UNIT-2

Demand: - The general meaning of demand is entirely different from the meaning used in economics. Generally, demand means asking for something, but in economics, demand depends on three major factors, which are as under: -

i) Price
ii) Quantity and
iii) Time

Definitions of Demand:-

In words of **Ferguson**, *"Demand refers to quantities of a commodity that the consumers are able and willing to buy at each possible price during a given period of time, other things being equal."*

According to **Meyers**, *"The demand for a commodity is a schedule of the amounts that buyers would be willing to purchase at all possible prices at any one instant of time."*

On the basis of the above definitions, following features can be defined of demand:

- *There is an effective demand for a commodity.*
- *The quantity of a commodity is there.*
- *The quantity of a commodity is demanded at a given price.*
- *The commodity is demanded at a given time.*

Types of Demand:-

- Composite Demand (Ex. Crude Oil)
- Competitive Demand (Ex.)
- Direct and Derived Demands
- Domestic and Industrial Demands
- Autonomous and Induced Demand
- Perishable and Durable Goods' Demands
- New and Replacement Demands

- Final and Intermediate Demands
- Individual and Market Demands
- Total Market and Segmented Market Demands
- Company and Industry Demands

Demand Function:-

The market demand function for a product is a function showing the relation between the quantity demanded and the factors affecting the quantity of demand.

Such a single variable function can be expressed as:

$$Dx = f(Px)$$

We have seen that demand is, in reality, a multivariate function. Demand for commodity is influenced by its own price, related prices, own income, related income, and non-price and non-income factors as well. The demand for *X(Dx)* depends on:

- $D_x = f(P_x, P_y, P_z, B, W, A, E, T, U)$

- Here D_x, stands for demand for item x (say, a car)
- P_x, its own price (of the car)
- P_y, the price of its substitutes (other brands/models)
- P_z, the price of its complements (like petrol)
- B, the income (budget) of the purchaser (user/consumer)
- W, the wealth of the purchaser
- A, the advertisement for the product (car)
- E, the price expectation of the user
- T, taste or preferences of user
- U, all other factors.

Law of Demand:-

According to **Marshal**, *"The law of demand states that other things being equal the quantity demanded increases with a fall in price & diminishes when price increases."*

According to **Ferguson**, *"According to the law of demand, the quantity demanded varies inversely with price."*

Assumptions of Law of Demand

- Money income of consumers
- Price of a commodity
- Price of related goods
- Future expectations about the prices
- Population growth
- Taste, Fashion and Habits of consumer
- Climatic conditions
- Quantity of the commodity
- Consumer's wealth status

Demand Schedule

Individual Demand Schedule: A schedule showing a consumer's quantity demanded for a commodity at different market prices at a given time is called demand schedule.

The following table shows individual demand schedule of firms as follows:

Price (in Rs.)	Quantity Demanded (in units)
1	50
2	40
3	30
4	20
5	10

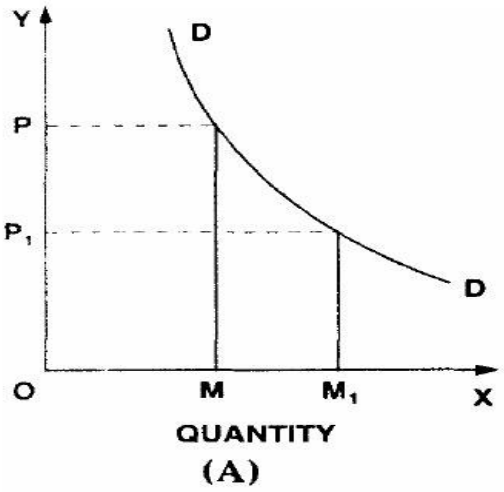
Market Demand Schedule: Market Demand Schedule is defined as the quantities of a given commodity which all consumers will buy at all possible pries at a given point of time.

This can be explained as follows:

Price per quintal (Rs.)	Demand of A (quintals)	Demand of B (quintals)	Total Market Demand(quintals)
80	10	5	15
70	20	10	30
60	30	15	45

Demand Curve

When the individual demand schedule is plotted on the graph, it is known as Demand Curve, this can be shown below:



Reasons for application of law of demand

- Operation of Law of Diminishing Marginal Utility
- Price Effect, Income Effect and Substitution Effect
- Demonstration Effect
- Multiple use of a commodity

Exceptions to Law of Demand

- Continuous changes in the price
- Giffens's Paradox

- Conspicuous Consumption
- Ignorance Effect

Elasticity of Demand

According to **Marshall**, *"the elasticity (or responsiveness) of demand in a market is great or small accordingly as the demand changes (rises or falls) much or little for a given change (rise or fall) in price."*

The concept of elasticity can be expressed in the form of an equation as:

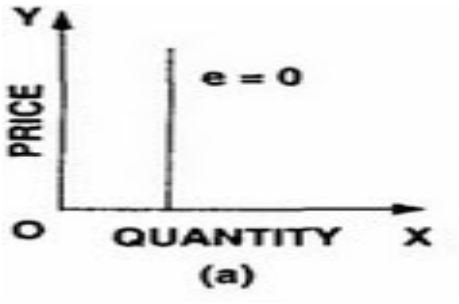
Ep = Percentage change in quantity demanded
Percentage change in the price

Ep = $(\Delta Dx/Dx) \times (Px/\Delta Px)$

Types of Price Elasticity:

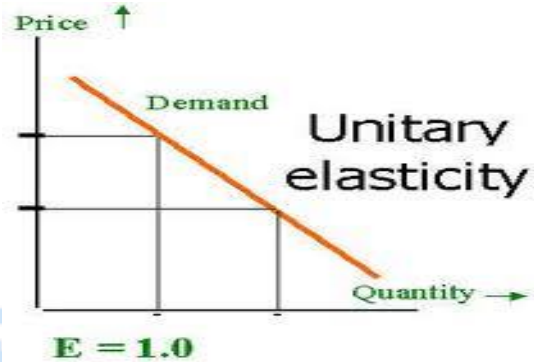
1. Perfectly inelastic demand (ep = 0)
2. Inelastic (less elastic) demand (e < 1)
3. Unitary elasticity (e = 1)
4. Elastic (more elastic) demand (e > 1)
5. Perfectly elastic demand (e = ∞)

Perfectly inelastic demand (ep = 0)

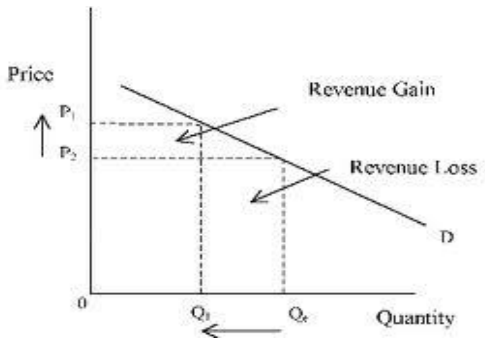


Inelastic (less elastic) demand (e < 1)

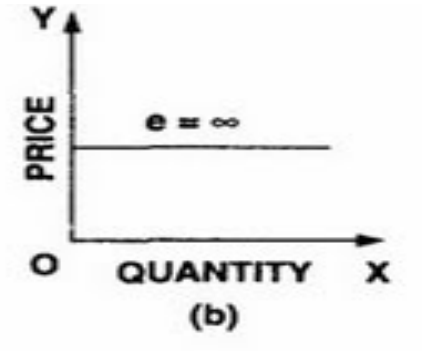
Unitary elasticity demand (e = 1)



Elastic (more elastic) demand (e > 1)



Perfectly elastic demand (e = ∞)



Determinants of Elasticity

- Nature of the Commodity
- Number of Substitutes Available
- Number of Uses
- Possibility of Postponement of Consumption
- Range of prices
- Proportion of Income Spent

Income Elasticity of Demand

The discussion of price elasticity of demand reveals that extent of change in demand as a result of change in price.

Thus, income elasticity of demand can be expressed as:

EY = [Percentage change in demand / Percentage change in income]

The following types of income elasticity can be observed

- Income Elasticity of Demand Greater than One (Ey>1)
- Income Elasticity is unitary (EY=1)
- Income Elasticity Less Than One (EY< 1)
- Zero Income Elasticity of Demand (EY=o)
- Negative Income Elasticity of Demand (EY< o)

Cross Elasticity of Demand:-

Percentage Change in demand for X

Percentage change in price of Y

In short, cross elasticity will be of three types:

- Negative cross elasticity – Complementary commodities.
- Positive cross elasticity – Substitutes.
- Zero cross elasticity – Unrelated goods.

Advertising Elasticity of Demand:

Advertising elasticity of demand (or simply advertising elasticity, often shortened to AED) is an elasticity measuring the effect of an increase or decrease in advertising on a market.

$$AED = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in spending on advertising}} = \frac{\Delta Q_d / Q_d}{\Delta A / A}$$

Importance of Elasticity

- Theoretically, its importance lies in the fact that it deeply analyses the price-demand relationship.
- The Pricing policy of the producer is greatly influenced by the nature of demand for his product.
- The price of joint products can be fixed on the basis of elasticity of demand.
- The concept of elasticity of demand is helpful to the Government in fixing the prices of public utilities.
- The Elasticity of demand is important not only in pricing the commodities but also in fixing the price of labour viz., wages.
- The concept of elasticity of demand is very important in the field international trade.

Use of Demand Elasticity in Managerial Decisions

- Useful for Businessmen
- Useful for Government and Finance Minister
- Useful in international Trade
- Useful to Policy Makers
- Useful for Trade Union

Measurement of Elasticity

- **Percentage Method:**

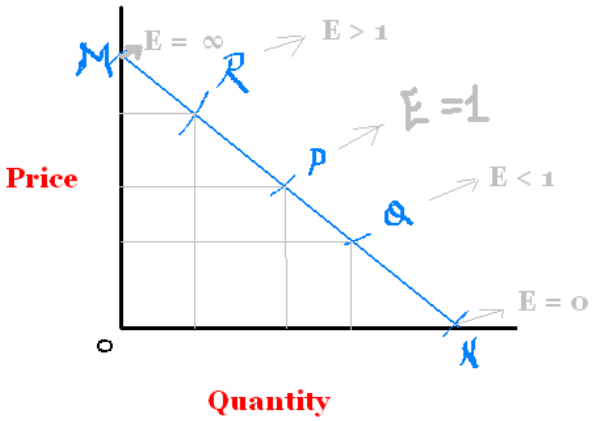
$$Ep = \frac{\text{Percentage change in demand}}{\text{Percentage change in price}}$$

- **Total Outlay Method:** The elasticity of demand can be measured by considering the changes in price and the consequent changes in demand causing changes in the total amount spent on the goods.

- **Point Method:**

$$Ep = \frac{\text{Lower part of Demand curve}}{\text{Upper part of Demand curve}}$$

$$Ep = \frac{PQ}{PR}$$



- **The Arc Elasticity of Demand**

ARC METHOD: The **arc elasticity of demand** refers to the relationship between changes in price and the subsequent change in quantity demanded.

$$\text{Arc Elasticity of Demand} = \frac{\dfrac{Q_1 - Q_o}{\left(\dfrac{Q_1 + Q_o}{2}\right)}}{\dfrac{P_1 - P_o}{\left(\dfrac{P_1 + P_o}{2}\right)}}$$

Q_o is the initial quantity demanded.

Q_1 is the new quantity demanded.

P_o is the initial price.

P_1 is the new price.

The arc elasticity formula is used if the change in price is relatively large. It is more accurate a measure of elasticity than simple "price elasticity".

If the arc or price elasticity of demand is **greater than 1**, demand is said to be **elastic**. The demand curve has a "flat" appearance.

If the arc or price elasticity of demand is **less than 1**, demand is said to be **inelastic**. The demand curve has a "steep" appearance.

Meaning of Demand Forecasting

Demand forecast means estimation of the demand for the product in question for the forecast period.

Demand forecasting may be undertaken at following levels:

- Micro Level
- Macro Level
- Industry Level

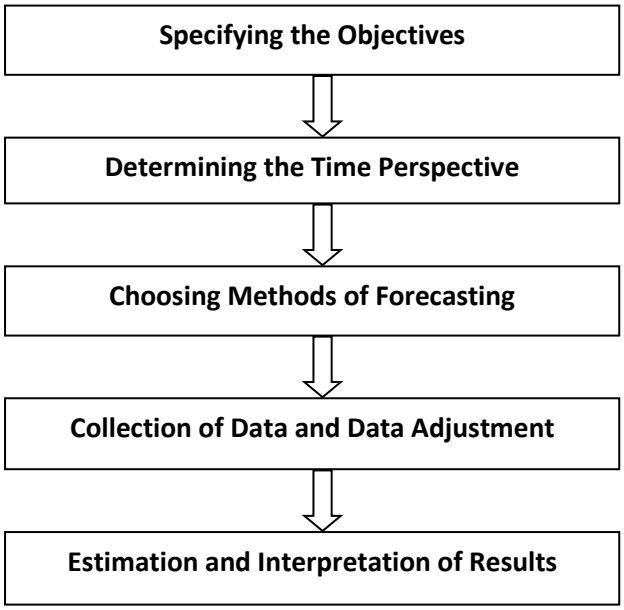
Objectives of Demand forecasting:

1. **Short term**
   a. Helps in reducing costs of raw materials and control inventories.
   b. Make arrangements for short term financial requirements.
   c. Establish targets and to provide incentives to sales force.
   d. Make arrangements for appropriate promotional efforts such as advertising and sales campaign etc.
   e. Formulate pricing policies for achieving desired results.
   f. Assists in production planning and scheduling operations.
2. **Long term**
   a. Helps in predicting long term demand.
   b. Provide information for deciding proper product mix.
   c. Helps in taking long term decisions like plan for new units, new plants, new projects and expansion of existing scale of operations.
   d. Significant for preparing plans for long term financial requirement.
   e. Helps in long term human resource planning like training programmes expansion programmes etc.
   f. Major decisions of large business organizations are based on demand forecasting only.

Significance of Demand Forecasting

- Production Planning
- Sales Forecasting
- Control of Business
- Inventory Control
- Growth and Long-term Investment programmes
- Stability
- Economic Planning and policy making

Steps of Demand Forecasting



Methods of Demand Forecasting:

Demand Forecasting Methods

Simple Survey Method

(I)Experts Opinion Poll

(II) Reasoned Opinion-Delphi Technique

(III) Consumers Survey- Complete Enumeration Method

(IV) Consumer Survey-Sample Survey Method

(V) End-user Method of Consumers Survey

Complex Statistical Methods

(I) Time series analysis

(II) Barometric Techniques

(III) Correlation and Regression

Supply Analysis:

Meaning of supply:

The supply of a commodity means the amount of that commodity which producers are able and willingness to offer for sale at a given prices.

Prof.Bach:- "Supply is a schedule of amounts that will be offered for sale at different prices during any time period,other factors remaining same"

Determinants Of Supply

- Price of the good
- Number of Producers
- Factor prices
- technology changes
- Prices of other products of the producer.
- Expectation of the future

Law of Supply

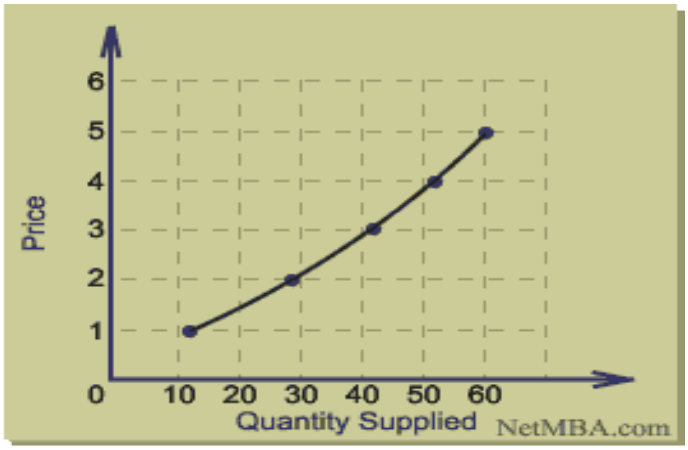
All other factors being equal, as the price of a good or service increases, the quantity of goods or services offered by suppliers increases and vice versa.

Like the law of demand, the law of supply demonstrates the quantities that will be sold at a certain price. But unlike the law of demand, the supply relationship shows an upward slope. This means that the higher the price, the higher the quantity supplied. Producers supply more at a higher price because selling a higher quantity at a higher price increases revenue.

Supply Schedule

Price	Quantity Supplied
1	12
2	28
3	42
4	52
5	60

Supply Curve



Limitations of the law of supply

- Expectations about the future price: when the price rises and the seller expects the future price to rise further,supply will decline as the seller will be induced to withhold the supplies so as to sell later and earn larger profits.
- Agriculture output: law of supply will not apply in case of agricultural commodities as their production can not be increased at once following price increases.
- Factors other than price not remaining constant.

Elasticity of supply

It can be defined as the "degree of responsiveness of supply to a given change in price"

Types of elasticity of supply

- Perfectly Inelastic: where a change in price causes no change in quantity supplied. Es = 0
- Perfectly elastic supply: where a small change in price leads to big or infinite change in supply. Es=
- Unity elastic: where a given proportionate change in price leads to proportionate change in supply. Es = 1
- Relatively inelastic supply: where a change in price leads to less than proportionate increase in supply. Es<1
- Relatively elastic demand : where a change in price leads to more than proportionate change in supply. Es>1

Factor Influencing Elasticity of Supply

Importance of Elasticity of Supply

Production Analysis: production is the transformation of resources into commodities over time and / or space. Thus the production is creation of utility. A business firm carries its production process with the employment of various factors of production.

Meaning and Definition of Production Function:

The physical relationship between inputs and output is production function. Production function is an engineering concept, but it is widely used in business economics for studying production behavior. The production function tells us with given technology what will be resultant output with different combination of inputs.

It is a mathematical expression which relates the quantity of factor inputs to the quantity of outputs that result. There are **three measures** of production / productivity.

- **Total product** is simply the total output that is generated from the factors of production employed by a business.
- **Average product** is the total output divided by the number of units of the variable factor of production employed.
- **Marginal product** is the change in total product when an additional unit of the variable factor of production is employed.

According to **Professor J.M. Joshi**, "The term production function refers to the physical relationship between a firm's inputs of resources and its output of goods and services per unit of time, leaving prices aside."

Algebraic Statement of Production Function

In a mathematical formula production function can be expressed as given below:

$$Q = f\,(Ld, L, K, M, T)$$

Where
Q = output in physical units of good X

Ld = land units employed in the production of Q
L = labour units employed in the production of Q
K = capital units employed in the production of Q
M = managerial units employed in the production of Q
T = technology employed in production of Q
f = function

Assumption of Production Function

The production function is based on certain assumptions as given under:

- Function gives the maximum possible output that can be produced from a given amount of various inputs.
- Minimum quantity of inputs necessary to produce a given level of output.
- All the output and input variable and input variables are in their corresponding physical quantities and not in their value (rupee) terms.
- It is related with the given period of time.
- During short period production function is based on one fixed factor of production while other factors of production are variable.
- During long period production function has all the factors of production as variable and even the scale of production can be changed.
- Different factors of production are divisible into small units.
- Production function is based on the assumption that the state of technology is given.
- It is assumed that an individual firm adopts the best possible techniques of production.

Types of Production Function
There are two types of production function:

1. Short run production function.
2. Long run production function.

Short-run Laws of Production: Production with One Variable Input

The laws of production state the relationship between output and input. In the short-run, input-output relations are studied with one variable input (labour), other inputs (especially, capital) held constant. The short run is defined in economics as a period of time where at least one factor of production is assumed to be in fixed supply i.e. it cannot be changed.

We normally assume that the quantity of capital inputs (e.g. plant and machinery) is fixed and that production can be altered by suppliers through changing the demand for variable inputs such as labour, components, raw materials and energy inputs. Often the amount of land available for production is also fixed. The laws of production under these conditions are called the **'Laws of Variable Proportions'** or the **'Laws of Return to a Variable Input'**.

Laws of returns process through three stages as given below:

- **Law of Increasing Returns**
- **Law of Diminishing Returns**
- **Law of Negative Returns**

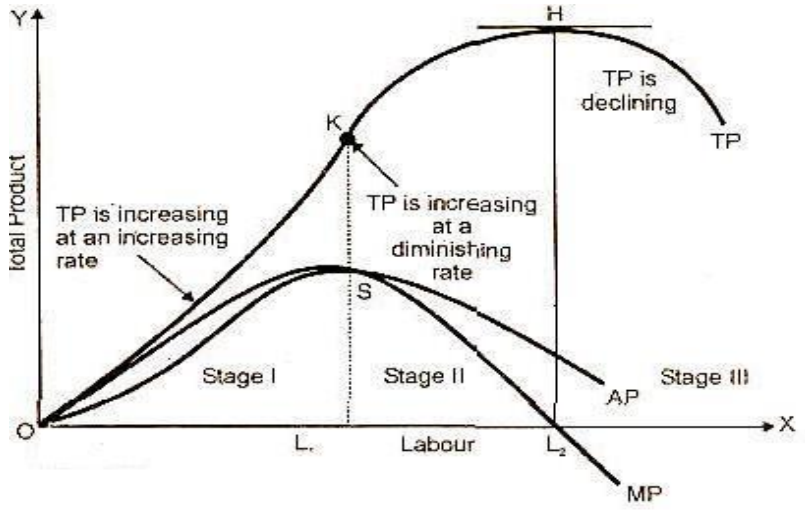
To illustrate the working of this law, let us take a hypothetical production schedule of a firm:

Production Schedule

Units of Variable Input (Labour) (n)	*Total Product (TP)*	*Average Product (AP)*	*Marginal Product (MP)*	
1	20	20	20	
2	50	25	30	**Stage**
3	90	30	**I**	
4	120	30	40	
5	135	27	30	
6	144	24	15	
7	147	21	9	**Stage II**
8	148	18.5	3	
9	148	16.4	1	
10	145	14.5	0	
			-3	**Stage**
			III	

It is assumed that the amount of fixed factors, land and capital, is given and held constant throughout. To this, labour – the variable factor – is added unit-wise in order to increase the production of commodity X. The rate of technology remains unchanged. The input output relationship is thus observed in following figure:

The Product Curves



The Laws of Return to Scale:

Economists use the phrase "returns to scale" to describe the output behaviour in the long run in relation to the variations in factor inputs.

The law of return to scale is long run concept. In the long run volume if production can be changed by changing all factor of production. It shows the behavior of output when all factor are altered in the same proportion.

In the short run, thus, we have returns to variable factors. In the long run, we have returns to scale. The long run production function implies that all components of inputs (*Ld, L, K, M, T*) are varied to increase production.

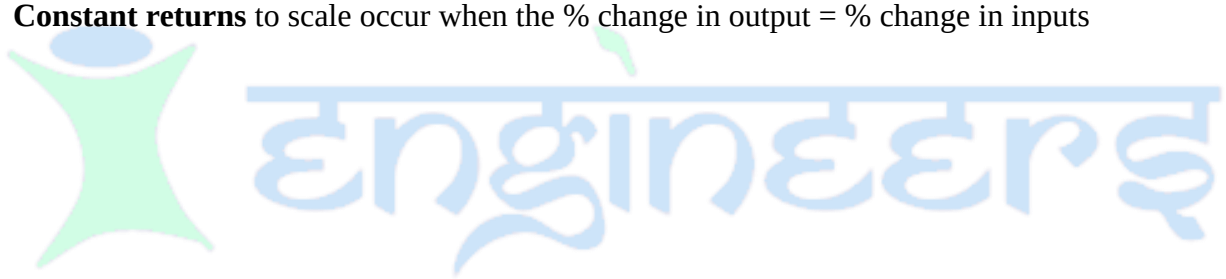
Assumptions

The law follow certain assumptions;

(1) Technology of production is unchanged.
(2) All units of factors are homogeneous.
(3) Returns are measured in physical term.
(4) Return to scale is related to long period.
(5) Prices of factors of production are assumed to remain constant.

Stages of Law of Return to Scale:

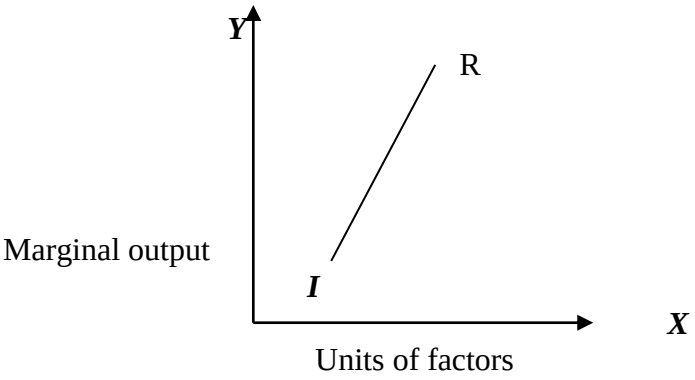
- **Increasing returns** to scale occur when the % change in output > % change in inputs
- **Decreasing returns** to scale occur when the % change in output < % change in inputs
- **Constant returns** to scale occur when the % change in output = % change in inputs



A numerical example of long run returns to scale					
Units of Capital	**Units of Labour**	**Total Output**	**% Change in Inputs**	**% Change in Output**	**Returns to Scale**
20	150	3000			
40	300	7500	100	150	Increasing
60	450	12000	50	60	Increasing
80	600	16000	33	33	Constant
100	750	18000	25	13	Decreasing

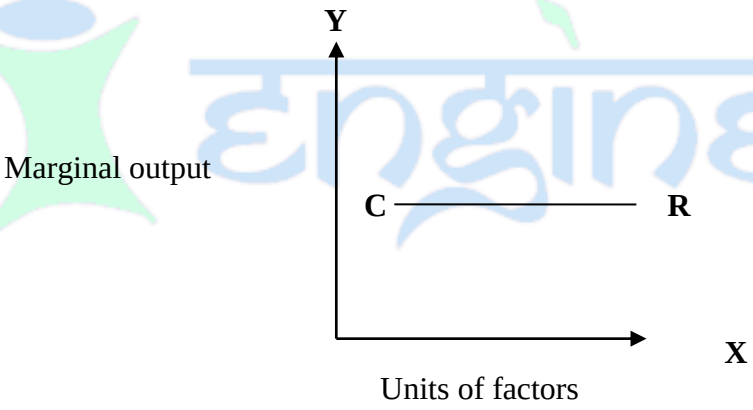
The Law of Increasing Return: When all the factors of production are increased in equal proportion and output increases in greater proportion.

Increasing Return



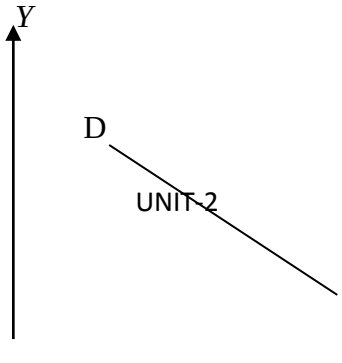
The law of constant returns: The process of increasing returns to scale, however, cannot go on forever. It may be followed by constant return to scale. As the firm continues to expand its scale of operation, it gradually exhausts the economies responsible for the increasing returns. Then, the constant returns may occur.

Constant Return



The law of decreasing returns: As the firm expands, it may encounter growing diseconomies of the factor employed. At this stage the proportionate change in output is less than the proportionate change in all the factors of production (inputs).

Decreasing Return



Marginal output

R

X

Units of factors

Cost Concept:

The cost concepts that are relevant to business operations and decisions can be grouped on the basis of their nature and purpose under two categories, (i) cost concepts used for accounting purpose, and (ii) analytical cost concepts used in economic analysis of business activities. Some important concepts of these two categories are as follows:

Accounting costs:

- ***Opportunity Costs and Actual Costs;*** The *opportunity cost* of a resource can be defined as the value of resource in its next best use, that is, if it were not being used for the present purpose. The opportunity cost is the opportunity lost.
- ***Business Costs and Full Costs;*** *Business costs* include all the expenses that are incurred to carry out a business. The concept of *full cost* includes business costs, opportunity costs and normal profit.
- ***Actual or Explicit Costs and Implicit or Imputed Costs;***
- ***Out- of- Pocket and Book Costs;***

Analytical Cost:

- ***Fixed and Variable Costs;***
- ***Total, Average and Marginal Costs***
- ***Long-Run and Short- Run costs;***
- ***Incremental Costs and Sunk Costs;***
- ***Historical and Replacement Costs;***
- ***Private and Social Costs;***

Short Run Cost Curves:

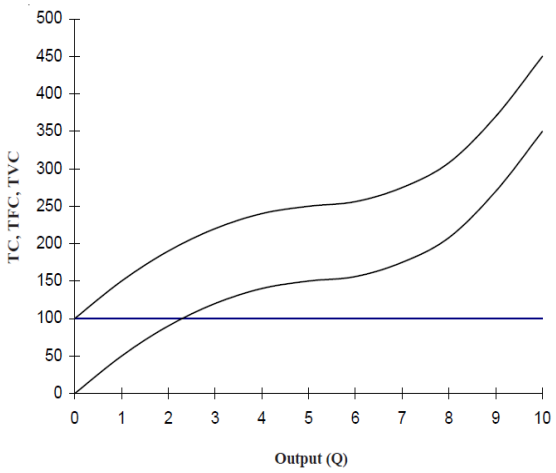
- ***Total Costs***

Three concepts of total cost in the short run must be considered: total fixed cost (TFC), total variable cost (TVC), and total cost (TC). Following table shows the costs of a firm in the short run. According to this table, the firm's total fixed costs are Rs. 100.

Table-1, A Firm's Short Run Costs (in Rs.)

Q	TFC	TVC	TC	MC	AFC	AVC	ATC
0	100	0	100				
1	100	50	150	50	100.0	50	150
2	100	90	190	40	50.0	45	95.0
3	100	120	220	30	33.3	40	73.3
4	100	140	240	20	25.0	35	60.0
5	100	150	250	10	20.0	30	50.0
6	100	156	256	6	16.7	26	42.7
7	100	175	275	19	14.3	25	39.3
8	100	208	308	33	12.5	26	38.5

9 10	100 100	270 350	370 450	62 80	11.1 10.0	30 35	41.4 45.0



TC = TFC + TVC

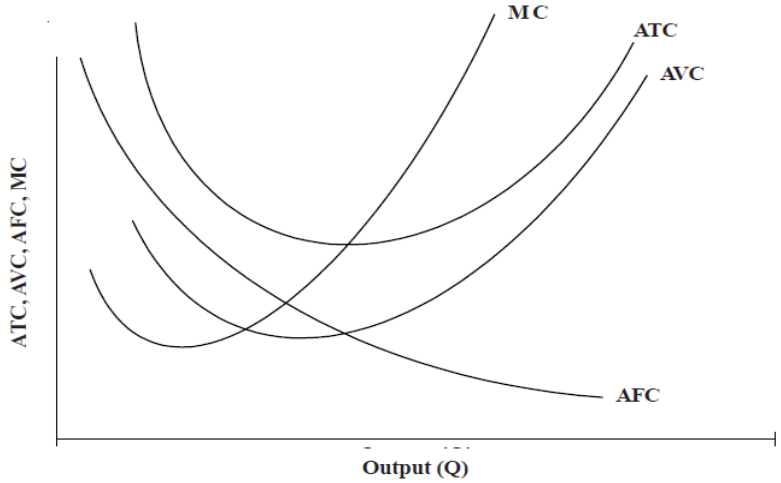
Where,
TC = total cost
TFC = total fixed costs
TVC = total variable costs

- **Average Fixed Costs**

There are three average cost concepts corresponding to the three total cost concepts. These are *average fixed cost (AFC), average variable cost (AVC),* and *average total cost (ATC).* Figure 2 shows typical average fixed cost function graphically. *Average fixed cost* is the total fixed cost divided by output. Average fixed cost declines as output (Q) increases. Thus we can write average fixed cost as:

AFC = TFC/Q

Figure-2, Short Run Average and Marginal Cost Curves



- **Average Variable Costs**

$$AVC = \frac{TVC}{Q}$$

- **Average Total Cost**

$$ATC = AFC + AVC = \frac{TC}{Q}$$

- **Marginal Cost**

$$\mathbf{MC = \frac{WTC}{WQ} = \frac{WTVC}{WQ}}$$

- Where,
- MC = marginal cost
- WQ = change in output
- WTC = change in total cost due to change in output
- WTVC = change in total variable cost due to change in output