</b>	Excess profit monopoly gain	Extra profit realised by products differentiation and selling costs mostly monopoly profit.
<b>10. Application</b>	Pure Monopoly is rare but elements of monopoly are there in markets.	More realistic in life

Q. The following information, the books of a manufacturing company sales price = 10rs, variable cost = 4rs, fixed overhead = 48,000, computing PIV ratio, break even point in units and rupees.

$$\text{SOP: } S = \text{RS. 10}$$

$$V = \text{RS. 4}$$

$$\text{fixed cost} = 48,000$$

$$(a) \text{ PIV ratio} = \frac{S-V}{S} \times 100 \\ = \frac{10-4}{10} \times 100 \\ = 60\%.$$

$$(b) \text{ BEP (units)} = \frac{F}{S-V} = \frac{48000}{10-4} = 8000 \text{ units}$$

$$(c) \text{ BEP (rupees)} = \frac{F \times S}{S-V} = \frac{48000 \times 10}{10-4} = 80000$$

Q. The following information is the books of manufacturing company selling price = 50 & variable cost = £35, fixed cost = 75000 calculate PIV ratio, Break even point in units and rupees.

$$\text{SOP: } S = 50$$

$$V = 35$$

$$f.c = 75000$$

$$a) P/V \text{ ratio} = \frac{s-v}{s} \times 100$$

$$= \frac{50 - 35}{50} \times 100$$

$$= 30\%$$

$$b) \text{ Break even point (units)} = \frac{F}{s-v}$$

$$= \frac{75000}{50 - 35} = 5000$$

$$c) \text{ Break even point (rupees)} = \frac{F \times s}{s-v}$$

$$= \frac{75000 \times 50}{50 - 35}$$

$$= 2,50,000$$

③ Q. The following information the  
colce manufacturing company sales  
polce = 25 paisa variable cost = 15  
paisa fixed overheads 3500  
calculate P/V ratio & BEP in units & rupees

Sol  $s = 0.25 \text{ ₹}$

$$v = 0.15 \text{ ₹}$$

$$\text{fixed cost} = 3500$$

$$(a) P/V ratio = \frac{s-v}{s} \times 100 = \frac{0.25 - 0.15}{0.25} \times 100$$

$$= 40\%$$

$$(b) \text{ BEP (units)} = \frac{F}{s-v} = \frac{3500}{0.25 - 0.15}$$

$$= 35000$$

$$(c) \text{ BEP (Rupees)} = \frac{f \times s}{s - v}$$

$$= \frac{3500 \times 0.25}{0.25 - 0.15}$$

$$= 8750$$

④ Q. The following data is providing by Z - limited sales = 5,00,000, variable cost = 3,75,000, fixed cost = 37500, calculate BEP units and rupees, plr, margin of safety.

Sol:  $s = 5,00,000, v.c = 3,75,000,$   
 $f = 37500$

$$(a) \text{ BEP (Units)} = \frac{f}{s-v} = \frac{37500}{500000 - 375000}$$

$$= 0.311$$

$$(b) \text{ BEP (rupees)} = \frac{f \times s}{s-v} = \frac{37500 \times 500000}{500000 - 375000}$$

$$= 150000,$$

$$(c) \text{ PLR ratio} = \frac{s-v}{s} \times 100 = \frac{500000 - 375000}{500000} \times 100$$

$$= 25\%.$$

$$(d) \text{ BEP} = \frac{f.c}{\text{PLR ratio}} \times 100$$

$$= \frac{37500}{25\%} \times 100 = 150000$$

$$(e) \text{ Margin of safety (MOS)} = \text{actual sale} - \text{BEP}$$

$$= ₹ 500000 - ₹ 150000$$

$$= ₹ 350000$$

⑤ Q. The following data is provided by Y-limited sale = ₹ 1,00,000, variable cost = ₹ 37500, fixed cost = ₹ 37500, calculate ① BEP ② P/V ratio ③ margin of safety ④ profit well margin of safety is ₹ 400000 ⑤ sales to earn a profit of ₹ 100000.

$$\Rightarrow S = ₹ 500000$$

$$V = ₹ 375000$$

$$F = ₹ 37500$$

$$\text{BEP} = \frac{FC}{P/V \text{ ratio}} \times 100$$

$$\textcircled{2} \text{ P/V ratio} = \frac{S-V}{S} \times 100 = \frac{500000 - 375000}{500000} \times 100$$

$$= 25\%$$

$$\textcircled{1} \text{ BEP} = \frac{37500}{25\%} \times 100 = ₹ 150000,$$

$$\textcircled{3} \text{ MOS} = \text{actual sale} - \text{BEP at even point}$$

$$\Rightarrow ₹ 500000 - ₹ 150000$$

$$= ₹ 350000$$

at even point

④ Profit = plv ratio x mos  
=  $25 \times 400000$   
= 10000000

③ sales to earn a profit of 1,00000

Sof: 
$$\frac{FC + \text{desired profit}}{\text{plv ratio}} = \frac{37500 + 100000}{25\%} = 550000$$

$$\text{mos ratio} = \frac{\text{mos} \times 100}{\text{sales}} = \frac{350000 \times 100}{500000} = 70$$

- ⑥ Q. The following data is provided by  
a limited sales = 600000, VC = 450000,  
FC = 55000, calculate ① BEP ②, plv ratio  
③ mos ratio ④ profit when mos is  $\pm 300$   
⑤ sales to earn profit of 200000

Sof:  $s = 600000, v = 450000, fc = 55000$

$$\text{BEP} = \frac{FC}{\text{plv ratio}} \times 100$$

① plv ratio =  $\frac{s-v \times 100}{s} = \frac{600000 - 450000}{600000} \times 100$

$$\text{plv} = 25\%$$

② BEP =  $\frac{55000}{25} \times 100 = 220000$

$$\Rightarrow \text{BEP (units)} = \frac{F}{S-V} = \frac{55000}{60000 - 45000} = 0.36$$

$$\Rightarrow \text{BEP (rupees)} = \frac{F \times S}{S-V} = 220000$$

(3)  $MOS = \text{actual sale} - BEP$

$$= 600000 - 220000 \\ = 380000$$

$$MOS \text{ ratio} = \frac{MOS \times 100}{\text{sales}}$$

$$= 63.3\%$$

$$(4) \text{ profit} = PLV \times MOS \\ = 25\% \times 300000 \\ = 75000$$

$$\left. \begin{array}{l} \text{(a) profit when MOS is} \\ \text{FC + desired profit} \\ \text{PLV} \\ \text{PLV} = \frac{55000 + 75000}{25\%} \\ = 520000 \end{array} \right\}$$

(5) sales to earn profit of  $\approx 200000$

$$\frac{\text{FC} + \text{desired profit}}{PLV}$$

$$= \frac{55000 + 200000}{25\%} = 1020000$$

(6) Q. problem on BEP sales = 1000000,

$VC = 800000$ ,  $FC = 100000$  calculate BEP,

PLV ratio, MOS ratio, profit when

MOS 50000  $\neq$  1, sales to earn profit of

$$\textcircled{1} \text{ P/V ratio} = \frac{S-V}{S} \times 100 \\ = \frac{1000000 - 800000}{1000000} \times 100 = 20\%$$

$$\textcircled{2} \text{ BEP (units)} = \frac{F}{S-V} = \frac{100000}{1000000 - 800000} = 0.5$$

$$\textcircled{3} \text{ BEP (rupees)} = \frac{F \times S}{S-V} = \frac{100000 \times 1000000}{1000000 - 800000} = 500000$$

$$\textcircled{4} \text{ BEP} = \frac{FC}{P/V} \times 100 = \frac{100000}{20} \times 100 = 500000$$

$$\text{mos} = \text{actual sale} - \text{BEP}$$

$$= 1000000 - 500000 = 500000$$

$$\textcircled{5} \text{ mos ratio} = \frac{\text{mos} \times 100}{\text{sales}} = \frac{500000 \times 100}{1000000} \times 1 \\ = 50\%$$

$$\textcircled{6} \text{ profit} = P/V \times \text{mos} \\ = 20\% \times 500000 \\ = 100000$$

$$\Rightarrow \frac{FC + \text{desired profit}}{P/V \text{ ratio}} \\ \Rightarrow \frac{100000 + 100000}{20\%} = 1000000$$

$$\textcircled{7} \text{ sales to earn profit of } \$5000$$

$$\Rightarrow \frac{FC + \text{desired profit}}{P/V \text{ ratio}} = \frac{1000000 + 85000}{20\%} = 925000$$

problems on BEP :-

① The following data provided by private limited sales = 10,00,000, V.C = 3,75,000 S.F.C = 85,000 calculate 1) BEP, 2) P/V ratio 3) MOS ratio 4) profit when mos 2,00,000 5) sales to earn profit 3,00,000

SOL :- Given  $s = 10,00,000$

$$V.C = 375000$$

$$F.C = 85000$$

$$\begin{aligned} \textcircled{1} \quad P/V \text{ ratio} &= \frac{s-v}{s} \times 100 \\ &= \frac{1000000 - 375000}{1000000} \times 100 \\ &= 62.5\% \end{aligned}$$

$$\textcircled{2} \quad BEP (\text{units}) = \frac{F}{s-v} = \frac{85000}{1000000 - 375000} = 0.136$$

$$\textcircled{3} \quad BEP (\text{rupees}) = \frac{F \times s}{s-v} = \frac{85000 \times 1000000}{1000000 - 375000} = 88333$$

$$\begin{aligned} \textcircled{4} \quad BEP &= \frac{F.C}{P/V \text{ ratio}} \times 100 \\ &= \frac{85000}{62.5\%} \times 100 \\ &= 136000, \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad MOS &= \text{actual sale} - BEP \\ &= 1000000 - 136000 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \text{ mos ratio} &= \frac{\text{mos} \times 100}{\text{sales}} \\
 &= \frac{864000 \times 100}{1000000} \\
 &= 86.4\%
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{7} \text{ profit} &= P/V \times \text{mos} \\
 &= 62.5\% \times 200000 \\
 &= 125000
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{8} \text{ profit when mos is } &\text{ $800000} \\
 &\frac{\text{FC} + \text{desired profit}}{P/V \%} \\
 &= \frac{85000 + 125000}{62.5\%}
 \end{aligned}$$

$$= 336000$$

$$\textcircled{9} \text{ sales to earn profit when } 3,001,000$$

$$\frac{\text{FC} + \text{desired profit}}{P/V \%}$$

$$\begin{aligned}
 &= \frac{85000 + 300000}{62.5\%} \\
 &= 616000
 \end{aligned}$$

$$= 616000$$