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Theory of Demand And Supply

UNIT 1: LAW OF DEMAND AND ELASTICITY OF DEMAND

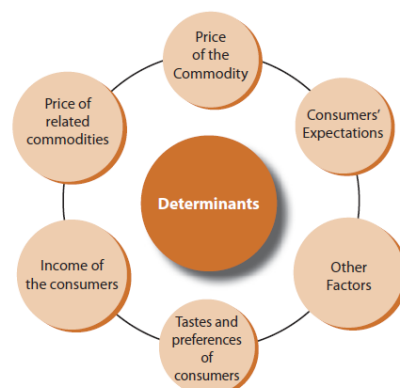
2.0. MEANING OF DEMAND

What is Economics about?

- 1) The concept 'demand' refers to the quantity of a good or service that consumers are willing and able to purchase at various prices during a given period of time. It is to be noted that demand, in Economics, is something more than the desire to purchase, though desire is one element of it. A beggar, for instance, may desire food, but due to lack of means to purchase it, his demand is not effective. Thus, effective demand for a thing depends on (i) desire (ii) means to purchase and (iii) willingness to use those means for that purchase. Unless desire is backed by purchasing power or ability to pay, and willingness to pay, it does not constitute demand.
- 2) Two things are to be noted about the quantity demanded.
 - (i) The quantity demanded is always expressed at a given price.
 - (ii) The quantity demanded is a flow. We are concerned not with a single isolated purchase, but with a continuous flow of purchases and we must therefore express demand as 'so much per period of time' i.e., one thousand dozens of oranges per day, seven thousand dozens of oranges per week and so on.
- 3) **In short "By demand, we mean the various quantities of a given commodity or service which consumers would buy in one market during a given period of time, at various prices, or at various incomes, or at various prices of related goods".**

2.1 WHAT DETERMINES DEMAND?

The important factors that determine demand are given below.



- (i) **Price of the commodity:** Ceteris paribus i.e. other things being equal, the demand for a commodity is inversely related to its price. It implies that a rise

in the price of a commodity brings about a fall in the quantity purchased and vice-versa. This happens because of income and substitution effects.

(ii) Price of related commodities: Related commodities are of two types: (a) complementary goods and (b) competing goods or substitutes.

(a) Complementary goods are those goods which are consumed together or simultaneously. For example; tea and sugar, automobile and petrol and pen and ink. When two commodities are complements, a fall in the price of one (other things being equal) will cause the demand for the other to rise. For example, a fall in the price of petrol-driven cars would lead to a rise in the demand for petrol. The reverse will be the case when the price of a complement rises. Thus, we find that, there is an inverse relation between the demand for a good and the price of its complement.

(b) Two commodities are called competing goods or substitutes when they satisfy the same want and can be used with ease in place of one another. For example, tea and coffee, ink pen and ball pen, are substitutes for each other and can be used in place of one another easily. When goods are substitutes, a fall in the price of one (*ceteris paribus*) leads to a fall in the quantity demanded of its substitutes. For example, if the price of tea falls, people will try to substitute it for coffee and demand more of it and less of coffee i.e. the demand for tea will rise and that of coffee will fall. Therefore, there is direct or positive relation between the demand for a product and the price of its substitutes.

(iii) Income of the consumer: Other things being equal, the demand for a commodity depends upon the money income of the consumer. The purchasing power of the consumer is determined by the level of his income. In most cases, the larger the average money income of the consumer, the larger is the quantity demanded of a particular good.

The nature of relationship between income and quantity demanded depends upon the nature of consumer goods. Most of the consumption goods fall under the category of normal goods. These are demanded in increasing quantities as consumers' income increases. Household furniture, clothing, automobiles, consumer durables and semi durables etc. fall in this category. Essential consumer goods such as food grains, fuel, cooking oil, necessary clothing etc., satisfy the basic necessities of life and are consumed by all individuals in a society. A change in consumers' income, although will cause an increase in demand for these necessities, but this increase will be less than proportionate to the increase in income. This is because as people become richer, there is a relative decline in the importance of food and other non durable goods in the overall consumption basket and a rise in the importance of durable goods such as a TV, car, house etc.

There are some commodities for which the quantity demanded rises only up to a certain level of income and decreases with an increase in money income beyond this level. These goods are called inferior goods. A same good may be normal for one condition and may be inferior in another. For example Bajra may become an inferior good for a person when his income increases above a certain level and he can now afford better substitutes such as wheat. Demand for luxury goods and prestige goods arise beyond a certain level of consumers' income and keep rising as income increases.

(iv) Tastes and preferences of consumers: The demand for a commodity also depends upon the tastes and preferences of consumers and changes in them over a period of time. Consumers may perceive a product as obsolete and discard it before it is fully utilised and prefer another good which is currently in fashion. For example, there is greater demand for LCD/LED televisions and more and more people are discarding their ordinary television sets even though they could have used it for some more years.

‘Demonstration effect’ or **‘bandwagon effect’** plays an important role in determining the demand for a product. An individual’s demand for LCD/LED television may be affected by his seeing one in his neighbour’s or friend’s house, either because he likes what he sees or because he figures out that if his neighbour or friend can afford it, he too can. A person may develop a taste or preference for wine after tasting some, but he may also develop it after discovering that serving it enhances his prestige. On the contrary, when a product becomes common among all, some people decrease or altogether stop its consumption. This is called **‘snob effect’**. Highly priced goods are consumed by status seeking rich people to satisfy their need for conspicuous consumption. This is called **‘Veblen effect’** (named after the American economist Thorstein Veblen). In any case, people have tastes and preferences and these change, sometimes, due to external and sometimes, due to internal causes and influence demand.

(v) Consumers’ Expectations: Consumers’ expectations regarding future prices, income, supply conditions etc. influence current demand. If the consumers expect increase in future prices, increase in income and shortages in supply, more quantities will be demanded. If they expect a fall in price, they will postpone their purchases of nonessential commodities and therefore, the current demand for them will fall.

Other factors: Apart from the above factors, the demand for a commodity depends upon the following factors:

(a) Size of population: Generally, larger the size of population of a country or a region, greater is the demand for commodities in general.

(b) Composition of population: If there are more old people in a region, the demand for spectacles, walking sticks, etc. will be high. Similarly, if the population consists of more of children, demand for toys, baby foods, toffees, etc. will be more.

(c) The level of National Income and its Distribution: The level of national income is a crucial determinant of market demand. Higher the national income, higher will be the demand for all normal goods and services. The wealth of a country may be unevenly distributed so that there are a few very rich people while the majority are very poor. Under such conditions, the propensity to consume of the country will be relatively less, because the propensity to consume of the rich people is less than that of the poor people. Consequently, the demand for consumer goods will be comparatively less. If the distribution of income is more equal, then the propensity to consume of the country as a whole will be relatively high indicating higher demand for goods.

(d) Consumer-credit facility and interest rates: Availability of credit facilities induces people to purchase more than what their current incomes permit them. Credit facilities mostly determine the demand for durable

goods which are expensive and require bulk payments at the time of purchase. Low rates of interest encourage people to borrow and therefore demand will be more. Apart from above, factors such as government policy in respect of taxes and subsidies, business conditions, wealth, socioeconomic class, group, level of education, marital status, weather conditions, salesmanship and advertisements, habits, customs and conventions also play an important role in influencing demand.

Demand Function

The demand function states the relationship between the demand for a product (the dependent variable) and its determinants (the independent or explanatory variables). A demand function may be expressed as follows:

$$D_x = f(P_x, M, P_y, P_c, T, A)$$

Where D_x is the quantity demanded of product X

P_x is the price of the commodity

M is the money income of the consumer

P_y is the price of its substitutes

P_c is the price of its complementary goods

T is consumer tastes, and preferences

A is advertisement expenditure

2.2 LAW OF DEMAND

1. The law states the nature of relationship between the quantity demanded of a product and its price.
2. According to the law of demand, other things being equal, if the price of a commodity falls, the quantity demanded of it will rise and if the price of a commodity rises, its quantity demanded will decline.
3. Thus, there is an inverse relationship between price and quantity demanded, ceteris paribus.
4. The other things which are assumed to be equal or constant are the prices of related commodities, income of consumers, tastes and preferences of consumers, and such other factors which influence demand.
5. If these factors which determine demand also undergo a change, then the inverse price-demand relationship may not hold good. For example, if incomes of consumers increase, then an increase in the price of a commodity, may not result in a decrease in the quantity demanded of it.

Definition of the Law of Demand

Prof. Alfred Marshall defined the Law thus: “The greater the amount to be sold, the smaller must be the price at which it is offered in order that it may find purchasers or in other words the amount demanded increases with a fall in price and diminishes with a rise in price”.

The Law of Demand may be illustrated with the help of a demand schedule and a demand curve.

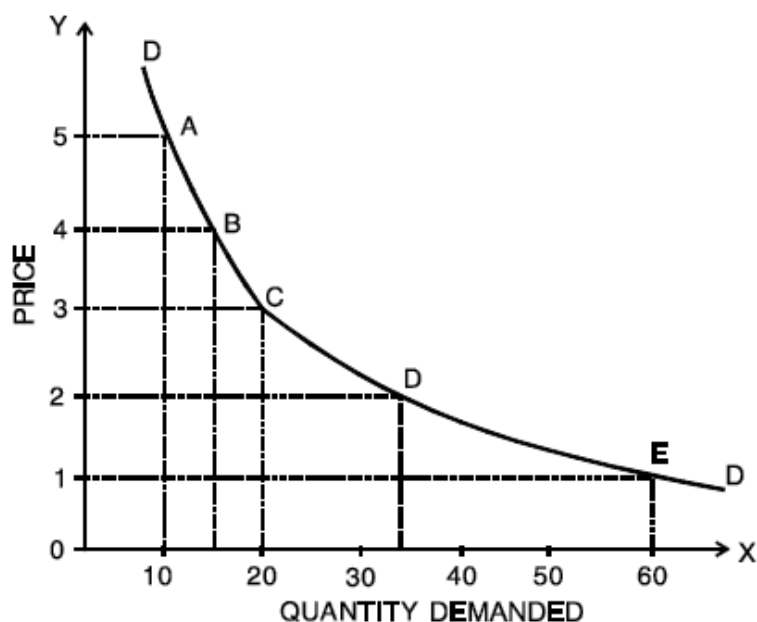
2.2.0 Demand Schedule

A demand schedule is a table which presents the different prices of a good and the corresponding quantity demanded per unit of time.

Table 1 : Demand schedule of an individual consumer

	Price (in Rupees)	Quantity demanded (Units)
A	5	10
B	4	15
C	3	20
D	2	35
E	1	60

When the price of commodity X is ₹ 5 per unit, the consumer purchases 10 units of the commodity. When the price falls to ₹ 4, he purchases 15 units of the commodity. Similarly, when the price further falls, the quantity demanded by him goes on rising until at price ₹ 1, the quantity demanded by him rises to 60 units. The above table depicts an inverse relationship between price and quantity demanded; as the price of the commodity X goes on rising, its demand goes on falling.



Demand curve: A demand curve is a graphical presentation of the demand schedule. It is obtained by plotting a demand schedule. We can now plot the data from Table 1 on a graph with price on the vertical axis and quantity on the horizontal axis. In Fig. 1, we have shown such a graph and plotted the five points corresponding to each price-quantity combination shown in Table 1. Point A shows the same information as the first row of Table 1, that at ₹ 5 per unit, only 10 units of X will

be demanded. Point E shows the same information as does the last row of the table, when the price is Re 1, the quantity demanded will be 60 units.

We now draw a smooth curve through these points. The curve is called the demand curve for commodity 'X'. It has a negative slope. The curve shows the quantity of 'X' that a consumer would like to buy at each price; its downward slope indicates that the quantity of 'X' demanded increases as its price falls.

2.2.1 Market Demand Schedule

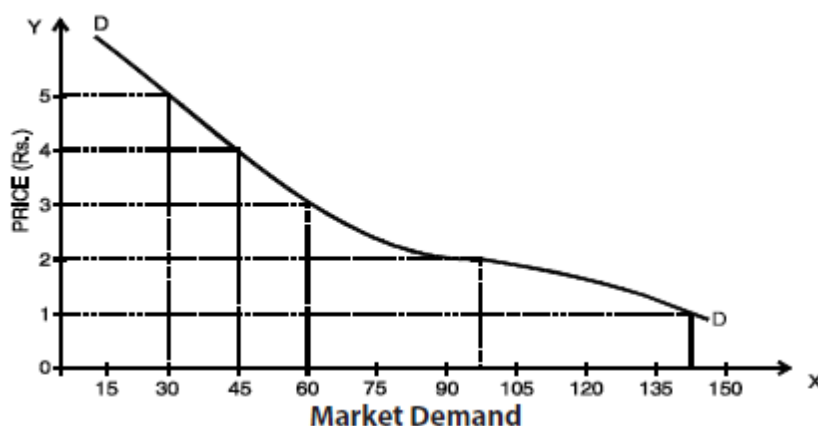
Market demand is the total quantity that all consumers of a commodity are willing to buy per unit of time at a given price, all other things remaining constant. When we add up the various quantities demanded by different

consumers in the market, we can obtain the market demand schedule. How the summation is done is illustrated in Table 2. Suppose there are only three individual buyers of the goods in the market namely, P, Q and R. The Table 2 shows their individual demands at various prices.

Table 2: Market Demand Schedule

Price(₹)	Quantity demanded by			
	P	Q	R	Total Market Demand
5	10	8	12	30
4	15	12	18	45
3	20	17	23	60
2	35	25	40	100
1	60	35	45	140

When we add the quantities demanded at each price by consumers P, Q and R, we get the total market demand. Thus, when price is ₹ 5 per unit, the market demand for commodity 'X' is 30 units (i.e. 10+8+12). When price falls to ₹ 4, the market demand is 45 units. At ₹ 1, 140 units are demanded in the market. The market demand schedule also indicates inverse relationship between price and quantity demanded of 'X'.



Market Demand Curve: If we plot the market demand schedule on a graph, we get the market demand curve. Figure 2 shows the market demand curve for commodity 'X'. The market demand curve, like the individual demand curve, slopes downwards to the right because it is nothing but the lateral summation of individual demand curves. Besides, as the price of the good falls, it is very likely that new buyers will enter the market which will further raise the quantity demanded of the good.

2.2.2 Rationale of the Law of Demand

The following are reasons:-

(1) Law of diminishing marginal utility: A consumer is in equilibrium (i.e. maximises his satisfaction) when the marginal utility of the commodity and its price equalize. According to Marshall, the consumer has diminishing utility for each additional unit of a commodity and therefore, he will be willing to pay only less for each additional unit. A rational consumer will not pay more for lesser satisfaction. He is induced to buy additional units only when the prices are

lower. The operation of diminishing marginal utility and the act of the consumer to equalize the utility of the commodity with its price result in a downward sloping demand curve.

(2) Price effect: The total fall in quantity demanded due to an increase in price is termed as Price effect. The law of demand can be dubbed as “Negative Price Effect” with some exceptions. The price effect manifests itself in the form of income effect and substitution effect.

(a) Substitution effect: Hicks and Allen have explained the law in terms of substitution effect and income effect. When the price of a commodity falls, it becomes relatively cheaper than other commodities. Assuming that the prices of all other commodities remain constant, it induces consumers to substitute the commodity whose price has fallen for other commodities which have now become relatively expensive. The result is that the total demand for the commodity whose price has fallen increases. This is called substitution effect.

(b) Income effect: When the price of a commodity falls, the consumer can buy the same quantity of the commodity with lesser money or he can buy more of the same commodity with the same amount of money. In other words, as a result of fall in the price of the commodity, consumer’s real income or purchasing power increases. This increase in the real income induces him to buy more of that commodity. Thus, the demand for that commodity (whose price has fallen) increases. This is called income effect.

(3) Arrival of new consumers: When the price of a commodity falls, more consumers start buying it because some of those who could not afford to buy it earlier may now be able to buy it. This raises the number of consumers of a commodity at a lower price and hence the demand for the commodity in question.

(4) Different uses: Certain commodities have multiple uses. If their prices fall, they will be used for varied purposes and therefore their demand for such commodities will increase. When the price of such commodities are high (or rises) they will be put to limited uses only. Thus, different uses of a commodity make the demand curve slope downwards reacting to changes in price. For example Olive oil can be used for cooking as well as for cosmetic purposes. So if the price of olive oil rises we can limit our usage and thus the demand will fall.

2.2.3 Exceptions to the Law of Demand

According to the law of demand, other things being equal, more of a commodity will be demanded at lower prices than at higher prices,. The law of demand is valid in most cases; however there are certain cases where this law does not hold good. The following are the important exceptions to the law of demand.

(i) Conspicuous goods: Articles of prestige value or snob appeal or articles of conspicuous consumption are demanded only by the rich people and these articles become more attractive if their prices go up. Such articles will not conform to the usual law of demand. This was found out by Veblen in his doctrine of “Conspicuous Consumption” and hence this effect is called Veblen effect or prestige goods effect. Veblen effect takes place as some consumers measure the utility of a commodity by its price i.e., if the commodity is expensive they think that it has got more utility. As such, they buy less of this commodity

at low price and more of it at high price. Diamonds are often given as an example of this case. Higher the price of diamonds, higher is the prestige value attached to them and hence higher is the demand for them.

(ii) Giffen goods: Sir Robert Giffen, a Scottish economist and statistician, was surprised to find out that as the price of bread increased, the British workers purchased more bread and not less of it. This was something against the law of demand. Why did this happen? The reason given for this is that when the price of bread went up, it caused such a large decline in the purchasing power of the poor people that they were forced to cut down the consumption of meat and other more expensive foods. Since bread, even when its price was higher than before, was still the cheapest food article, people consumed more of it and not less when its price went up.

Such goods which exhibit direct price-demand relationship are called 'Giffen goods'. Generally those goods which are inferior, with no close substitutes easily available and which occupy a substantial place in consumer's budget are called 'Giffen goods'. All Giffen goods are inferior goods; but all inferior goods are not Giffen goods. Inferior goods ought to have a close substitute. Moreover, the concept of inferior goods is related to the income of the consumer i.e. the quantity demanded of an inferior good falls as income rises, price remaining constant as against the concept of giffen goods which is related to the price of the product itself. Examples of Giffen goods are coarse grains like bajra, low quality rice and wheat etc.

(iii) Conspicuous necessities: The demand for certain goods is affected by the demonstration effect of the consumption pattern of a social group to which an individual belongs. These goods, due to their constant usage, become necessities of life. For example, in spite of the fact that the prices of television sets, refrigerators, coolers, cooking gas etc. have been continuously rising, their demand does not show any tendency to fall.

(iv) Future expectations about prices: It has been observed that when the prices are rising, households expecting that the prices in the future will be still higher, tend to buy larger quantities of such commodities. For example, when there is wide-spread drought, people expect that prices of food grains would rise in future. They demand greater quantities of food grains as their price rise. However, it is to be noted that here it is not the law of demand which is invalidated but there is a change in one of the factors which was held constant while deriving the law of demand, namely change in the price expectations of the people.

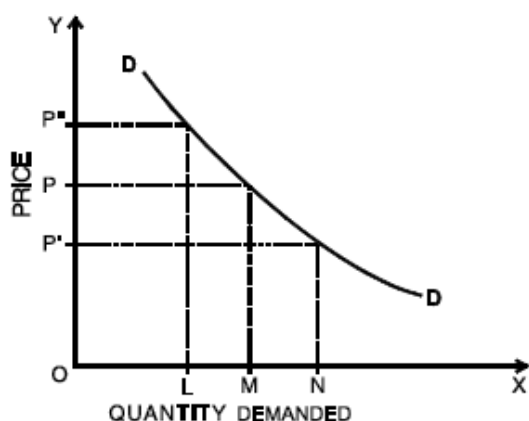
(v) The law has been derived assuming consumers to be rational and knowledgeable about market conditions. However, at times, consumers tend to be irrational and make impulsive purchases without any rational calculations about the price and usefulness of the product and in such contexts the law of demand fails.

(vi) Demand for necessities: The law of demand does not apply much in the case of necessities of life. Irrespective of price changes, people have to consume the minimum quantities of necessary commodities. Similarly, in practice, a household may demand larger quantity of a commodity even at a higher price because it may be ignorant of the ruling price of the commodity. Under such circumstances, the law will not remain valid. For example Food, power, water, gas.

(vii) Speculative goods: In the speculative market, particularly in the market for stocks and shares, more will be demanded when the prices are rising and less will be demanded when prices decline.

The law of demand will also fail if there is any significant change in other factors on which demand of a commodity depends. If there is a change in income of the household, or in prices of the related commodities or in tastes and fashion etc., the inverse demand and price relation may not hold good.

2.3 EXPANSION AND CONTRACTION OF DEMAND



- The demand schedule, demand curve and the law of demand all show that when the price of a commodity falls, its quantity demanded increases, other things being equal.
- When, as a result of decrease in price, the quantity demanded increases, in Economics, we say that there is an expansion of demand and when, as a result of increase in price, the quantity demanded decreases, we say that there is contraction of demand.
- For example, suppose the price of apples at any time is ₹ 100/ per kilogram and a consumer buys one kilogram at that price. Now, if other things such as income, prices of other goods and tastes of the consumers remain the same but the price of apples falls to ₹ 80 per kilogram and the consumer now buys two kilograms of apples, we say that there is a change in quantity demanded or there is an expansion of demand.
- On the contrary, if the price of apples rises to ₹ 150 per kilogram and the consumer then buys only half a kilogram, we say that there is a contraction of demand.
- The phenomena of expansion and contraction of demand are shown in Figure 3.
- The figure shows that when price is OP, the quantity demanded is OM, given other things equal. If, as a result of increase in price (OP''), the quantity demanded falls to OL, we say that there is 'a fall in quantity demanded' or 'contraction of demand' or 'an upward movement along the same demand curve'.
- Similarly, as a result of fall in price to OP', the quantity demanded rises to ON, we say that there is 'expansion of demand' or 'a rise in quantity demanded' or 'a downward movement on the same demand curve.'

2.4 INCREASE AND DECREASE IN DEMAND

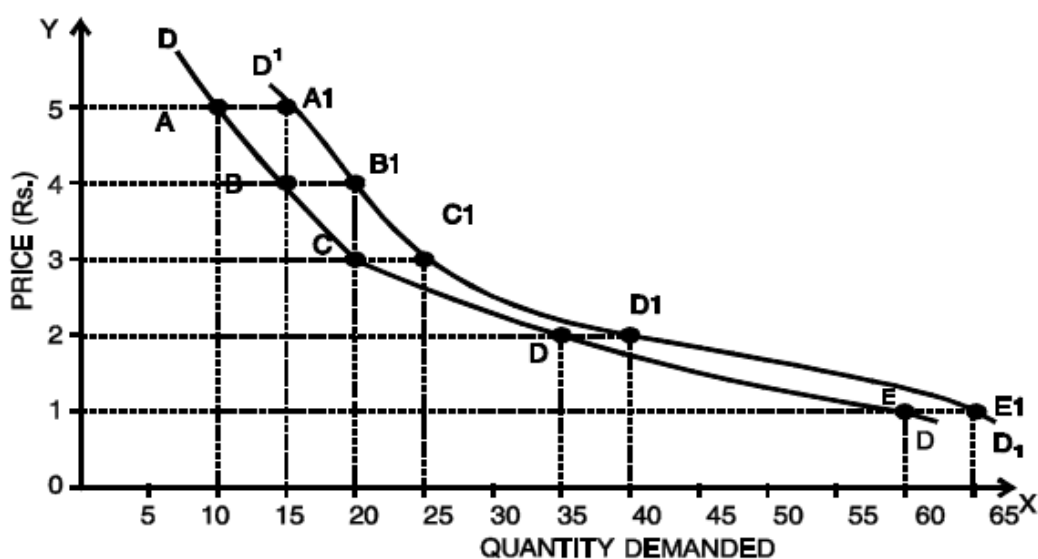
Till now we have assumed that other determinants of demand remain constant when we are analysing demand for a commodity. It should be noted that expansion and contraction of demand take place as a result of changes in the price while all other determinants of price viz. income, tastes, propensity to consume and price of related goods remain constant. The 'other factors remaining constant' means that the position of the demand curve remains the same and the consumer moves downwards or upwards on it. What happens if

there is a change in consumers' tastes and preferences, income, the prices of the related goods or other factors on which demand depends? Let us consider the demand for commodity X:

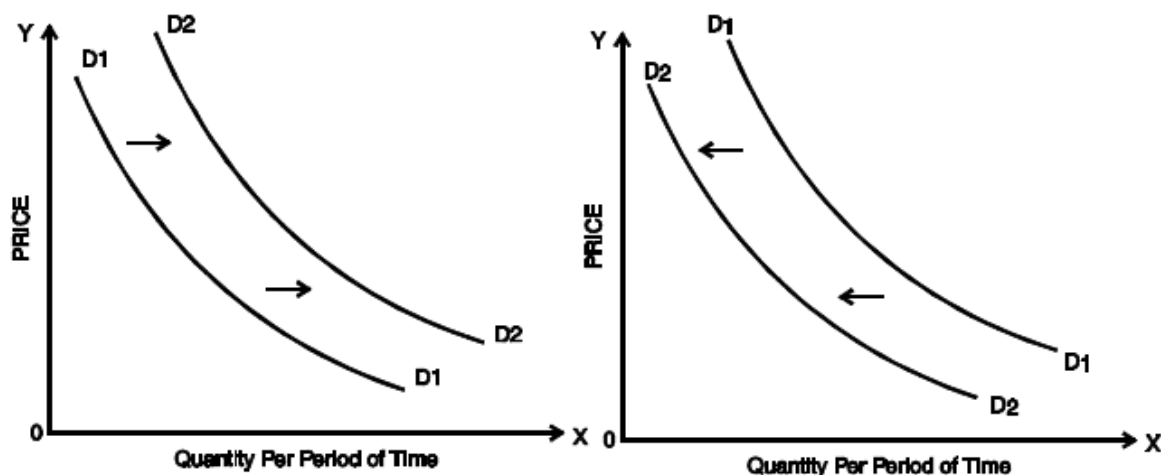
Table 3 shows the possible effect of an increase in income of the consumer on the quantity demanded of commodity X.

Table 3 : Two demand schedules for commodity X

	Price (₹)	Quantity of 'X' demanded when average household income is ₹ 20,000 per month	Quantity of 'X' demanded when average household income is ₹ 25,000 per month	
A	5	10	15	A1
B	4	15	20	B1
C	3	20	25	C1
D	2	35	40	D1
E	1	60	65	E1



These new data are plotted in Figure 4 as demand curve D'D' along with the original demand curve DD. We say that the demand curve for X has shifted [in this case it has shifted to the right]. The shift from DD to D'D' indicates an increase in the desire to purchase 'X' at each possible price. For example, at the price of ₹ 4 per unit, 15 units are demanded when average household income is ₹ 20,000 per month. When the average household income rises to ₹ 25,000 per month, 20 units of X are demanded at price ₹ 4. A rise in income thus shifts the demand curve to the right, whereas a fall in income will have the opposite effect of shifting the demand curve to the left.



5(a) A rightward shift in the demand curve (when more is demanded at each price) can be caused by a rise in income, a rise in the price of a substitute, a fall in the price of a complement, a change in tastes in favour of this commodity, an increase in population, and a redistribution of income to groups who favour this commodity.

5(b) A leftward shift in the demand curve (when less is demanded at each price) can be caused by a fall in income, a fall in the price of a substitute, a rise in the price of a complement, a change in tastes against this commodity, a decrease in population, and a redistribution of income away from groups who favour this commodity.

2.5 MOVEMENTS ALONG THE DEMAND CURVE VS. SHIFT OF DEMAND CURVE

- 1) A movement along the demand curve indicates changes in the quantity demanded because of price changes, other factors remaining constant. A shift of the demand curve indicates that there is a change in demand at each possible price because one or more other factors, such as incomes, tastes or the price of some other goods, have changed.
- 2) Thus, when an economist speaks of an increase or a decrease in demand, he refers to a shift of the whole curve because one or more of the factors which were assumed to remain constant earlier have changed. When the economists speak of change in quantity demanded he means movement along the same curve (i.e., expansion or contraction of demand) which has happened due to fall or rise in price of the commodity.
- 3) In short 'change in demand' represents shift of the demand curve to right or left resulting from changes in factors such as income, tastes, prices of other goods etc. and 'change in quantity demanded' represents movement upwards or downwards on the same demand curve resulting from a change in the price of the commodity.

2.6 ELASTICITY OF DEMAND

- 1) Till now we were concerned with the direction of the changes in prices and quantities demanded. Now we will try to measure these changes, or to say, we will try to answer the question “by how much does demand change due to a change in price”?
- 2) Consider the following situations:
 - (i) As a result of a fall in the price of radio from ₹ 500 to ₹ 400, the quantity demanded increases from 100 radios to 150 radios.
 - (ii) As a result of fall in the price of wheat from ₹ 20 per kilogram to ₹ 18 per kilogram, the quantity demanded increases from 500 kilograms to 520 kilograms.
 - (iii) As a result of fall in the price of salt from ₹ 9 per kilogram to ₹ 7.50, the quantity demanded increases from 1000 kilogram to 1005 kilograms.
- 3) What do you notice? You notice that as a result of a fall in the price of radios, the quantity demanded of radios increases. Same is the case with wheat and salt. Thus, we can say that demand for radios, wheat and salt all respond to price changes. Then, what is the difference? The difference lies in the degree of response of demand which can be found out by comparing the percentage changes in prices and quantities demanded. Here lies the concept of elasticity.
- 4) Definition: Elasticity of demand is defined as the responsiveness of the quantity demanded of a good to changes in one of the variables on which demand depends. More precisely, elasticity of demand is the percentage change in quantity demanded divided by the percentage change in one of the variables on which demand depends.
- 5) These variables are price of the commodity, prices of the related commodities, income of the consumers and other factors on which demand depends. Thus, we have price elasticity, cross elasticity, income elasticity, advertisement elasticity and elasticity of substitution,. It is to be noted that when we talk of elasticity of demand, unless and until otherwise mentioned, we talk of price elasticity of demand.

2.6.0 Price Elasticity

- 1) Price elasticity of demand expresses the response of quantity demanded of a good to a change in its price, given the consumer’s income, his tastes and prices of all other goods.
- 2) In other words

$$\text{Price Elasticity} = E_p = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}}$$

Or

$$E_p = \frac{\frac{\text{Change in Quantity}}{\text{Original Quantity}} \times 100}{\frac{\text{Change in Price}}{\text{Original Price}} \times 100} \quad \text{OR} \quad E_p = \frac{\text{Change in Quantity}}{\text{Original Quantity}} \times \frac{\text{Original Price}}{\text{Change in Price}}$$

This method is known as percentage method

3) In symbolic terms

$$E_p = \frac{\Delta q}{q} \times \frac{p}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

Where

E_p stands for price elasticity

q stands for quantity

p stands for price

Δ stands for a very small change.

- 4) Since price and quantity are inversely related, the value of price elasticity coefficient will always be negative. But for the value of elasticity coefficients we ignore the negative sign and consider the numerical value only.
- 5) A few examples for price elasticity of demand case as follows:

Illustration 1:- The price of a commodity decreases from ₹ 6 to ₹ 4 and quantity demanded of the good increases from 10 units to 15 units. Find the coefficient of price elasticity.

Solution: Price elasticity = $(-) \Delta q / \Delta p \times p/q = 5/2 \times 6/10 = (-) 1.5$

Illustration 2:- A 5% fall in the price of a good leads to a 15% rise in its demand. Determine the elasticity and comment on its value.

Solution :-

$$\begin{aligned} \text{Price elasticity} &= \frac{\text{Percentage change in quantity demanded}}{\text{percentage change in price}} \\ &= 15\% / 5\% \\ &= 3 \end{aligned}$$

Comment: The good in question has elastic demand.

Illustration 3:- The price of a good decreases from ₹ 100 to ₹ 60 per unit. If the price elasticity of demand for it is 1.5 and the original quantity demanded is 30 units, calculate the new quantity demanded.

Solution:-

$$\begin{aligned} E_p &= \Delta q / \Delta p \times p/q, \quad \text{Here } 1.5 = \frac{\Delta q}{40} \times \frac{100}{30} \\ \Delta q &= \frac{1.5 \times 1200}{100} = 18 \end{aligned}$$

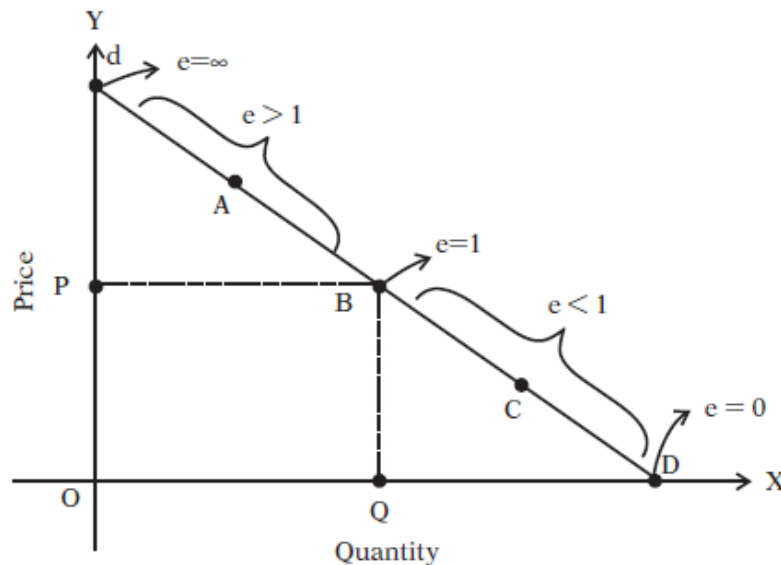
Therefore new quantity demanded = $30+18 = 48$ units.

The Point Method Or Geometric Method:

- The point elasticity method, we measure elasticity at a given point on a demand curve.
- This method is useful when changes in price and quantity demanded are very small so that they can be considered one and the same point only.
- **Eg.** If price of X commodity was Rs. 5,000 per unit and now it changes to Rs. 5002 per unit which is very small change. In such a situation we measure elasticity at a point on demand curve by using formula $\frac{\Delta q}{\Delta p} \times \frac{p}{q}$

- Diagrammatically also we can find elasticity at a point by using the formula –

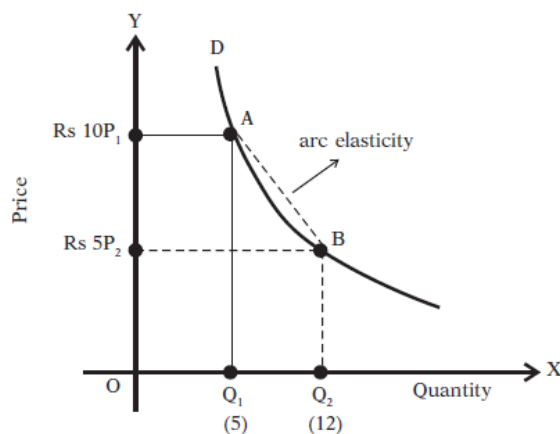
$$E_p = \frac{\text{Lower Segment of the Demand Curve}}{\text{Upper Segment of the Demand Curve}}$$



- The figure shows that even though the shape of the demand curve is constant, the elasticity is different at different points on the curve.
- If the demand curve is not a straight line curve, then in order to measure elasticity at a point on demand curve we have to draw tangent at the given point and then measure elasticity using the above formula.
- We can also find out numerical elasticities on different points.

The Arc Elasticity Method:

- When there is large change in the price or we have to measure elasticity over an arc of the demand curve, we use the “arc method” to measure price elasticity of demand.



- The arc elasticity is a measure of the “average elasticity” i.e. elasticity at MID –POINT that connects the two points on the demand curve.
- Thus, an arc is a portion of a curved line, hence a portion of a demand curve. Here instead of using original or new data as the basis of measurement, we use average of the two.

- The formula used is –

$$E_p = \frac{q_1 - q_2}{q_1 + q_2} \times \frac{p_1 + p_2}{p_1 - p_2}$$

Where - p_1 & q_1 = Original price and quantity

p_2 & q_2 = new price and quantity

$$E_p = \frac{5-12}{5+12} \times \frac{10+5}{10-5}$$

$$E_p = \frac{-7}{17} \times \frac{15}{5} = \frac{21}{17} = 1.23$$

$$E_p = 1.23$$

Interpretation of the numerical values of elasticity of demand

The numerical value of elasticity of demand can assume any value between zero and infinity.

- 1) **Elasticity is zero**, if there is no change at all in the quantity demanded when price changes i.e. when the quantity demanded does not respond at all to a price change. [$E_d = 0$]
- 2) **Elasticity is one**, or unitary, if the percentage change in quantity demanded is equal to the percentage change in price. [$E_d = 1$]
- 3) **Elasticity is greater than one** when the percentage change in quantity demanded is greater than the percentage change in price. In such a case, demand is said to be elastic. [$E_d > 1$]
- 4) **Elasticity is less than one** when the percentage change in quantity demanded is less than the percentage change in price. In such a case, demand is said to be inelastic. [$E_d < 1$]
- 5) **Elasticity is infinite**, when a 'small price reduction raises the demand from zero to infinity. Under such a case, consumers will buy all that they can obtain of the commodity at some price. If there is a slight increase in price, they would not buy anything from the particular seller. This type of demand curve is found in a perfectly competitive market. [$E_d = \infty$]

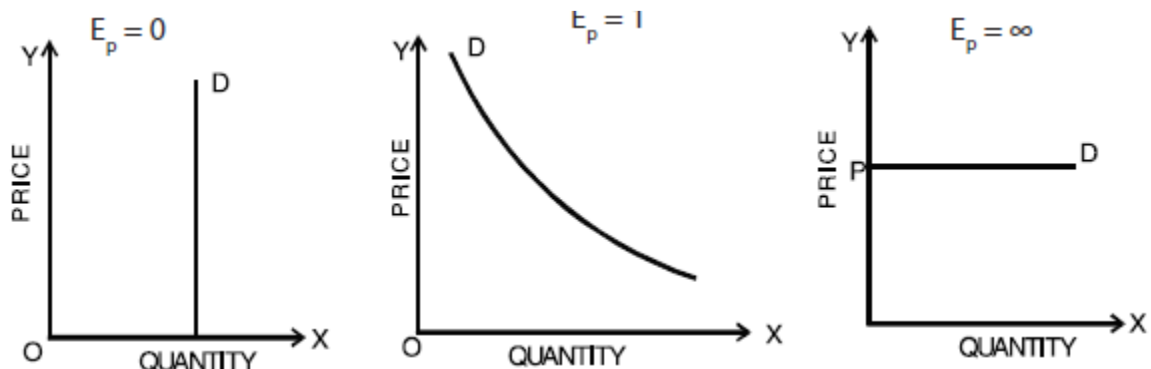


Fig.: Demand curve of zero, unitary and infinite elasticity

Elasticity is greater than one ($E_p > 1$) Elasticity is less than one ($E_p < 1$)

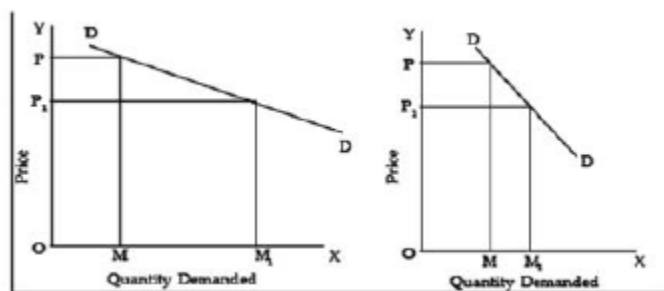


Fig.: Demand curves of greater than one and less than one elasticities

Table 4 : Elasticity measures, meaning and nomenclature

Numerical measure of elasticity	Verbal description	Terminology
Zero [$E_d = 0$]	Quantity demanded does not change as price changes	Perfectly (or completely) inelastic
Greater than zero, but less than one [$E_d < 1$]	Quantity demanded changes by a smaller percentage than does price	Inelastic
One [$E_d = 1$]	Quantity demanded changes by exactly the same percentage as does price	Unit elasticity
Greater than one, but less than infinity [$E_d > 1$]	Quantity demanded changes by a larger percentage than does price	Elastic
Infinity [$E_d = \infty$]	Purchasers are prepared to buy all they can obtain at some price and none at all at an even slightly higher price	Perfectly (or infinitely) elastic

Now that we are able to classify goods according to their price elasticity, let us see whether the goods which we considered in our example on page 2.37, are price elastic or inelastic.

Sl. No.	Name of the Commodity	Calculation of Elasticity $\frac{(q_1 - q_2)}{(q_1 + q_2)} \times \frac{(p_1 + p_2)}{(p_1 - p_2)}$	Nature of Elasticity
1.	Radios	$\frac{100 - 150}{100 + 150} \times \frac{500 + 400}{500 - 400} = 1.8 > 1$	Elastic
2.	Wheat	$\frac{500 - 520}{500 + 520} \times \frac{20 + 18}{20 - 18} = 1.37 < 1$	Inelastic
3.	Common Salt	$\frac{1000 - 1005}{1000 + 1005} \times \frac{9 + 7.50}{9 - 7.50} = 0.02743 < 1$	Inelastic

What do we note in the above hypothetical example? We note that the demand for radios is quite elastic, while demand for wheat is quite inelastic and the demand for salt is almost the same even after a reduction in price.

Generally, in real world situations also, we find that demand for goods like radios, TVs, refrigerators, fans, etc. is elastic; demand for goods like wheat and rice is inelastic; and demand for salt is highly inelastic or perfectly inelastic.

The Total Outlay Or Expenditure Method or Seller's Total Revenue Method:

The total outlay refers to the total expenditure done by a consumer on the purchase of a commodity. It is obtained by multiplying the price with the quantity demanded. Thus,

Total Outlay (TO) = Price (P) × Quantity (Q)

TO = P × Q

In this method, we measure price elasticity by examining the change in total outlay due to change in price.

Dr. Alfred Marshall laid the following propositions:

- (i) When with the change in price, the TO remains unchanged, $E_p = 1$.
- (ii) When with a rise in price, the TO falls or with a fall in price, the TO rises, $E_p > 1$.
- (iii) When with a rise in price, the TO also rises and with a fall in price, the TO also falls, $E_p < 1$.

Price per Unit (Rs.)	Quantity Demanded	Total Outlay (P×Q)	Elasticity of Demand
5	40 Units	200	$EP = 1$
4	50 Units	200	Unitary
5	40 Units	200	$EP > 1$
4	60 Units	240	Elastic
5	40 Units	200	$EP < 1$
4	44 Units	176	Inelastic

- However, total outlay method of measuring price elasticity is less exact. This method only classifies elasticity into elastic, inelastic and unit elastic.
- The exact and precise coefficient of elasticity cannot be found out with this method.

Table: The Relationship between Price elasticity and Total Revenue (TR)

Demand			
Price increase	TR Decreases	TR remains same	TR Increases
Price decrease	TR Increases	TR remains same	TR Decreases

Determinants of price elasticity of demand.

- Price elasticity of demand which measures the degree of responsiveness of quantity demanded of a commodity to a change in price (other things remaining unchanged) depends on the following factors:-

a) Nature of commodity:

- The demand for necessities of life like food, clothing, housing etc. is less elastic or inelastic because people have to buy them whatever be the price.
- Whereas, demand for luxury goods like cars, air-conditioners, cellular phone, etc. is elastic.

b) Availability of Substitutes:

- If for a commodity wide range of close substitutes are available i.e. if a commodity is easily replaceable by others, its demand is relatively elastic. **Eg.** Demand for cold drinks like Thumbs-up, Coca-cola, Limca, etc.
- Conversely, a commodity having no close substitute has inelastic demand. **Eg.** – Salt (but demand for TATA BRAND SALT is elastic.)

c) Number of uses of a commodity:

- A commodity which has many uses will have relatively elastic demand.
- **Eg.** Electricity can be put to many uses like lighting, cooking, motive-power, etc. If the price of electricity falls, its consumption for various purposes will rise and vice-versa.
- On the other hand if a commodity has limited uses will have inelastic demand.

d) Price range:

- If price of a commodity is either too high or too low, its demand is inelastic but those which are in middle price range have elastic demand.

e) Position of a commodity in the budget of consumer:

- If a consumer spends a small proportion of his income to purchase a commodity, the demand is inelastic. **Eg.** Newspaper, match box, salt, buttons, needles.
- But if consumer spends a large proportion of his income to purchase a commodity, the demand is elastic **Eg.** Clothes, milk, etc.

f) Time period:

- The longer any price change remains the greater is the price elasticity of demand. On the other hand, shorter any price change remains, the lesser is the price elasticity of demand.

g) Habits:

- Habits makes the demand for a commodity relatively inelastic. **Eg.** A smoker's demand for cigarettes tend to be relatively inelastic even at higher price.

h) Tied Demand (Joint Demand):

- Some goods are demanded because they are used jointly with other goods. Such goods normally have inelastic demand as against goods having autonomous demand.
 - **Eg.** Printers & Cartridges.
- Knowledge of the concept of elasticity of demand and the factors that may change it is a great IMPORTANCE in practical life. The concept of elasticity of demand is helpful to–
 - (a) **Business Managers** as it helps them to recognise the effect of price change on their total sales and revenues. The objective of a firm is **profit maximization**. If demand is ELASTIC for the product, the managers can fix a lower price in order to expand the volume of sales and vice-versa.
 - (b) **Government** for determining the prices of goods and services provided by them. **Eg.- transport, electricity, water, cooking gas, etc.** It also helps governments to understand the nature of response of demand when taxes are raised and its effect on the tax revenues. **Eg.- Higher taxes are imposed on the goods having INELASTIC DEMAND like cigarettes, liquor, etc.**

Income Elasticity of Demand.

- The income elasticity of demand measures the degree of responsiveness of quantity demanded to changes in income of the consumers.
- The income elasticity is defined as a ratio of percentage change in the quantity demanded to the percentage change in income. OR

$$\text{Income Elasticity (EY)} = \frac{\% \text{ change in Quantity Demanded}}{\% \text{ Change in Income}}$$

$$\text{Symbolically - EY} = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

Where - ΔQ & ΔY denote new quantity & income.

Q & Y denote original quantity & income.

- **The income elasticity of demand is POSITIVE for all normal or luxury goods and the income elasticity of demand is NEGATIVE for inferior goods. Income elasticity can be classified under five heads:-**

a) Zero Income Elasticity:

- It means that a given increase in income does not at all lead to any increase in quantity demanded of the commodity.
- In other words, demand for the commodity is completely income inelastic or $E_y = 0$.
- Commodities having zero income elasticity are called NEUTRAL GOODS.
- **Eg.** – Demand in case of SALT, MATCH BOX, KEROSENE OIL, POST CARDS, etc.

b) Negative Income Elasticity;

- It means that an increase in income results in fall in the quantity demanded of the commodity or $E_y < 0$.
- Commodities having negative income elasticity are called INFERIOR GOODS.
- **Eg.** – Jawar, Bajra, etc.

c) Unitary Income Elasticity:

- It means that the proportion of consumer's income spent on the commodity remains unchanged before and after the increase in income or $E_y = 1$. This represents a useful dividing line.

d) Income Elasticity Greater Than Unity:

- It refers to a situation where the consumers spends GREATER proportion of his income on a commodity when he becomes richer. $E_y > 1$,
- **Eg.** In the case of LUXURIES like cars, T.V. sets, music system, etc.

e) Income Elasticity Less Than Unity:

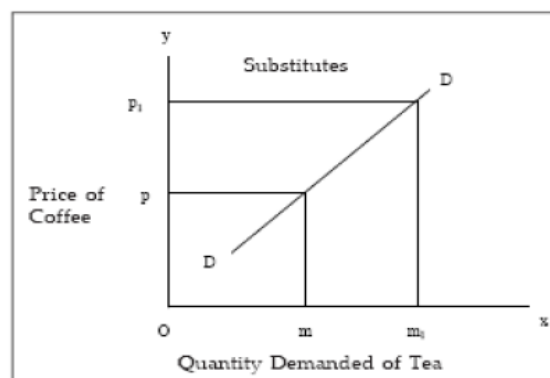
- It refers to a situation where the consumer spends a SMALLER proportion of his income on a commodity when he becomes richer. $E_y < 1$,
- **Eg.** In the case of NECESSITIES like rice, wheat, etc.

Cross Elasticity of Demand**1) Price of Related Goods and Demand:**

The demand for a particular commodity may change due to changes in the prices of related goods. These related goods may be either complementary goods or substitute goods. This type of relationship is studied under 'Cross Demand'.

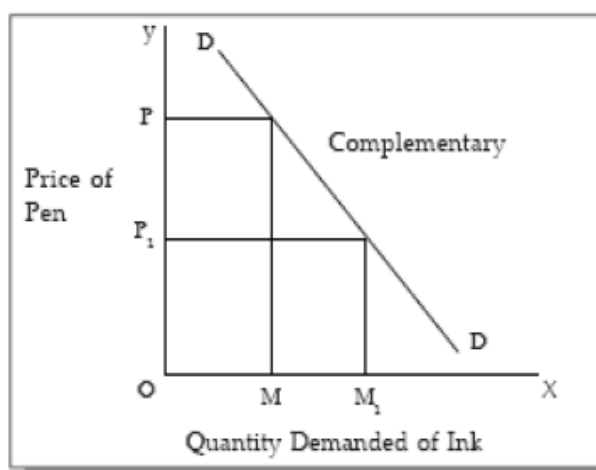
2) Substitute Products

In the case of substitute commodities, the cross demand curve slopes upwards (i.e. positively) showing that more quantities of a commodity, will be demanded whenever there is a rise in the price of a substitute commodity. In figure 9, the quantity demanded of tea is given on the X axis. Y axis represents the price of coffee which is a substitute for tea. When the price of coffee increases, due to the operation of the law of demand, the demand for coffee falls. The consumers will substitute tea in the place of coffee. The price of tea is assumed to be constant. Therefore, whenever there is an increase in the price of one commodity, the demand for the substitute commodity will increase.



3) Complementary Goods

In the case of complementary goods, as shown in the figure below, a change in the price of a good will have an opposite reaction on the demand for the other commodity which is closely related or complementary. For instance, an increase in demand for pen will necessarily increase the demand for ink. The same is the case with complementary goods such as bread and butter; car and petrol electricity and electrical gadgets etc. Whenever there is a fall in the demand for fountain pens due to a rise in prices of fountain pens, the demand for ink will fall, not because the price of ink has gone up, but because the price of fountain pen has gone up. So, we find that there is an inverse relationship between price of a commodity and the demand for its complementary good (other things remaining the same).



Symbolically, (mathematically)

$$E_c = \frac{\Delta q_x}{q_x} \div \frac{\Delta p_y}{p_y}$$

$$E_c = \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x}$$

Where E_c stands for cross elasticity.

q_x stands for original quantity demanded of X.

Δq_x stands for change in quantity demanded of X.

p_y stands for the original price of good Y.

Δp_y stands for a small change in the price of Y.

If two goods are perfect substitutes for each other, the cross elasticity between them is infinite. Greater the cross elasticity, the closer is the substitute. If two goods are totally unrelated, cross elasticity between them is zero.

If two goods are substitutes (like tea and coffee), the cross elasticity between them is positive, that is, in response to a rise in price of one good, the demand for the other good rises. On the other hand, when two goods are complementary (tea and sugar) to each other, the cross elasticity between them is negative so that a rise in the price of one leads to a fall in the quantity demanded of the other. Higher the negative cross elasticity, higher will be the extent of complementarity.

However, one need not base the classification of goods on the basis of the above definitions. While the goods between which cross elasticity is positive can be called substitutes, the goods between which cross elasticity is negative are not always complementary. This is because negative cross elasticity is also found when the income effect of the price change is very strong.

Illustration 1:- The price of 1kg of tea is ₹ 30. At this price 5kg of tea is demanded. If the price of coffee rises from ₹ 25 to ₹ 35 per kg, the quantity demanded of tea rises from 5kg to 8kg. Find out the cross price elasticity of tea.

Solution :-

$$\begin{aligned}\text{Cross elasticity} &= \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x} \text{ Here } x = \text{tea } y = \text{coffee} \\ &= \frac{5-8}{-10} \times \frac{25}{5} = \frac{-3}{-10} \times \frac{25}{5} = +1.5\end{aligned}$$

The elasticity of demand of tea is +1.5 showing that the demand of tea is highly elastic with respect to coffee. The positive sign shows that tea and coffee are substitute goods.

Illustration 2:- The price of 1 kg of sugar is ₹ 50. At this price 10 kg is demanded. If the price of tea falls from ₹ 30 to ₹ 25 per kg, the consumption of sugar rises from 10 kg to 12 kg. Find out the cross price elasticity and comment on its value.

Solution :-

$$\begin{aligned}\text{Cross elasticity} &= \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x} \text{ Here } x = \text{sugar } y = \text{tea} \\ &= \frac{2}{-5} \times \frac{30}{10} = (-)1.2\end{aligned}$$

Since the elasticity is -1.2, we can say that sugar and tea are complementary in nature.

Advertisement Elasticity

Advertisement elasticity of sales or promotional elasticity of demand is the responsiveness of a good's demand to changes in firm's spending on advertising. The advertising elasticity of demand measures the percentage change in demand that occurs given a one percent change in advertising expenditure. Advertising elasticity measures the effectiveness of an advertisement campaign in bringing about new sales.

Advertising elasticity of demand is typically positive. Higher the value of advertising elasticity greater will be the responsiveness of demand to change in advertisement. Advertisement elasticity varies between zero and infinity. It is measured by using the formula;

$$E_a = \frac{\% \text{Change in demand}}{\% \text{change in spending on advertising}}$$

$$E_a = \frac{\Delta Q_d / Q_d}{\Delta A / A}$$

Where ΔQ_d denotes change in demand.

ΔA denotes change in expenditure on advertisement.

Q_d denotes initial demand.

A denotes initial expenditure on advertisement.

Elasticity	Interpretation
$E_a = 0$	Demand does not respond to increase in advertisement expenditure.
$E_a > 0$ but < 1	Change in demand is less than proportionate to the change in advertisement expenditure.
$E_a = 1$	Demand changes in the same proportion in which advertisement expenditure changes.
$E_a > 1$	Demand changes at a higher rate than change in advertisement expenditure.

As far as a business firm is concerned, the measure of advertisement elasticity is useful in understanding the effectiveness of advertising and in determining the optimum level of advertisement expenditure.

2.7 DEMAND FORECASTING

Meaning

Forecasting of demand is the art and science of predicting the probable demand for a product or a service at some future date on the basis of certain past behaviour patterns of some related events and the prevailing trends in the present.

Usefulness

- 1) Forecasting of demand plays a vital role in the process of planning and decision-making, whether at the national level or at the level of a firm. The importance of demand forecasting has increased all the more on account of mass production and production in response to demand.
- 2) Forecasts offer information for budgetary planning and cost control in functional areas of finance and accounting.
- 3) Good forecasts help in efficient production planning, process selection, capacity planning, facility layout and inventory management.
- 4) A firm can plan production scheduling well in advance and obtain all necessary resources for production such as inputs, and finances.
- 5) Capital investments can be aligned to demand expectations and this will check the possibility of overproduction and underproduction, excess of unused capacity and idle resources. Marketing relies on sales forecasting in making key decisions.
- 6) Demand forecasts also provide the necessary information for formulation of suitable pricing and advertisement strategies.

Types of forecasts

- (1) Macro-level forecasting deals with the general economic environment prevailing in the economy as measured by the Index of Industrial Production (IIP), national income and general level of employment etc.
 - (i) Industry- level forecasting is concerned with the demand for the industry's products as a whole. For example, demand for cement in India.
 - (ii) Firm- level forecasting refers to forecasting the demand for a particular firm's product, say, the demand for ACC cement.
- (2) Based on time period, demand forecasts may be short-term demand forecasting and long-term demand forecasting.
 - (i) Short-term demand forecasting covers a short span of time, depending of the nature of industry. It is done usually for six months or less than one year and is generally useful in tactical decisions.
 - (ii) Long-term forecasts are for longer periods of time, say two to five years and more. It provides information for major strategic decisions of the firm such as expansion of plant capacity.

Demand Distinctions

Before we analyse the different methods of forecasting demand, it is important for us to understand the demand distinctions which are as follows:

- a) Producer's goods and Consumer's goods
- b) Durable goods and Non-durable goods
- c) Derived demand and Autonomous demand
- d) Industry demand and Company demand
- e) Short-run demand and Long-run demand

a) Producer's goods and Consumer's goods: Producer's goods are those which are used for the production of other goods - either consumer goods or producer goods themselves. Examples of such goods are machines, plant and equipments. Consumer's goods are those which are used for final consumption. Examples of consumer's goods are readymade clothes, prepared food, residential houses, etc.

b) Demand for Durable goods and Non-durable goods: Goods may be further sub-divided into durable and non-durable goods. Non durable goods are those which cannot be consumed more than once. Raw materials, fuel and power, packing items etc are examples of non durable producer goods. Beverages, bread, milk etc are examples of non-durable consumer goods. These will meet only the current demand. On the other hand, durable goods do not quickly wear out, can be consumed more than once and yield utility over a period of time. Examples of durable consumer goods are: cars, refrigerators and mobile phones. Building, plant and machinery, office furniture etc are durable producer goods. The demand for durable goods is likely to be derived demand. Further, there are semi-durable goods such as, clothes and umbrella.

c) Derived demand and Autonomous demand: The demand for a commodity that arises because of the demand for some other commodity called 'parent product', is called derived demand. For example, the demand for cement is derived demand, being directly related to building activity. In general, the

demand for producer goods or industrial inputs is derived demand. Also the demand for complementary goods is derived demand. If the demand for a product is independent of the demand for other goods, then it is called autonomous demand. It arises on its own out of an innate desire of the consumer to consume or to possess the commodity. But this distinction is purely arbitrary and it is very difficult to find out which product is entirely independent of other products.

d) Demand for firm's product and industry demand: The term industry demand is used to denote the total demand for the products of a particular industry, e.g. the total demand for steel in the country. On the other hand, the demand for firm's product denotes the demand for the products of a particular firm, i.e. the quantity that a firm can dispose off at a given price over a period of time. E.g. demand for steel produced by the Tata Iron and Steel Company. The demand for a firm's product when expressed as a percentage of industry demand signifies the market share of the firm.

e) Short-run demand and Long-run demand: This distinction is based on time period. Short-run demand refers to demand with its immediate reaction to changes in product price and prices of related commodities, income fluctuations, ability of the consumer to adjust their consumption pattern, their susceptibility to advertisement of new products etc. Long-run demand refers to demand which exists over a long period. Most generic goods have long-term demand. Long term demand depends on long-term income trends, availability of substitutes, credit facilities etc. In short, long-run demand is that which will ultimately exist as a result of changes in pricing, promotion or product improvement, after enough time is allowed to let the market adjust to the new situation. For example, if electricity rates are reduced, in the short run, the existing users will make greater use of electric appliances. In the long-run, more and more people will be induced to use electric appliances.

The above distinction is important because each of these goods exhibit distinctive characteristics which should be taken into account while analysing demand for them.

Factors affecting demand for non-durable consumer goods:

There are three basic factors which influence the demand for these goods:

- (i) Disposable income:** Other things being equal, the demand for a commodity depends upon the disposable income of the household. Disposable income is found out by deducting personal taxes from personal income.
- (ii) Price:** Other things being equal, the demand for a commodity depends upon its own price and the prices of related goods (its substitutes and complements). While the demand for a good is inversely related to its own price and the price of its complements, it is positively related to the price of its substitutes.
- (iii) Demography:** This involves the characteristics of the population, human as well as non-human, using the product concerned. For example, it may pertain to the number and characteristics of children in a study of demand for toys and characteristics of automobiles in a study of the demand for tyres or petrol.

Non-durables are purchased for current consumption only. From a business firm's point of view, demand for non-durable goods gets repeated depending on the nature of the non durable goods. Usually, non durable goods come in wide varieties and there is competition among the sellers to acquire and retain customer loyalty.

Factors affecting the demand for durable-consumer goods:

Demand for durable goods has certain special characteristics. Following are the important factors that affect the demand for durable goods.

- (i) A consumer can postpone the replacement of durable goods. Whether a consumer will go on using the good for a long time or will replace it depends upon factors like his social status, prestige, level of money income, rate of obsolescence etc.
- (ii) These goods require special facilities for their use e.g. roads for automobiles, and electricity for refrigerators and radios. The existence and growth of such factors is an important variable that determines the demand for durable goods
- (iii) As consumer durables are used by more than one person, the decision to purchase may be influenced by family characteristics like income of the family, size, age distribution and sex composition. Likely changes in the number of households should be considered while determining the market size of durable goods.
- (iv) Replacement demand is an important component of the total demand for durables. Greater the current holdings of durable goods, greater will be the replacement demand. Therefore, all factors that determine replacement demand should be considered as a determinant of the demand for durable goods.
- (v) Demand for consumer durables is very much influenced by their prices and credit facilities available to buy them.

Factors affecting the demand for producer goods:

Since producers' goods or capital goods help in further production, the demand for them is derived demand, derived from the demand of consumer goods they produce. The demand for them depends upon the rate of profitability of user industry and the size of the market of the user industries. Hence data required for estimating demand for producer goods (capital goods) are:

- (i) growth prospects of the user industries;
- (ii) norms of consumption of capital goods per unit of installed capacity.

An increase in the price of a substitutable factor of production, say labour, is likely to increase the demand for capital goods. On the contrary, an increase in the price of a factor which is complementary may cause a decrease in the demand for capital. Higher the profit making prospects, greater will be the inducement to demand capital goods. If firms are optimistic about selling a higher output in future, they will have greater incentive to invest in producer goods. Advances in technology enabling higher efficiency at reduced cost on account of higher productivity of capital will have a positive impact on investment in capital goods. Investments in producer goods will be greater when lower interest rates prevail as firms will have lower opportunity cost of investments and lower cost of borrowing.

Methods of Demand Forecasting

There is no easy method to predict the future with certainty. The firm has to apply a proper mix of methods of forecasting to predict the future demand for a product. The various methods of demand forecasting are as follows:

(1) Survey of Buyer's intentions: In this method, customers are asked what they are planning to buy for the forthcoming time period usually a year.

- This method involve use of conducting **direct interviews or mailing questionnaire** asking customers about their intentions or plans to buy the product.
- The survey may be conducted by any of the following methods:
 - (a) Complete Enumeration** where all potential customers of a product are interviewed about what they are planning or intending to buy in future. It is cumbersome, costly and time consuming method.
 - (b) Sample Survey** where only a few customers are selected and interviewed about their future plans. It is less cumbersome and less costly method
 - (c) End-use method or Input-output method** where the bulk of good is made to industrial manufactures who usually have definite future plans.
- This method is useful for short-term forecasts.
- In this method burden of forecasting is put on the customers.

(2) Collective opinion Method: The method is also known as **sales force opinion method or grass roots approach.**

- Under this method, salesmen are asked to estimate of expectations of sales in their territories. Salesmen are considered to be the nearest persons to the customers retailers and wholesalers and have good knowledge and information about the future demand trend.
- The estimates of all the sales-force is collected are examined in the light of proposed changes in selling price, product design, expected competition, etc. and also factors like purchasing power, employment, population, etc.
- This method is based on first hand knowledge of the salesmen. However, its main drawback is that it is **subjective**. Its accuracy depends on the intelligence, vision and his ability to foresee the influence of many unknown factors.

(3) Expert Opinion Method (Delphi Method): Under this method of demand forecasting **views of specialists/experts and consultants** are sought to estimate the demand in future. These experts may be of the firm itself like the executives and sales managers or consultant firms who are professionally trained for forecasting demand.

- **The Delphi technique**, developed by **OLAF HEMLER** at the **Rand Corporation of the U.S.A.** is used to get the opinion of a number of experts about future demand.

- Experts are provided with information and opinion feedbacks of other experts at different rounds and are repeatedly questioned for their opinion and comments till consensus emerges.
- It is a time saving method.

(4) Statistical Method: Statistical methods have proved to be very useful in demand forecasting. Statistical methods are **superior, more scientific, reliable and free from subjectivity**. The important statistical methods of demand forecasting are:

(a) Trend Projection Method: The method is also known as **Classical Method**. It is considered as a **‘naïve’ approach** to demand forecasting.

- Under this, data on sales over a period of time is chronologically arranged to get a **‘time series’**. The time series shows the past sales pattern. It is assumed that the past sales pattern will continue in the future also. The techniques of trend projection based on, time series data are **Graphical Method and Fitting trend equation or Least Square Method**.

(b) Graphical Method: This is the simplest technique to determine the trend.

- Under this method, all values of sales for different years are plotted and free hand curve is drawn passing through as many points as possible. The direction of the free hand curve shows the trend.
- The main drawback of this method is that it may **show trend but not measure it**.

(c) Fitting Trend Equation/ Least Square Method: This method is based on the assumption that the past rate of change will continue in the future.

- It is a mathematical procedure for fitting a time to a set of observed data points in such a way that the sum of the squared deviation between the calculated and observed values is minimized.
- This method is popular because it is simple and inexpensive.

(d) Regression Analysis: This is a very common method of forecasting demand.

- Under this method, a quantitative relationship is established between quantity demanded (**dependent variable**) and the independent variables like income, price of good, price of related goods, etc. Based on this relationship, an estimate is made for future demand.
- It can be expressed as follows–

$$Y = a + b X$$

Where

X, Y are variables

a, b are constants

(5) Controlled Experiments: Under this method, an effort is made to vary certain determinants of demand like price, advertising, etc. and conduct the experiments assuming that the other factors remain constant.

- The effect of demand determinants on sales can be assessed either by varying them in different markets or by varying over a period of time in the same market.
- The responses of demand to such changes over a period of time are recorded and are used for estimating the future demand for the product.
- This method is used less as it is expensive and time consuming.
- This method is also called as **market experiment method**.

(6) Barometric Method of forecasting: This method is based on the assumption that future can be predicted from certain events occurring in the present. We need not depend upon the past observations for demand forecasting.

- There are economic ups and downs in an economy which indicate the **turning points**. There are many economic indicators like income, population, expenditure, investment, etc. which can be used to forecast demand. There are three types of economic indicators, viz.
 - (a) Coincidental Indicators** are those which move up and down simultaneously with aggregate economy. It measures the current economic activity. **Eg.-** rate of unemployment.
 - (b) Leading Indicators** reflect future change in the trend of aggregate economy.
 - (c) Lagging Indicators** reflect future changes in the trend of aggregate economic activities.

UNIT 2 : THEORY OF CONSUMER BEHAVIOUR

2.0 NATURE OF HUMAN WANTS

All desires, tastes and motives of human beings are called wants in Economics. All wants of human beings exhibit some characteristic features.

1. Wants are unlimited in number. They are never completely satisfied.
2. Wants differ in intensity. Some are urgent, others are felt less intensely.
3. Each want is satiable.
4. Wants are competitive. They compete each other for satisfaction because resources are scarce to satisfy all wants.
5. Wants are complementary. Some wants can be satisfied only by using more than one good or group of goods.
6. Wants are alternative.
7. Wants are subjective and relative.
8. Wants vary with time, place, and person.
9. Some wants recur again whereas others do not occur again and again.
10. Wants may become habits and customs.
11. Wants are affected by income, taste, fashion, advertisements and social customs.
12. Wants arise from multiple causes such as natural instincts, social obligation and individual's economic and social status.

Classification of wants

In Economics, wants are classified into three categories, viz., necessities, comforts and luxuries.

1) Necessaries

Necessaries are those which are essential for living. Necessaries are further subdivided into necessities for life or existence, necessities for efficiency and conventional necessities. Necessaries for life are things necessary to meet the minimum physiological needs for the maintenance of life such as minimum amount of food, clothing and shelter. Man requires something more than the necessities of life to maintain longevity, energy and efficiency of work, such as nourishing food, adequate clothing, clean water, comfortable dwelling, education, recreation etc. These are necessities for efficiency. Conventional necessities arise either due to pressure of habit or due to compelling social customs and conventions. They are not necessary either for existence or for efficiency.

2) Comforts

While necessities make life possible comforts make life comfortable and satisfying. Comforts are less urgent than necessities. Tasty and wholesome food, good house, clothes that suit different occasions, audio-visual and labour saving equipments etc. make life more comfortable.

3) Luxuries

Luxuries are those wants which are superfluous and expensive. They are not essential for living. Items such as expensive clothing, exclusive motor cars, classy furniture, goods used for vanity etc fall under this category.

4) The above categorization is not rigid as a thing which is a comfort or luxury for one person or at one point of time may become a necessity for another person or at another point of time. As all of us are aware, the things which were considered luxuries in the past have become comforts and necessities today.

What is Utility?

- 1) The concept of utility is used in neo classical Economics to explain the operation of the law of demand.
- 2) Utility is the want satisfying power of a commodity. It is the expected satisfaction to a consumer when he is willing to spend money on a stock of commodity which has the capacity to satisfy his want.
- 3) Utility is the anticipated satisfaction by the consumer, and satisfaction is the actual satisfaction derived.
- 4) A commodity has utility for a consumer even when it is not consumed. It is a subjective entity and varies from person to person.
- 5) A commodity has different utility for the same person at different places or at different points of time. It should be noted that utility is not the same thing as usefulness.
- 6) From the economic standpoint, even harmful things like liquor, may be said to have utility because people want them. Thus, in Economics, the concept of utility is ethically neutral.
- 7) Two important theories are (i) Marginal Utility Analysis propounded by Marshall, and (ii) Indifference Curve Analysis propounded by Hicks and Allen.

2.1 MARGINAL UTILITY ANALYSIS

- 1) This theory which is formulated by Alfred Marshall, a British economist, seeks to explain how a consumer spends his income on different goods and services so as to attain maximum satisfaction.
- 2) **Total utility:** Assuming that utility is measurable and additive, total utility may be defined as the sum of utility derived from different units of a commodity consumed by a consumer. Total utility is the sum of marginal utilities derived from the consumption of different units i.e.
$$TU = MU_1 + MU_2 + \dots + MU_n$$
Where MU_1, MU_2, \dots, MU_n etc are marginal utilities of the successive units of a commodity.
- 3) **Marginal utility:** It is the addition made to total utility by the consumption of an additional unit of a commodity. In other words, it is the utility derived from the marginal or one additional unit consumed or possessed by the individual.
Marginal utility = the addition made to the total utility by the addition of consumption of one more unit of a commodity.

Symbolically,

$$MU_n = TU_n - TU_{n-1}$$

Where,

MU_n is the marginal utility of the n th unit,

TU_n is the total utility of the n th unit, and

TU_{n-1} is the total utility of the $(n-1)$ th unit.

2.1.0 Assumptions of Marginal Utility Analysis

(1) Rationality: A consumer is rational and attempts to attain maximum satisfaction from his limited money income.

(2) Cardinal Measurability of Utility: According to neoclassical economists, utility is a cardinal concept i.e., utility is a measurable and quantifiable entity. It implies that utility can be measured in cardinal numbers and assigned a cardinal number like 1, 2, 3 etc. Marshall and some other economists used a psychological unit of measurement of utility called utils. Thus, a person can say that he derives utility equal to 10 utils from the consumption of 1 unit of commodity A and 5 from the consumption of 1 unit of commodity B. Since a consumer can quantitatively express his utility, he can easily compare different commodities and express which commodity gives him greater utility and by how much. Utilities from different units of the commodity can be added as well.

According to this theory, money is the measuring rod of utility. The amount of money which a person is prepared to pay for a unit of a good, rather than go without it, is a measure of the utility which he derives from the good.

(3) Constancy of the Marginal Utility of Money: The marginal utility of money remains constant throughout when the individual is spending money on a good. This assumption, although not realistic, has been made in order to facilitate the measurement of utility of commodities in terms of money. If the marginal utility of money changes as income changes, the measuring-rod of utility becomes unstable and therefore would be inappropriate for measurement.

(4) The Hypothesis of Independent Utility: The total utility which a person gets from the whole collection of goods purchased by him is simply the sum total of the separate utilities of the goods. The theory ignores complementarity between goods.

2.1.1 The Law of Diminishing Marginal Utility

The Law of Diminishing Marginal Utility is based on two important facts, namely:

- (i) Human wants are unlimited
- (ii) Each separate human want is limited. The amount of any commodity which a man can consume, in a given period of time is limited and hence each single want is satiable.

The law describes that, as the consumer has more and more of a commodity, the additional utility which he derives from an additional unit of commodity goes on falling. Marshall stated the law as follows-

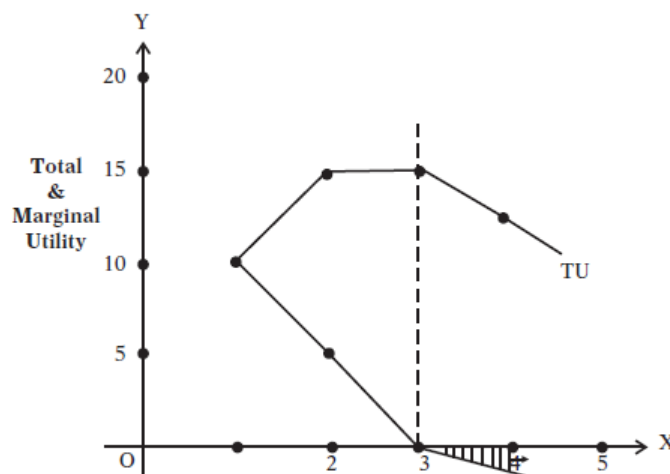
"The additional benefit which a person derives from a given increase in stock of a thing diminishes with every increase in the stock that he already has." The law can be explained with the help of following table:

Table : Utility Schedule

Units of Laddu's Consumed	Total Utility $TU = U_1 + U_2 + \dots + U_n$	Marginal Utility $MU = TU_n - TU_{n-1}$
1	10	10
2	15	5
3	15	0
4	13	-2

- ❖ The above table shows that as the consumer goes on consuming laddus, the additional or marginal utility goes on diminishing.
- ❖ The consumption of 3rd unit of laddus gives no additional utility and the 4th unit is giving negative utility.
- ❖ The 4th unit instead of giving satisfaction causes dissatisfaction.
- ❖ Total utility goes on increasing as long as MU is positive, but at diminishing rate.
- ❖ When total utility is highest, marginal utility is zero. This is the point of full satisfaction.
- ❖ When marginal utility becomes negative, total utility starts falling.
- ❖ MU is the rate of change in TU or slope of TU curve
- ❖ MU can be positive, zero or negative.
- ❖ We can show the information given in the table on a graph as follows:-

Figure : Marginal Utility of laddu Consumed



The figure shows that marginal utility curve goes on declining as the consumption increases. It even crosses the X-axis and suggest negative marginal utility. Total utility curve rises upto a point and then starts falling.

- **The Law of Diminishing Marginal Utility helps us to understand how a consumer reaches equilibrium in ONE COMMODITY CASE.**
 - A consumer tries to equalize marginal utility of a commodity with its price inorder to maximize the satisfaction. A consumer thus compares the price with the marginal utility of a commodity.
 - He keep on purchasing a commodity till $MU > P$. In other words, so long as price is less, he buys more which is also the basis of the law of demand.

- The consumer is at equilibrium where:
Marginal Utility of the commodity = Price of the commodity
 $MU_x = P_x \cdot MU_{\text{money}}$
 $\frac{MU_x}{P_x} = MU_{\text{money}}$

- **In reality, a consumer spends his money income to buy different commodities. In case of many commodities, consumer equilibrium is explained with the Law of Equi-Marginal Utility.**

- The law states that a consumer will allocate his expenditure in a way that the utility gained from the last rupee spent on each commodity is equal or the marginal utility each commodity is proportional to its price.
- The consumer is said to be equilibrium when the following condition is met–

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = MU_{\text{money}}$$

OR

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

Limitations of the Law

The law of diminishing marginal utility is applicable only under certain assumptions.

- Homogenous units:** The different units consumed should be identical in all respects. The habit, taste, temperament and income of the consumer also should remain unchanged.
- Standard units of Consumption:** The different units consumed should consist of standard units. If a thirsty man is given water by successive spoonfuls, the utility of the second spoonful of water may conceivably be greater than the utility of the first.
- Continuous Consumption:** There should be no time gap or interval between the consumption of one unit and another unit i.e. there should be continuous consumption.
- The Law fails in the case of prestigious goods:** The law may not apply to articles like gold, cash, diamonds etc. where a greater quantity may increase the utility rather than diminish it. It also fails to apply in the case of hobbies, alcohol, cigarettes, rare collections etc.
- Case of related goods:** Utility is not in fact independent. The shape of the utility curve may be affected by the presence or absence of articles which are substitutes or complements. The utility obtained from tea may be seriously affected if no sugar is available and the utility of bottled soft drinks will be affected by the availability of fresh juice.
- Based on unrealistic assumptions:** The assumptions of cardinal measurability of utility, constancy of marginal utility of money, continuous consumption and consumer rationality are unrealistic.

2.1.2 Consumer's Surplus

The concept of consumer's surplus was propounded by Alfred Marshall. This concept occupies an important place not only in economic theory but also in economic policies of government and in decision-making of monopolists.

The demand for a commodity depends on the utility of that commodity to a consumer. If a consumer gets more utility from a commodity, he would be willing to pay a higher price and vice-versa. It has been seen that consumers generally are ready to pay more for certain goods than what they actually pay for them. This extra satisfaction which consumers get from their purchase of a good is called by Marshall as consumer's surplus.

Marshall defined the concept of consumer's surplus as the "excess of the price which a consumer would be willing to pay rather than go without a thing over that which he actually does pay", is called consumer's surplus."

Thus consumer's surplus = what a consumer is ready to pay - what he actually pays.

- The concept of consumer's surplus is derived from the law of diminishing marginal utility.
- As we know from the law of diminishing marginal utility, the more of a thing we have, the lesser marginal utility it has.
- In other words, as we purchase more of a good, its marginal utility goes on diminishing.
- The consumer is in equilibrium when the marginal utility of a good is equal to its price i.e., he purchases that many number of units of a good at which marginal utility is equal to price (It is assumed that perfect competition prevails in the market).
- Since the price is the same for all units of the good he purchases, he gets extra utility for all units consumed by him except for the one at the margin.
- This extra utility or extra surplus for the consumer is called consumer's surplus.

Consider Table 7 in which we have illustrated the measurement of consumer's surplus in case of commodity X. The price of X is assumed to be ₹ 20.

Table : Measurement of Consumer's Surplus

No. of units	Marginal Utility (worth ₹)	Price (₹)	Consumer's Surplus
1	30	20	10
2	28	20	8
3	26	20	6
4	24	20	4
5	22	20	2
6	20	20	0
7	18	20	-

- We see from the above table that when consumer's consumption increases from 1 to 2 units, his marginal utility falls from ₹ 30 to ₹ 28.
- His marginal utility goes on diminishing as he increases his consumption of good X.

- Since marginal utility for a unit of good indicates the price the consumer is willing to pay for that unit, and since price is assumed to be fixed at ₹ 20, the consumer enjoys a surplus on every unit of purchase till the 6th unit.
- Thus, when the consumer is purchasing 1 unit of X, the marginal utility is worth ₹ 30 and price fixed is ₹ 20, thus he is deriving a surplus of ₹ 10.
- Similarly, when he purchases 2 units of X, he enjoys a surplus of ₹ 8 [₹ 28 – ₹ 20].
- This continues and he enjoys consumer's surplus equal to ₹ 6, 4, 2 respectively from 3rd, 4th and 5th unit.
- When he buys 6 units, he is in equilibrium because his marginal utility is equal to the market price or he is willing to pay a sum equal to the actual market price and therefore, he enjoys no surplus.
- Thus, given the price of ₹ 20 per unit, the total surplus which the consumer will get, is ₹ 10 + 8 + 6 + 4 + 2 + 0 = 30.

Concept of consumer's surplus can also be illustrated graphically

- 1) Consider figure 12. On the X-axis we measure the amount of the commodity and on the Y-axis the marginal utility and the price of the commodity.
- 2) MU is the marginal utility curve which slopes downwards, indicating that as the consumer buys more units of the commodity, its marginal utility falls.
- 3) Marginal utility shows the price which a person is willing to pay for the different units rather than go without them.
- 4) If OP is the price that prevails in the market, then the consumer will be in equilibrium when he buys OQ units of the commodity, since at OQ units, marginal utility is equal to the given price OP.
- 5) The last unit, i.e., Qth unit does not yield any consumer's surplus because here price paid is equal to the marginal utility of the Qth unit.
- 6) But for units before Qth unit, marginal utility is greater than price and thus these units fetch consumer's surplus to the consumer.

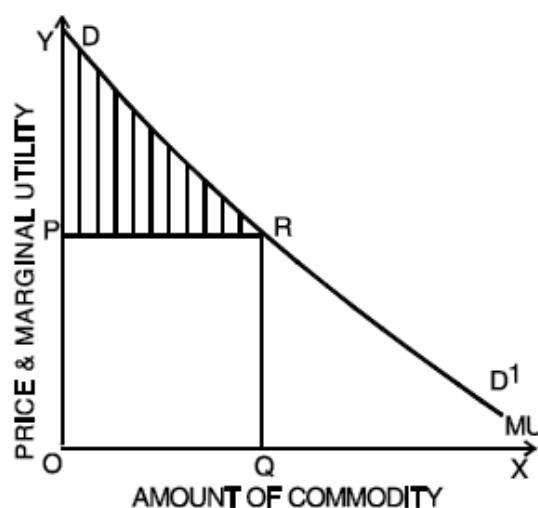


Fig.: Marshall's Measure of Consumer's Surplus

In Figure 12, the total utility is equal to the area under the marginal utility curve up to point Q i.e. ODRQ. But, given the price equal to OP, the consumer actually pays OPRQ. The consumer derives extra utility equal to DPR which is nothing but consumer's surplus.

Limitations:

It is often argued that this concept is hypothetical and illusory. The surplus satisfaction cannot be measured precisely.

- (1) Consumer's surplus cannot be measured precisely - because it is difficult to measure the marginal utilities of different units of a commodity consumed by a person.
- (2) In the case of necessities, the marginal utilities of the earlier units are infinitely large. In such case the consumer's surplus is always infinite.
- (3) The consumer's surplus derived from a commodity is affected by the availability of substitutes.
- (4) There is no simple rule for deriving the utility scale of articles which are used for their prestige value (e.g., diamonds).
- (5) Consumer's surplus cannot be measured in terms of money because the marginal utility of money changes as purchases are made and the consumer's stock of money diminishes. (Marshall assumed that the marginal utility of money remains constant. But this assumption is unrealistic).
- (6) The concept can be accepted only if it is assumed that utility can be measured in terms of money or otherwise. Many modern economists believe that this cannot be done.

The concept of consumer surplus has important practical applications. Few such applications are listed below:

- ❖ Consumer surplus is a measure of the welfare that people gain from consuming goods and services. It is very important to a business firm to reflect on the amount of consumer surplus enjoyed by different segments of their customers because consumers who perceive large surplus are more likely to repeat their purchases.
- ❖ Understanding the nature and extent of surplus can help business managers make better decisions about setting prices. If a business can identify groups of consumers with different elasticity of demand within their market and the market segments which are willing and able to pay higher prices for the same products, then firms can profitably use price discrimination.
- ❖ Large scale investment decisions involve cost benefit analysis which takes into account the extent of consumer surplus which the projects may fetch.
- ❖ Knowledge of consumer surplus is also important when a firm considers raising its product prices. Customers who enjoyed only a small amount of surplus may no longer be willing to buy products at higher prices. Firms making such decisions should expect to make fewer sales if they increase prices.
- ❖ Consumer surplus usually acts as a guide to finance ministers when they decide on the products on which taxes have to be imposed and the extent to which a commodity tax has to be raised. It is always desirable to impose taxes or increase the rates of taxes on commodities yielding high consumer's surplus because the loss of welfare to citizens will be minimal.

2.2 INDIFFERENCE CURVE ANALYSIS

In the last section, we have discussed the marginal utility analysis of demand. A very popular alternative and a more realistic method of explaining consumer's demand is the ordinal utility approach used a different tool namely indifference curve to analyse consumer behaviour. This approach to consumer behaviour is based on consumer preferences. It believes that human satisfaction, being a psychological phenomenon, cannot be measured quantitatively in monetary terms as was attempted in Marshall's utility analysis. In this approach, it is felt that it is much easier and scientifically more sound to order preferences than to measure them in terms of money.

The consumer preference approach is, therefore, an ordinal concept based on ordering of preferences compared with Marshall's approach of cardinality.

2.2.0 Assumptions Underlying Indifference Curve Approach

- (i) The consumer is rational and possesses full information about all the relevant aspects of economic environment in which he lives.
- (ii) The indifference curve analysis assumes that utility is only ordinally expressible. The consumer is capable of ranking all conceivable combinations of goods according to the satisfaction they yield. Thus, if he is given various combinations say A, B, C, D and E, he can rank them as first preference, second preference and so on. However, if a consumer happens to prefer A to B, he cannot tell quantitatively how much he prefers A to B.
- (iii) Consumer's choices are assumed to be transitive. If the consumer prefers combination A to B, and B to C, then he must prefer combination A to C. In other words, he has a consistent consumption pattern.
- (iv) If combination A has more commodities than combination B, then A must be preferred to B.

2.2.1 Indifference Curves

What are Indifference Curves? The ordinal analysis of demand (here we will discuss the one given by Hicks and Allen) is based on indifference curves. *An indifference curve is a curve which represents all those combinations of two goods which give same satisfaction to the consumer. Since all the combinations on an indifference curve give equal satisfaction to the consumer, the consumer is indifferent among them. In other words, since all the combinations provide the same level of satisfaction the consumer prefers them equally and does not mind which combination he gets.*

If a consumer equally prefers two product bundles, then the consumer is indifferent between the two bundles. An Indifference curve is also called iso-utility curve or equal utility curve.

- To understand indifference curves, let us consider the example of a consumer who has one unit of food and 12 units of clothing.
- Now, we ask the consumer how many units of clothing he is prepared to give up to get an additional unit of food, so that his level of satisfaction does not change.
- Suppose the consumer says that he is ready to give up 6 units of clothing to get an additional unit of food.

- We will have then two combinations of food and clothing giving equal satisfaction to the consumer: Combination A which has 1 unit of food and 12 units of clothing, and combination B which has 2 units of food and 6 units of clothing.
- Similarly, by asking the consumer further how much of clothing he will be prepared to forgo for successive increments in his stock of food so that his level of satisfaction remains unaltered, we get various combinations as given below:

Table : Indifference Schedule

Combination	Food	Clothing	MRS
A	1	12	
B	2	6	6
C	3	4	2
D	4	3	1

Now, if we plot the above schedule, we will get the following figure.

In Figure, an indifference curve IC is drawn by plotting the various combinations given in the indifference schedule. The quantity of food is measured on the X axis and the quantity of clothing on the Y axis. As in indifference schedule, the combinations lying on an indifference curve will give the consumer the same level of satisfaction.

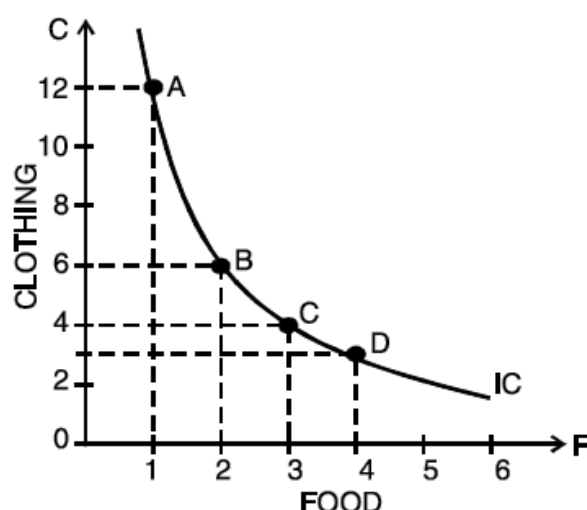


Fig.: A Consumer's Indifference Curve

2.2.2 Indifference Map

An Indifference map represents a collection of many indifference curves where each curve represents a certain level of satisfaction. In short, a set of indifference curves is called an indifference map.

An indifference map depicts the complete picture of consumer's tastes and preferences. In Figure 14, an indifference map of a consumer is shown which consists of three indifference curves.

We have taken good X on X-axis and good Y on Y-axis. It should be noted that while the consumer is indifferent among the combinations lying on the same indifference curve, he certainly prefers the combinations on the higher

indifference curve to the combinations lying on a lower indifference curve because a higher indifference curve signifies a higher level of satisfaction. Thus, while all combinations of IC_1 give him the same satisfaction, all combinations lying on IC_2 give him greater satisfaction than those lying on IC_1 .

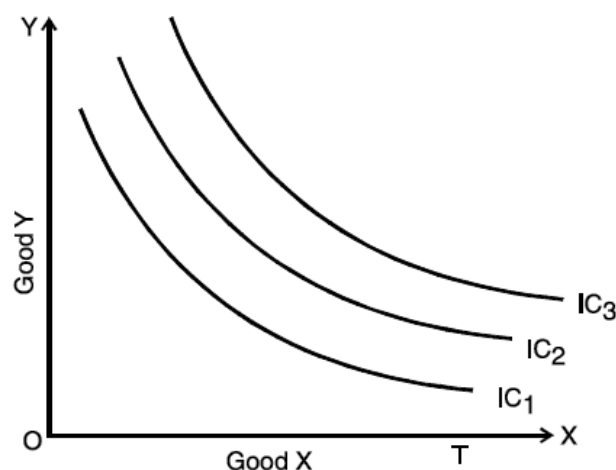


Fig. : Indifference Map

2.2.3. Marginal Rate of Substitution

- Marginal Rate of Substitution (MRS) is the rate at which a consumer is prepared to exchange goods X and Y.
- Consider Table-8. In the beginning the consumer is consuming 1 unit of food and 12 units of clothing.
- Subsequently, he gives up 6 units of clothing to get an extra unit of food, his level of satisfaction remaining the same the MRS here is 6.
- Likewise when he moves from B to C and from C to D in his indifference schedule, the MRS are 2 and 1 respectively.
- Thus, we can define MRS of X for Y as the amount of Y whose loss can just be compensated by a unit gain of X in such a manner that the level of satisfaction remains the same.

The marginal rate of substitution of X for Y (MRS_{xy}) is equal to $\frac{MU_x}{MU_y}$

We notice that MRS is falling i.e., as the consumer has more and more units of food, he is prepared to give up less and less units of clothing. There are two reasons for this.

1. The want for a particular good is satiable so that when a consumer has more of it, his intensity of want for it decreases. Thus, in our example, when the consumer has more units of food, his intensity of desire for additional units of food decreases.
2. Most goods are imperfect substitutes of one another. MRS would remain constant if they could substitute one another perfectly.

2.2.4 Properties of Indifference Curves

The following are the main characteristics or properties of indifference curves:

(i) Indifference curves slope downward to the right: This property implies that the two commodities can be substituted for each other and when the amount of one good in the combination is increased, the amount of the other good is reduced. This is essential if the level of satisfaction is to remain the same on an indifference curve.

(ii) Indifference curves are always convex to the origin :

- It has been observed that as more and more of one commodity (X) is substituted for another (Y), the consumer is willing to part with less and less of the commodity being substituted (i.e. Y). This is called diminishing marginal rate of substitution.
- Thus, in our example of food and clothing, as a consumer has more and more units of food, he is prepared to forego less and less units of clothing.
- This happens mainly because the want for a particular good is satiable and as a person has more and more of a good, his intensity of want for that good goes on diminishing.
- In other words, the subjective value attached to the additional quantity of a commodity decreases fast in relation to the other commodity whose total quantity is decreasing.
- This diminishing marginal rate of substitution gives convex shape to the indifference curves.
- However, there are two extreme situations:-
 - (i) When two goods are perfect substitutes of each other, the indifference curve is a straight line on which MRS is constant and,
 - (ii) When two goods are perfect complementary goods (e.g. printer and cartridge), the indifference curve will consist of two straight lines with a right angle bent which is convex to the origin, or in other words, it will be L shaped.

(iii) Indifference curves can never intersect each other:

- No two indifference curves will intersect each other although it is not necessary that they are parallel to each other.
- In case of intersection the relationship becomes logically absurd because it would show that higher and lower levels are equal, which is not possible. This property will be clear from Figure.

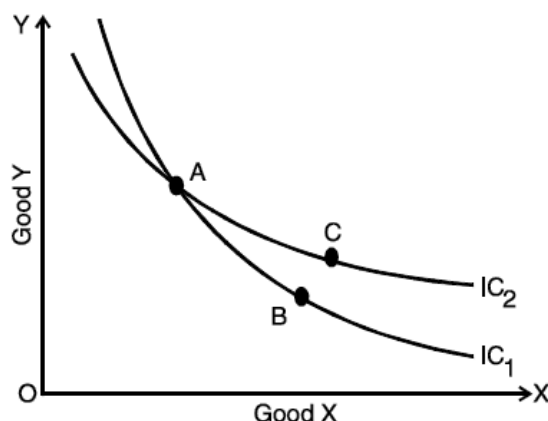


Fig. : Intersecting Indifference Curves

- In figure, IC_1 and IC_2 intersect at A. Since A and B lie on IC_1 , they give same satisfaction to the consumer.
- Similarly since A and C lie on IC_2 , they give same satisfaction to the consumer.
- This implies that combination B and C are equal in terms of satisfaction.
- But a glance will show that this is an absurd conclusion because certainly combination C is better than combination B because it contains more units of commodities X and Y.
- Thus we see that no two indifference curves can touch or cut each other.

(iv) A higher indifference curve represents a higher level of satisfaction than the lower indifference curve: This is because combinations lying on a higher indifference curve contain more of either one or both goods and more goods are preferred to less of them.

(v) Indifference curve will not touch either axes:

- Another characteristic feature of indifference curve is that it will not touch the X axis or Y axis.
- This is born out of our assumption that the consumer is considering different combination of two commodities. If an indifference curve touches the Y axis at a point P as shown in the figure 16, it means that the consumer is satisfied with OP units of y commodity and zero units of x commodity.
- This is contrary to our assumption that the consumer wants both commodities although in smaller or larger quantities.
- Therefore an indifference curve will not touch either the X axis or Y axis.

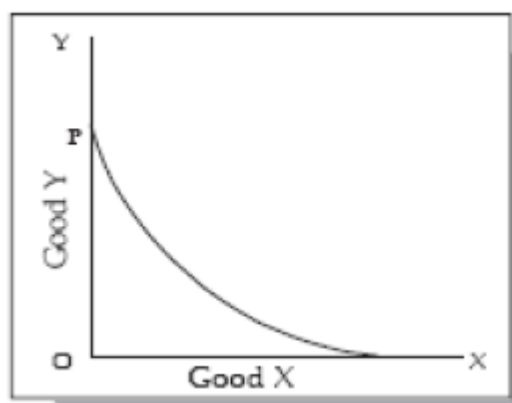


Fig. : Indifference Curve

2.2.5 The Budget Line

- 1) A higher indifference curve shows a higher level of satisfaction than a lower one. Therefore, a consumer, in his attempt to maximise satisfaction will try to reach the highest possible indifference curve.
- 2) But in his pursuit of buying more and more goods and thus obtaining more and more satisfaction, he has to work under two constraints:
 - (i) first, he has to pay the prices for the goods and,
 - (ii) second, he has a limited money income with which to purchase the goods.
- 3) A consumer's choices are limited by the budget available to him. As we know, his total expenditure for goods and services can fall short of the budget constraint but may not exceed it.

- 4) Algebraically, we can write the budget constraint for two goods X and Y as:

$$P_X Q_X + P_Y Q_Y \leq B$$

Where P_X and P_Y are the prices of goods X and Y and Q_X and Q_Y are the quantities of goods X and Y chosen and B is the total money available to the consumer.

- 5) The budget constraint can be explained by the budget line or price line. In simple words, a budget line shows all those combinations of two goods which the consumer can buy spending his given money income on the two goods at their given prices. All those combinations which are within the reach of the consumer (assuming that he spends all his money income) will lie on the budget line.



Fig. : Price Line

- 6) It should be noted that any point outside the given price line, say H, will be beyond the reach of the consumer and any combination lying within the line, say K, shows under spending by the consumer.
- 7) This slope of budget line is equal to 'Price Ratio' of two goods. i.e. P_X / P_Y

2.2.6 Consumer's Equilibrium

Having explained indifference curves and budget line, we are in a position to explain how a consumer reaches equilibrium position. A consumer is in equilibrium when he is deriving maximum possible satisfaction from the goods and therefore is in no position to rearrange his purchases of goods. We assume that:

- The consumer has a given indifference map which shows his scale of preferences for various combinations of two goods X and Y.
- He has a fixed money income which he has to spend wholly on goods X and Y.
- Prices of goods X and Y are given and are fixed.
- All goods are homogeneous and divisible, and
- The consumer acts 'rationally' and maximizes his satisfaction.

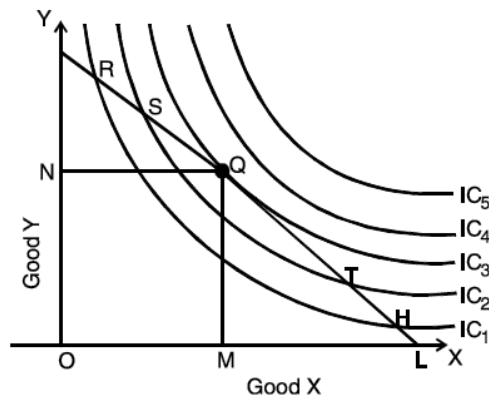


Fig. : Consumer's Equilibrium

- To show which combination of two goods X and Y the consumer will buy to be in equilibrium we bring his indifference map and budget line together.
- We know by now, that the indifference map depicts the consumer's preference scale between various combinations of two goods and the budget line shows various combinations which he can afford to buy with his given money income and prices of the two goods.
- Consider Figure 18, in which IC₁, IC₂, IC₃, IC₄ and IC₅ are shown together with budget line PL for good X and good Y.
- Every combination on the budget line PL costs the same.
- Thus combinations R, S, Q, T and H cost the same to the consumer.
- The consumer's aim is to maximise his satisfaction and for this, he will try to reach the highest indifference curve.
- Since there is a budget constraint, he will be forced to remain on the given budget line, that is he will have to choose combinations from among only those which lie on the given price line.
- Which combination will our hypothetical consumer choose? Suppose he chooses R. We see that R lies on a lower indifference curve IC₁, when he can very well afford S, Q or T lying on higher indifference curves.
- Similar is the case for other combinations on IC₁, like H. Again, suppose he chooses combination S (or T) lying on IC₂.
- But here again we see that the consumer can still reach a higher level of satisfaction remaining within his budget constraints i.e., he can afford to have combination Q lying on IC₃ because it lies on his budget line.
- Now, what if he chooses combination Q? We find that this is the best choice because this combination lies not only on his budget line but also puts him on the highest possible indifference curve i.e., IC₃.
- The consumer can very well wish to reach IC₄ or IC₅, but these indifference curves are beyond his reach given his money income.
- Thus, the consumer will be at equilibrium at point Q on IC₃. What do we notice at point Q? We notice that at this point, his budget line PL is tangent to the indifference curve IC₃. In this equilibrium position (at Q), the consumer will buy OM of X and ON of Y.
- We have seen that the consumer attains equilibrium at the point where the budget line is tangent to the indifference curve and

$$MU_x / P_x = MU_y / P_y$$

- At the tangency point Q, the slopes of the price line PL and the indifference curve IC_3 are equal. The slope of the indifference curve shows the marginal rate of substitution of X for Y (MRS_{xy}) which is equal to $\frac{MU_x}{MU_y}$

while the slope of the price line indicates the ratio between the prices of two goods i.e., $\frac{p_x}{p_y}$

At equilibrium point Q,

$$MRS_{xy} \frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

- Thus, we can say that the consumer is in equilibrium position when the price line is tangent to the indifference curve or when the marginal rate of substitution of goods X and Y is equal to the ratio between the prices of the two goods.
- The indifference curve analysis is superior to utility analysis:
 - it dispenses with the assumption of measurability of utility
 - it studies more than one commodity at a time
 - it does not assume constancy of marginal utility of money
 - it segregates income effect from substitution effect.

UNIT 3 : SUPPLY

3.0 INTRODUCTION

In a market economy, sellers for products and services constitute the supply side. As the term 'demand' refers to the quantity of a good or service that the consumers are willing and able to purchase at various prices during a given period of time, the term 'supply' refers to the amount of a good or service that the producers are willing and able to offer to the market at various prices during a given period of time.

3.1 DETERMINANTS OF SUPPLY

Although price is an important consideration in determining the willingness and desire to part with commodities, there are many other factors which determine the supply of a product or a service. These are discussed below:

(i) Price of the good: Other things being equal, the higher the relative price of a good the greater the quantity of it that will be supplied. This is because goods and services are produced by the firm in order to earn profits and, *ceteris paribus*, profits rise if the price of its product rises.

(ii) Prices of related goods: If the prices of other goods rise, they become relatively more profitable to the firm to produce and sell than the good in question. It implies that, if the price of Y rises, the quantity supplied of X will fall. For example, if price of wheat rises, the farmers may shift their land to wheat production away from corn and soya beans.

(iii) Prices of factors of production: Cost of production is a significant factor that affects supply. A rise in the price of a particular factor of production will cause an increase in the cost of making those goods that use a great deal of that factor than in the costs of producing those that use relatively small amount of the factor. For example, a rise in the cost of land will have a large effect on the cost of producing wheat and a very small effect on the cost of producing automobiles.

(iv) State of technology: The supply of a particular product depends upon the state of technology also. Inventions and innovations tend to make it possible to produce more or better goods with the same resources, and thus they tend to increase the quantity supplied of some products and to reduce the quantity supplied of products that are displaced.

(v) Government Policy: The production of a good may be subject to the imposition of commodity taxes such as excise duty, sales tax and import duties. These raise the cost of production and so the quantity supplied of a good would increase only when its price in the market rises. Subsidies, on the other hand, reduce the cost of production and thus provide an incentive to the firm to increase supply. When government imposes restrictions such as import quota on inputs, rationing of input supply etc, production tends to fall.

(vi) Nature of competition and size of industry: Under competitive conditions, supply will be more than that under monopolized conditions. If there are large number of firms in the market, supply will be more. Besides, entry of new firms, either domestic or foreign, causes the industry supply curve to shift rightwards.

(vii) Other Factors: The quantity supplied of a good also depends upon government's industrial and foreign policies, goals of the firm, infrastructural facilities, natural factors such as weather, floods, earthquake and man-made factors such as war, labour strikes, communal riots and etc.

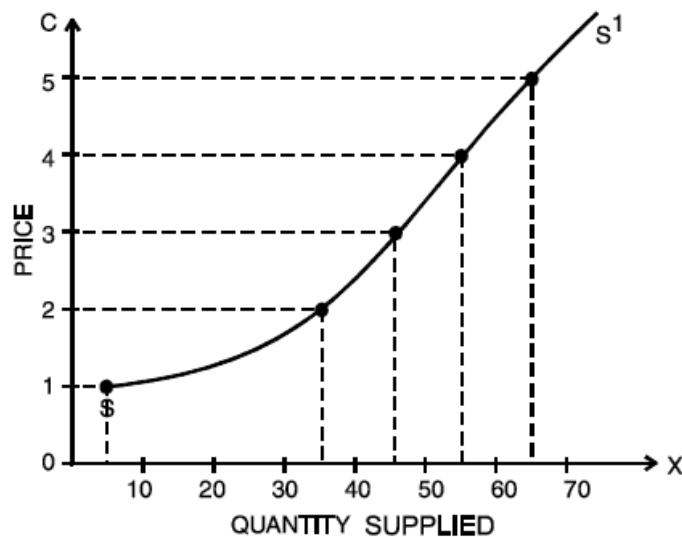
3.2 LAW OF SUPPLY

- 1) The law of supply can be stated as: Other things remaining constant, the quantity of a good produced and offered for sale will increase as the price of the good rises and decrease as the price falls.
- 2) This law is based upon common sense, because the higher the price of the good, the greater the profits that can be earned and thus greater the incentives to produce the good and offer it for sale. The law is known to be correct in a large number of cases. There is an exception however. If we take the supply of labour at very high wages, we may find that the supply of labour has decreased instead of increasing. Thus, the behaviour of supply depends upon the phenomenon considered and the degree of possible adjustment in supply.
- 3) The behaviour of supply is also affected by the time taken into consideration. In the short run, it may not be easy to increase supply, but in the long run supply can be easily adjusted in response to changes in price.
- 4) The law of supply can be explained through a supply schedule and a supply curve. A supply schedule is the tabular presentation of the law of supply. It shows the different prices of a commodity and the corresponding quantities that suppliers are willing to offer for sale. Consider the following hypothetical supply schedule of good X.

Table : Supply Schedule of Good 'X'

Price (₹) (per kg)	Quantity supplied (kg)
1	5
2	35
3	45
4	55
5	65

- 5) The table shows the quantities of good X that would be produced and offered for sale at a number of alternative prices. At ₹ 1, for example, 5 kilograms of good X are offered for sale and at ₹ 3 per kg. 45 kg. would be forthcoming.
- 6) We can now plot the data from Table 9 on a graph. In Figure 19, price is plotted on the vertical axis and quantity on the horizontal axis, and various price-quantity combinations of the schedule 9 are plotted.



When we draw a smooth curve through the plotted points, what we get is the supply curve for good X. The supply curve is a graphical presentation of the supply schedule. It shows the quantity of X that will be offered for sale at each price of X. It slopes upwards towards right (positive slope) showing that as price increases, the quantity supplied of X increases and vice-versa.

The market supply curve for 'X' can be obtained by adding horizontally the supply curves of various firms.

3.3 MOVEMENTS ON THE SUPPLY CURVE – INCREASE OR DECREASE IN THE QUANTITY SUPPLIED

When the supply of a good increase as a result of an increase in its price, we say that there is an increase in the quantity supplied and there is a upward movement on the supply curve. The reverse is the case when there is a fall in the price of the good.

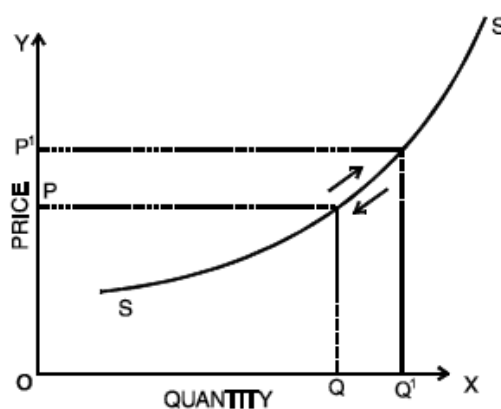


Fig. : Figure showing change in quantity supplied as a result of a price change

3.4 SHIFTS IN SUPPLY CURVE – INCREASE OR DECREASE IN SUPPLY

When the supply curve bodily shifts towards the right as a result of a change in one of the factors that influence the quantity supplied other than the commodity's own price, we say there is an increase in supply. When these factors cause the supply curve to shift to the left, we call it decrease in supply [See Figures 21(i) and (ii)].

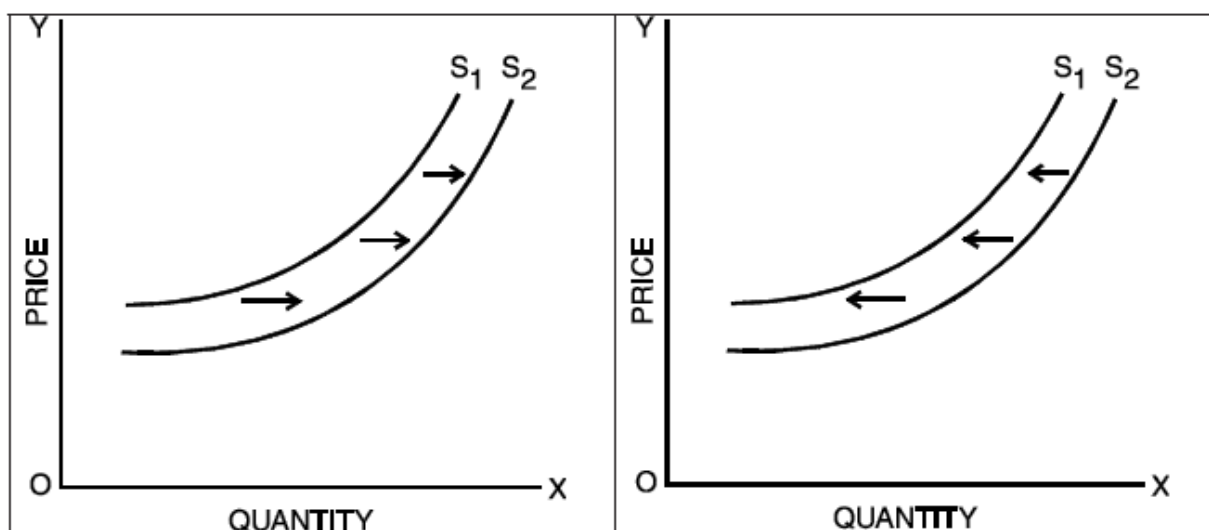


Fig. : Shifts in supply curves

3.5 ELASTICITY OF SUPPLY

The elasticity of supply is defined as the responsiveness of the quantity supplied of a good to a change in its price. Elasticity of supply is measured by dividing the percentage change in quantity supplied of a good by the percentage change in its price i.e.,

$$E_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in Price}}$$
$$\frac{\text{Change in quantity supplied}}{\text{quantity supplied}} \frac{\Delta q}{q} = \frac{\Delta q}{\Delta p} = \frac{p}{q}$$
$$\text{or } \frac{\text{Change in price}}{\text{price}} \text{ or } \frac{\Delta p}{p}$$

Where q denotes original quantity supplied.

Δq denotes change in quantity supplied.

p denotes original price.

Δp denotes change in price.

Example:

a) Suppose the price of commodity X increases from ₹ 2,000 per unit to ₹ 2,100 per unit and consequently the quantity supplied rises from 2,500 units to 3,000 units. Calculate the elasticity of supply.

Here $\Delta q = 500$ units $\Delta p = ₹ 100$
 $ = ₹ 2000$ $ q = 2500$ units

$$\therefore E_1 = \frac{500}{100} \times \frac{2000}{2500} = 4$$

Elasticity of Supply = 4.

3.5.0 Type of Supply Elasticity

The elasticity of supply can be classified as under:

(i) Perfectly inelastic supply: If as a result of a change in price, the quantity supplied of a good remains unchanged, we say that the elasticity of supply is zero or the good has perfectly inelastic supply. The vertical supply curve in Figure 22 shows that irrespective of price change, the quantity supplied remains unchanged.

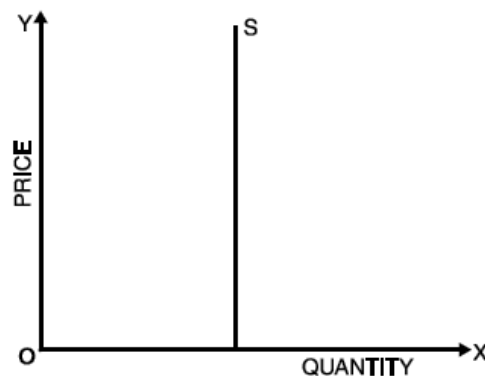


Fig. : Supply curves of zero elasticity

(ii) Relatively less-elastic supply: If as a result of a change in the price of a good its supply changes less than proportionately, we say that the supply of the good is relatively less elastic or elasticity of supply is less than one. Figure 23 shows that the relative change in the quantity supplied (Δq) is less than the relative change in the price (Δp).

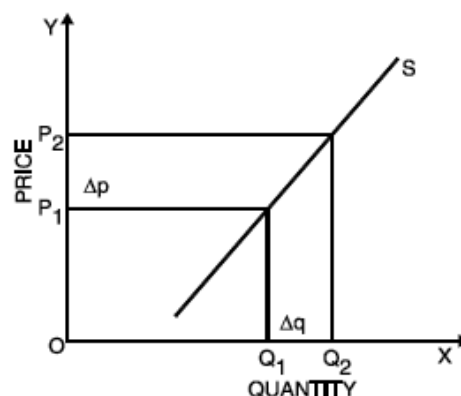


Fig. : Showing relatively less elastic supply

(iii) Relatively greater-elastic supply: If elasticity of supply is greater than one i.e., when the quantity supplied of a good changes substantially in response to a small change in the price of the good we say that supply is relatively elastic. Figure, shows that the relative change in the quantity supplied (Δq) is greater than the relative change in the price.

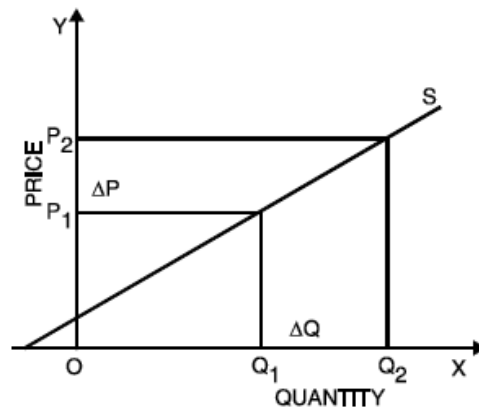


Fig. : Showing relatively greater elastic supply

(iv) Unit-elastic: If the relative change in the quantity supplied is exactly equal to the relative change in the price, the supply is said to be unitary elastic. Here the coefficient of elasticity of supply is equal to one. In Figure 25, the relative change in the quantity supplied (Δq) is equal to the relative change in the price (Δp).

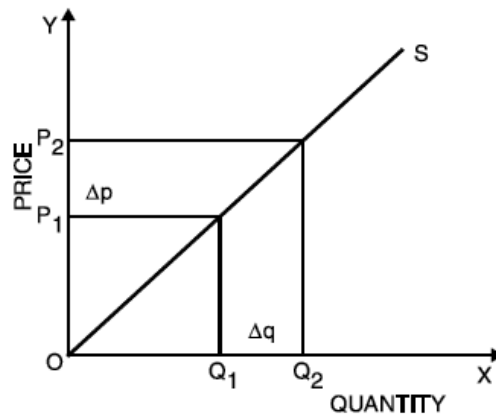


Fig. : Showing unitary elasticity

(v) Perfectly elastic supply: Elasticity of supply said to be infinite when nothing is supplied at a lower price, but a small increase in price causes supply to rise from zero to an infinitely large amount indicating that producers will supply any quantity demanded at that price. Figure shows infinitely elastic supply.

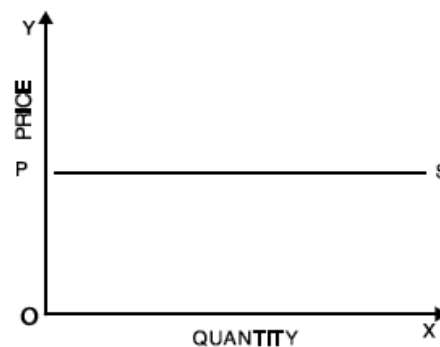


Fig. : Supply curve of infinite elasticity

3.5.1 Measurement of supply-elasticity

The elasticity of supply can be considered with reference to a given point on the supply curve or between two points on the supply curve. When elasticity is measured at a given point on the supply curve, it is called point elasticity. Just as in demand, point-elasticity of supply can be measured with the help of the following formula:

$$E_s = \frac{dq}{dp} \times \frac{p}{q}$$

Qus: The Supply function is given as $q = -100 + 10p$. Find the elasticity of supply using point method, when price is ₹ 15.

$$E_s = \frac{dq}{dp} \times \frac{p}{q}$$

Since $\frac{dq}{dp} = 10$, $p = ₹ 15$, $q = -100 + 10(15)$

$$q = 50$$

$$\therefore E_s = 10 \times \frac{15}{50}$$

$$\text{Or } E_s = 3$$

Where $\frac{dq}{dp}$ is differentiation of the supply function with respect to price and p and q refer to price and quantity respectively.

Arc-Elasticity: Arc-elasticity i.e. elasticity of supply between two prices can be found out with the help of the following formula:

$$E_s = \frac{q_1 - q_2}{q_1 + q_2} \div \frac{p_1 - p_2}{p_1 + p_2}$$

Or

$$E_s = \frac{q_1 - q_2}{q_1 + q_2} \times \frac{p_1 + p_2}{p_1 - p_2}$$

Where p_1 q_1 are original price and quantity and p_2 q_2 are new price and quantity supplied. Thus, if we have to find elasticity of supply when $p_1 = ₹ 12$, $p_2 = ₹ 15$, $q_1 = 20$ units and $q_2 = 50$ units. Then using the above formula, we will get supply elasticity as:

$$E_s = \frac{20 - 50}{20 + 50} \times \frac{12 + 15}{12 - 15}$$
$$\frac{30}{70} \times \frac{27}{3} = +3.85$$

Equilibrium Price

Equilibrium refers to a market situation where quantity demanded is equal to quantity supplied. The intersection of demand and supply determines the equilibrium price. At this price the amount that the buyers want to buy is equal to the amount that sellers want to sell. Only at the equilibrium price, both the buyers and sellers are satisfied. Equilibrium price is also called market clearing price.

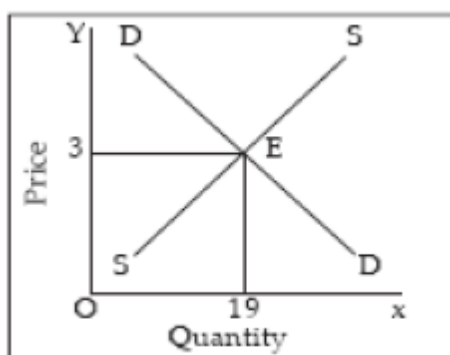
The determination of market price is the central theme of micro economic analysis. Hence, micro-economic theory is also called price theory.

The following table explains the equilibrium price

Table : Supply and Demand Schedule

Price (₹)	Quantity Demanded	Quantity Supplied	Impact on price
5	6	31	Downward
4	12	25	Downward
3	19	19	Equilibrium
2	25	12	Upward
1	31	6	Upward

The equilibrium between demand and supply is depicted in the diagram below. Demand and supply are in equilibrium at point E where the two curves intersect each other. It means that only at price ₹ 3 the quantity demanded is equal to the quantity supplied. The equilibrium quantity is 19 units and these are exchanged at price ₹ 3. If the price is more than the equilibrium level, excess supply will push the price downwards as there are few takers in the market at this price. For example, in Table 10, if price is say ₹ 5, quantity demanded is 6 units which is quite less than the quantity supplied (31 units). There will be excess supply in the market which will force the sellers to reduce price if they want to sell off their product. Hence the price will fall and continue falling down till the level where quantity demanded becomes equal to the quantity supplied. Opposite will happen when quantity demanded is more than quantity supplied at a particular price.



The equilibrium price is determined by the intersection between demand and supply. It is also called the market equilibrium.

SELF EXAMINATION QUESTIONS

1. Demand for a commodity refers to:
(a) desire backed by ability to pay for the commodity.
(b) need for the commodity and willingness to pay for it.
(c) the quantity demanded of that commodity at a certain price.
(d) the quantity of the commodity demanded at a certain price during any particular period of time.
2. Contraction of demand is the result of:
(a) decrease in the number of consumers.
(b) increase in the price of the good concerned.
(c) increase in the prices of other goods.
(d) decrease in the income of purchasers.
3. All but one of the following are assumed to remain the same while drawing an individual's demand curve for a commodity. Which one is it?
(a) The preference of the individual. (b) His monetary income.
(c) Price of the commodity. (d) Price of related goods.
4. Which of the following pairs of goods is an example of substitutes?
(a) Tea and sugar. (b) Tea and coffee.
(c) Pen and ink. (d) Shirt and trousers.
5. In the case of a straight line demand curve meeting the two axes, the price-elasticity of demand at the mid-point of the line would be:
(a) 0 (b) 1 (c) 1.5 (d) 2
6. The Law of Demand, assuming other things to remain constant, establishes the relationship between:
(a) income of the consumer and the quantity of a good demanded by him.
(b) price of a good and the quantity demanded.
(c) price of a good and the demand for its substitute.
(d) quantity demanded of a good and the relative prices of its complementary goods.
7. Identify the factor which generally keeps the price-elasticity of demand for a good low:
(a) Variety of uses for that good. (b) very low price of a commodity.
(c) Close substitutes for that good.
(d) High proportion of the consumer's income spent on it.
8. Identify the coefficient of price-elasticity of demand when the percentage increase in the quantity of a good demanded is smaller than the percentage fall in its price:
(a) Equal to one. (b) Greater than one.
(c) Smaller than one. (d) Zero.
9. In the case of an inferior good, the income elasticity of demand is:
(a) positive. (b) zero. (c) negative. (d) infinite.
10. If the demand for a good is inelastic, an increase in its price will cause the total expenditure of the consumers of the good to:
(a) remain the same. (b) increase. (c) decrease. (d) any of these.

11. If regardless of changes in its price, the quantity demanded of a good remains unchanged, then the demand curve for the good will be:
 - (a) horizontal. (b) vertical.
 - (c) positively sloped. (d) negatively sloped.
12. Suppose the price of Pepsi increases, we will expect the demand curve of Coca Cola to:
 - (a) shift towards left since these are substitutes.
 - (b) shift towards right since these are substitutes.
 - (c) remain at the same level.
 - (d) None of the above.
13. All of the following are determinants of demand except:
 - (a) tastes and preferences. (b) quantity supplied.
 - (c) income of the consumer. (d) price of related goods.
14. A movement along the demand curve for soft drinks is best described as :
 - (a) An increase in demand. (b) A decrease in demand.
 - (c) A change in quantity demanded. (d) A change in demand.
15. If the price of Pepsi decreases relative to the price of Coke and 7-UP, the demand for :
 - (a) Coke will decrease. (b) 7-Up will decrease.
 - (c) Coke and 7-UP will increase. (d) Coke and 7-Up will decrease.
16. If a good is a luxury, its income elasticity of demand is:
 - (a) positive and less than 1. (b) negative but greater than -1.
 - (c) positive and greater than 1. (d) zero.
17. The price of hot dogs increases by 22% and the quantity of hot dogs demanded falls by 25%. This indicates that demand for hot dogs is:
 - (a) elastic. (b) inelastic. (c) unitarily elastic. (d) perfectly elastic.
18. If the quantity demanded of mutton increases by 5% when the price of chicken increases by 20%, the cross-price elasticity of demand between mutton and chicken is:
 - (a) -0.25 (b) 0.25 (c) -4 (d) 4
19. Given the following four possibilities, which one results in an increase in total consumer expenditure?
 - (a) demand is unitary elastic and price falls.
 - (b) demand is elastic and price rises.
 - (c) demand is inelastic and price falls.
 - (d) demand is inelastic and prices rises.
20. Which of the following statements about price elasticity of supply is correct?
 - a) Price elasticity of supply is a measure of how much the quantity supplied of a good responds to a change in the price of that good.
 - b) Price elasticity of supply is computed as the percentage change in quantity supplied divided by the percentage change in price.
 - c) Price elasticity of supply in the long run would be different from that of the short run.
 - d) All the above.

21. Which of the following is an incorrect statement?
- When goods are substitutes, a fall in the price of one (*ceteris paribus*) leads to a fall in the quantity demanded of its substitutes.
 - When commodities are complements, a fall in the price of one (other things being equal) will cause the demand of the other to rise.
 - As the income of the consumer increases, the demand for the commodity increases always and vice versa.
 - When a commodity becomes fashionable people prefer to buy it and therefore its demand increases.
22. Suppose the price of movies seen at a theatre rises from ₹ 120 per person to ₹ 200 per person. The theatre manager observes that the rise in price causes attendance at a given movie to fall from 300 persons to 200 persons. What is the price elasticity of demand for movies? (Use Arc Elasticity Method)
- .5
 - .8
 - 1.0
 - 1.2
23. Suppose a department store has a sale on its silverware. If the price of a plate-setting is reduced from ₹ 300 to ₹ 200 and the quantity demanded increases from 3,000 plate-settings to 5,000 plate-settings, what is the price elasticity of demand for silverware? (Use Arc Elasticity Method)
- .8
 - 1.0
 - 1.25
 - 1.50
24. When the numerical value of cross elasticity between two goods is very high, it means
- The goods are perfect complements and therefore have to be used together.
 - The goods are perfect substitutes and can be used with ease in place of one another.
 - There is a high degree of substitutability between the two goods.
 - The goods are neutral and therefore cannot be considered as substitutes.
25. If the local pizzeria raises the price of a medium pizza from ₹ 60 to ₹ 100 and quantity demanded falls from 700 pizzas a night to 100 pizzas a night, the price elasticity of demand for pizzas is: (Use Arc Elasticity Method)
- .67
 - 1.5
 - 2.0
 - 3.0
26. If electricity demand is inelastic, and electricity charges increase, which of the following is likely to occur?
- Quantity demanded will fall by a relatively large amount.
 - Quantity demanded will fall by a relatively small amount.
 - Quantity demanded will rise in the short run, but fall in the long run.
 - Quantity demanded will fall in the short run, but rise in the long run.
27. Suppose the demand for meals at a medium-priced restaurant is elastic. If the management of the restaurant is considering raising prices, it can expect a relatively:
- large fall in quantity demanded.
 - large fall in demand.
 - small fall in quantity demanded.
 - small fall in demand.

28. Point elasticity is useful for which of the following situations?
- (a) The bookstore is considering doubling the price of notebooks.
 - (b) A restaurant is considering lowering the price of its most expensive dishes by 50 percent.
 - (c) An auto producer is interested in determining the response of consumers to the price of cars being lowered by ₹ 100.
 - (d) None of the above.
29. A decrease in price will result in an increase in total revenue if :
- (a) the percentage change in quantity demanded is less than the percentage change in price.
 - (b) the percentage change in quantity demanded is greater than the percentage change in price.
 - (c) demand is inelastic.
 - (d) the consumer is operating along a linear demand curve at a point at which the price is very low and the quantity demanded is very high.
30. An increase in price will result in an increase in total revenue if :
- (a) the percentage change in quantity demanded is less than the percentage change in price.
 - (b) the percentage change in quantity demanded is greater than the percentage change in price.
 - (c) demand is elastic.
 - (d) the consumer is operating along a linear demand curve at a point at which the price is very high and the quantity demanded is very low.
31. Demand for a good will tend to be more elastic if it exhibits which of the following characteristics?
- (a) It represents a small part of the consumer's income.
 - (b) The good has many substitutes available.
 - (c) It is a necessity (as opposed to a luxury).
 - (d) There is little time for the consumer to adjust to the price change.
32. Demand for a good will tend to be more inelastic if it exhibits which of the following characteristics?
- (a) The good has many substitutes.
 - (b) The good is a luxury (as opposed to a necessity).
 - (c) The good is a small part of the consumer's income.
 - (d) There is a great deal of time for the consumer to adjust to the change in prices.
33. Suppose a consumer's income increases from ₹ 30,000 to ₹ 36,000. As a result, the consumer increases her purchases of compact discs (CDs) from 25 CDs to 30 CDs. What is the consumer's income elasticity of demand for CDs? (Use Arc Elasticity Method)
- (a) 0.5 (b) 1.0 (c) 1.5 (d) 2.0
34. Total utility is maximum when:
- (a) marginal utility is zero.
 - (b) marginal utility is at its highest point.
 - (c) marginal utility is negative.
 - (d) none of the above.

35. Which one is not an assumption of the theory of demand based on analysis of indifference curves?
- Given scale of preferences as between different combinations of two goods.
 - Diminishing marginal rate of substitution.
 - Constant marginal utility of money.
 - Consumers would always prefer more of a particular good to less of it, other things remaining the same.
36. The consumer is in equilibrium at a point where the budget line:
- is above an indifference curve.
 - is below an indifference curve.
 - is tangent to an indifference curve.
 - cuts an indifference curve.
37. An indifference curve slopes down towards right since more of one commodity and less of another result in:
- same level of satisfaction.
 - greater satisfaction.
 - maximum satisfaction.
 - any of the above.
38. Which of the following statements is incorrect?
- An indifference curve must be downward-sloping to the right.
 - Convexity of a curve implies that the slope of the curve diminishes as one moves from left to right.
 - The income elasticity for inferior goods to a consumer is positive.
 - The total effect of a change in the price of a good on its quantity demanded is called the price effect.
39. The second glass of lemonade gives lesser satisfaction to a thirsty boy. This is a clear case of
- Law of demand.
 - Law of diminishing returns.
 - Law of diminishing utility.
 - Law of supply.
40. What will happen in the rice market if buyers are expecting higher rice prices in the near future?
- The demand for rice will increase.
 - The demand for rice will decrease.
 - The demand for rice will be unaffected.
 - None of the above.
41. In the case of a Giffen good, the demand curve will be:
- horizontal.
 - downward-sloping to the right.
 - vertical.
 - upward-sloping to the right.
42. By consumer surplus, economists mean
- the area inside the budget line.
 - the area between the average revenue and marginal revenue curves.
 - the difference between the maximum amount a person is willing to pay for a good and its market price.
 - none of the above.
43. Which of the following is a property of an indifference curve?
- it is convex to the origin.
 - the marginal rate of substitution is constant as you move along an indifference curve.

- (c) marginal utility is constant as you move along an indifference curve.
 (d) total utility is greatest where the 45 degree line cuts the indifference curve.
44. When economists speak of the utility of a certain good, they are referring to
 (a) the demand for the good.
 (b) the usefulness of the good in consumption.
 (c) the expected satisfaction derived from consuming the good.
 (d) the rate at which consumers are willing to exchange one good for another.
45. A vertical supply curve parallel to Y axis implies that the elasticity of supply is:
 (a) Zero. (b) Infinity.
 (c) Equal to one. (d) Greater than zero but less than infinity.
46. The supply of a good refers to:
 (a) actual production of the good.
 (b) total existing stock of the good.
 (c) stock available for sale.
 (d) amount of the good offered for sale at a particular price per unit of time.
47. An increase in the supply of a good is caused by:
 (a) improvements in its technology.
 (b) fall in the prices of other goods.
 (c) fall in the prices of factors of production.
 (d) all of the above.
48. Elasticity of supply refers to the degree of responsiveness of supply of a good to changes in its:
 (a) demand. (b) price.
 (c) cost of production. (d) state of technology.
49. A horizontal supply curve parallel to the quantity axis implies that the elasticity of supply is:
 (a) zero. (b) infinite.
 (c) equal to one. (d) greater than zero but less than one.
50. Contraction of supply is the result of:
 (a) decrease in the number of producers.
 (b) decrease in the price of the good concerned.
 (c) increase in the prices of other goods.
 (d) decrease in the outlay of sellers.
51. Conspicuous goods are also known as:
 (a) prestige goods. (b) snob goods. (c) veblen goods. (d) all of the above.
52. The quantity purchased remains constant irrespective of the change in income. This is known as
 (a) negative income elasticity of demand.
 (b) income elasticity of demand less than one.
 (c) zero income elasticity of demand.
 (d) income elasticity of demand is greater than one.

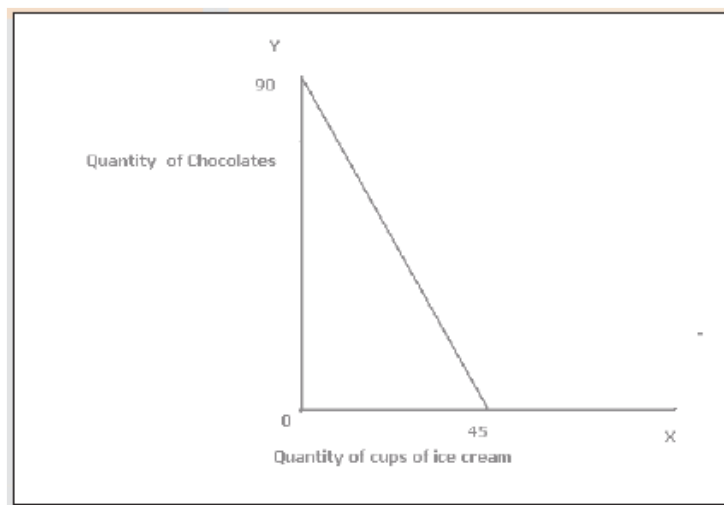
53. As income increases, the consumer will go in for superior goods and consequently the demand for inferior goods will fall. This means:
- (a) income elasticity of demand less than one.
 - (b) negative income elasticity of demand.
 - (c) zero income elasticity of demand.
 - (d) unitary income elasticity of demand.
54. When income increases the money spent on necessities of life may not increase in the same proportion, This means:
- (a) income elasticity of demand is zero.
 - (b) income elasticity of demand is one.
 - (c) income elasticity of demand is greater than one.
 - (d) income elasticity of demand is less than one.
55. The luxury goods like jewellery and fancy articles will have
- (a) low income elasticity of demand
 - (b) high income elasticity of demand
 - (c) zero income elasticity of demand
 - (d) none of the above
56. A good which cannot be consumed more than once is known as
- (a) durable good
 - (b) non-durable good
 - (c) producer good
 - (d) none of the above
57. A relative price is
- (a) price expressed in terms of money
 - (b) what you get paid for babysitting your cousin
 - (c) the ratio of one money price to another
 - (d) equal to a money price
58. A point below the budget line of a consumer
- (a) Represents a combination of goods which costs the whole of consumer's income.
 - (b) Represents a combination of goods which costs less than the consumer's income.
 - (c) Represents a combination of goods which is unattainable to the consumer given his/her money income.
 - (d) Represents a combination of goods which costs more than the consumers' income.
59. Demand is the
- (a) the desire for a commodity given its price and those of related commodities.
 - (b) the entire relationship between the quantity demanded and the price of a good other things remaining the same.
 - (c) willingness to pay for a good if income is larger enough.
 - (d) ability to pay for a good.
60. If, as people's income increases, the quantity demanded of a good decreases, the good is called
- (a) a substitute.
 - (b) a normal good.
 - (c) an inferior good.
 - (d) a complement.

61. The price of tomatoes increases and people buy tomato puree. You infer that tomato puree and tomatoes are
 (a) normal goods. (b) complements.
 (c) substitutes. (d) inferior goods.
62. Chicken and fish are substitutes. If the price of chicken increases, the demand for fish will
 (a) increase or decrease but the demand curve for chicken will not change.
 (b) increase and the demand curve for fish will shift rightwards.
 (c) not change but there will be a movement along the demand curve for fish.
 (d) decrease and the demand curve for fish will shift leftwards.
63. Potato chips and popcorn are substitutes. A rise in the price of potato chips will _____ the demand for popcorn and the quantity of popcorn will _____
 (a) increase; increase (b) increase; decrease
 (c) decrease; decrease (d) decrease; increase
64. If the price of Orange Juice increases, the demand for Apple Juice will _____.
 (a) increase (b) decrease
 (c) remain the same. (d) become negative.
65. An increase in the demand for computers, other things remaining same, will:
 (a) Increase the number of computers bought.
 (b) Decrease the price but increase the number of computers bought.
 (c) Increase the price of computers.
 (d) Increase the price and number of computers bought.
66. When total demand for a commodity whose price has fallen increases, it is due to:
 (a) income effect. (b) substitution effect.
 (c) complementary effect. (d) price effect.
67. With a fall in the price of a commodity:
 (a) consumer's real income increases.
 (b) consumer's real income decreases.
 (c) there is no change in the real income of the consumer.
 (d) none of the above.
68. With an increase in the price of diamond, the quantity demanded also increases. This is because it is a:
 (a) substitute good. (b) complementary good.
 (c) conspicuous good. (d) none of the above.
69. An example of a good that exhibit direct price-demand relationship is
 (a) Giffen goods. (b) Complementary goods.
 (c) Substitute goods. (d) None of the above.
70. In Economics, when demand for a commodity increases with a fall in its price it is known as:
 (a) contraction of demand. (b) expansion of demand.
 (c) no change in demand. (d) none of the above.

71. The quantity supplied of a good or service is the amount that
- is actually bought during a given time period at a given price.
 - producers wish they could sell at a higher price.
 - producers plan to sell during a given time period at a given price.
 - people are willing to buy during a given time period at a given price.
72. Supply is the
- limited resources that are available with the seller.
 - cost of producing a good.
 - entire relationship between the quantity supplied and the price of good.
 - Willingness to produce a good if the technology to produce it becomes available.
73. In the book market, the supply of books will decrease if any of the following occurs except
- a decrease in the number of book publishers.
 - a decrease in the price of the book.
 - an increase in the future expected price of the book.
 - an increase in the price of paper used.
74. If price of computers increases by 10% and supply increases by 25%. The elasticity of supply is :
- 2.5
 - 0.4
 - (-) 2.5
 - (-) 0.4
75. An increase in the number of sellers of bikes will increase the
- the price of a bike.
 - demand for bikes.
 - the supply of bikes.
 - demand for helmets.
76. If the supply of bottled water decreases, other things remaining the same, the equilibrium price _____ and the equilibrium quantity _____
- increases; decreases.
 - decreases; increases.
 - decreases; decreases.
 - increases; increases.
77. A decrease in the demand for cameras, other things remaining the same will.
- increase the number of cameras bought.
 - decrease the price but increase the number of cameras bought.
 - increase the price of cameras.
 - decrease the price and decrease in the number of cameras bought.
78. If good growing conditions increases the supply of strawberries and hot weather increases the demand for strawberries, the quantity of strawberries bought
- increases and the price might rise, fall or not change.
 - does not change but the price rises.
 - does not change but the price falls.
 - increases and the price rises.
79. Comforts lies between
- inferior goods and necessities.
 - luxuries and inferior goods.
 - necessaries and luxuries.
 - none of the above.

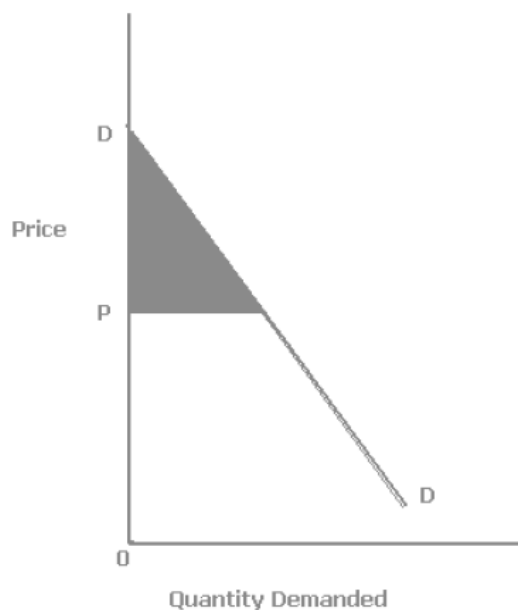
80. In a very short period, the supply
 (a) can be changed. (b) can not be changed.
 (c) can be increased. (d) none of the above.
81. When supply curve moves to the left, it means
 (a) Smaller supply at a given price. (b) larger supply at a given price.
 (c) constant supply at a lower price. (d) none of the above.
82. When supply curve moves to right, it means
 (a) supply increases. (b) supply decreases.
 (c) supply remains constant. (d) none of the above.
83. The elasticity of supply is defined as the
 (a) responsiveness of the quantity supplied of a good to a change in its price.
 (b) responsiveness of the quantity supplied of a good without change in its price.
 (c) responsiveness of the quantity demanded of a good to a change in its price.
 (d) responsiveness of the quantity demanded of a good without change in its price.
84. Elasticity of supply is measured by dividing the percentage change in quantity supplied of a good by _____
 (a) Percentage change in income.
 (b) Percentage change in quantity demanded of goods.
 (c) Percentage change in price.
 (d) Percentage change in taste and preference.
85. Elasticity of supply is zero means
 (a) perfectly inelastic supply.
 (b) perfectly elastic supply.
 (c) imperfectly elastic supply.
 (d) none of the above.
86. Elasticity of supply is greater than one when
 (a) proportionate change in quantity supplied is more than the proportionate change in price.
 (b) proportionate change in price is greater than the proportionate change in quantity supplied.
 (c) change in price and quantity supplied are equal.
 (d) None of the above.
87. If the quantity supplied is exactly equal to the relative change in price then the elasticity of supply is
 (a) less than one.
 (b) greater than one.
 (c) one.
 (d) none of the above.
88. The price of a commodity decreases from ₹ 6 to ₹ 4 and the quantity demanded of the good increases from 10 units to 15 units, find the coefficient of price elasticity. (Use Point Elasticity Method)
 (a) 1.5 (b) 2.5 (c) -1.5 (d) 0.5

89. The supply function is given as $Q = -100 + 10P$. Find the elasticity using point method, when price is ₹ 15.
- (a) 4 (b) -3
(c) -5 (d) 3
90. The figure below shows the budget constraint of a consumer with an income of ₹ 900/- to spend on two commodities, namely ice cream and chocolates.



- The prices of these two commodities respectively are:
- (a) ₹ 10 and ₹ 20 (b) ₹ 20 and ₹ 10
(c) ₹ 10 and ₹ 5 (d) Any of the above.
91. Which of the following statements about price elasticity of demand is correct?
- (a) Price elasticity of demand is a measure of how much the quantity demanded of a good responds to a change in the price of that good.
(b) Price elasticity of demand is computed as the percentage change in quantity demanded divided by the percentage change in price.
(c) Price elasticity of demand in the long run would be different from that of the short run.
(d) All the above.
92. The aim of the consumer in allocating his income is to _____.
(a) maximize his total utility.
(b) maximize his marginal utility.
(c) to buy the goods he wants most whatever the price.
(d) to buy the goods which he expects to be short in supply.
93. At higher prices people demand more of certain goods not for their worth but for their prestige value – This is called
(a) veblen effect. (b) giffens paradox.
(c) speculative effect. (d) none of the above.
94. If the price of air-conditioner increases from ₹ 30,000 to ₹ 30,010 and resultant change in demand is negligible, we use the measure of _____ to measure elasticity.
(a) point elasticity. (b) perfect elasticity.
(c) perfect inelasticity. (d) price elasticity.

95. If the percentage change in supply is less than the percentage change in price it is called
 (a) unit elasticity of supply. (b) perfectly elastic.
 (c) more elastic supply. (d) inelastic supply.
96. The supply curve shifts to the right because of _____
 (a) improved technology. (b) increased price of factors of production.
 (c) increased excise duty. (d) all of the above.
97. Which of the following statements is correct?
 (a) When the price falls the quantity demanded falls.
 (b) Seasonal changes do not affect the supply of a commodity.
 (c) Taxes and subsidies do not influence the supply of the commodity.
 (d) With lower cost, it is profitable to supply more of the commodity.
98. If the demand is more than supply, then the pressure on price will be
 (a) upward (b) downward
 (c) constant (d) none of the above
99. The supply curve for perishable commodities is _____.
 (a) elastic (b) inelastic
 (c) perfectly elastic (d) perfectly inelastic
100. Supply is a _____ concept.
 (a) stock (b) flow and stock (c) flow (d) none of the above
101. The cross elasticity between Rye bread and Whole Wheat bread is expected to be:
 (a) positive (b) negative
 (c) zero (d) can't say
102. In the diagram given below, the shaded portion represents.



- (a) Price above which there is no demand for the commodity.
 (b) Monopoly price of the commodity.
 (c) Consumer surplus.
 (d) None of the above.

103. The income elasticity of tomatoes is 0.25, it means tomatoes are:
 (a) inferior goods. (b) luxury goods.
 (c) normal goods. (d) can't say.
104. The cross elasticity between personal computers and soft wares is:
 (a) positive. (b) negative.
 (c) zero. (d) one.
105. The cross elasticity between Bread and DVDs is:
 (a) positive. (b) negative. (c) zero. (d) one.
106. Which of the following statements is correct?
 (a) With the help of statistical tools, the demand can be forecasted accurately.
 (b) The more the number of substitutes of a commodity, more elastic is the demand.
 (c) Demand for butter is perfectly elastic.
 (d) Gold jewellery will have negative income elasticity.
107. Suppose the income elasticity of education in private school in India is 1.6. What does this indicate:
 (a) Private school education is a luxury.
 (b) Private school education is a necessity.
 (c) Private school education is an inferior commodity.
 (d) We should have more private schools.
108. Suppose potatoes have $(-).0.4$ as income elasticity. We can say from the data given that:
 (a) Potatoes are inferior goods.
 (b) Potatoes are superior goods.
 (c) Potatoes are necessities.
 (d) There is a need to increase the income of consumers so that they can purchase potatoes.

Answers

1 - d	2 - b	3 - c	4 - b	5 - b	6 - b	7 - b	8 - c	9 - c	10 - b
11 - b	12 - b	13 - b	14 - c	15 - d	16 - c	17 - a	18 - b	19 - d	20 - d
21 - c	22 - b	23 - c	24 - c	25 - d	26 - b	27 - a	28 - c	29 - b	30 - a
31 - b	32 - c	33 - b	34 - a	35 - c	36 - c	37 - a	38 - c	39 - c	40 - a
41 - d	42 - c	43 - a	44 - c	45 - a	46 - d	47 - d	48 - b	49 - b	50 - b
51 - d	52 - c	53 - b	54 - d	55 - b	56 - b	57 - c	58 - b	59 - b	60 - c
61 - c	62 - b	63 - a	64 - a	65 - d	66 - d	67 - a	68 - c	69 - a	70 - b
71 - c	72 - c	73 - b	74 - a	75 - c	76 - a	77 - d	78 - a	79 - c	80 - b
81 - a	82 - a	83 - a	84 - c	85 - a	86 - a	87 - c	88 - c	89 - d	90 - b
91 - d	92 - a	93 - a	94 - a	95 - d	96 - a	97 - d	98 - a	99 - d	100 - c
101 - a	102 - c	103 - c	104 - b	105 - c	106 - b	107 - a	108 - a		

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