



**SYLLABUS**

**Class – B.B.A. I Sem.**

**Subject – Micro Economics**

UNIT – II	Demand Analysis and Supply Analysis: Meaning of Demand, Types of Demand, Law of demand, Determinants of Demand, Demand Function, Elasticity of demand- price elasticity of demand. Income elasticity of demand, Cross Elasticity of demand, Law of Supply, Supply Schedule, Supply Curve, Price elasticity of supply,
UNIT – III	Production Analysis: Production function, Types of Production Function, Law of Returns, Law of variable proportions, Law of Increasing Returns, Law of Constant Returns, Law of Diminishing returns, Returns to scale,
UNIT – IV	Cost and Revenue Analysis: Cost concepts, Elements of Cost, Relationship between Production and Cost, Average and Marginal cost curves, Relationship between average and marginal cost, Concept of revenue, Revenue Curve, Relationship between average and marginal revenue,



## UNIT 2

### MEANING OF DEMAND

Demand for a commodity is the amount of it that a consumer will purchase will be ready to take off from the market at various given prices in a period of time such as a day, week, month or a year. It constitute three things as (i) desire for a commodity (ii) ability to pay (availability of resources) (iii) willingness to spend the resources.

“The demand for anything at a given price is the amount of it which will be bought per unit of time at that price.” According to Hansen, “By demand, we mean the quantity of a commodity that will be purchased at a particular price and not merely the desire of a thing.” Thus demand in economics implies both the desire to purchase and the ability to pay for a good.

The demand for a commodity and quantity demanded are two different concepts. Demand refers to quantities of a commodity which consumers plan to buy at **various prices** of a good during a period of time whereas quantity demanded is the amount of good or service which consumers plan to buy at a **particular price**.

### CLASSIFICATION OF DEMAND

The main classification types of demand are as under:

- 1. Price Demand:** Price demand refers to the various quantities of commodity which the consumer will buy per unit of time at a certain prices (other things remaining the same). The quantity demanded changes with the change in price. The quantity demanded increases with a fall in price and the quantity demanded falls with an increase in price. In other words, we can say that quantity demanded and price have a negative correlation as

$$D_A = f(P_A)$$

Where  $D_A$  = Demand for commodity A

$f$  = Function

$P_A$  = Price of the commodity A.

$P \uparrow$   $D \downarrow$

$P \downarrow$   $D \uparrow$

- 2. Income Demand:** Being **ceterus-paribus**, the income demand indicates the relationship between income and demand of the consumer. The income demand shows how much quantity a consumer will buy at different levels of his income. Generally, there is positive relationship between income and demand of the consumer i.e.

$$D_A = f(Y_A)$$

Where  $D_A$  = Demand for commodity A

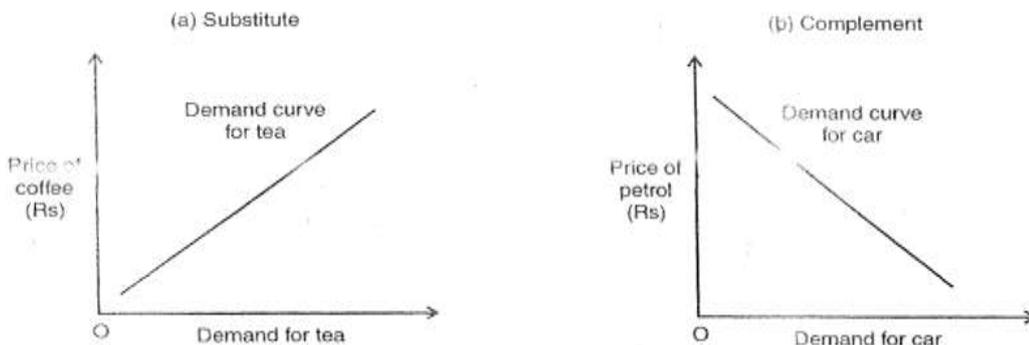
$Y_A$  = Income of the consumer A.

$Y \uparrow$   $D \uparrow$

$Y \downarrow$   $D \downarrow$

The above function shows as the income of the consumer increases demand also increases and when income falls demand also decreases.

- 3. Cross Demand:** Cross demand refers to the relationship between quantity demanded of good 'A' and price to related good 'B' other things being equal. In simple words, from cross demand we mean the change in the quantity demanded of a commodity without any change in its price but due to the change in the price of related goods i.e. B commodity. The related goods can either be substitute goods or complementary goods. The demand curve in the case of substitute will be of upward sloping while the demand curve in complementary goods will be of downward slop.



**DEMAND SCHEDULE**

It summarizes the information on prices and quantity demanded in a tabular form. It is of two types.

1. Individual Demand Schedule
2. Market Demand Schedule

1. **Individual Demand Schedule:** Considering other things being equal individual demand schedule refers to the quantities of the commodities demanded by the consumer at various prices. It can be explained with the help of table:

**Individual Demand Schedule**

Price per unit of the bale	Quantity Demanded
5	1
4	2
3	3
2	4
1	5

From the above table it is seen that as the price per unit say cotton goes on increasing, the quantity demanded goes on falling. As is clear, when price of cotton is Rs. 5, quantity demanded is 1 units. Now, the price of cotton falls to Rs. 3, the quantity demanded increases to 3 units. Moreover, as the price falls to Rs. 1 quantity demanded shoots upto 5 units.

**Market Demand Schedule**

The market demand is the summation of collective demand of all persons of a homogeneous commodity. Basically, the market demand schedule-depicts the functional relationship between prices and quantity demanded. If we are interested to know the demand schedule for a year, we will add the demand for all the months of that particular year. In this way, we may conclude that market demand schedule is a lateral summation of the quantities purchased by all individuals at different prices in a particular period of time. Therefore, "Market demand schedule is defined as the quantities of a given commodity which all consumers will buy at all possible prices at a given moment of time." The market demand schedule is shown in the following table.

**Market Demand Schedule**

Price Per Unit	Quantity Demanded by A	Quantity Demanded by B	Total Market Demand (A + B)
5	10	15	25
4	15	20	35
3	20	25	45
2	25	30	55
1	30	35	65



In table 2, market schedule is obtained by adding the demand of A and B at different prices. For instance, at a price of Rs. 5 the market demand is 25 i.e. 10 of A consumer and 15 for B consumer. AS the price falls to Rs. 1 the market demand increases to 65 i.e. 30 and 35 for A and B consumers respectively. In other words, we can say that like individual demand, market demand also depicts the negative correlation between price and quantity demanded.

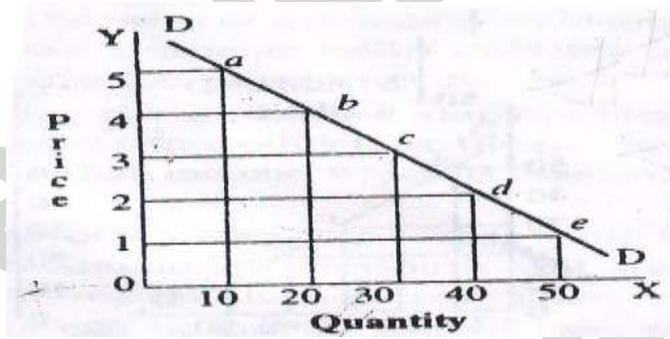
**Demand Curve**

It summarizes the information of prices and quantity demanded in graphical form. It is of two types:

- 1) Individual Demand Curve
- 2) Market Demand Curve

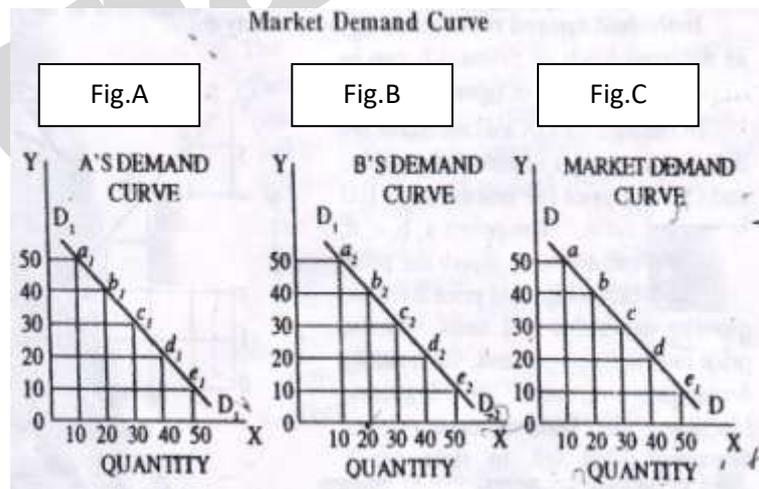
**Individual Demand Curve**

Individual demand curve refers to the quantity demanded by the consumer at different levels of prices. It can be shown with the help of figure



In the figure given above OX axis measures the different quantities of cotton demanded on OY-axis price per unit cotton. DD is demand curve. The points a, b, c, d, e on the demand curve shows the price quantity relationship. At price Rs. 5 the quantity demanded is 1 units. As the price falls to Rs. 1 per unit, the quantity demanded increases to 5 units. Moreover, the demand curve slopes downward from left to right which indicates that there is inverse relation between price and quantity demanded.

**Market Demand Curve**



The market demand curve is the horizontal summation of all individuals demand for the commodity. The above figures A and B shows the individual demand curves. D<sub>1</sub> D<sub>1</sub> and D<sub>2</sub> D<sub>2</sub>are the demand curves for consumers A and B and the market demand curve is DD. It is also assumed that there are two consumers in the market facing same price of the the commodity but they purchase according to their individual requirements.



### A + B = Market Demand

At price Rs. 5 the market demand is

$$a_1 + a_2 = a$$

At price Rs. 4 the market demand is

$$b_1 + b_2 = b$$

In the same fashion, at prices 3, 2, 1, the market demand is

$$c_1 + c_2 = c$$

$$d_1 + d_2 = d$$

$$e_1 + e_2 = e$$

Now, if we combine these points we will get the market demand curve as DD.

### Why Demand Curve Slopes Downward to the Right

The Diagram for Demand Curve shows that demand curve slopes downward to the right. Why does it happen? The reasons behind the law of demand are following:

**(i) Income effect.** When price of a commodity falls, real income of its consumers increases in terms of this commodity. In other words, their purchasing power increases since they are required to pay less for the same quantity. According to another economic law, increase in real income (or purchasing power) increases demand for goods and services in general and for the goods with reduced price in particular. The increase in demand on account of increase in real income is called income effect.

**(ii) Substitution effect.** When price of a commodity falls, it becomes cheaper compared to its substitutes, their prices remaining constant. In other words, when price of a commodity falls, price of its substitutes remaining the same, its substitute becomes relatively costlier. Consequently, rational consumers tend to substitute cheaper goods for costlier ones within the range of normal goods- goods whose demand increases with increase in consumer's income-other things remaining the same. Therefore, demand for the relatively cheaper commodity increases. The increase in demand on account of this factor is known as substitution effect.

**(iii) Diminishing marginal utility.** Marginal utility is the utility derived from the marginal unit of a commodity when its price falls. When a person buys a commodity, he exchanges his money income with the commodity in order to maximize his satisfaction. He continues to buy goods and services so long as marginal utility of his money ( $Mu_m$ ) is less than the marginal utility of the commodity ( $Mu_c$ ). commodity  $Mu_m$  with  $Mu_c$ , with a view to maximizing his satisfaction. Consequently, demand for a commodity increases when its price falls.

### DETERMINANTS OF DEMAND

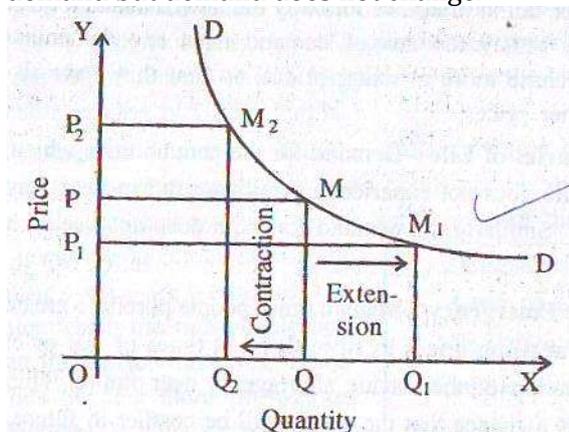
- 1) Price of the commodity
- 2) Price of substitutes and complementary goods.
- 3) Consumers' income.
- 4) Consumer's taste and preference.
- 5) Consumers' expectations of future prices
- 6) Demonstration effect/Advertisement
- 7) Consumer-credit facility
- 8) Population of the country
- 9) Distribution of national income
- 10) Season & weather

### Changes in Demand

**1) Movement along Demand Curve:** When other things remaining the same, the quantity demanded of a commodity varies with variation in price only, these variations are known as Movement along Demand Curve. When the quantity demanded rises due to fall in the price of a commodity it is called **extension of demand**. On the contrary when the quantity demanded falls due to rise in price it is



known as **contraction of demand**. The quantity demanded varies with the change in price in case of extension and contraction of demand but demand does not change.



1) **Shift in Demand Curve:** When the demand for a commodity changes with changes in other elements and price remaining constant, it is known as shift in demand. When the demand for a commodity rises while price remaining constant or the quantity demanded remains unchanged even when the prices rises, it is called an **increase in demand**. Demand curve varies with an increase in demand and it shifts rightward from the initial demand curve. When the demand for a commodity falls while price remaining constant or the quantity demanded remains unchanged even when the prices falls, it is called an **decrease in demand**. Demand curve varies with a decrease in demand and it shifts leftward from the initial demand curve.

2)

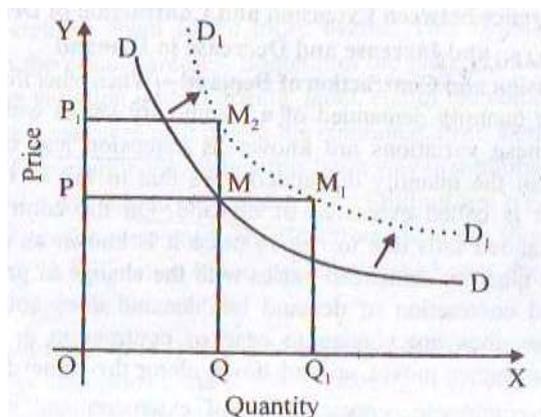


Fig. 5.5  
Increase in demand

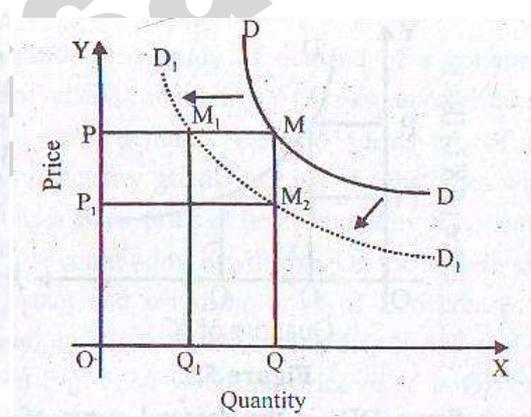


Fig. 5.6  
Decrease in demand

### Law of Demand

The law of demand states that there is inverse relation between the price and demand for a commodity. According to law of demand, **other things being equal**, if price of a commodity falls, the quantity demanded of it will rise and if price of a commodity rises, the quantity demanded of it will fall. Although, this relationship is not proportionate i.e. it does not mean when price falls by one-half the demand for good will be doubled. It simply shows the direction of change in demand as a result of change in price. We can say that quantity demanded and price have a inverse relationship.

### Assumptions in the law of demand

According to Stigler and Boulding, the law of demand is based on the following assumptions:

1. There should be no change in the income of the consumers.



2. There should be no change in the tastes and preferences of the consumers, because the law of the demand applies only when the tastes and preferences of the consumers remain constant.
3. Price of the related commodities should remain unchanged.
4. The commodity in questions should be a normal one.
5. There should be no change in the size of population.
6. There distribution of income and wealth should be equal.
7. There should be continuous demand except in case of indivisible commodities.
8. There should be perfect competition in the market.

### Importance of the Law

The law of demand has been of great theoretical and practical importance in economics as:

1. Price Determination.
2. Importance for the consumer
3. Importance to Finance Minister
4. Important for Planning.
5. Important for Producers
6. Importance for Farmers

### EXCEPTIONS TO THE LAW OF DEMAND

The law of demand is one of the fundamental laws of economics. The law of demand, however, does not apply to the following cases:

- (i) Expectations regarding future prices.
- (ii) Prestigious goods.
- (iii) Giffen goods.

### ELASTICITY OF DEMAND

Elasticity of demand is defined as the degree of responsiveness of the quantity demanded of a good to a change in its price, consumers income and prices of related goods. There are three concepts of demand elasticity – price elasticity, income elasticity and cross elasticity.

$$E = \frac{\% \text{ change in Quantity demanded}}{\% \text{ change in variable}}$$

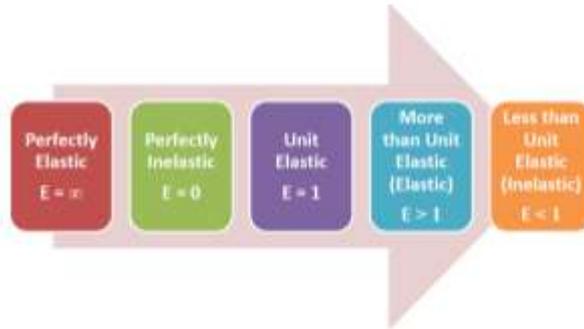
#### Price elasticity of demand

(PED or  $E_d$ ) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a one percent change in price (holding constant all the other determinants of demand, such as income).

$$\text{Price elasticity of Demand} = \frac{\text{Proportionate change in purchases of commodity X}}{\text{Proportionate change in price of commodity X}}$$

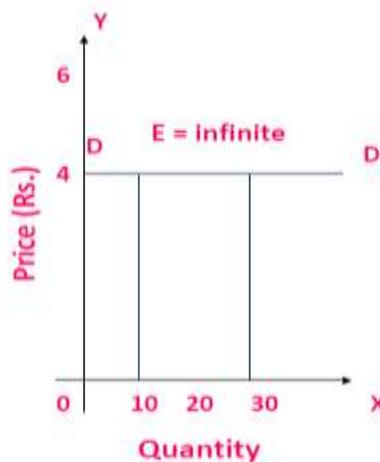


### Degrees of Price Elasticity of Demand

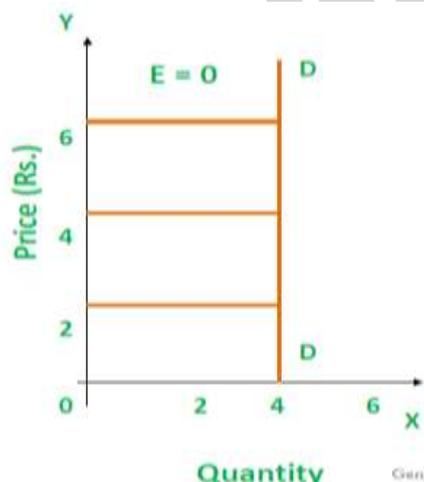


#### Types/Degrees of Price Elasticity of Demand

A) Perfectly Elastic Demand: A perfectly elastic demand refers to the situation when demand is infinite at the prevailing price. It is a situation where the slightest rise in price causes the quantity demanded of the commodity falls to zero.

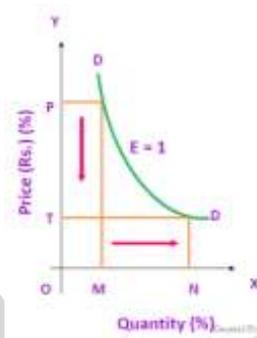


B) Perfectly Inelastic Demand: A perfectly inelastic demand refers to a situation when change in price causes no change in the quantity demanded. Even a substantial change in price does not impact quantity demanded.

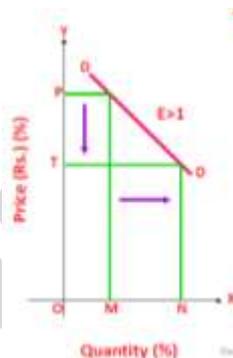




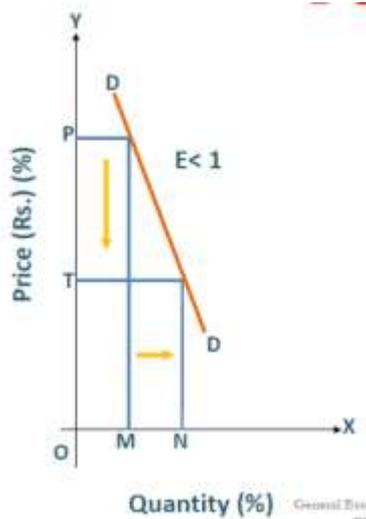
- C) Unitary Elastic Demand: It is a situation when change in quantity demanded in response to change in own price of the commodity is such that total expenditure of the quantity remains constant. In short % change in quantity demanded is equal to % change in price. This type of demand curve is called Rectangular Hyperbola



- D) Greater than unitary Elastic Demand: Demand is greater than unitary elastic when change in quantity demanded in response to change in price of the commodity is such that total expenditure of the commodity increases when the price decreases, and total expenditure decreases when price increases. In short % change in quantity demanded is greater than % change in price.



- E) Less than Unitary Elastic Demand: Demand is less than unitary elastic when change in quantity demanded in response to change in price of the commodity is such that total expenditure on the commodity decreases when price falls, and total expenditure increases when price rises. In short % change in quantity demanded is less than % change in price.



**Methods to measure Price Elasticity of demand**

There are three methods of measuring price elasticity of demand:

- (1) Total Expenditure Method.
- (2) Geometrical Method or Point Elasticity Method.
- (3) Arc Method.

**Total Expenditure (Outlay) Method:**

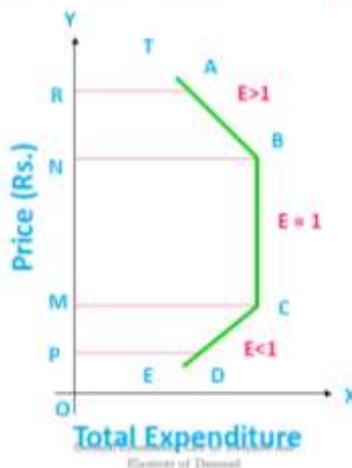
This method is evolved by Dr. Alfred Marshall. According to this method, to measure the elasticity of demand it is essential to know how much & in what direction the total expenditure has changed as a result of change in the price of good.

**Total Expenditure (Outlay) Method**

Elasticity of Demand	Price	Total Expenditure
Greater than Unity i.e. $E_p > 1$	↑ ↓	↓ ↑
Unity i.e. $E_p = 1$	Same Same	Unchanged Unchanged
Less than Unity i.e. $E_p < 1$	↑ ↓	↑ ↓

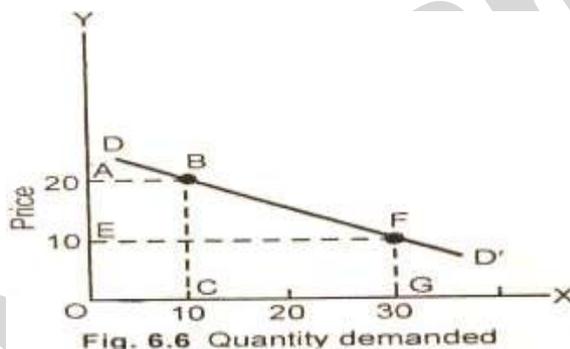


### Total Expenditure (Outlay) Method



For Example:

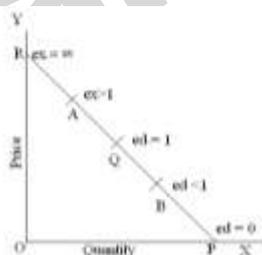
Price Per Unit (\$)	Quantity Demanded	Total Expenditure (\$)
20	10 Pens	200.0
10	30 Pens	300.0



#### Point Method or Geometrical Method:

This method was also suggested by Alfred Marshall. It explains the elasticity of demand at a particular point of the demand curve if the demand function is linear one (or when demands curve is straight line sloping down from left to right). The point method is not applicable on curvilinear demand curves. This method is based on the proposition that each point of the straight line demand curve has different elasticity of demand. Different elasticity of demand. We have already shown (under the heading slope and elasticity) that every point on demand curve does not have the same elasticity. This has been explained by point method, also known as Geometrical Method. The basic formula for this method is :

$$E_p = \text{Length of Lower segment} / \text{Length of Upper segment}$$





Now we can calculate elasticity of demand at different points R,A,Q, B and P, As per the ratio of the lower part to upper part.

$$e_p \text{ at } Q = \frac{QP}{RQ} = 1$$

$$e_p \text{ at } A = \frac{AP}{AR} < 1$$

$$e_p \text{ at } B = \frac{BP}{RB} > 1$$

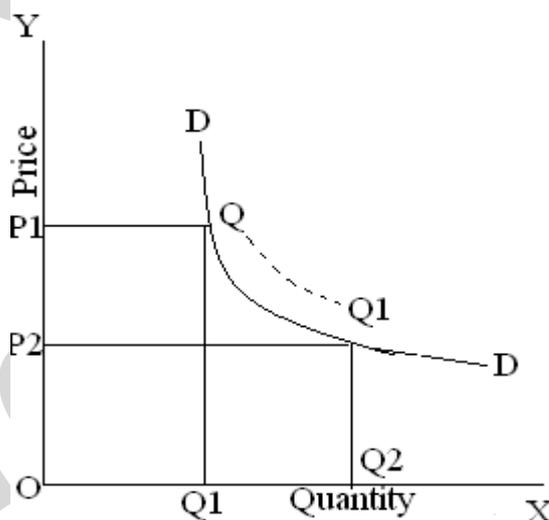
$$e_p \text{ at } R = \frac{RP}{0} = \infty$$

$$e_p \text{ at } P = \frac{0}{RP} = 0$$

Therefore, we can say that at the mid-point on a straight line demand curve, elasticity will be unitary, at higher points (such as A and R) elasticity will be greater than one; at lower points (B and P) the elasticity will be less than one. At points R and P the elasticities will be infinite and zero respectively. Point method is very useful in economics. It helps us measuring elasticity with very small changes in price and quantity demanded. It also tells us that slope and elasticity are two different things.

**Arc Method:**

As we have seen that point elasticity method can be used to determine the elasticity of demand at different points when infinitesimal changes in price are taking place. If the price change is somewhat large or we have to measure elasticity between two different points rather than at a specific point we use Arc Method. When we have to measure the price elasticity over an arc of the demand curve, such as between points Q and Q1 on the demand curve in figure the point elasticity method cannot yield true picture. In measuring arc elasticity we use the average of the two prices and average of two quantities at these prices in the following manner.





Suppose commodity X's position is like this- At price of Rs. 10 (P1) its, quantity demanded is 100 (Q1) and at price of Rs. 5 (P2) its quantity demanded is 300 (Q2). The elasticity of demand as per Arc Method will be

$$\begin{aligned} ed &= \frac{\Delta q}{\Delta p} \times \frac{p_1+p_2}{q_1+q_2} \\ &= \frac{200}{5} \times \frac{10+5}{400} \\ &= \frac{200}{5} \times \frac{15}{400} = 1.5 \end{aligned}$$

### Income elasticity of demand

Income elasticity of demand measures the percentage change in demand caused by a percent change in income. A change in income causes the demand curve to shift reflecting the change in demand. IED is a measurement of how far the curve shifts horizontally along the X-axis. Income elasticity can be used to classify goods as normal or inferior. With a normal good demand varies in the same direction as income. With an inferior good demand and income move in opposite directions

**Income Elasticity = Proportionate change in the quantity purchased / Proportionate change in Income**

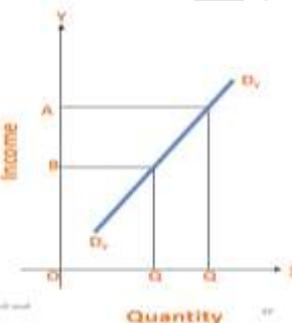
$$E_y = \frac{\% \text{ Change in Quantity Demanded}}{\% \text{ Change in Income}}$$

### Degree of Income Elasticity of Demand

1. Positive Income Elasticity of Demand
  - a. Unitary income elasticity of demand
  - b. Less than unitary income elasticity of demand
  - c. More than unitary income elasticity of demand
2. Negative income elasticity of demand
3. Zero income elasticity of demand

### Positive income Elasticity of Demand

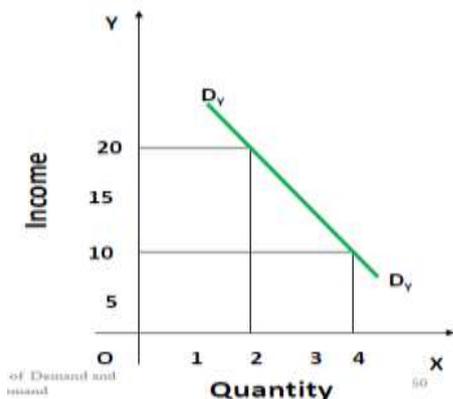
Income elasticity of demand for a good is positive, when with a increase in the income of a consumer his demand for the goods is increases and vice-versa.



### Negative Income Elasticity of Demand:

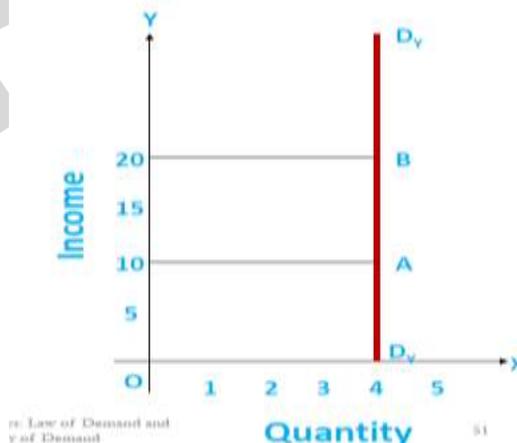
Income Elasticity of Demand is negative when increases in the income of the consumer is accomplished by fall in demand of good.

It is negative in case of inferior goods which are known as Giffen goods.



**Zero Income Elasticity of Demand:**

Income Elasticity of demand is zero, when change in the income of consumer evokes no change in his demands. Demands for necessities like oil, salt, etc., have zero income elasticity of demand



**CROSS ELASTICITY OF DEMAND**

Cross price elasticity of demand measures the percentage change in demand for a particular good caused by a percent change in the price of another good. Goods can be complements, substitutes or unrelated. A change in the price of a related good causes the demand curve to shift reflecting a change in demand for the original good. Cross price elasticity is a measurement of how far, and in which direction, the curve shifts horizontally along the x-axis. Positive cross-price elasticity means that the goods are substitute goods.

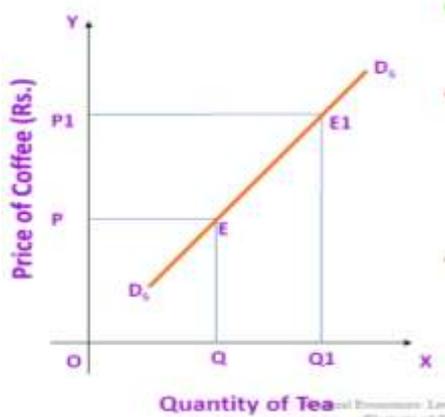
**Cross elasticity of Demand for X and Y =  $\frac{\text{Proportionate change in purchases of commodity X}}{\text{Proportionate change in price of commodity Y}}$**

The numerical value of cross elasticity depends on whether the two goods in question are substitutes, complements or unrelated.

**Degree of Cross Elasticity of Demand**

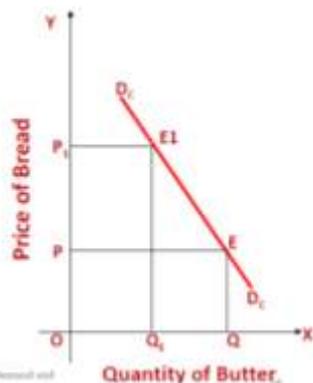
Positive Cross Elasticity of Demand:

It is positive in case of substitute goods for example, Rise in the price of coffee will lead to increase in Demand for Tea. The curve slopes upward from left to right



**Negative Cross Elasticity of Demand:**

It is negative in case of complementary goods. For example rise in price of bread will bring down the demand for butter. the curves slopes downward from left to right.



**Zero Elasticity Of Demand:**

Cross elasticity of demand is zero when two goods are not related to each other . for example, Rise in the price of wheat will have no effect on the demand for shoes.

**Types of Cross Elasticity**

**(i) Substitute Goods.** When two goods are substitute of each other, such as coke and Pepsi, an increase in the price of one good will lead to an increase in demand for the other good. The numerical value of goods is positive.

**For example** there are two goods. Coke and Pepsi which are close substitutes. If there is increase in the price of Pepsi called good y by 10% and it increases the demand for Coke called good X by 5%, the cross elasticity of demand would be:

$$E_{xy} = \% \Delta q_x / \% \Delta p_y = 0.2$$

Since  $E_{xy}$  is positive ( $E > 0$ ), therefore, Coke and Pepsi are close substitutes.

**(ii) Complementary Goods.** However, in case of complementary goods such as car and petrol, cricket bat and ball, a rise in the price of one good say cricket bat by 7% will bring a fall in the demand for the balls (say by 6%). The cross elasticity of demand which are complementary to each other is, therefore,  $6\% / 7\% = 0.85$  (**negative**).

**(iv) Unrelated Goods.** The two goods which are unrelated to each other, say apples and pens, if the price of apple rises in the market, it is unlikely to result in a change in quantity demanded of pens. The elasticity is zero of unrelated goods.



**SUPPLY AND ELASTICITY OF SUPPLY**

**Meaning of Supply**

Supply means the quantities of goods which are offered for sale at particular prices during a given period of time. Thus, the supply of a commodity may be defined as the amount of that commodity which the sellers (or producers) are able and willing to offer for sale at a particular price during a certain period of time.

**Factors Affecting Supply**

The determinants of supply, other than price, are as follows:

- 1) Price.
- 2) Prices of related goods.
- 3) Objectives of producer
- 4) Infrastructure
- 5) The cost of factors of production
- 6) The State of Technology
- 7) Factors Outside the Economic Sphere. Weather conditions, floods and droughts, epidemics etc.
- 8) Tax and Subsidy

**Statement of the Law**

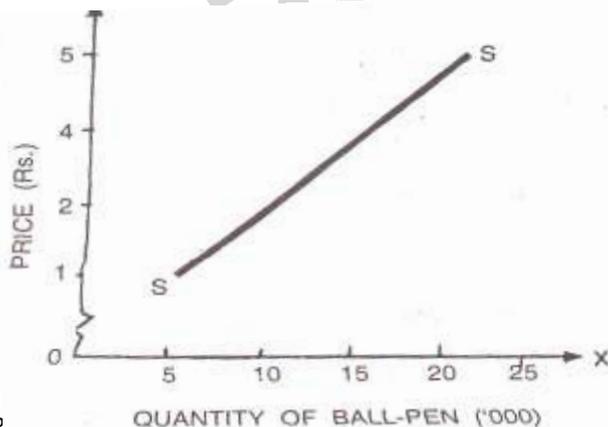
Law of supply may be stated as "Other things remaining unchanged, the supply of a commodity expands (i.e., rise) with a rise in its price, and contracts (i.e. falls) with a fall in its price." The law, thus, suggests that the supply varies directly with the changes in price. So, a larger amount is supplied at a higher price than at a lower price in the market.

**Explanation of the Law**

The law can be explained and illustrated with the help of a supply schedule as well as supply curve, based on imaginary data, as follows see table and figure given below. When the data of Table are plotted on a graph, a supply curve can be drawn as shown in Figure. From the supply schedule it appears that the market supply tends to expand with a rise in price and vice versa. Similarly, the upward sloping curve also depicts a direct co-variation between price and supply.

**TABLE : Market Supply Schedule**

Price of a ball pen (Rs.)	Quantity Supplied (in 000 per week)
1	5
2	10
3	15
4	20
5	25



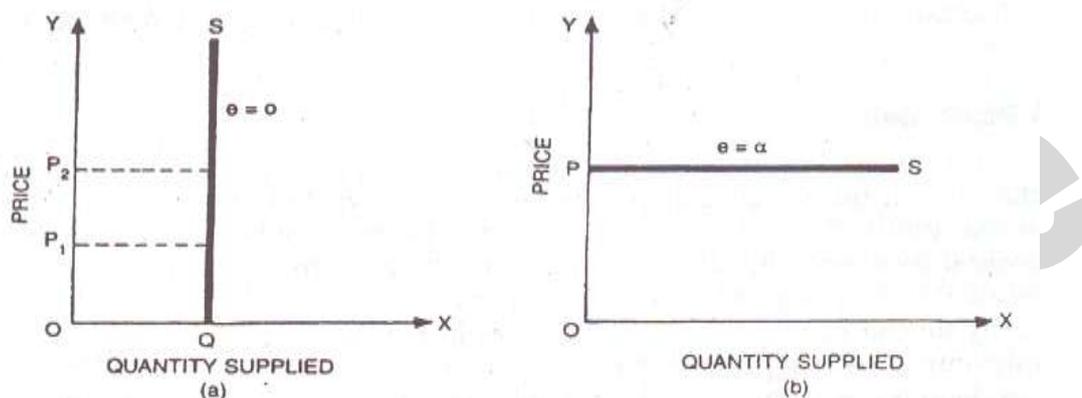


### Elasticity of Supply

Elasticity of supply may be defined as the ratio of the percentage change or the proportionate change in quantity supplied to the percentage or proportionate change in price. In symbolic terms;

$$E_s = \frac{\Delta q}{\Delta p} \times \frac{p_1}{q_1}$$

Where  $e_s$  represents elasticity of supply, Q stands for quantity supplied, P for price and the symbols indicates a change.



There are various degrees of elasticity of supply. It may be relatively elastic, relatively or may have perfect elasticity or inelasticity. Different types of supply elasticities have been illustrated in Figure

The panel (a) of Fig. represents the supply curve of zero elasticity. Irrespective of the price, the producer would be supplying OC quantity ( $e_s = 0$ ). The panel (b) represents the supply curve of infinite elasticity, at OP price the producer would be supplying any amount of the commodity ( $e_s = \infty$ )

### Methods of calculating Supply Elasticity

- Proportionate method  
 $E_s = \frac{\% \text{ change in Quantity supplied}}{\% \text{ change in price}}$
- Geometric Method

### Factors affecting Elasticity of Supply

- Nature and input used
- Natural Constraints
- Risk Taking
- Nature of the commodity
- Cost of Production
- Time Factor
- Technique of production



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UNIT-III

PRODUCTION FUNCTION

- 1) Production is the process of conversion of inputs into outputs.
- 2) It is the creation of utility and addition of value
- 3) Production function is the relationship between inputs & output of a commodity
- 4) The mathematical expression of production function is –  
 $Q_x = f(x_1, x_2, x_3, \dots, x_n)$   
 $Q_x \rightarrow$  Output of commodity X.  
 $f =$  Function of  
 $x_1, x_2, x_3, \dots, x_n \rightarrow$  Inputs
- 5) The inputs/resources used for production are called factors of production. These are namely land, labour, capital & entrepreneur.

**Attributes of production function**

1. It indicates a functional relationship between physical inputs and physical outputs. For example, if we have two factors, say, labour (L) and capital (K) then the production function  $Q = f(L, K)$
2. The production function is always in relation to a period of time. It denotes the flow of inputs resulting in a flow of outputs during a particular period of time. This is due to the fact when the firm wants to increase the production, it can either employ “some factors” additionally or increase “all the factors” in accordance with availability of the time period. Later we will study it as short period and long period.
3. The production function can specify either the maximum quantity of output that can be produced by a given set of input or the minimum quantity of inputs required for producing certain level of output.
4. The quantity of inputs is dependent upon the state of technology available and firm’s managerial ability to use them. In order to simplify things the state of technology is considered to be given.
5. Production function takes into account the most efficient technology and methodology available at a time.
6. Production function is purely a technology relationship between input and output. It has nothing to do with the nominal relationship between input and output. It has nothing to do with the nominal price of factors; or value of quantity produced by them.

**Fixed factors & variable factors:**

**1) Fixed Factor (FF)**

- a. Fixed factors refer to those factors of production which cannot be changed during short run.
- b. These are used in a fixed quantity in the short run.
- c. These factors can be changed only in the long run.
- d. Example-land, plant and machinery, factory building etc.

**2) Variable Factor (VF)**

- a. Variable factor refer to those factors of production which can be changed during short period.
- b. The quantity of variable inputs varies according to the level of output.
- c. Example-labour, raw material etc.

**Time Element in Production Function**

**Short Run and Long Run**



**Short Run:** Short refer to a period of time in which a firm cannot change its fixed factors of production only variable factors can be changed.

**Long Run:** Long run refers to a time period during which a firm can change all the factors of production. In the long run, all inputs are variable. Therefore the distinction between fixed factors and variable factors will disappear.

**Basic Concepts of Production**

**1. Total product or Total physical product (TP or TPP)**

Total product refers to the total volume of a commodity produced by a firm with given inputs during a given period.

**2. Average product or Average physical product (AP or APP)**

Average product is per unit product of a variable input

It is obtained by dividing the total product (TP) by the units of a variable factor.

Symbolically,  $AP = \frac{TP}{L}$

**3. Marginal product or Marginal physical product (MP or MPP)**

Marginal product is an addition to the total product when an additional unit of variable factor (labour) is employed.

**Law of Variable Proportions**

The Law of Variable Proportions (also called as returns to factor or Laws of Returns) is discussed under the situation of having one factor variable and another factor being used in fixed quantity if there are only two factors of production. This alters the proportions between factors; therefore, it is called as Law of Variable Proportions. The law is applicable for short run. Here  $Q_x=f(L)$ .

The law can be explained with the help of below table:

Units of Capital (K)	Units of Labour (L)	TP (Units) (Q)	AP ( $\frac{Q}{L}$ )	MP ( $\frac{\Delta Q}{\Delta L}$ )	
1	0	0	0	0	
1	1	70	70	70	Stage I
1	2	160	80	90	
1	3	270	90	110	
1	4	360	90	90	
1	5	430	86	70	Stage II
1	6	498	83	68	
1	7	546	78	48	
1	8	546	68.25	0	Stage III
1	9	522	58	-24	
1	10	470	47	-52	

**First Stage- Stage of Increasing Returns**

- In this stage as the input of variable factor (labour) increases, marginal product (MP) tends to increase and total product (TP) increases at increasing rate because there is underutilization of the fixed input
- MP also tends to rise alongwith AP.

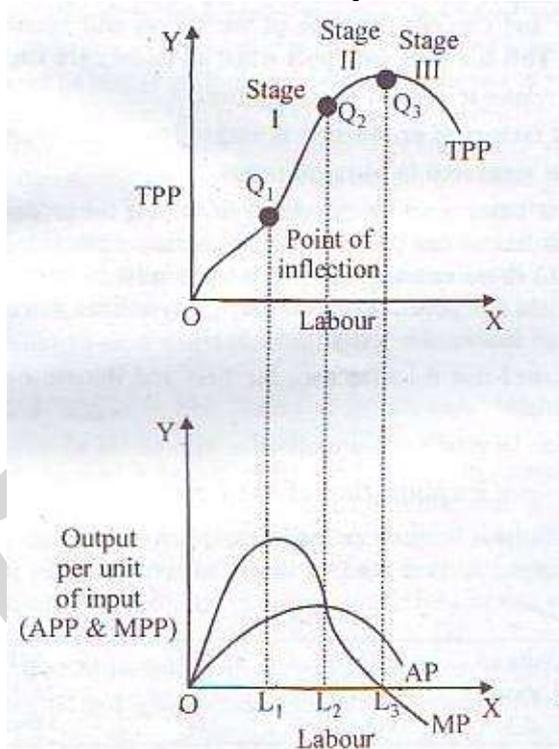
**Second Stage- Stage of Diminishing Returns**

- In this stage, increase in the input of variable factor (Labour) is followed by a decrease in MP but it remains positive and TP increases at decreasing rate because there is pressure on fixed input.

**Third Stage- Stage of Negative Returns**



- In this stage, increase in the units of variable factor (labour) renders MP negative and TP starts declining because there is too much of variable input in relation to the fixed input.



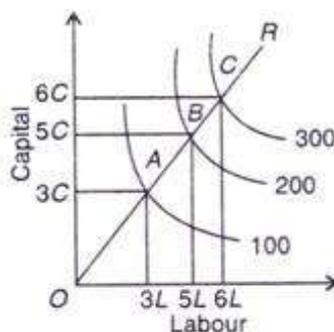
**THE LAWS OF RETURNS TO SCALE: PRODUCTION FUNCTION WITH TWO VARIABLE INPUTS**

The laws of returns to scale refer to the effects of a change in the scale of factors (inputs) upon output in the long run when the combinations of factors are changed in the same proportion.

If by increasing two factors, say labour and capital, in the same proportion, output increases in exactly the same proportion, there are constant returns to scale. If in order to secure equal increases in output, both factors are increased in larger proportionate units, there are decreasing returns to scale. If in order to get equal increases in output, both factors are increased in smaller proportionate units, there are increasing returns to scale.

**Increasing Returns to Scale:**

Below figure shows the case of increasing returns to scale where to get equal increases in output, lesser proportionate increases in both factors, labour and capital, are required.



**It follows that in the figure:**

- 100 units of output require 3C + 3L
- 200 units of output require 5C + 5L



300 units of output require  $6C + 6L$

So that along the expansion path OR,  $OA > AB > BC$ . In this case, the production function is homogeneous of degree greater than one. The increasing returns to scale are attributed to the existence of indivisibilities in machines, management, labour, finance, etc. Some items of equipment or some activities have a minimum size and cannot be divided into smaller units. When a business unit expands, the returns to scale increase because the indivisible factors are employed to their full capacity.

Increasing returns to scale also result from specialisation and division of labour. When the scale of the firm expands there is wide scope for specialisation and division of labour. Work can be divided into small tasks and workers can be concentrated to narrower range of processes. For this, specialized equipment can be installed.

### Thus with specialization efficiency increases and increasing returns to scale follow:

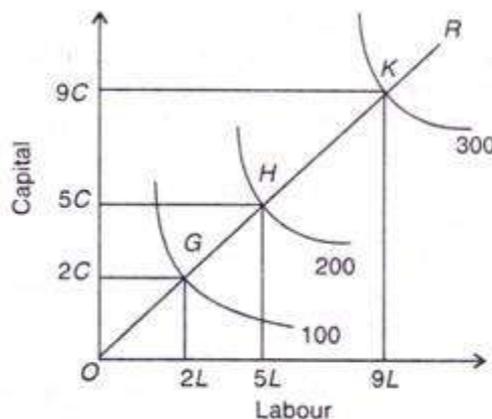
Further, as the firm expands, it enjoys internal economies of production. It may be able to install better machines, sell its products more easily, borrow money cheaply, procure the services of more efficient manager and workers, etc. All these economies help in increasing the returns to scale more than proportionately.

Not only this, a firm also enjoys increasing returns to scale due to external economies. When the industry itself expands to meet the increased long-run demand for its product, external economies appear which are shared by all the firms in the industry. When a large number of firms are concentrated at one place, skilled labour, credit and transport facilities are easily available.

Subsidiary industries crop up to help the main industry. Trade journals, research and training centres appear which help in increasing the productive efficiency of the firms. Thus these external economies are also the cause of increasing returns to scale.

### Decreasing Returns to Scale:

Below Figure shows the case of decreasing returns where to get equal increases in output, larger proportionate increases in both labour and capital are required.



### It follows that:

100 units of output require  $2C + 2L$

200 units of output require  $5C + 5L$

300 units of output require  $9C + 9L$

So that along the expansion path OR,  $OG < GH < HK$ .

In this case, the production function is homogeneous of degree less than one. Returns to scale may start diminishing due to the following factors. Indivisible factors may become inefficient and less productive. Business may become unwieldy and produce problems of supervision and coordination.

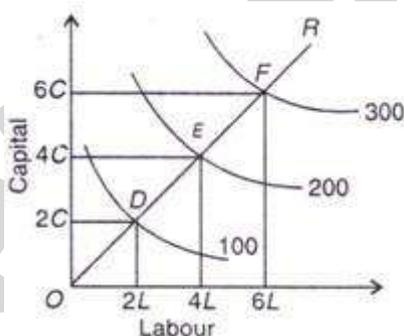
Large management creates difficulties of control and rigidities. To these internal diseconomies are added external diseconomies of scale. These arise from higher factor prices or from diminishing productivities of the factors. As the industry continues to expand the demand for skilled labour, land, capital, etc. rises.



There being perfect competition, intensive bidding raises wages, rent and interest. Prices of raw materials also go up. Transport and marketing difficulties emerge. All these factors tend to raise costs and the expansion of the firms leads to diminishing returns to scale so that doubling the scale would not lead to doubling the output.

### Constant Returns to Scale:

Below Figure shows the case of constant returns to scale. Where the distance between the isoquants 100, 200 and 300 along the expansion path OR is the same, i.e.,  $OD = DE = EF$ . It means that if units of both factors, labour and capital, are doubled, the output is doubled. To treble the output, units of both factors are trebled.



### It follows that:

100 units of output require

$$1 (2C + 2L) = 2C + 2L$$

200 units of output require

$$2 (2C + 2L) = 4C + 4L$$

300 units of output require

$$3 (2C + 2L) = 6C + 6L$$

The returns to scale are constant when internal economies enjoyed by a firm are neutralised by internal diseconomies so that output increases in the same proportion. Another reason is the balancing of external economies and external diseconomies.

Constant returns to scale also result when factors of production are perfectly divisible, substitutable, homogeneous and their supplies are perfectly elastic at given prices. That is why, in the case of constant returns to scale, the production function is homogeneous of degree one.

### ECONOMIES AND DISECONOMIES OF SCALE

**Economies of scale** are advantages that arise for a firm because of its larger size, or scale of operation. These advantages translate into lower unit costs (or improved **productive efficiency**), although some economies of scale are not so easy to quantify.

In some markets, firms have to be of at least a certain size to be able to compete at all, because of the minimum level of investment required; economists call this **minimum efficient scale**.

On the other hand, inefficiencies can also creep in because of increased size, known as **diseconomies of scale**

In the correct sense of the term, **economies and diseconomies of scale** relate to advantages and disadvantages of an **increase** in the firm's productive capacity – such as moving to a larger factory or installing completely new technology. Do not confuse these terms with **capacity utilisation**, which is the degree to which the **current** scale of operations is actually being used.

Economies of scale can be 'internal' (specific to an individual firm) or external (advantages that benefit the industry as a whole).

The main kinds of **internal Economies of Scale** are:

**Purchasing** – firms producing on a larger scale should be able to **bulk buy** raw materials or product for resale in larger quantities. They may be able to cut out wholesalers by buying direct from producers,



and transport costs per unit may also be reduced. The firm might also be buying in large enough quantities to make very specific demands about product quality, specifications, service and so on, so that supplies exactly match their needs.

**Technical** – it may be cost-effective to invest in more advanced production machinery, IT and software when operating on a larger scale.

**Managerial** – larger firms can afford to have specialist managers for different functions within a business – such as Marketing, Finance and Human Resources. Furthermore, they may be able to pay the higher salaries required to attract the best people, leading to better planning and decision making.

**Specialisation** – with a larger workforce, the firm may be better able to divide up the work and recruit people whose skills very closely match the requirements of the job.

**Marketing** – more options are available for larger firms, such as television and other national media, which would not be cost-effective for smaller producers. The marketing cost for selling 10 million items might be no greater than to sell 1 million items. Larger firms might find it easier to gain publicity for new launches simply because of their existing reputation.

**Financial** – there is a wider range of finance options available to larger firms, such as the stock market, bonds and other kinds of bank lending. Furthermore, a larger firm is likely to be perceived by banks as a lower risk and the cost of borrowing is likely to be lower.

**Risk bearing** – a larger firm can be safer from the risk of failure if it has a more diversified product range. A larger firm may have greater resilience in the case of a downturn in its market because of larger reserves and greater scope to make cutbacks.

**Social and welfare** – larger firms are more likely to be able to justify additional benefits for employees such as pension funds, healthcare, sports and social facilities, which in turn can help attract and retain good employees.

### External economies of scale

External economies of scale arise from firms in related industries operating in a concentrated geographical area; suppliers of services and raw materials to all these firms can do so more efficiently. Infrastructure such as roads and sophisticated telecommunications are easier to justify.

There is also likely to be a growing local pool of skilled labour as other local firms in the industry also train workers. This gives a larger and more flexible labour market in the area.

### Diseconomies of scale

These are inefficiencies that can creep in when a firm operates on a larger scale (do not confuse with high capacity utilisation). The main diseconomies of scale are:

**Lack of motivation** – in larger firms, workers can feel that they are not appreciated or valued as individuals - see **Mayo** and **Herzberg**. It can be more difficult for managers in larger firms to develop the right kind of relationship with workers. If motivation falls, productivity may fall leading to inefficiencies.

**Poor communication** – it can be easier for smaller firms to communicate with all staff in a personal way. In larger firms, there is likely to be greater use written of notes rather than by explaining personally. Messages can remain unread or misunderstood and staff are not properly informed.

**Co-ordination** – a very large business takes a lot of organising, leading to an increase in meetings and planning to ensure that all staff know what they are supposed to be doing. New layers of management may be required, adding to costs and creating further links in the chain of communication.



## FACTORS OF PRODUCTION

### FACTORS OF PRODUCTION

- 1) Production is the process of conversion of inputs into outputs.
- 2) By production, we mean the process by which man utilizes or converts the natural resources, working upon them so as to make them satisfy human wants.
- 3) It is the creation of utility and addition of value. This creation of utility may be by way of creating goods in physical terms (called commodities) or non-physical terms (called services).
- 4) Production of all goods and services require the use of certain factors (or inputs). The inputs/resources used for production are called factors of production. These are namely land, labour, capital & entrepreneur.

### LAND -

**The term 'Land' in economics is often used in a wider sense. It does not mean only the surface of the soil, but it also includes all those natural resources which are the free gifts of nature.**

It, therefore, means all the free gifts of nature. These natural gifts include: (i) rivers, forests, mountains and oceans; (ii) heat of sun, light, climate, weather, rainfall, etc. which are above the surface of land; (iii) minerals under the surface of the earth such as iron, coal, copper, water, etc. According to Marshall, "By land is meant... materials and forces which nature gives freely for man's aid in land, water, air, light and heat." Therefore, land is a stock of free gifts of nature

### Characteristics of Land:

Land possesses the following characteristics:

#### **1. Free Gift of Nature:**

Man has to make efforts in order to acquire other factors of production. But to acquire land no human efforts are needed. Land is not the outcome of human labour. Rather, it existed even long before the evolution of man.

#### **2. Fixed Quantity:**

The total quantity of land does not undergo any change. It is limited and cannot be increased or decreased with human efforts. No alteration can be made in the surface area of land.

#### **3. Land is Permanent:**

All man-made things are perishable and these may even go out of existence. But land is indestructible. Thus it cannot go out of existence. It is not destructible.

#### **4. Land is a Primary Factor of Production:**

In any kind of production process, we have to start with land. For example, in industries, it helps to provide raw materials, and in agriculture, crops are produced on land.

#### **5. Land is a Passive Factor of Production:**

This is because it cannot produce anything by itself. For example, wheat cannot grow on a piece of land automatically. To grow wheat, man has to cultivate land. Labour is an active factor but land is a passive factor of production.

#### **6. Land is Immovable:**

It cannot be transported from one place to another. For instance, no portion of India's surface can be transported to some other country.

#### **7. Land has some Original Indestructible Powers:**

There are some original and indestructible powers of land, which a man cannot destroy. Its fertility may be varied but it cannot be destroyed completely.

#### **8. Land Differs in Fertility:**

Fertility of land differs on different pieces of land. One piece of land may produce more and the other less.

#### **9. Supply of Land is Inelastic:**

The demand for a particular commodity makes way for the supply of that commodity, but the supply of land cannot be increased or decreased according to its demand.



### **10. Land has Many Uses:**

We can make use of land in many ways. On land, cultivation can be done, factories can be set up, roads can be constructed, buildings can be raised and shipping is possible in the sea and big rivers.

### **LABOUR**

Labour includes both physical and mental work undertaken for some monetary reward. In this way, workers working in factories, services of doctors, advocates, ministers, officers and teachers are all included in labour. Any physical or mental work which is not undertaken for getting income, but simply to attain pleasure or happiness, is not labour.

For example, the work of a gardener in the garden is called labour, because he gets income for it. But if the same work is done by him in his home garden, it will not be called labour, as he is not paid for that work. So, if a mother brings up her children, a teacher teaches his son and a doctor treats his wife, these activities are not considered 'labour' in economics. It is so because these are not done to earn income.

### **Characteristics of Labour:**

Labour has the following peculiarities which are explained as under:

#### **1. Labour is Perishable:**

Labour is more perishable than other factors of production. It means labour cannot be stored. The labour of an unemployed worker is lost forever for that day when he does not work. Labour can neither be postponed nor accumulated for the next day. It will perish. Once time is lost, it is lost forever.

#### **2. Labour cannot be separated from the Labourer:**

Land and capital can be separated from their owner, but labour cannot be separated from a labourer. Labour and labourer are indispensable for each other. For example, it is not possible to bring the ability of a teacher to teach in the school, leaving the teacher at home. The labour of a teacher can work only if he himself is present in the class. Therefore, labour and labourer cannot be separated from each other.

#### **3. Less Mobility of Labour:**

As compared to capital and other goods, labour is less mobile. Capital can be easily transported from one place to other, but labour cannot be transported easily from its present place to other places. A labourer is not ready to go too far off places leaving his native place. Therefore, labour has less mobility.

#### **4. Weak Bargaining Power of Labour:**

The ability of the buyer to purchase goods at the lowest price and the ability of the seller to sell his goods at the highest possible price is called the bargaining power. A labourer sells his labour for wages and an employer purchases labour by paying wages. Labourers have a very weak bargaining power, because their labour cannot be stored and they are poor, ignorant and less organised.

Moreover, labour as a class does not have reserves to fall back upon when either there is no work or the wage rate is so low that it is not worth working. Poor labourers have to work for their subsistence. Therefore, the labourers have a weak bargaining power as compared to the employers.

#### **5. Inelastic Supply of labour:**

The supply of labour is inelastic in a country at a particular time. It means their supply can neither be increased nor decreased if the need demands so. For example, if a country has a scarcity of a particular type of workers, their supply cannot be increased within a day, month or year. Labourers cannot be 'made to order' like other goods.

The supply of labour can be increased to a limited extent by importing labour from other countries in the short period. The supply of labour depends upon the size of population. Population cannot be increased or decreased quickly. Therefore, the supply of labour is inelastic to a great extent. It cannot be increased or decreased immediately.

#### **6. Labourer is a Human being and not a Machine:**

Every labourer has his own tastes, habits and feelings. Therefore, labourers cannot be made to work like machines. Labourers cannot work round the clock like machines. After continuous work for a few hours, leisure is essential for them.



**7. A Labourer sells his Labour and not Himself:**

A labourer sells his labour for wages and not himself. 'The worker sells work but he himself remains his own property'. For example, when we purchase an animal, we become owners of the services as well as the body of that animal. But we cannot become the owner of a labourer in this sense.

**8. Increase in Wages may reduce the Supply of Labour:**

The supply of goods increases, when their prices increase, but the supply of labourers decreases, when their wages are increased. For example, when wages are low, all men, women and children in a labourer's family have to work to earn their livelihood. But when wage rates are increased, the labourer may work alone and his wife and children may stop working. In this way, the increase in wage rates decreases the supply of labourers. Labourers also work for less hours when they are paid more and hence again their supply decreases.

**9. Labour is both the Beginning and the End of Production:**

The presence of land and capital alone cannot make production. Production can be started only with the help of labour. It means labour is the beginning of production. Goods are produced to satisfy human wants. When we consume them, production comes to an end. Therefore, labour is both the beginning and the end of production.

**10. Differences in the Efficiency of Labour:**

Labourer differs in efficiency. Some labourers are more efficient due to their ability, training and skill, whereas others are less efficient on account of their illiteracy, ignorance, etc.

**11. Indirect Demand for Labour:**

The consumer goods like bread, vegetables, fruit, milk, etc. have direct demand as they satisfy our wants directly. But the demand for labourers is not direct, it is indirect. They are demanded so as to produce other goods, which satisfy our wants. So the demand for labourers depends upon the demand for goods which they help to produce. Therefore, the demand for labourers arises because of their productive capacity to produce other goods.

**12. Difficult to find out the Cost of Production of Labour:**

We can easily calculate the cost of production of a machine. But it is not easy to calculate the cost of production of a labourer i.e., of an advocate, teacher, doctor, etc. If a person becomes an engineer at the age of twenty, it is difficult to find out the total cost on his education, food, clothes, etc. Therefore, it is difficult to calculate the cost of production of a labourer.

**13. Labour creates Capital:**

Capital, which is considered as a separate factor of production is, in fact, the result of the reward for labour. Labour earns wealth by way of production. We know that capital is that portion of wealth which is used to earn income. Therefore, capital is formulated and accumulated by labour. It is evident that labour is more important in the process of production than capital because capital is the result of the working of labour.

**14. Labour is an Active Factor of Production:**

Land and capital are considered as the passive factors of production, because they alone cannot start the production process. Production from land and capital starts only when a man makes efforts. Production begins with the active participation of man. Therefore, labour is an active factor of production.

### **DIVISION OF LABOUR AND EFFICIENCY OF LABOUR**

Division of labour first originated from the division of workers in different occupations. Now, when the production is done on a large scale with the help of heavy machines, it is split up into a number of processes and many people join to produce an article.

It is called the division of labour. For instance, in a large scale readymade garment factory, a man does cutting of cloth, the second man stitches clothes with machines, the third buttons, the fourth makes folding and packing, etc.

This way of doing the work is called division of labour because different workers are engaged in performing different parts of production. In the words of Watson, "Production by division of labour consists in splitting up the productive process into its component parts."



In fact, one cannot produce all the goods he requires. Production has become so technical and complex that different workers are put to different tasks according to their capacity and ability. One becomes specialised in the production of those goods for which he or she is best suited. Different workers perform different parts of production on the basis of their specialisation.

The result is that goods come to the final shape with the cooperation of many workers. Thus, division of labour means that the main process of production is split up into many simple parts and each part is taken up by different workers who are specialised in the production of that specific part.

### **Forms of Division of Labour:**

The division of labour has been divided into different forms by the economists which can be explained as follows:

#### **1. Simple Division of Labour:**

When the production is split up into different parts and many workers come together to complete the work, but the contribution of each worker cannot be known, it is called simple division of labour. For example, when many persons carry a huge log of wood, it is difficult to assign how much labour has been contributed by an individual worker. It is simple division of labour.

#### **2. Complex Division of Labour:**

When the production is split up into different parts and each part is performed by different workers who have specialised in it, it is called complex division of labour. For example, in a shoe factory one worker makes the upper portion, the second one prepares the soles, the third one stitches them, the fourth one polishes them, and so on. In this way, shoes are manufactured. It is a case of complex division of labour.

#### **3. Occupational Division of Labour:**

When the production of a commodity becomes the occupation of the worker, it is called occupational division of labour. Thus, the production of different goods has created different occupations. The caste system in India is perhaps the best example of the occupational division of labour. The work of farmers, cobblers, carpenters, weavers and blacksmiths is known as occupational division of labour.

#### **4. Geographical or Territorial Division of Labour:**

Sometimes, due to different reasons, the production of goods is concentrated at a particular place, state or country. This particular type of division of labour comes into being when the workers or factories having specialised in the production of a particular commodity are found at a particular place. That place may be the most suitable geographically for the production of that commodity. This is called the geographical or territorial division of labour. For example, Assam has specialised in the production of tea, whereas the textile industry is localised in Mumbai and the jute production in West Bengal.

### **Merits and Demerits of Division of Labour:**

Division of labour possesses the following merits and demerits:

#### **Its Merits:**

#### **Division of labour has the following merits:**

##### **1. Increase in Production:**

With the adoption of division of labour, the total production increases. Adam Smith has explained the advantage of division of labour with the help of an example that a worker can produce only 20 pins daily. If the making of pins in a modern factory is divided into 18 processes, then 18 workers can produce 48,000 pins in a single day.

##### **2. Increase in Efficiency of Labour:**

With division of labour, a worker has to do the same work time and again, and he gets specialisation in it. In this way, the division of labour leads to a great increase in efficiency.

##### **3. Increase in Skill:**

Division of labour contributes to the development of skill, because with the repetition of the same work, he becomes specialised in it. This specialisation enables him to do the work in the best possible way, which improves his skill.



#### **4. Increase in Mobility of Labour:**

Division of labour facilitates greater mobility of labour. In it, the production is split up into different parts and a worker becomes trained in that very specific task in the production of the commodity which he performs time and again. He becomes professional, which leads to the occupational mobility. On the other hand, division of labour implies a large-scale production and labourers come to work from far and near. Thus, it increases geographical mobility of labour.

#### **5. Increase in Use of Machines:**

The division of labour is the result of the large-scale production, which implies more use of machines. On the other hand, the division of labour increases the possibility of the use of machines in the small-scale production also. Therefore, in modern times the use of machines is increasing continuously due to the increase in the division of labour.

#### **6. Increase in Employment Opportunities:**

Division of labour leads to the diversity of occupations which further leads to the employment opportunities. On the other hand, the scale of production being large, the number of employment opportunities also increases.

#### **7. Work According to Taste:**

Workers have their own taste in production. For example, a person can take up that type of job for which he considers himself to be the most suitable and which is in accordance with his taste. Division of labour extends the work to such an extent that every person can find work according to his taste and interest.

#### **8. Work for Disable:**

Division of labour splits up the production work in small processes and different persons can work at different places with the help of machines. Certain machines can be operated with the help of hands only and others with the help of foot as well. Therefore, the disabled persons can also find work according to their suitability.

#### **9. Best Use of Tools:**

In this system, it is not necessary to provide each worker with a complete set of tools. He needs a few tools only for the job in which he can make their best use. Therefore, the continuous use of tools is possible which are used at different stages.

#### **10. Best Selection of the Workers:**

Division of labour helps the employers in the best selection of workers.

As the work is divided into different parts and each part is taken up by such a worker who is more suitable for it, the employer can select very easily the man who is best suited for the work.

#### **11. Saving of Capital and Tools:**

Division of labour helps in the saving of capital and tools. It is not essential to provide a complete set of tools to every worker. He needs a few tools only for the job he has to do. Thus there is the saving of tools as well as capital. For instance, if a tailor stitches the shirt, he requires a sewing machine, scissors, etc. But on the basis of division of labour, one can do the cutting and the other can stitch the clothes. In this way, two tailors can work with the help of one pair of scissors and one machine only.

#### **12. Goods of Superior Quality:**

Division of labour is beneficial in making goods of superior quality. When the worker is entrusted with the work for which he is best suited, he will produce superior quality goods.

#### **13. Saving of Time:**

There is no need for the worker to shift from one process to another. He is employed in a definite process with certain tools. He, therefore, goes on working without loss of time, sitting at one place. Continuity in work also saves time and helps in more production at less cost.

#### **14. Right Man at the Right Job:**

Division of labour implies splitting up of production into a number of processes. Each person is given the job for which he is best suited. There will be no round pegs in square holes. In this way, a right man is placed at the right job.



### **15. Reduction in the Cost of Production:**

If a shoe-maker makes himself two pairs of shoes daily, then four shoe-makers can make more than eighth pairs of shoes if they work in cooperation with each other. In this way, division of labour increases production which reduces the average cost of production. Saving of capital, tools and machinery, etc. also help in the reduction of cost of production.

### **16. Cheap Goods:**

Division of labour helps in mass production. Thus production becomes less expensive and more economical. Therefore, cheaper goods are turned out, which improve the standard of living of the people.

### **17. Saving of Time and Expenses in Training:**

Under division of labour, a worker has to train himself in a small part of production. There is no need to learn the whole process of production. It ensures saving of time as well as expenses in training.

### **18. Spirit of Co-operation among Workers:**

Division of labour gives chances of working under the same roof and with the cooperation of each other. It further gives rise to the feeling of cooperation and trade unionism in their daily lives. The work cannot be completed unless they cooperate with each other. They help each other at the time of adversities as well.

### **19. Development of International Trade:**

Division of labour increases the tendency of specialisation not only in the workers or industries, but in different countries also. On the basis of specialisation, every country produces only those goods in which it has a comparative advantage and imports such goods from those countries which have also greater comparative advantage. Therefore, division of labour is beneficial for the development of international trade also.

### **Its Demerits:**

The division of labour has also certain demerits which are explained below:

#### **1. Monotony:**

Under division of labour, a worker has to do the same job time and again for years together. Therefore, after some time, the worker feels bored or the work becomes irksome and monotonous. There remains no happiness or pleasure in the job for him. It has an adverse effect on the production.

#### **2. Loss of Joy:**

In the absence of division of labour, he feels a lot of pleasure on the successful completion of his goods. But under division of labour, nobody can claim the credit of making it. The work gives him neither pride nor pleasure. Therefore, there is total loss of joy, happiness and interest in the work.

#### **3. Loss of Responsibility:**

Many workers join hands to produce a commodity. If the production is not good and adequate, none can be held responsible for it. It is generally said that 'every man's responsibility is no man's responsibility.' Therefore, the division of labour has the disadvantage of loss of responsibility.

#### **4. Loss of Mental Development:**

When the labourer is made to work only on a part of the work, he does not possess complete knowledge of the work. Thus, division of labour proves to be a hurdle in the way of mental development.

#### **5. Loss of Efficiency:**

Division of labour is sometimes accounted for the loss of efficiency. For instance, if a cobbler goes on cutting the leather for a long time, he may lose the efficiency of making shoes.

#### **6. Reduction in Mobility of Labour:**

The mobility of labour is reduced on account of division of labour. The worker performs only a part of the whole task. He is trained to do that much part only. So, it may not be easy for him to trace out exactly the same job somewhere else, if he wants to change the place. In this way, the mobility of labour gets retarded.



### **7. Increased Dependence:**

When the production is split up into a number of processes and each part is performed by different workers, it may lead to over-dependence. For instance, in the case of a readymade garments factory, if the man cutting cloth is lazy, the work of stitching, buttoning, etc. will suffer. Therefore, increased dependence is the result of division of labour.

### **8. Danger of Unemployment:**

The danger of unemployment is another disadvantage of division of labour. When the worker produces a small part of goods, he gets specialised in it and he does not have complete knowledge of the production of goods. For instance, a man is expert in buttoning the clothes. If he is dismissed from the factory, it is difficult for him to find the job of buttoning. Thus division of labour has a fear of unemployment.

### **9. Increased Dependence on Machines:**

As division of labour increases, there will be an increased use of machines. Almost all the workers work on different types of machines. It is difficult for them to work without machines. Thus, division of labour increases the dependence on machines.

### **10. Danger of Over-Production:**

Over-production means that the supply of production is comparatively more than its demand in the market. Because of the division of labour, when production is done on a large scale, the demand for production lags much behind its increased supply. Such conditions create overproduction which is very harmful for the producers as well as for the workers when they become unemployed.

### **11. Exploitation of Labour:**

Division of labour is concerned with large scale production in big factories which are owned by the capitalists. No poor worker can afford to start his own production. Therefore, they have to seek employment in big factories of the capitalists. These employers pay less wages to them as compared to their marginal productivity, because there is no other alternative to the workers but to work at very low wages. Therefore, division of labour results in the exploitation of labour.

### **12. Evils of Factory System:**

The modern industrial or factory system has been developed as a result of the division of labour. This system further gives rise to the evils like dense population, pollution, bad habits of gambling and drinking, low standard of living, poor food, clothes and housing, etc.

### **13. Employment of Women and Children:**

Division of labour results in the large scale production in which children and women are also employed. It is because a simple and small part of the whole task can easily be performed by them. Thus the number of employed women and children increases. They are also exploited by the employers by paying them lower wages.

### **14. Industrial Disputes:**

The industrial disputes mean strikes by workers, closure of factory, etc. due to clashes between the employees and the employers. Division of labour results in the division of society into workers and employers. The employer always tries to increase his profits by exploiting the workers and workers form trade unions against the employers to put an end to their exploitation or to make them increase their wages. It gives rise to a severe conflict between the employers and the workers in the form of strikes, closures and lockouts of factories.

### **Conclusion:**

To sum up, we can say that division of labour is beneficial to the workers, to the producers and to the society as a whole. Its merits outweigh its demerits.

**EFFICIENCY OF LABOUR :-** The working capacity of the labour is called his efficiency being given the same time limit and given the same type of work.



### ***FACTORS DETERMINING THE EFFICIENCY OF LABOUR***

**1. PERSONAL QUALITIES :-** Some people have some personal qualities and they are suitably built for certain heavy labour. On the other hand some people are very suitable for mental labour. Family background also plays a very important role in this regard.

**2. EDUCATION :-** It is the basic and essential element which determines the efficiency of labour. Educated labourer is more efficient as compared to the illiterate worker.

**3. TRAINING AND SKILL :-** The modern world requires highly skilled labourers. A labourer with sound technical training will be more effective as compared to a labourer who has no training. It increases the efficiency of the labourer.

**4. CLIMATIC CONDITIONS :-** Climate also plays an important role in increasing or decreasing the efficiency. Hot weather has a vital factor for the low efficiency of labour in Asia and Middle East. On the other hand cold weather is an important element for increasing the efficiency in labour in U.S.A and Europe.

**5. WAGES AND BENEFITS :-** If wages, allowances, bonuses and other fringe benefits are given to the workers, then their working efficiency increases. Labourer works very hard if he has attractive salary. On the other hand if wages rate is low then efficiency of the labourer will be also low.

**6. COMBINATION OF PRODUCTION FACTORS :-** If the other three factors of production combination is ideal then efficiency of labourer will be high otherwise low.

**7. WORKING HOURS :-** If working hours of labourer are reasonable then the efficiency will be high. If the working time is very long and without extra payment then efficiency of the worker will be low.

**8. ENVIRONMENT :-** If the working environment is pleasant then efficiency of labourer will be high. It is observed that labourer working in air conditioned rooms and healthy conditions are more efficient as compared to others.

**9. RACIAL QUALITIES :-** By birth some races are very hard working and strong built so they are more efficient as compared to other races.

### ***FACTORS PROMOTING EFFICIENCY OF LABOUR***

Following are the important factors which promote the efficiency of labour.

**1. INCREASE IN WAGES :-** Increase in wages and fringe benefits promote the efficiency of labour. When wages and incentives will increase it will make the labourer hard worker and efficient.

**2. TECHNICAL EDUCATION :-** Vocational, technical and commercial colleges, should be opened to provide technical skill to the people. Modern industry, agriculture, banking, transport and commerce require highly skilled persons. Such type of training and skill is provided in the colleges and universities.

**3. CARE OF HEALTH :-** Health facilities should be provided to the labourers. A healthy worker can work more efficiently as compared to sick worker. All the factory owners should open the health clinics in their factories and regular medical check-up should be compulsory.

**4. INCREASES IN ALLOWANCES :-** Various types of allowances like dearness and bonus must be increased. Special allowances should be given to the efficient workers.



**5. LABOUR LAWS :-** Government should also frame the strict labour laws. In case of accident special compensation should be given. In case of industrial dispute courts should be established. This step will provide the security to the labourers and they will work with full concentration.

**6. SPECIAL STORES :-** To provide the goods on lower rates to the labourers special stores should be opened for the workers.

**7. ESTABLISHMENT OF THE CANTEEN :-** Lunch and dinner facility should be provided to the workers. On the lower rates food should be provided during the working interval. In this way time of the workers will be saved and their efficiency will increase.

### **MOBILITY OF LABOUR**

Mobility refers to the willingness and actual movement of labour from one place to another-near or far and distant. This mobility may be for searching jobs or for better job prospects. This mobility may be territorial, occupational or intra-regional.

### **FACTORS AFFECTING MOBILITY OF LABOUR:**

- 1) Means of transport and communication
- 2) Knowledge and Information
- 3) Stage of development
- 4) Family bonds
- 5) Urge to excel

### **CAPITAL**

#### **Meaning**

The term, 'Capital', in economics does not mean merely money as the accountants call it. Capital is that part of wealth which can be used for further production of wealth. According to Marshall, "Capital consists of all kinds of wealth, other than free gifts of nature, which yield income." Therefore, every type of wealth other than land which helps in further production of income is called capital.

In this way, money, machine, factories, etc. are included in capital provided they are used in production. For instance, if a man has an income of Rs 10,000 per month and out of it he invests Rs 6,000 in a business, this amount of Rs 6000 is called capital. In the same way, plough, tractor and other agricultural implements of farmers are also capital. The house in which a man resides is his wealth and the house which is given on rent is his capital.

#### **Characteristics of Capital:**

Capital has its own peculiarities which distinguish it from other factors of production. Capital possesses the following main characteristics:

##### **1. Man Produces Capital:**

Capital is that wealth which is used in the production of goods. Capital is the result of human labour. Thus, every type of capital such as roads, machines, buildings and factories etc. are produced by man. It is a produced factor of production.

##### **2. Capital is a Passive Factor of Production:**

Capital cannot produce without the help of the active services of labour. To produce with machines, labour is required. Thus, labour is an active, whereas capital is a passive factor of production. Capital on its own cannot produce anything until labour works on it.

##### **3. Capital is a Produced Means of Production:**

The composition or supply of capital is not automatic, but it is produced with the joint efforts of labour and land. Therefore, capital is a produced means of production.



#### **4. Capital is Variable:**

The total supply of land cannot be changed, whereas the supply of capital can be increased or decreased. If the residents of a country produce more or save more from their income, and these savings are invested in factories or capital goods, it increases the supply of capital.

#### **5. Capital is more Mobile than other Factors of Production:**

Of all the factors of production, capital is the most mobile. Land is perfectly immobile. Labour and entrepreneur also lack mobility. Capital can be easily transported from one place to another.

#### **6. Capital Depreciates:**

As we go on using capital, the value of capital goes on depreciating. When machines are used continuously for some time, these depreciate and their value falls.

#### **7. Capital is Stored-up Labour:**

Scholars like Marx admit that capital is stored-up labour. By putting in his labour man earns wealth. A part of this wealth is spent on consumption goods and the rest of it is saved. When saving is invested, it becomes capital. In other words, capital is the result of accumulation of savings of a man. Therefore, capital is stored-up labour.

#### **8. Capital is Destructible:**

All capital goods are destructible and are not permanent. Because of the continuous use, machines and tools become useless with the passage of time.

### **Classification of Capital**

The functional classification of capital is as follows:

- 1) **Real capital and financial capital:** Real capital refers to physical goods (capital goods as they are known to be) used for further production like, equipments, machinery, structure, plants etc. Financial capital is monetary resources available for investment into these physical goods.
- 2) **Private capital and social capital:** Private capital includes the amount and type of investment made by the private sector, usually, for earning some profits. Social capital, on the other hand, is created and developed by the state, for example, construction of roads, bridges, educational institutions and some such economic organizations.
- 3) **Fixed and Floating capital:** The long-term capital like plant and machinery is fixed capital whereas cash, inventories required for production is floating or circulating capital.
- 4) **Tangible and Intangible capital:** Any capital which has physical manifestation like plant and machinery, building etc. is called tangible capital, Intangible capital is, which is not physically existing but contributing to the production of goods and services like goodwill, brand image etc.
- 5) **Indigenous and Foreign capital:** Such capital having its sources from within the country is called indigenous capital whereas the capital, in any form, brought from abroad is called foreign capital.

### **Capital Formation**

Production is an ongoing process. Whatever amount of goods and services are produced in a certain period of time (usually in a year) is not consumed instantaneously. A part of it is set aside for "Some future use" in production. This keeps on increasing and used for further production sometime somewhere. This 'setting aside of a portion of current production' and used for further production is known as 'capital formation'. We may define capital formation as the surplus of production over consumption in a certain period which is used for further production.

### **Role of Capital:**

- 1) Capital formation plays a very crucial role in the process of economic development of a country. Higher the rate of capital formation higher will be the growth prospects of the economy. The fact is that capital formation shows the potentials of the economy.
- 2) Another contribution of capital accumulation (or formation) is that it makes the technology development possible in an economy. Without capital formation, new discoveries, inventions will remain unused and efforts in researching and developing them will go waste.



- 3) Capital formation also creates job opportunities in the economy both at the level of production of capital and at the level of utilization of such capital.

### Stages of Capital Formation:

- **Stage 1:** Savings
- **Stage 2:** Mobilisation of Savings
- **Stage 3:** Investment

## ORGANIZATION AND ENTERPRISE (ENTREPRENEURSHIP)

### Features of Entrepreneurship

The entrepreneur as an organizer of the process of production is the fore-runner of economic development of a country.

#### 1. Scarc human resource

Entrepreneurship is a very scarce human factor as it involves specific talent, organizational capacity, innovative spirit and boldness to bear risk which is not found in every person. In developing countries like India lack of entrepreneurship is a major impediment to development.

#### 2. Heterogeneous factor

Entrepreneurship is a heterogeneous factor of production because efficiency, talents, organizing skills, ability to bear risk, foresights and innovating capacities, etc. vary from entrepreneur to entrepreneur. The nature of enterprise varies with various forms of business organizations like sole trading, partnership, co-operatives, Joint Stock Company and public undertakings. In a small business, the same person may work as an entrepreneur, manager and capitalist.

#### 3. Indispensable factor

In modern business entrepreneur is a very important factor of production as he organizes production of goods & services by coordinating the other factors in an optimum way. He is an organiser & owner of the firm. Production is impossible in his absence.

#### 4. Intangible factor

Entrepreneurship is an abstract phenomenon. It is intangible. Entrepreneurial efforts cannot be measured in quantitative terms while we can measure in terms of hours of work and number of days. We can calculate the number of individual workers and their contribution to the firm but it is not possible to measure entrepreneurship as the firm itself is the enterprise.

#### 5. Highly mobile

Of all factors entrepreneur possess a higher degree of mobility as he can easily move from one industry to another or from one region to another. An entrepreneur's ability to move from one industry to another depends upon his knowledge, experience and specialization.

#### 6. Cannot be Bought & Sold

Land labour and capital can be bought and sold in factor markets but it is not possible to deal with entrepreneurs in a factor market. Since enterprise is an intangible factor, it cannot be bought and sold. Hence, like land, labour and capital market there is no entrepreneurial market where entrepreneurship can be bought and sold. Transaction is not possible in case of enterprise.

We cannot derive the demand and supply curves in case of entrepreneur. Hence, the Demand and Supply Theory of value cannot be applied to the factor enterprise or organization to determine its price.

#### 7. Residual reward

Entrepreneurship is a reward in terms of profit which is a residual reward, i.e. an income which is left after meeting all business expenses from the total sales revenue.

### Functions of an Entrepreneur:

- 1) Co-ordinating functions
- 2) Risk bearing functions
- 3) Innovating functions



## UNIT-IV

### COST CONCEPTS

Cost may be defined as price paid for different factors of productions involved in producing certain commodities.

### ELEMENTS OF COST

**(1) Money Cost:-** It is the cost which is expressed or calculated in monetary terms and is based on accountant's point of view.

Money cost has three elements:-

- (a) **Explicit Cost:** - Cost consist of all the payments made on basis of contract to various factors of production employed by a firm namely prices paid for raw materials, rent, wages, salaries etc.
- (b) **Implicit Cost:** - Payment made to owned factors of production like owned capital, owned labour etc are called implicit cost. These factors of production are personally owned by the producer/ firm used for the business purpose.
- (c) **Normal Cost:** - It is the minimum profit a firm should get in order to remain in an industry. It is over explicit and implicit cost of a firm.

**Money Cost = Explicit cost+ Implicit Cost + Normal Profit**

**(2) Real Cost:-** This type of cost is calculated by a sociologist. He is concerned with pains, sacrifices and efforts made by the society in production of a commodity.

**(3) Opportunity Cost:-** It is also called alternative cost or transfer cost. Opportunity cost is the cost sacrificed for one alternative for obtaining the next best possible alternative. For ex. Commodity x is produced by sacrificing the production of y commodity so opportunity cost of x will be the cost of production of y commodity.

**(4) Direct Cost And Indirect Cost :-** Direct cost is the cost directly concerned with the production of commodity. ex:- Cost on raw material, wages, fuel etc. where as indirect cost is the cost which is not directly concerned with the production of commodity. For ex: supervision, administration cost, rent, office overheads etc.

**(5) Incremental Cost And Sunk Cost:-** Cost incurred when a business firm changes its business activities or nature of business operation is called on incremental cost.

**Incremental Cost = Changed total cost - Initial total cost**

Sunk cost are those cost which are not affected by the changes in the level of business activity or nature of business firm. These costs once incurred cannot be recovered easily.

Ex:- Depreciation

**(6) Fixed Costs And Variable Costs:-** Fixed cost are those costs which are fixed weather production is being carried or not. Variable cost are those costs which vary with the change in production process. If there will be no production these costs will not incurred.

**(7) Short Run And Long Run Costs:-** Short run cost are those which are concerned with short run production of a firm i.e. fixed cost and variable costs.

Long run cost are concerned with long run production of a firm where all factors of production are variable and all cost are variable costs.

### COST - OUTPUT RELATION DURING SHORT RUN

During short run time period two types of factors of production are employed under which one is fixed factor an others are variable factors of production. Raw material, semi finished material, unskilled labour, energy etc are variable inputs which can be changed during short run, Machines, Capital, Infrastructure, Salaries of managers etc are fixed inputs.



### SHORT RUN COST

- Total Fixed Cost (TFC):-** Those cost which remain constant when the output is zero as well as it does not increases with increase in production are called total fixed cost (TFC).  
For Ex:- Plant, Land, Building, Machinery, Tools, Equipments, Insurance, Salaries of manager etc.
- Total Variable Cost (TVC):-** Those costs vary with the production of a commodity during short period and have direct relation with the change in production a called total variable costs (TVC). These costs are also called prime cost are direct costs. It increases with increase in production of output.
- Total Cost:-** Aggregate of total fixed cost and total variable cost increased by a firm in the production of any commodity is called total cost.  
Total cost (TC) = Total Fixed cost + Total Variable Cost (TVC)  
Total cost increases with change in output.

### AVERAGE OR PER UNIT COST

- Average Fixed Cost:-** Average fixed cost is total fixed cost divided by the volume of output. AFC has inverse relation with output and it decreases with increase and increases with decrease in output. AFC curve in rectangular hyperbola in shape.  
AFC = TFC / Output  
i.e.  $\frac{\text{Total Fixed Cost}}{\text{Output (in Units)}}$
- Average Variable Cost (AVC):-** Average variable cost is total variable cost divided by the volume of output. AVC falls with increase in output reaches its minimum and then starts rising. It is due to operation of law of returns. Shape of AVC curve is U shaped because of operation of law of returns where at 1st stage i.e. during law of increasing returns production rises and cost decreases then at 2nd stage i.e. laws of constant & diminishing returns cost reaches at minimum and remains constant and at 3rd stage i.e. law of negative returns cost starts increasing.  
AVC = TVC / Output  
i.e.  $\frac{\text{Total Variable Cost}}{\text{Output (in Units)}}$
- Average Costs (AC):-** Average cost or average total cost (ATC) is the aggregate of AFC & AVC.  
AC = TC / Output    i.e. = Total cost / Output    Or    AC = AFC + AVC  
AC curve decreases with increase in output remains constant up to a point and then increases with increase in output.
- Marginal Cost (MC):-** Marginal cost is additional cost incurred in producing an additional unit of output.  
MC =  $\Delta \text{TC} / \Delta \text{Output}$   
Marginal cost changes with the change in AVC and is independent of fixed cost. MC falls in beginning reaches at its minimum and there after rises. MC is also a U shaped curve.

Output	Total Cost			Average Costs			
	TFC	TVC	TC	AFC	AVC	AC	MC
0	100	0	100	0	0	0	---
1	100	30	130	100	30	130	30
2	100	60	160	50	30	80	30
3	100	80	180	33.3	26.7	60	20
4	100	90	190	25	22.5	47.5	10
5	100	100	200	20	20.0	40.0	10
6	100	120	220	16.66	20.0	36.6	20



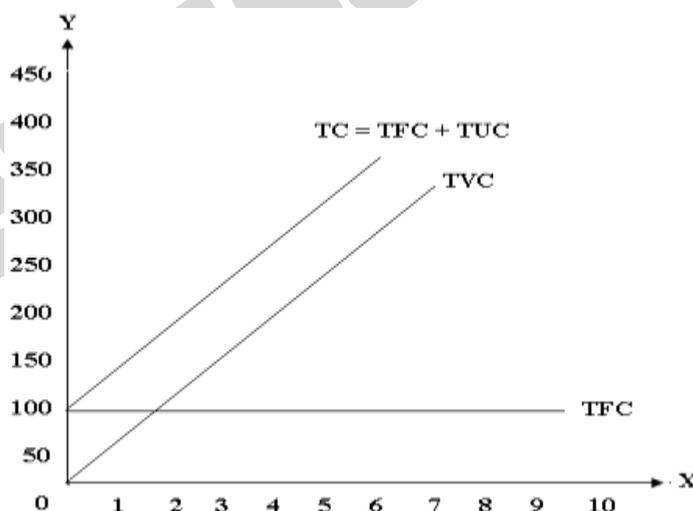
7	100	150	250	14.3	21.4	35.7	30
8	100	190	290	12.5	23.7	36.2	40
9	100	240	340	11.1	26.6	37.7	50
10	100	320	420	10	32.0	42.0	80

In above table TFC remains constant and TVC goes on increasing and TC is also increasing with increase in output. AFC is decreasing with increase in output. AVC decreases reaches to minimum and then increasing. AC decreases reach to minimum and then increase. MC decreases reach to minimum remains constant and then increases.

**DIAGRAM 1st**

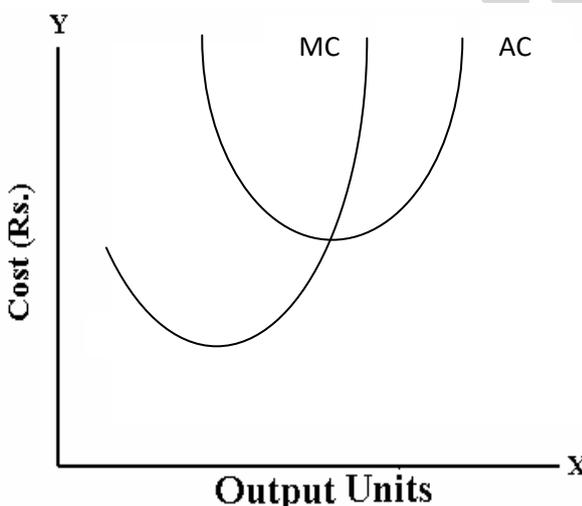
**Output (In Units)**

TFC remains constant weathers production is zero or 10units. TVC starts from 0 units and increases with increase in output. TC is the total of TVC and TFC.



AC, MC and AVC are U shaped curves because of the operations of law of returns. AFC curve shows a decreasing trend. MC curve passes through minimum point, point of AC and AVC.

**RELATIONSHIP BETWEEN AC AND MC**





- (1) AC and MC fall in beginning but MC falls more rapidly than AC and MC is below AC or vice versa (AC > MC).
- (2) When AC rises MC also rises but rises rapidly than AC and MC is more than AC or vice versa.(MC > AC)
- (3) When AC is minimum it is equal to MC curve cuts AC curve at its minimum point.(MC=AC)

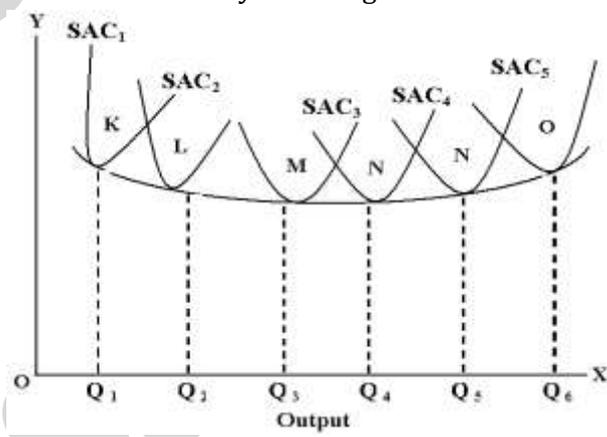
**COST OUTPUT RELATION DURING LONG RUN**

Long period gives sufficient time to business managers to change even the scale of production. All the factors of production are variable. All cost are variable and there is no fixed cost. In long run there is long run average cost curve and long run marginal cost curve.

**Long Run Total Cost (Ltc) :-** The long run total cost of production is the least possible cost of producing any given level of output when all inputs are variable.

**Long Run Average Cost (Lac):-** Long run average cost curve shows the lowest average cost of producing output when all inputs can be varied. LAC is also known by following names:-

- (1) **Envelope Curve:-** LAC is also known as envelop curve because it envelopes all the SAC curves. It indicates that LAC cannot exceed SAC and it will be surrounding the SAC, and does not rise upwards. Long run cost cannot be more than than short run cost.



- (2) **Planning Curve:-** Lac is also known as planning curve as firm or a producer can decide that which plant size should be used to produce different quantities of output so that production is done at minimum cost .Usually rational

produce selects plant size where LAC is at its minimum for the output production.

In above fig. LAC is shown which is tangent to all SAC curves.

In order to produce OQ3 level of output corresponding point an LAC is K which is tangent to SAC<sub>1</sub> and therefore.

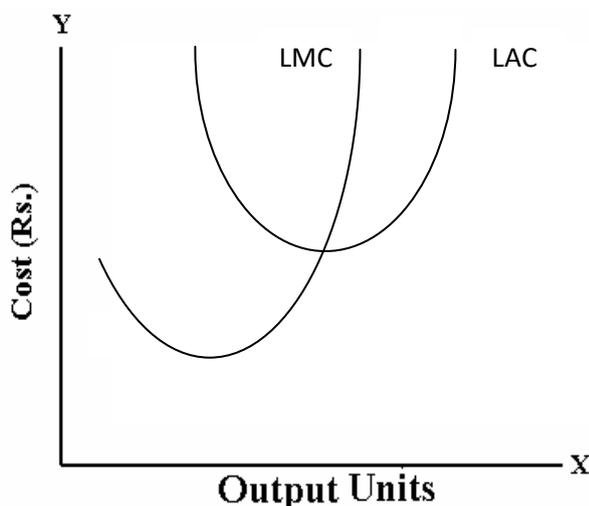
**LONG RUN MARGINAL COST (LAC)**

Long - run marginal cost curve is that which shows the extra cost incurred in producing one more unit of output when all inputs can be changed.

$$LMC = \frac{\Delta LTC}{\Delta Q}$$



RELATION BETWEEN LAC AND LMC



Relation between long-run marginal cost and long-run average cost is similar to that of what it is in short run AC and MC. The only difference in long run AC and MC is that long run MC and AC curve are more flat to than that of SAC and SMC, it is so because in long run all factors of production are variable and firm selects appropriate scale of production at minimum cost so cost increase in long run is gradual in comparison to short run curves. LAC is also a expanded U Shaped curve because of operation of laws of returns to scale.

As firm expend their output scale of operation also increased by firm so they will enjoy economies of scale but if these firm produce beyond their installed capacity of scale that results in increase in cost gradually.

CONCEPTS OF REVENUE

In economics revenue is studied in terms of total revenue (TR), Average revenue (AR) and marginal revenue (MR).

**Total Revenue:-** Total revenue is the total money receipts of a firm or producer with sales of its output.

$$TR = Q \times P$$

i.e. quantity of goods sold x price per unit.

**Average Revenue:-** It is average pr unit of sale of output. It is also called. Price per unit of output.

$$AR = TR / O$$

i.e. total revenue / No. of output sold.

**Marginal Revenue:-** It is an addition to the total revenue when an additions unit of output is sold by a firm.

$$MR = \Delta TR / \Delta R$$

$\Delta TR$  = Change in Total Revenue  
 $\Delta O$  = Change in Output

or  $MR = TR_n - TR_{n-1}$   
 $TR$  = Total Revenue  
 $TR_n$  = Total Revenue of n products  
 $TR_{n-1}$  = Total Revenue of n-1 products.



**INTER RELATIONSHIP AMONG CONCEPTS OF REVENUE**

Units of output sale	Price per units (Rs.)	TR	AR	MR
1	12	12	12	12
2	11	22	11	10
3	10	30	10	8
4	9	36	9	6
5	8	40	8	4
6	7	42	7	2
7	6	42	6	0
8	5	40	5	-2

Table shows that with increase in output unit sale price per unit decreases and TR increases reaches to maximum remains constant and declines. AR falls with every unit of output sold and is equal to price. MR will also decrease at increasing rate reaches to 0 and then becomes negative. AR and MR is decreasing but AR is positive and MR has three trends decreases, becomes zero and negative. Fall in AR is less than MR (AR > MR) when MR is 0 then TR will be at its maximum.

TR, AR and MR are revenue curves shown on OY axis output is shown on OX axis. A to B is increasing stage of TR. B to C is constant and C to D is decreasing stage of TR. AR and MR are falling but AR is above the MR (AR > MR). MR will be negative when TR falls.

**Relation between AR and MR**

Under different market conditions the relation between AR and MR can be as given below:

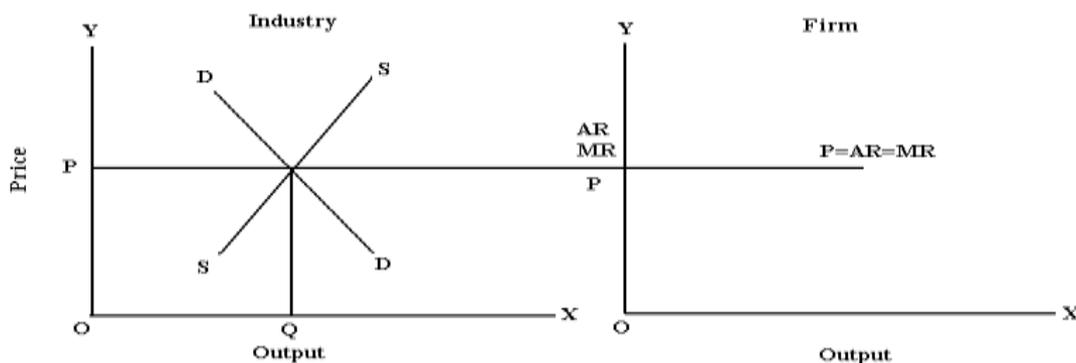
**AR and MR under perfect Competition**

Under perfect competition price remains constant. Price, AR and MR will be the same and the demand curve will be horizontal to OX-axis because there is a large number of buyers and sellers, homogeneous product and price is determined by the total demand and supply, firm is a price taker, Hence, there is one price prevailing in the market. It can be seen from the following table:-

**AR and MR under Perfect competition**

Units of Output	Price per Unit (Rs.)	TR (Rs.)	AR (Rs.)	MR (Rs.)
1	5	5	5	5
2	5	10	5	5
3	5	15	5	5
4	5	20	5	5
5	5	25	5	5
6	5	30	5	5

The table reveals that the price per unit is the same and TR is increasing but AR and MR remain constant. Price is equal to AR and MR (P=AR=MR) under perfect competition. The table can be shown on a diagram as given below:



**(Diagram: AR and MR under Perfect Competition)** The diagram shows that price is determined by the intersection of demand and supply by the industry and the same is accepted by individual firm. Price, MR

and AR are shown by the horizontal line parallel to OX axis.

**AR and MR under imperfect Competition**

As we have seen that perfect competition is an imaginary and unrealistic situation. It is called a myth. Under imperfect competition the firm can increase its sales by reducing the price of its product. Hence, AR and MR will be different under this market structure. It can be seen from the following table:-

**AR and MR under Imperfect Competition**

Units of Output	Price (Rs.)	Total Revenue (Rs.)	Average Revenue (Rs.)	Marginal Revenue (Rs.)
1	10	10	10	10
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2
6	5	30	5	0
7	4	28	4	-2

The table shows that AR is decreasing but it is positive. MR is decreasing, becomes zero and thereafter it becomes negative. AR and price are equal ( P=AR) but AR and MR are different. AR is decreasing and MR is also decreasing but AR is higher then MR (AR > MR). The slope of AR and MR will be declining.

