THEORY OF DEMAND AND SUPPLY
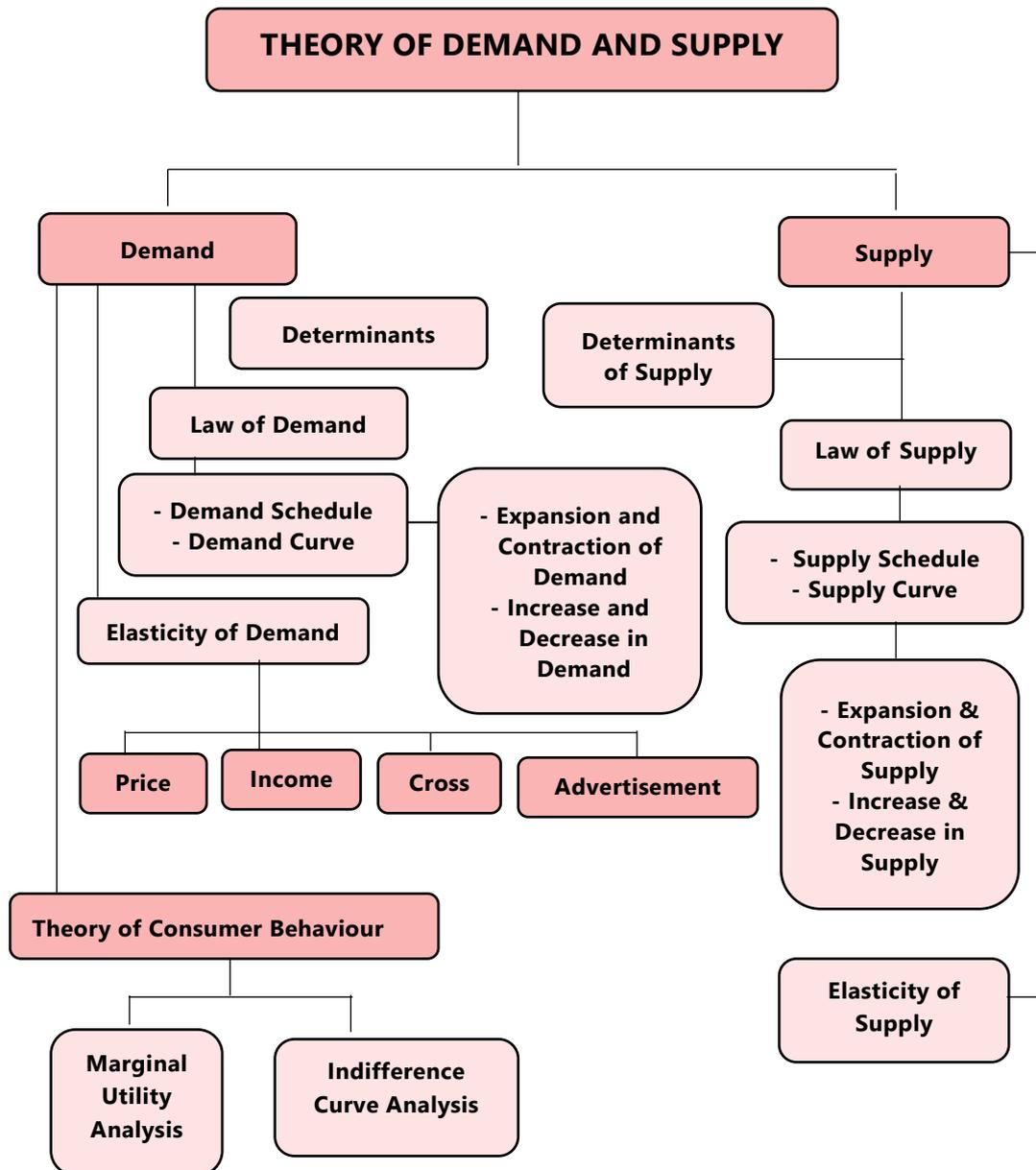
UNIT -1: LAW OF DEMAND AND ELASTICITY OF DEMAND

LEARNING OUTCOMES

After studying this unit, you would be able to:

♦ Explain the meaning of Demand.

♦ Describe what Determines Demand.

♦ Explain the Law of Demand.

♦ Explain the difference between Movement along the Demand Curve and Shift of the Demand Curve.

♦ Define and Measure Elasticity.

♦ Apply the Concepts of Price, Cross and Income Elasticities.

♦ Explain the Determinants of Elasticity.

CHAPTER OVERVIEW

THEORY OF DEMAND AND SUPPLY

Demand

- Determinants
- Law of Demand
- Demand Schedule
- Demand Curve
- Elasticity of Demand
  - Price
  - Income
  - Cross
  - Advertisement
- Expansion and Contraction of Demand
- Increase and Decrease in Demand

Theory of Consumer Behaviour

- Marginal Utility Analysis
- Indifference Curve Analysis

Supply

- Determinants of Supply
- Law of Supply
- Supply Schedule
- Supply Curve
- Expansion & Contraction of Supply
- Increase & Decrease in Supply
- Elasticity of Supply

Consider the following hypothetical situation:

Aroma Tea Limited is considering diversifying its business. A meeting of the board of directors is called. While discussing the matter, Rajeev Aggarwal, the CEO of Aroma Tea Limited asks, Sanjeev Bhandari, the marketing head, "What do you think Sanjeev, should we enter into green tea business also? What does the market pulse say? Who all are there in this market? How will the demand for green tea affect the demand for our black tea? Is green tea a luxury good or is it a necessity now? What are the key determinants of the demand for green tea? Will coffee drinkers or soft drinkers shift to green tea? The answers to these questions will help us better understand how to price and position our brand in the market. "Before we rush into this line, I want a report on exactly why you believe green tea will be the star of our company in the coming five years?"

As an entrepreneur of a firm or as a manager of a company, you would often face situations in which you have to answer questions similar to the above. Why do prices change when events such as weather changes, wars, pandemics or new discoveries occur? Why is it that some producers are able to charge higher prices than others? The answers to these and a thousand other questions can be found in the theory of demand and supply.

The market system is governed by market mechanism. Demand and supply are the forces that make market economies work. These two together determine the price and quantity sold of a commodity or service. While buyers constitute the demand side of the market, sellers make the supply side of that market. Since business firms produce goods and services to be sold in the market, it is important for them to know how much of their products would be wanted by buyers during a given period of time. The buyers include consumers, businesses and even government. The quantity that the buyers buy at a given price determines the size of the market. As we are aware, as far as a firm is concerned, the size of the market is a significant determinant of its prospects.

When a market is competitive, its behaviour is suitably described by the demand and supply model. We understand that the terms demand and supply refer to the behaviour of buyers and sellers respectively as they interact each other in markets. A thorough understanding of the demand and supply theory is therefore essential for any business firm. We shall study the theory of demand in this Unit. The theory of supply will be discussed in Unit-3.

1.0 MEANING OF DEMAND

The term 'demand' refers to the quantity of a good or service that buyers 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. For example, people may desire much bigger houses, luxurious cars etc. But there are also constraints that they face such as prices of products and limited means to pay. Thus, wants or desires together with the real world constraints determine what they buy. The 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. Effective demand alone would figure in economic analysis and business decisions.

Two things are to be noted about the quantity demanded.

(i)   The quantity demanded is always expressed at a given price. At different prices different quantities of a commodity are generally demanded.

(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.

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".

1.1   WHAT DETERMINES DEMAND?

Knowledge of the common determinants of demand for a product or service and the nature of relationship between demand and its determinants are essential for a business firm for estimating the market demand for its products. There are a number of factors which influence the demand for a commodity. All these factors are not equally important. Moreover, some of these factors cannot be easily measured or quantified. The important factors that determine demand are given below.

(i)   **Price of the commodity**: Obviously, the good's own price is a key determinant of its demand. 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: (i) complementary goods and (ii) competing goods or substitutes.

Complementary goods and services are those that are bought or consumed together or simultaneously. Examples are: tea and sugar, automobile and petrol and pen and ink.

The increase in the demand for one causes an increase in the demand for the other. 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. Similarly, computers and computer software are complementary goods. A fall in the price of computers will cause a rise in the demand for software. The reverse will be the case when the price of a complement rises. An increase in the price of a complementary good reduces the demand for the good in question. Thus, we find that, there is an inverse relation between the demand for a good and the price of its complement.

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, different brands of toothpaste etc. are substitutes for each other and can be used in place of one another easily. When goods are substitutes, if the price of a product being purchased goes up, buyers may switch to a cheaper substitute. This decreases the demand for the product at a given price, but increases the demand for the substitute. Similarly, a fall in the price of a product (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) **Disposable Income of the consumer**: The purchasing power of a buyer is determined by the level of his disposable income. Other things being equal, the demand for a commodity depends upon the disposable income of the potential purchasers. In general, increase in disposable income tends to increase the demand for particular types of goods and services at any given price. A decrease in disposable income generally lowers the quantity demanded at all possible prices.

The nature of relationship between disposable income and quantity demanded depends upon the nature of goods. A basic description of the nature of goods is useful in describing the effect of income on demand.

Normal goods are those that are demanded in increasing quantities as consumers' income increases. Most goods and services fall under the category of normal goods. Household furniture, clothing, automobiles, consumer durables and semi durables etc. fall in this category. When income is reduced (for example due to recession), demand for normal goods falls.

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.

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. Demand for luxury goods and prestige goods arise beyond a certain level of consumers' income and keep rising as income increases.

Business managers should be fully aware of the nature of goods which they produce (or the nature of need which their products satisfy) and the nature of relationship of quantities demanded with changes in buyers' incomes. For assessing the current as well as future demand for their products, they should also recognize the movements in the macro economic variables that affect buyers' incomes.

(iv) **Tastes and preferences of buyers**: The demand for a commodity also depends upon the tastes and preferences of buyers and changes in them over a period of time. Goods which are modern or more in fashion command higher demand than goods which are of old design or are out of fashion. Consumers may perceive a product as obsolete and discard it before it is fully utilised and then prefer another good which is currently in fashion. For example, there is greater demand for the latest digital devices and trendy clothing and we find that more and more people are discarding these goods currently in use even though they could have used it for some more years.

External effects on utility such as' demonstration effect',' bandwagon effect', Veblen effect and 'snob effect' do play important roles in determining the demand for a product. Demonstration effect, a term coined by James Duesenberry, refers to the desire of people to emulate the consumption behaviour of others. In other words, people buy or have things because they see that other people are able to have them. For example, an individual's demand for cell phone may be affected by his seeing a new model of cell phone 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 have it, he too can.

Bandwagon effect refers to the extent to which the demand for a commodity is increased due to the fact that others are also consuming the same commodity. It represents the desire of people to purchase a commodity in order to be fashionable or stylish or to conform to the people they wish to be associated with.

By 'snob effect' we refer to the extent to which the demand for a consumers' good is decreased owing to the fact that others are also consuming the same commodity. This represents the desire of people to be exclusive; to be different; to dissociate themselves from the "common herd." For example, when a product becomes common among all, some people decrease or altogether stop its consumption.

Difference between Demonstration/Bandwagon Effect and Snob Effect	
Demonstration/Bandwagon Effect	**Snob Effect**
It is a psychological effect in which people do the same what others are doing. They do not have their own belief and thinking.	It is understood as the desire to possess a unique commodity having a prestige value. It is quite opposite to the bandwagon or demonstration effect.
It leads to increase in demand of a particular commodity.	It leads to decrease in demand of a particular commodity.
Example: When some people start investing money in share market then many people start following the same without considering its advantages and disadvantages.	**Example:** If Miss. X and Miss. Y are rich rivals of each other and if in any party Miss. X wears an expensive dress and on seeing it Miss. Y who also having the same dress decided to reject the use of the same dress further. Rather Miss. Y will try to use even more expensive one.

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). For example, expensive cars and jewels. The distinction between the snob effect and the Veblen effect is that the former is a function of the consumption of others and the latter is a function of price. We conclude that people have tastes and preferences and these do change - sometimes, due to external and sometimes due to internal causes - and influence demand.

Knowledge regarding tastes and preferences is extremely valuable for the manufacturers and marketers as it would help them appropriately design new models of products and services and plan production to suit the changing tastes and needs of the customers.

(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 or fall in income they will postpone their purchases of nonessential commodities and therefore, the current demand for them will fall. Levels of consumer and business confidence about their future economic situations also affect spending and demand.

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, larger would be the number of buyers and the quantity demanded in the market would be higher at every price. The opposite is the case when population is less.

(b)   **Age Distribution of population**: If a larger proportion of people belong to older age groups relative to younger age groups, there will be increased demand for geriatric care services, spectacles, walking sticks, etc. and less demand for children's books. Similarly, if the population consists of more of children, demand for toys, baby foods, toffees, etc. will be more. Likewise, if there is migration from rural areas to urban areas, there will be decrease in demand for goods and services in rural areas.

(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 is 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 investment and 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.

(e) **Government policies and regulations:** The governments influence demand through its taxation, purchases, expenditure, and subsidy policies. While taxes increase prices and decrease the quantity demanded, subsidies decrease the prices and increase the quantity demanded. For example taxes on luxurious goods and subsidies for solar panels. Similarly total bans, restrictions and higher taxes may be used by government to restrict the demand for socially undesirable goods and services. Government's policy on international trade also will affect the domestic demand for goods and services.

Apart from above, factors such as weather conditions, business conditions, stage of business cycle, wealth, levels of education, marital status, socioeconomic class, group membership, habits of the consumer, social customs and conventions, salesmanship and advertisements also play important roles in influencing demand.

1.2 THE DEMAND FUNCTION

As we know, a function is a symbolic statement of a relationship between the dependent and the independent variables.

The demand function states in equation form, the relationship between the demand for a product (the dependent variable) and its determinants (the independent or explanatory variables). Any other factors that are not explicitly listed in the demand function are assumed to be irrelevant or held constant. A simple demand function may be expressed as follows:

$$Q_x = f(P_X, Y, P_r)$$

Where Q_x is the quantity demanded of product X

P_X is the price of the commodity

Y is the money income of the consumer, and

P_r is the price of related goods

The demand function stated as above does not indicate the exact quantitative relationship between Q_x and P_X, M and P_r. For this, we need to write the demand function in a particular form with specified values of the explanatory variables appearing on the right-hand side. For example; we may write $Q_x = 45 + 2y + 1 P_r, - 2 P$. In this unit, we will be studying demand as a function of only price, keeping everything else constant.

1.3 THE LAW OF DEMAND

Most of us have an implicit understanding of the law of demand. The law of demand is one of the most important laws of economic theory. The law states the nature of relationship between the quantity demanded of a product and its price. ***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 states that other things being equal, when the price of a good rises, the quantity demanded of the good will fall. Thus, there is an inverse relationship between price and quantity demanded, *ceteris paribus*. 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 all factors other than price which influence demand.(Refer section 1.1 above).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. Thus, the constancy of these 'other factors' is an important assumption of the law of demand.

The quantity demanded is the amount of a good or service that consumers are willing to buy at a given price, holding constant all the other factors that influence purchases. The quantity demanded of a good or service can exceed the quantity actually sold.

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

1.3.0 The Demand Schedule

A demand schedule is a table showing the quantities of a good that buyers would choose to purchase at different prices, per unit of time, with all other variables held constant. To illustrate the relation between the quantity of a commodity demanded and its price, we may take a hypothetical data for prices and quantities of ice-cream. A demand schedule is drawn upon the assumption that all the other influences remain unchanged. It thus attempts to isolate the influence exerted by the price of the good upon the amount sold.

**Table 1: Demand Schedule of an Individual Buyer**

	Price per cup of ice-cream	Quantity of ice-cream demanded (per week)
	(in ₹)	(Cups)
A	60	0
B	50	2
C	40	4
D	30	6
E	20	8
F	10	10
G	0	12

Table 1 shows how many cups of ice-cream this particular buyer buys each week at different prices of ice-cream, holding constant everything else that influences how much of ice-cream this particular consumer wants to buy. If ice-cream is free (price =0), she consumes 12cups of ice-cream per week. As the price rises, she buys fewer and fewer cups of ice-cream. When the price reaches ₹60 per cup, she does not buy ice-cream at all. The above table depicts an inverse relationship between price and quantity of ice-cream demanded. We may note that that the demand schedule obeys the law of demand: As the price of ice-cream increases, ceteris paribus, the quantity demanded falls.

1.3.1 The Demand Curve

A demand curve is a graphical presentation of the demand schedule. By convention, the vertical axis of the graph measures the price per unit of the good. The horizontal axis measures the quantity of the good, which is usually expressed in some physical measure per time period. By plotting each pair of values as a point on a graph and joining the resulting points, we get the individual's demand curve for a commodity. It shows the relationship between the quantities of a good that buyers are willing to buy and the price of the good. We can now plot the data from Table 1 on a graph.

In Fig. 1, we have shown such a graph and plotted the seven points corresponding to each price-quantity combination shown in Table 1. The demand curve hits the vertical axis at price ₹60 indicating that no quantity is demanded when the price is ₹ 60 (or higher). The demand curve hits the horizontal quantity axis at 12, the amount ice-cream that the consumer wants if the price is zero. Point A shows the same information as the first row of Table 1, and Point G shows the same information as does the last row of the table.
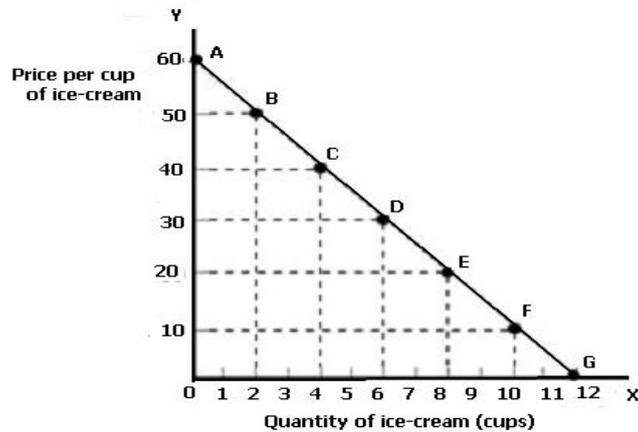
Fig. 1: Demand Curve for Ice-cream

We now draw a smooth curve through these points. The curve is called the demand curve for ice-cream and shows the quantity of ice-cream that the consumer would like to buy at each price. The negative or downward slope indicates that the quantity demanded increases as the price falls. Consumers are usually ready to buy more if the price is lower. Briefly put, more of a good will be purchased at lower prices. Thus, the downward sloping demand curve is in accordance with the law of demand which, as stated above, describes an inverse price-demand relationship.

The slope of a demand curve is $- \Delta P/\Delta Q$ (i.e the change along the vertical axis divided by the change along the horizontal axis). The negative sign of this slope is consistent with the law of demand.

The demand curve for a good does not have to be linear or a straight line; it can be curvilinear- meaning its slope may vary along the curve. If the change in quantity demanded does not follow a constant proportion, then the demand curve will be non linear. However, linear demand curves provide a convenient tool for analysis.

1.3.2 Market Demand Schedule

The market demand for a commodity gives the alternative amounts of the commodity demanded per time period, at various alternative prices, by all the buyers in the market. In other words, it is the total quantity that all the buyers of a commodity are willing to buy per unit of time at a given price, other things remaining constant. The market demand for a commodity thus depends on all the factors that determine the individual's demand and, in addition, on the number of buyers of the commodity in the market.

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 two individual buyers of good X in the market namely, A and B. The Table 2 shows their individual demand at various prices.

Table 2: Market Demand Schedule of Good X (per day)

Price of Good X in (`)	Quantity demanded by		Total Market Demand
	A	**B**	
0	3	2	5
10	2	1	3
20	1	0	1
30	0	0	0

When we add the quantities demanded at each price by consumers A and B, we get the total market demand. Thus, when good X is free or price is zero per unit, the market demand for commodity 'X' is 5 units (i.e.3+2). When price rises to ₹ 10, the market demand is 3 units. At a price of ₹ 20, only one unit is demanded in the market. At price ₹ 30, both A and B do not buy good X and therefore, market demand is zero. The market demand schedule also indicates inverse relationship between price and quantity demanded of 'X'.
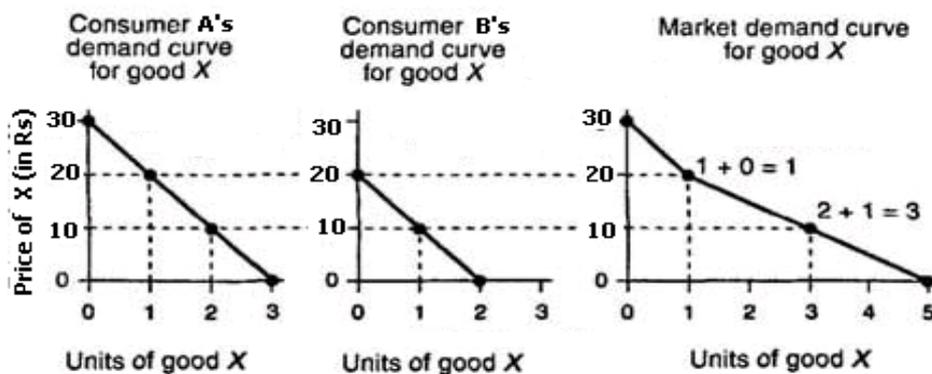
Fig. 2: The Market Demand Curve for Good X

1.3.3 The Market Demand Curve

The market demand curve for good X represents the quantities of good X demanded by all buyers in the market for good X. The market demand curve is obtained by horizontal summation of all individual demand curves.

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 two consumers A and B have different individual demand curves corresponding to their different preferences for good X. The two individual demand curves are shown in Figure 2 along with the market demand curve for good X. When there are more than two consumers in the market for some good, the same principle continues to apply and the market demand curve would be the horizontal summation of all the market participants' individual demand curves. 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.

In addition to the demand schedule and the demand curve, the buyers' demand for a good can also be expressed algebraically, using a demand equation**.** The demand equation relates the price of the good, denoted by P**,** to the quantity of the good demanded, denoted by Q.

The straight-line demand curve where we hold everything else constant is described by a linear demand function. We can write a demand function as follows:

$$Q = a - bP$$

Where 'a' is the vertical intercept and 'b' is the slope.

For example: For a demand function Q = 100 -2P,

$$P = \frac{a}{b} - \frac{Q}{b} : P = 50 - \frac{Q}{2}$$

1.3.4 Rationale of the Law of Demand

Normally, the demand curves slope downwards. This means people buy more at lower prices. We shall now try to understand why do demand curves slope downwards? Put in other words, why do people buy more at lower prices? Different economists have given different explanations for the operation of the law of demand. These are given below:

(1)   **Price Effect of a fall in price:** The price effect which indicates the way the consumer's purchases of good X change, when its price changes, is the sum of its two components namely: substitution effect and income effect.

   (a)   **Substitution effect**: Hicks and Allen have explained the law in terms of substitution effect and income effect. The substitution effect describes the change in demand for a product when its relative price changes. When the price of a commodity falls, the price ratio between items change and 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. When the price falls, the substitution effect is always positive; i.e it will always cause more to be demanded. The substitution effect will be stronger when:

(a)   the goods are closer substitutes

(b)   there is lower cost of switching to the substitute good

(c)   there is lower inconvenience while switching to the substitute good

(b)   **Income effect**: The increase in demand on account of an increase in real income is known as 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. A part or whole of the resulting increase in real income can now be used to buy more of the commodity in question, given that the good is normal. Therefore, the demand for that commodity (whose price has fallen) increases. However, there is one exception. In the case of inferior goods, the income effect works in the opposite direction to the substitution effect. In the case of inferior goods, the expansion in demand due to a price fall will take place only if the substitution effect outweighs the income effect.

(2)   **Utility maximising behaviour of Consumers:** 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.

(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 increases.

(4)   **Different uses**: Many commodities have multiple uses. When the price of such commodities are high (or rises) they will be put to limited uses only. If the prices of such commodities fall, they will be put to more number of uses and therefore their

demand will increase. Thus, the increase in the number of uses consequent to a fall in price make the buyer demand more of such commodities making the demand curve slope downwards. For example: Electricity

1.3.5 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 used by the rich people as status symbol for enhancing their social prestige or /and for displaying wealth. These articles will not conform to the usual law of demand as they become more attractive only if their prices are high or keep going up. 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.

(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 available and which occupy a substantial place in consumers' budget are called 'Giffen goods'. All Giffen goods are inferior goods; but all inferior goods are not Giffen goods. 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, air-conditioners 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 even 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 even as their price rises. On the contrary, if prices are falling and people anticipate further fall, rather than buying more, they postpone their purchases. However, it is to be noted that here it is not the law of demand which is invalidated. 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) **Incomplete information and irrational behaviour:** The law has been derived assuming consumers to be rational and knowledgeable about market-conditions. However, at times, consumers have incomplete information and therefore make inconsistent decisions regarding purchases. 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.

Sometimes, 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 necessaries**: The law of demand does not apply much in the case of necessaries of life. Irrespective of price changes, people have to consume the minimum quantities of necessary commodities.

(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 the prices of related commodities or in tastes and fashion etc., the inverse demand and price relation may not hold good.

1.4 EXPANSION AND CONTRACTION OFDEMAND

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 a contraction of demand. For example, suppose the price of apples 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. When as a result of increase in price (O P_{II}), 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^I, the quantity demanded rises to ON, we say that there is an 'expansion of demand' or 'a rise in quantity demanded' or 'a downward movement on the same demand curve.'
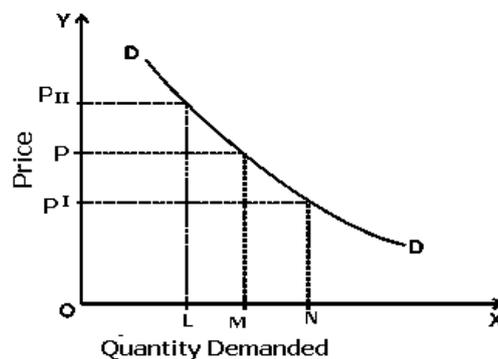
Fig. 3: Expansion and Contraction of Demand

1.4.1 Increase and Decrease in Demand

Till now we have assumed that the other determinants of demand remain constant when we are analysing the 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
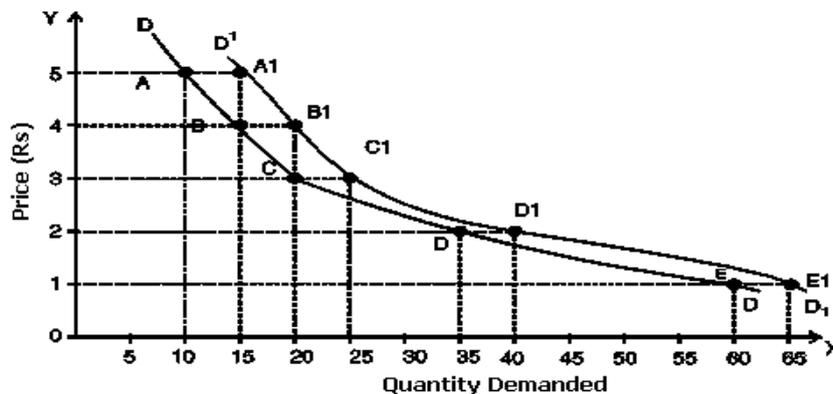
determinants of price viz. income, tastes, propensity to consume and price of related goods remain constant. The 'other factors remaining constant' means that the position of the demand curve remains the same and the consumer moves downwards or upwards on it.

There are factors other than price (non-price factors) or conditions of demand which might cause either an increase or decrease in the quantity of a particular good or service that buyers are prepared to demand at a given price. 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? As an example, let us consider what happens to the demand for commodity X if the consumer's income increases:

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 ₹ 5,000 per month	Quantity of 'X' demanded when average household income is ₹ 10,000 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

### Fig. 4: Figure Showing Two Demand Curves at Different Incomes

The two sets of data are plotted in Figure 4 as DD pertaining to demand when average household income is ₹ 5000/ and D'D' when income is ₹ 10, 000/. We find that with increase in income, 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 ₹ 5,000 per month. When the average household income rises to ₹ 10,000 per month, 20 units of X are demanded at price ₹ 4. You can find similar increase in demand at each price. Since this increase would occur regardless of what the market price is, the result would be a shift to the right of the entire demand curve.

Alternatively, we can ask what price consumers would be willing to pay to purchase a given quantity, say 15 units of X. With greater income, they should be willing to pay a higher price of ₹ 5 instead of 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.

Any change that increases the quantity demanded at every price shifts the demand curve to the right and is called an increase in demand. Any change that decreases the quantity demanded at every price shifts the demand curve to the left, and is called a decrease in demand.

Figure 5(a) and (b) illustrate increase and decrease in demand respectively. When there is an increase in demand, the demand curve shifts to the right and more quantity will be purchased at a given price (Q1 instead of Q at price P). A decrease in demand causes the entire demand curve to shift to the left and we find that less quantity is bought at the same price P.
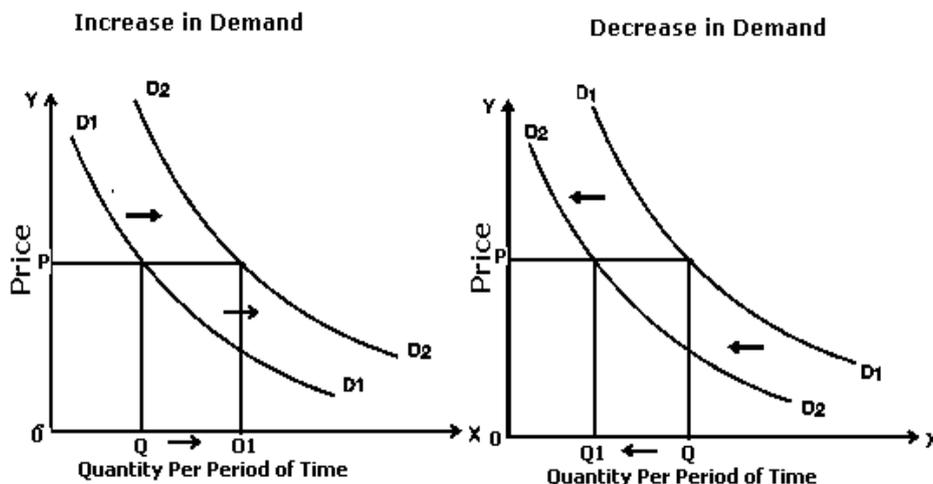
Fig. 5(a): Rightward shift in the demand Curve   **Fig. 5(b): Leftward shift in the demand Curve**

The table below summarises the effect of non - price determinants on demand

Changes in determinants other than price that cause increase in demand	Changes in determinants other than price that cause Decrease in Demand (Leftward shift of

(Rightward shift of demand curve when more is demanded at each price)	demand curve when less is demanded at each price)
Rise in income in the case of normal goods	A fall in income in case of normal goods, and a rise in income in case of inferior goods
Increase in wealth in the case of normal goods	Decrease in wealth in case of normal goods, and an increase in wealth in case of inferior goods
Rise in the price of a substitute good	Fall in the price of a substitute good
Fall in the price of a complement	Rise in the price of a complement
An increase in the number of buyers	A decrease in the number of buyers
A change in tastes in favour of the commodity	A change in tastes against the commodity
A redistribution of income to groups of people who favour the commodity	Redistribution of income away from groups of people who favour the commodity.
An expectation that price will rise in the future	An expectation that price will fall in the future
Government policies encouraging consumption of the good Eg. Grant of consumer subsidies	Government regulations discouraging consumption e.g. ban on cigarette smoking / ban on consumption.

1.4.2 Movements along the Demand Curve vs. Shift of Demand Curve

It is important for the business decision-makers to understand the distinction between a movement along a demand curve and a shift of the whole demand curve.

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.

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.

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.

When demand increases due to factors other than price, firms can sell more at the existing prices resulting in increased revenue. The objective of advertisements and all other sales promotion activities by any firm is to shift the demand curve to the right and to reduce the elasticity of demand. (The latter will be discussed in the next section). However, the additional demand is not free of cost as firms have to incur expenditure on advertisement and sales promotion devices.

1.5 ELASTICITY OF DEMAND

Till now we were concerned with the direction of the changes in prices and quantities demanded. From the point of view of a business firm, it is more important to know the extent of the relationship or the degree of responsiveness of demand to changes in its determinants.

Often, we would want to know how sensitive is the demand for a product to its price; for example, if price increases by 5 percent, how much will the quantities demanded change? Also, how much change in demand will be there if the average income rises by 5 percent? What effect will an advertising campaign have on sales? Economists use a number of different types of elasticity to answer questions like these so as to make demand predictions and to recommend changes in strategies.

Consider the following situations:

(1) As a result of a fall in the price of headphones from ₹ 500 to ₹ 400, the quantity demanded increases from 100headphones to 150 headphones.

(2) 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.

(3) 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.

What do you notice? You notice that the demand for headphones, wheat and salt responds in the same direction to price changes. The difference lies in the degree of response of demand. The differences in responsiveness of demand can be found out by comparing the percentage changes in prices and quantities demanded. Here lies the concept of elasticity.

The amount of a commodity purchased is a function of many variables such as price of the commodity, prices of the related commodities, income of the consumers and other factors

on which demand depends. A change in one of these independent variables will cause a change in the dependent variable, namely, the amount purchased per unit of time. The elasticity of demand measures the relative responsiveness of the amount purchased per unit of time to a change in any one of these independent variables while keeping others constant. In general, the coefficient of elasticity is defined as the proportionate change in the dependent variable divided by the proportionate change in the independent variable.

Elasticity of demand is defined as the degree of 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.

We may find different measures of elasticity such as 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. In other words, it is price elasticity of demand which is usually referred to as elasticity of demand.

1.5.1 Price Elasticity of Demand

Perhaps, the most important measure of elasticity of demand is the price elasticity of demand which measures the sensitivity of quantity demanded to 'own price' or the price of the good itself. The concept of price elasticity of demand is important for a firm for two reasons.

♦ Knowledge of the nature and degree of price elasticity allows firms to predict the impact of price changes on its sales.

♦ Price elasticity guides the firm's profit-maximizing pricing decisions.

Price elasticity of demand expresses the degree of responsiveness 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. In other words, it is measured as the percentage change in quantity demanded divided by the percentage change in price, other things remaining equal. The price elasticity of demand (also referred to as PED) tells us the percentage change in quantity demanded for each one percent (1%) change in price. That is,

$$\text{Price Elasticity} = \text{Ep} = \frac{\% \text{ change in quantity demaned}}{\% \text{ change in Price}}$$

The percentage change in a variable is just the absolute change in the variable divided by the original level of the variable.

Therefore,

$$Ep = \frac{\dfrac{\text{Change in quantity}}{\text{Original Quantity}} \times 100}{\dfrac{\text{Change in Price}}{\text{Original Price}} \times 100}$$

$$\text{OR } Ep = \frac{\text{Change in quantity}}{\text{Original Quantity}} \times \frac{\text{Original Price}}{\text{Change in price}}$$

In symbolic terms

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

Where Ep   stands for price elasticity

q   stands for original quantity

p   stands for original price

Δ   stands for a change.

A negative sign on the elasticity of demand illustrates the law of demand: less quantity is demanded as the price rises. Notice that the change in quantity was due solely to the price change. The other factors that potentially could affect sales (income and the competitor's price) did not change.

The greater the value of elasticity, the more sensitive quantity demanded is to price. Strictly speaking, the value of price elasticity varies from minus infinity to approach zero. This is because $\dfrac{\Delta q}{\Delta p}$ has a negative sign. In other words, since price and quantity are inversely related (with a few exceptions) price elasticity is negative.

While interpreting the coefficient of price elasticity, we consider only the magnitude of the price elasticity- i.e. its absolute size. For example, if Ep = -1.22, we say that the elasticity is 1.22 in magnitude. That is, we ignore the negative sign and consider only the numerical value of the elasticity. Thus if a 1% change in price leads to 2% change in quantity demanded of good A and 4% change in quantity demanded of good B, then we get elasticity of A and B as 2 and 4 respectively, showing that demand for B is more elastic or responsive to price changes than that of A. Had we considered minus signs, we would have concluded that the demand for A is more elastic than that for B, which is not correct. Hence, by convention, we take the absolute value of price elasticity and draw conclusions.

A numerical example for price elasticity of demand:

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 × 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

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

$$= 15\% / 5\% = 3$$

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

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

Here

$$1.5 = \frac{\Delta q}{40} \times \frac{100}{30} = 18$$

Therefore new quantity demanded = 30+18 = 48 units

ILLUSTRATION 4

The quantity demanded by a consumer at price ₹ 9 per unit is 800 units. Its price falls by 25% and quantity demanded rises by 160 units. Calculate its price elasticity of demand.

SOLUTION

Change in quantity demanded = 160

Therefore, % change in quantity demanded = = 20%

% change in price = 25%

$$E_d = \frac{\% \, \text{change in q}}{\% \, \text{change in p}}$$

$$E_a = \frac{20}{25} = 0.8$$

ILLUSTRATION 5

A consumer buys 80 units of a good at a price of ₹ 4 per unit. Suppose price elasticity of demand is - 4. At what price will he buy 60 units?

SOLUTION

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

Or

$$4 = \frac{20}{x-4} \times \frac{4}{80}$$

Or

$$4 = \frac{1}{x-4}$$

$$x = 4.2 \text{ per unit}$$

1.5.2 Point Elasticity

The point elasticity of demand is the price elasticity of demand at a particular point on the demand curve. The concept of point elasticity is used for measuring price elasticity where the change in price is infinitesimal. Price elasticity is a key element in applying marginal analysis to determine optimal prices. Since marginal analysis works by evaluating "small" changes taken with respect to an initial decision, it is useful to measure elasticity with respect to an infinitesimally small change in price.

Point elasticity makes use of derivative rather than finite changes in price and quantity. It may be defined as:

$$Ep = \frac{-dq}{dp} \times \frac{p}{q}$$

Where $\frac{dq}{dp}$ is the derivative of quantity with respect to price at a point on the demand curve, and p and q are the price and quantity at that point. Economists generally use the word

"elasticity" to refer to point elasticity.
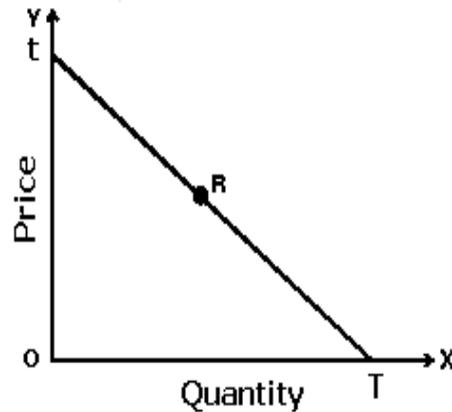
Fig 6: Point Elasticity

Point elasticity is, therefore, the product of price quantity ratio at a particular point on the demand curve and the reciprocal of the slope of the demand line.

1.5.3 Measurement of Elasticity on a Linear Demand Curve – Geometric Method

By definition, the price elasticity of demand is the change in quantity associated with a change in price ($\Delta Q/\Delta P$) times the ratio of price to quantity (P/Q) Therefore, the price elasticity of demand depends not only on the slope of the demand curve but also on the price and quantity. The elasticity, therefore, varies along the curve as price and quantity change. The slope of a linear demand curve is constant. However, the elasticity at different points on a linear demand curve would be different. When price is high price is high and quantity is small, the elasticity is high. The elasticity becomes smaller as we move down the curve.

Given a straight line demand curve tT, (Fig.6 above) point elasticity at any point say R can be found by using the formula

$$\frac{RT}{Rt} = \frac{\text{lower segment}}{\text{upper segment}}$$

Using the above formula we can get elasticity at various points on the demand curve.
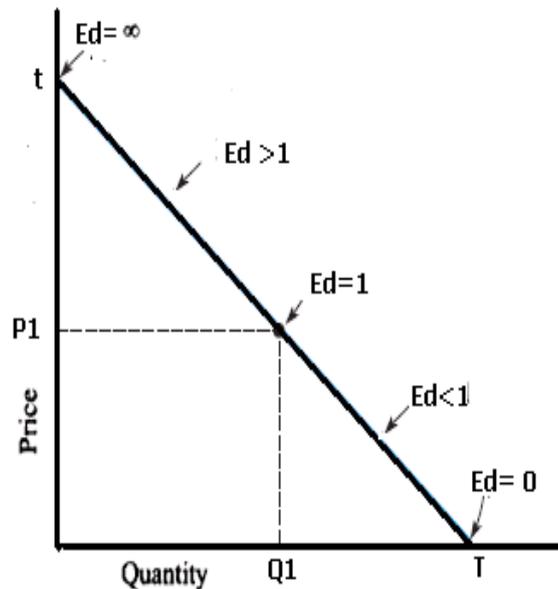
Fig .7: Elasticity at Different Points on the Demand Curve

Thus, we see that as we move from T towards t, elasticity goes on increasing. At the mid-point it is equal to one, at point t, it is infinity and at T it is zero.

1.5.4 Arc-Elasticity

Often we may be required to calculate price elasticity over some portion of the demand curve rather than at a single point. In other words, the elasticity may be calculated over a range of prices. When price and quantity changes are discrete and large we have to measure elasticity over an arc of the demand curve.

When price elasticity is to be found between two prices (or two points on the demand curve say, A and B in figure 8) the question arises as to which price and quantity should be taken as base. This is because elasticity found by using original price and quantity figures as base will be different from the one derived by using new price and quantity figures. Therefore, in order to avoid confusion, rather than choose the initial or the final price and quantity, the mid-point method is used i.e. the averages of the two prices and quantities are taken as (i.e. original and new) base. The midpoint formula is an approximation to the actual percentage change in a variable, but it has the advantage of consistent elasticity values when price moves in either directions.
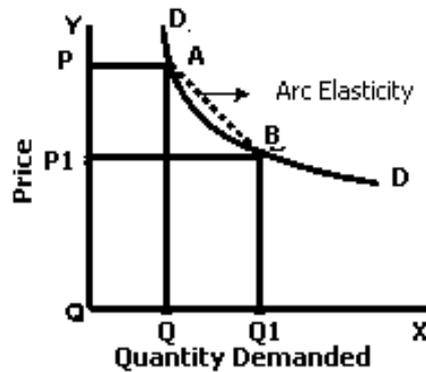
Fig. 8: Arc Elasticity

The arc elasticity can be found out by using the formula: We drop the minus sign and use the absolute value.

$$Ep = \frac{\dfrac{Q_2 - Q_1}{(Q_2 + Q_1)/2}}{\dfrac{P_2 - P_1}{(P_2 + P_1)/2}}$$

$$Ep = \frac{Q_2 - Q_1}{Q_2 + Q_1} \times \frac{P_2 + P_1}{P_2 - P_1}$$

Where P_1, Q_1 are the original price and quantity and P_2, Q_2 are the new ones.

Thus, if we have to find elasticity of demand for headphones between:

$P_1 = ₹ 500$ $Q_1 = 100$

$P_2 = ₹ 400$ $Q_2 = 150$

We will use the formula

$$Ep = \frac{Q_2 - Q_1}{Q_2 + Q_1} \times \frac{P_2 + P_1}{P_2 - P_1}$$

Or $$Ep = \frac{50}{250} \times \frac{900}{100}$$

or $$Ep = 1.8$$

The arc elasticity will always lie somewhere (but not necessarily in the middle) between the point elasticities calculated at the lower and the higher prices.

1.5.5 Interpretation of the Numerical Values of Elasticity of Demand

Economists have found it useful to divide the demand behaviour into different categories, based on values of price elasticity. Since we draw demand curves with price on the vertical axis and quantity on the horizontal axis, $\Delta Q/\Delta P$ = (1/slope of curve). As a result, for any price and quantity combination, the steeper the slope of the curve, the less elastic is demand.

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

Elasticity is zero, (Ep= 0) 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. In other words, any change in price leaves the quantity demanded unchanged and consumers will buy a fixed quantity of a good regardless of its price. Perfectly inelastic demand is as an extreme case of price insensitivity and is therefore only a theoretical category with less practical significance. The vertical demand curve in figure 8(a) represents perfectly or completely inelastic demand,

Elasticity is one, or unitary, (Ep= 1) if the percentage change in quantity demanded is equal to the percentage change in price. Figure 8 (b) shows special case of unit-elastic demand, where the demand curve is a rectangular hyperbola.

Elasticity is greater than one (Ep > 1) 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. [Figure8 (d)]. In other words, the quantity demanded is relatively sensitive to price changes. When drawn, the elastic demand line is fairly flat.

Elasticity is less than one (Ep < 1) 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.[Figure 8 (e)]In this situation, when price falls the buyers are unable or unwilling to significantly contract demand. In other words, the quantity demanded is relatively insensitive to price changes. When drawn, the inelastic demand line is fairly steep.
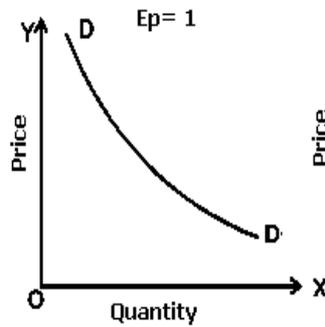
Elasticity is infinite, (Ep= ∞) when a 'small price reduction raises the demand from zero to infinity. The demand curve is horizontal at the price level (where the demand curve touches the vertical axis). As long as the price stays at one particular level any quantity might be demanded. Moving back and forth along this line, we find that there is a change in the quantity demanded but no change in the price. If there is a slight increase in price, they would not buy anything from the particular seller. That is, even the smallest price rise would cause quantity demanded to fall to zero. Roughly speaking, when you divide a number by zero, you get infinity, denoted by the symbol∞. So a horizontal demand curve implies an infinite price elasticity of demand. This type of demand curve is found in a perfectly

competitive market. The horizontal demand curve in figure 8 (c) represents perfectly or infinitely elastic demand,
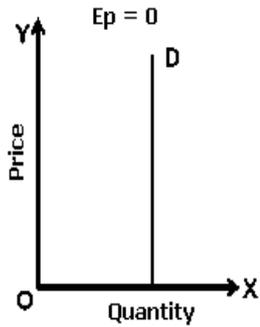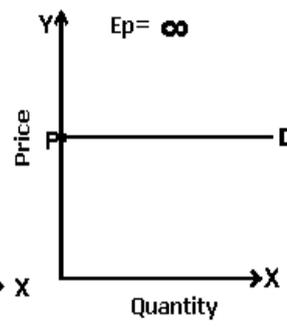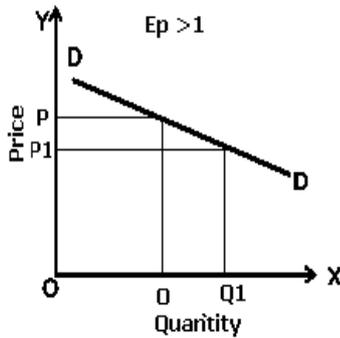

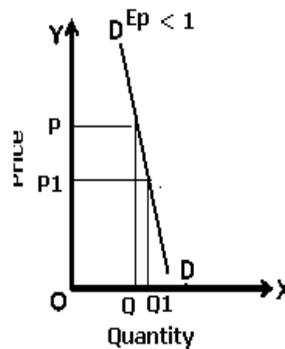| Fig. 8(a)	Fig. 8(b)	Fig. 8(c)
Demand curve of zero elasticity	Demand curve of unitary elasticity	Demand curve of infinite elasticity

Fig. 8(d)
Demand curve of elasticity greater than one

Fig. 8 (e)
Demand curve of Elasticity less than one

Table 4 : Elasticity Measures, Meaning and Nomenclature

Numerical measure of elasticity	Verbal description	Terminology
Zero	Quantity demanded does not change as price changes	Perfectly (or completely) inelastic
Greater than zero, but less than one	Quantity demanded changes by a smaller percentage than does price	Inelastic
One	Quantity demanded changes by exactly the same percentage as does price	Unit elasticity

Greater than one, but less than infinity	Quantity demanded changes by a larger percentage than does price	Elastic
Infinity	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 mentioned below are price elastic or inelastic.

Sl. No.	Name of the Commodity	Calculation of Elasticity $$Ep = \frac{Q_2 - Q_1}{Q_2 + Q_1} \times \frac{P_2 + P_1}{P_2 - P_1}$$	Nature of Elasticity
1.	Headphones	$\frac{100-150}{100+150} \times \frac{500+400}{500-400} = 1.8 > 1$	Elastic
2.	Wheat	$\frac{500-520}{500+520} \times \frac{20+18}{20-18} = 0.37 < 1$	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 headphones 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.

The price elasticity of demand for the vast majority of goods is somewhere between the two extreme cases of zero and infinity. Generally, in real world situations also, we find that the demand for goods like refrigerators, TVs, laptops, fans, etc. is elastic; the demand for goods like wheat and rice is inelastic; and the demand for salt is highly inelastic or perfectly inelastic. Why do we find such a difference in the behaviour of consumers in respect of different commodities? We shall explain later at length those factors which are responsible for the differences in elasticity of demand for various goods. Before that, we will consider another method of calculating price-elasticity which is called total outlay method.

1.5.6 Total Outlay Method of Calculating Price Elasticity

The price elasticity of demand for a commodity and the total expenditure or outlay made on it are significantly related to each other. As the total expenditure (price of the commodity multiplied by the quantity of that commodity purchased) made on a commodity is the total revenue received by the seller (price of the commodity multiplied by quantity of that

commodity sold of that commodity), we can say that the price elasticity and total revenue received are closely related to each other. By analysing the changes in total expenditure (or total revenue) in response to a change in the price of the commodity, we can know the price elasticity of demand for it.

Price Elasticity of demand equals one or Unity: When, as a result of the change in price of a good, the total expenditure on the good or the total revenue received from that good remains the same, the price elasticity for the good is equal to unity. This is because the total expenditure made on the good can remain the same only if the proportional change in quantity demanded is equal to the proportional change in price. Thus, if there is a given percentage increase (or decrease) in the price of a good and if the price elasticity is unitary, total expenditure of the buyer on the good or the total revenue received from it will remain unchanged.

Price elasticity of demand is greater than unity: When, as a result of increase in the price of a good, the total expenditure made on the good or the total revenue received from that good falls or when as a result of decrease in price, the total expenditure made on the good or total revenue received from that good increases, we say that price elasticity of demand is greater than unity. In our example of headphones, as a result of fall in price of headphones from ₹ 500 to ₹ 400, the total revenue received from headphones increases from ₹ 50,000 (500x100) to ₹ 60,000 (400 x 150), indicating elastic demand for headphones. Similarly, had the price of headphones increased from ₹ 400 to ₹ 500, the demand would have fallen from 150 to 100 indicating a fall in the total revenue received from ₹ 60,000 to ₹ 50,000 showing elastic demand for headphones.

Price elasticity of demand is less than unity: When, as a result of increase in the price of a good, the total expenditure made on the good or the total revenue received from that good increases or when as a result of decrease in its price, the total expenditure made on the good or the total revenue received from that good falls, we say that the price elasticity of demand is less than unity. In the example of wheat above, as a result of fall in the price of wheat from ₹ 20 per kg. to ₹ 18 per kg. the total revenue received from wheat falls from ₹ 10,000 (20 x 500) to ₹ 9360 (18 x 520) indicating inelastic demand for wheat. Similarly, we can show that as a result of increase in the price of wheat from ₹ 18 to ₹ 20 per kg, the total revenue received from wheat increase from ₹ 9360 to ₹ 10,000 indicating inelastic demand for wheat.

The main drawback of this method is that by using this we can only say whether the demand for a good is elastic or inelastic; we cannot find out the exact coefficient of price elasticity.

Why should a business firm be concerned about elasticity of demand? The reason is that the degree of elasticity of demand predicts how changes in the price of a good will affect the

total revenue earned by the producers from the sale of that good. The total revenue is defined as the total value of sales of a good or service. It is equal to the price multiplied by the quantity sold.

1.5.7 Total Revenue

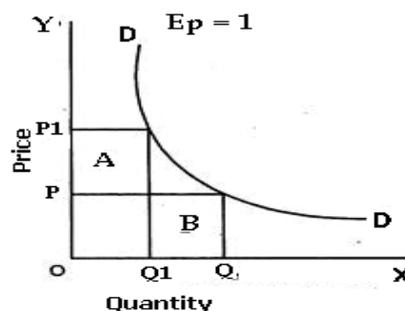Total revenue (TR) = Price × Quantity sold

Except in the rare case of a good with perfectly elastic or perfectly inelastic demand, when a seller raises the price of a good, there are two effects which act in opposite directions on revenue.

♦ **Price effect:** After a price increase (decrease), each unit sold sells at a higher (lower) price, which tends to raise (lower) the revenue.

♦ **Quantity effect:** After a price increase (decrease), fewer (more) units are sold, which tends to lower (increase) the revenue.

What will be the net effect on total revenue? It depends on which effect is stronger. If the price effect which tends to raise total revenue is the stronger of the two effects, then total revenue goes up. If the quantity effect, which tends to reduce total revenue, is the stronger, then total revenue goes down.

The price elasticity of demand tells us what happens to the total revenue when price changes: its size determines which effect, the price effect or the quantity effect, is stronger.

If demand for a good is unit-elastic (the price elasticity of demand is equal to one; Figure 9), an increase in price or decrease in price does not change total revenue. In this case, the quantity effect and the price effect exactly balance each other. When price rises from P to P1, the gain in revenue (Area A) is equal to loss in revenue due to lost sales (Area B)

Figure 9: Total revenue when Elasticity = 1

If demand for a good is inelastic (the price elasticity of demand is less than one), a higher price increases total revenue. In this case, the quantity effect is weaker than the price effect.

On the contrary, when demand is inelastic, a fall in price reduces total revenue because the quantity effect is dominated by the price effect. Refer Figure 8 (e) above.

If demand for a good is elastic (the price elasticity of demand is greater than one), an increase in price reduces total revenue and a fall in price increases total revenue. In this case, the quantity effect is stronger than the price effect. Refer Figure 8 (d) above.

Table 5 below summarizes the relationship between price elasticity and total revenue.

Table 5: The Relationship between Price elasticity and Total Revenue (TR)

Demand			
	Elastic	**Unitary Elastic**	**Inelastic**
Price increase	TR Decreases	TR remains same	TR Increases
Price decrease	TR Increases	TR remains same	TR Decreases

1.5.8 Determinants of Price Elasticity of Demand

In the above section we have explained what price elasticity is and how it is measured. Now an important question is: What are the factors which determine whether the demand for a good is elastic or inelastic? We will consider the following important determinants of price elasticity.

(1) **Availability of substitutes**: One of the most important determinants of elasticity is the degree of substitutability and the extent of availability of substitutes. Some commodities like butter, cabbage, car, soft drink etc. have close substitutes. These are margarine, other green vegetables, other brands of cars, other brands of cold drinks respectively. A change in the price of these commodities, the prices of the substitutes remaining constant, can be expected to cause quite substantial substitution – a fall in price leading consumers to buy more of the commodity in question and a rise in price leading consumers to buy more of the substitutes.

Commodities such as salt, housing, and all vegetables taken together, have few, if any, satisfactory substitutes and a rise in their prices may cause a smaller fall in their quantity demanded. Thus, we can say that goods which typically have close or perfect substitutes have highly elastic demand curves. Moreover, wider the range of substitutes available, the greater will be the elasticity. For example, toilet soaps, toothpastes etc have wide variety of brands and each brand is a close substitute for the other.

It should be noted that while as a group, a good or service may have inelastic demand, but when we consider its various brands, we say that a particular brand has

elastic demand. Thus, while the demand for a generic good like petrol is inelastic, the demand for Indian Oil's petrol is elastic. Similarly, while there are no general substitutes for health care, there are substitutes for one doctor or hospital. Likewise, the demand for common salt and sugar is inelastic because good substitutes are not available for these.

(2) **Position of a commodity in the consumer's budget**: The greater the proportion of income spent on a commodity; generally the greater will be its elasticity of demand and vice- versa. The demand for goods like common salt, matches, buttons, etc. tend to be highly inelastic because a household spends only a fraction of their income on each of them. On the other hand, demand for goods like rental apartments and clothing tends to be elastic since households generally spend a good part of their income on them. When the good absorbs a significant share of consumers' income, it is worth their time and effort to find a way to reduce their demand when the price goes up.

(3) **Nature of the need that a commodity satisfies**: In general, luxury goods are price elastic because one can easily live without a luxury. In contrast, necessities are price inelastic. Thus, while the demand for a home theatre is relatively elastic, the demand for food and housing, in general, is inelastic. If it is possible to postpone the consumption of a particular good, such good will have elastic demand. Consumption of necessary goods cannot be postponed and therefore, their demand is inelastic.

(4) **Number of uses to which a commodity can be put**: The more the possible uses of a commodity, the greater will be its price elasticity and vice versa. When the price of a commodity which has multiple uses decreases, people tend to extend their consumption to its other uses. To illustrate, milk has several uses. If its price falls, it can be used for a variety of purposes like preparation of curd, cream, ghee and sweets. But, if its price increases, its use will be restricted only to essential purposes like feeding the children and sick persons.

(5) **Time period**: The longer the time-period one has, the more completely one can adjust. Time gives buyers the opportunity to find alternatives or substitutes, or change their habits. A simple example of the effect can be seen in motoring habits. In response to a higher petrol price, one can, in the short run, make fewer trips by car. In the longer run, not only can one make fewer trips, but he can purchase a car with a smaller engine capacity when the time comes for replacing the existing one. Hence one's demand for petrol falls by more when one has made long term adjustments to higher prices.

(6) **Consumer habits**: If a person is a habitual consumer of a commodity, no matter how much its price change, the demand for the commodity will be inelastic. If buyers have rigid preferences demand will be less price elastic.

(7) **Tied demand**: The demand for those goods which are tied to others is normally inelastic as against those whose demand is of autonomous nature. For example printers and ink cartridges.

(8) **Price range**: Goods which are in very high price range or in very low price range have inelastic demand, but those in the middle range have elastic demand.

(9) **Minor complementary items:** The demand for cheap, complementary items to be used together with a costlier product will tend to have an inelastic demand.

Knowledge of the price elasticity of demand and the factors that may change it is of key importance to business managers because it helps them recognise the effect of a price change on their total sales and revenues. Firms aim to maximise their profits and their pricing strategy is highly decisive in attaining their goals. Knowledge of the price elasticity of demand for the goods they sell helps them in arriving at an optimal pricing strategy.

If the demand for a firm's product is relatively elastic, the managers need to recognize that lowering the price would expand the volume of sales and result in an increase in total revenue. On the contrary, when the demand is elastic, they have to be very cautious about increasing prices because a price increase will lead to a decline in total revenue as fall in sales would be more than proportionate. If the firm finds that the demand for their product is relatively inelastic, the firm may safely increase the price and thereby increase its total revenue as they can be assured of the fact that the fall in sales on account of a price rise would be less than proportionate.

Knowledge of price elasticity of demand is important for governments while determining the prices of goods and services provided by them, such as, transport and telecommunication. Further, it also helps the governments to understand the nature of responsiveness of demand to increase in prices on account of additional taxes and the implications of such responses on the tax revenues. Elasticity of demand explains why the governments are inclined to raise the indirect taxes on those goods that have a relatively inelastic demand, such as alcohol and tobacco products.

🕐1.6   INCOME ELASTICITY OF DEMAND

The income elasticity of demand is a measure of how much the demand for a good is affected by changes in consumers' incomes. Estimates of income elasticity of demand are useful for businesses to predict the possible growth in sales as the average incomes of consumers grow over time.

Income elasticity of demand is the degree of responsiveness of the quantity demanded of a good to changes in the income of consumers. In symbolic form,

$$E_i = \frac{\text{Percentge change in demand}}{\text{Percentge change in income}}$$

This can be given mathematically as follows:

$$E_i = \frac{\Delta Q}{Q} \div \frac{\Delta Y}{Y}$$

$$= \frac{\Delta Q}{Q} \times \frac{Y}{\Delta Y}$$

$$E_i = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

E_i =   Income elasticity of demand

ΔQ =   Change in demand

Q =   Original demand

Y =   Original money income

ΔY =   Change in money income

There is a useful relationship between income elasticity for a good and the proportion of income spent on it. The relationship between the two is described in the following three propositions:

1.   If the proportion of income spent on a good remains the same as income increases, then income elasticity for that good is equal to one.

2.   If the proportion of income spent on a good increase as income increases, then the income elasticity for that good is greater than one. The demand for such goods increase faster than the rate of increase in income

3.   If the proportion of income spent on a good decrease as income rises, then income elasticity for the good is positive but less than one. The demand for income-inelastic goods rises, but substantially slowly compared to the rate of increase in income. Necessities such as food and medicines tend to be income- inelastic

The above stated propositions can be better understood with the help of the below example:

Let, the price of a commodity is ₹ 10 per unit. Initially the consumer's income is ₹ 100 and he spends @10% of his income i.e. ₹ 10 on the commodity demanding 1 unit of the same. Now, as the consumer's income doubled to ₹200 (or increased by 100%), there may be three possibilities causing different degrees of income elasticity of demand as follows:

CASES	Proportion of Income Spent	Expenditure (in ₹)	Quantity Demanded (units)	Income Elasticity	Explanation
Proportion of income spent remains same with increase in income	@ 10%	20 (10% of ₹ 200)	2	$E_i = 1$	% change in quantity demanded = % change in income (i.e. 100% or doubled)
Proportion of income spent increases with increase in income	@ 20%	40 (20% of ₹ 200)	4	$E_i > 1$	% change in quantity demanded > % change in income (i.e. 300%)
Proportion of income spent decreases with increase in income	@ 5%	10 (5% of ₹ 200)	1	$E_i = 0$ Or $E_i < 1$	% change in quantity demanded < % change in income (i.e. 0%)

Income elasticity of goods reveals a few very important features of demand for the goods in question.

If income elasticity is zero, it signifies that the demand for the good is quite unresponsive to changes in income. When income elasticity is greater than zero or positive, then an increase in income leads to an increase in the demand for the good. This happens in the case of most of the goods and such goods are called normal goods. For all normal goods, income elasticity is positive. However, the degree of elasticity varies according to the nature of commodities.

When the income elasticity of demand is negative, the good is an inferior good. In this case, the quantity demanded at any given price decreases as income increases. The reason is that

when income increases, consumers choose to consume superior substitutes.

Another significant value of income elasticity is that of unity. When income elasticity of demand is equal to one, the proportion of income spent on goods remains the same as consumer's income increases. This represents a useful dividing line. If the income elasticity for a good is greater than one, it shows that the good bulks larger in consumer's expenditure as he becomes richer. Such goods are called luxury goods. On the other hand, if the income elasticity is less than one, it shows that the good is either relatively less important in the consumer's eye or, it is a good which is a necessity.

The following examples will make the above concepts clear:

(a)   The income of a household rises by 10%, the demand for wheat rises by 5%.

(b)   The income of a household rises by 10%, the demand for T.V. rises by 20%.

(c)   The incomes of a household rises by 5%, the demand for bajra falls by 2%.

(d)   The income of a household rises by 7%, the demand for commodity X rises by 7%.

(e)   The income of a household rises by 5%, the demand for buttons does not change at all.

Using formula for income elasticity,

i.e. $E_i = \dfrac{\text{Percentage change in demand}}{\text{Percentage chagne in income}}$

We will find income-elasticity for various goods. The results are as follows:

S. No.	Commodity	Income-elasticity for the household	Remarks
a	Wheat	$\dfrac{5\%}{10\%} = .5 (E_i < 1)$	Since 0 < .5 < 1, wheat is a normal good and fulfils a necessity.
b	T.V.	$\dfrac{20\%}{10\%} = 2 (E_i > 1)$	Since 2 > 1, T.V. is a luxurious commodity.
c	Bajra	$\dfrac{(-)2\%}{5\%} = (-).4 (E_i < 0)$	Since −.4 < 0, Bajra is an inferior commodity in the eyes of the household.
d	X	$\dfrac{7\%}{7\%} = 1 (E_i = 1)$	Since income elasticity is 1, X has unitary income elasticity.
e	Buttons	$\dfrac{0\%}{5\%} = 0 (E_i = 0)$	Buttons have zero income-elasticity.

It is to be noted that the words 'luxury', 'necessity', 'inferior good' do not signify the strict dictionary meanings here. In economic theory, we distinguish them in the manner shown above.

An important feature of income elasticity is that income elasticity differs in the short run and long run. For nearly all goods and services the income elasticity of demand is larger in the long run than in the short run

Knowledge of income elasticity of demand is very useful for a business firm in estimating the future demand for its products. Knowledge of income elasticity of demand helps firms measure the sensitivity of sales for a given product to incomes in the economy and to predict the outcome of a business cycle on its market demand. For instance, if EY = 1, sales move exactly in step with changes in income. If EY >1, sales are highly cyclical, that is, sales are sensitive to changes in income. For an inferior good, sales are countercyclical, that is, sales move in the opposite direction of income and EY < 0. This knowledge enables the firm to carry out appropriate production planning and management.

ILLUSTRATION 6

Income Elasticity of Demand

A car dealer sells new as well as used cars. Sales during the previous year were as follows:

Car type	Price	Quantity (Nos)
New	6 .5 lakhs	400
Used	60,000	4000

During the previous year, other things remaining the same, the real incomes of the customers rose on average by 10%. During the last year sales of new cars increased to 500, but sales of used cars declined to 3,850.

What is the income elasticity of demand for the new as well as used cars? What inference do you draw from these measures of income elasticity?

SOLUTION

Income Elasticity of demand for new cars

Percentage change in income = 10%, given

Percentage change in quantity of new cars demanded = (Δ Q/Q) X 100 = (100/400) X100 = 25%

Income elasticity of demand = 25%/ 10% = + 2.5

New car is therefore income elastic. Since income elasticity is positive, new car is a normal good.

Income Elasticity of demand for used cars

Percentage change in income = 10%, given

% change in quantity of used cars demanded = (Δ Q/Q) X 100 = (-1 50/4000) x100 = - 3.75%-
Income elasticity of demand = $-3.75/10 = -.375$

Since income elasticity is negative, used car is an inferior good.

1.7. CROSS - PRICE ELASTICITY OF DEMAND

1.7.1 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'. Cross demand refers to the quantities of a commodity or service which will be purchased with reference to changes in price, not of that particular commodity, but of other inter-related commodities, other things remaining the same. It may be defined as the quantities of a commodity that consumers buy per unit of time, at different prices of a 'related article', 'other things remaining the same'. The assumption 'other things remaining the same' means that the income of the consumer and also the price of the commodity in question will remain constant.

(a) Substitute Products and Demand

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 10, 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.
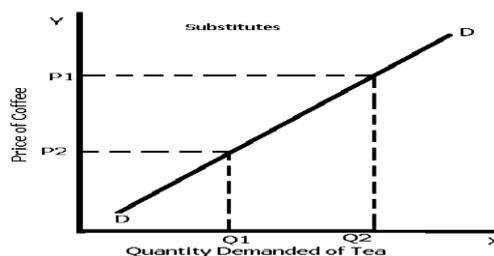
Fig. 10: Substitutes

(b)   Complementary Goods

In the case of complementary goods, as shown in the figure 11 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 solar panels will necessarily increase the demand for batteries. 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 solar panels due to a rise in their prices, the demand for batteries will fall, not because the price of batteries has gone up, but because the price of solar panels 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).
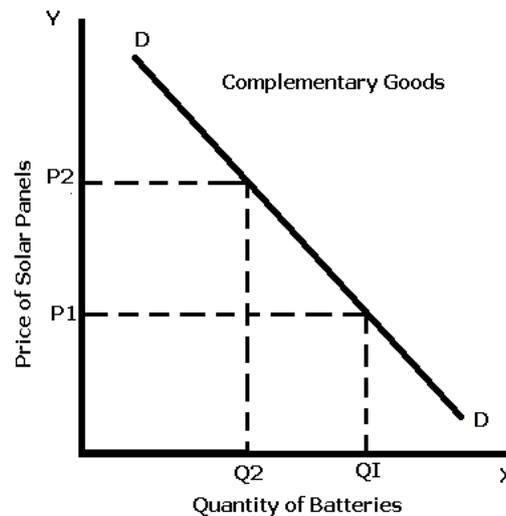
Fig. 11: Complementary Goods

We shall now look into the cross - price elasticity of demand.

The cross-price elasticity of demand between two goods measures the effect of the change in one good's price on the quantity demanded of the other good. Here, we consider the effect of changes in relative prices within a market on the pattern of demand. A change in the demand for one good in response to a change in the price of another good represents cross elasticity of demand of the former good for the latter good. It is equal to the percentage change in the quantity demanded of one good divided by the percentage change in the other good's price.

$$Ec = \frac{\text{Percentage change in quantity demanded of good X}}{\text{Percentage chagne in price of good Y}}$$

Symbolically, (mathematically)

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

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

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.

In the case of the cross-price elasticity of demand, the sign (plus or minus) is very important: it tells us whether the two goods are complements or substitutes.

When two goods X and Y are substitutes, the cross-price elasticity of demand is positive: a rise in the price of Y increases the demand for X and causes a rightward shift of the demand curve. When the cross-price elasticity of demand is positive, its size is a measure of how closely substitutable the two goods are. Greater the cross elasticity, the closer is the substitute. Higher the value of cross elasticity, greater will be the substitutability.

♦   If two goods are perfect substitutes for each other, the cross elasticity between them is infinite.

♦   If two goods are close substitutes, the cross-price elasticity will be positive and large.

♦   If two goods are not close substitutes, the cross-price elasticity will be positive and small.

♦   If two goods are totally unrelated, the cross-price elasticity between them is zero.

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 causing a leftward shift of the demand curve. The size of the cross-price elasticity of demand between two complements tells us how strongly complementary they are: if the cross-price elasticity is only slightly below zero, they are weak complements; if it is negative and very high, they are strong complements.

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.

The concept of cross elasticity of demand is useful for a manager while making decisions regarding changing the prices of his products which have substitutes and complements. If cross elasticity to change in the price of substitutes is greater than one, the firm may lose by increasing the prices and gain by reducing the prices of his products. With proper knowledge of cross elasticity, the firm can plan policies to safeguard against fluctuating prices of substitutes and complements.

Cross- price elasticity of demand

ILLUSTRATION 7

A shopkeeper sells only two brands of note books Imperial and Royal. It is observed that when the price of Imperial rises by 10% the demand for Royal increases by 15%.What is the cross price elasticity for Royal against the price of Imperial?

SOLUTION

$$Ec = \frac{\text{Percentage change in quantity demanded of good X}}{\text{Percentage chagne in price of good Y}}$$

$$Ec = \frac{15\%}{10\%} = +1.5$$

The two brands of note book Imperial and Royal are substitutes with significant substitutability

ILLUSTRATION 8

The cross price elasticity between two goods X and Y is known to be - 0.8. If the price of good Y rises by 20%, how will the demand for X change?

SOLUTION

Inserting the values in the formula:

-0.8 = X/ 20%

% change in quantity demanded of X = 20% x - 0.8 = - 16%

Since cross elasticity is negative, X and Y are complementary goods

ILLUSTRATION 9

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

$$\text{Cross elasticity} = \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x} \qquad \text{Here} \quad \begin{matrix} x = \text{tea} \\ y = \text{coffee} \end{matrix}$$

$$Ec = \frac{8-5}{10} \times \frac{25}{5} = \frac{3}{10} \times \frac{25}{5} = +1.5$$

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 10

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

$$\text{Cross elasticity} = \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x} \qquad \text{Here} \quad \begin{matrix} x = \text{Sugar} \\ y = \text{Tea} \end{matrix}$$

$$= \frac{2}{-5} \times \frac{30}{10} = (-)\,1.2$$

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

1.8 ADVERTISEMENT ELASTICITY

Advertisement elasticity of sales or promotional elasticity of demand is the responsiveness of a good's demand to changes in the 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;

$$Ea = \frac{\%\,Change\,in\,quantity\,demanded}{\%\,change\,in\,spending\,on\,advertising}$$

$$Ea = \frac{\Delta Qd\,/\,Qd}{\Delta A\,/\,A}$$

Where   Δ Qd denotes increase in demand

Δ A denotes additional expenditure on advertisement

Qd denotes initial demand

A denotes initial expenditure on advertisement

Elasticity	Interpretation
Ea = 0	Demand does not respond at all to increase in advertisement expenditure
Ea>0 but < 1	Increase in demand is less than proportionate to the increase in advertisement expenditure
Ea = 1	Demand increase in the same proportion in which advertisement expenditure increase
Ea> 1	Demand increase at a higher rate than increase 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.

SUMMARY

♦   Buyers constitute the demand side of the market; sellers make the supply side of that market. The quantity that consumers buy at a given price determines the size of the market.

♦   Demand means desire or wish to buy and consume a commodity or service backed by adequate ability to pay and willingness to pay

♦   The important factors that determine demand are price of the commodity, price of related commodities, income of the consumer, tastes and preferences of consumers, consumer expectations regarding future prices, size of population, composition of

population, the level of national income and its distribution, consumer-credit facility and interest rates.

♦ The law of demand states that people will buy more at lower prices and less at higher prices, other things being equal.

♦ A demand schedule is a table that shows various prices and the corresponding quantities demanded. The demand schedules are of two types; individual demand schedule and market demand schedule.

♦ According to Marshall, the demand curve slopes downwards due to the operation of the law of diminishing marginal utility. However, according to Hicks and Allen it is due to income effect and substitution effect.

♦ The demand curve usually slopes downwards; but exceptionally slopes upwards under certain circumstances as in the case of conspicuous goods, Giffen goods, conspicuous necessities, future expectations about prices, demand for necessaries and speculative goods.

♦ When the quantity demanded decreases due to a rise in own price, it is contraction of demand. On the contrary, when the price falls and the quantity demanded increases it is extension of demand.

♦ The demand curve will shift to the right when there is a rise in income (unless the good is an inferior one), a rise in the price of a substitute, a fall in the price of a complement, a rise in population and a change in tastes in favour of commodity. The opposite changes will shift the demand curve to the left.

♦ Elasticity of demand refers to the degree of sensitiveness or responsiveness of demand to a change in any one of its determinants. Elasticity of demand is classified mainly into four kinds. They are price elasticity of demand, income elasticity of demand, advertisement elasticity and cross elasticity of demand.

♦ Price elasticity of demand refers to the percentage change in quantity demanded of a commodity as a result of a percentage change in price of that commodity. Because demand curve slopes downwards and to the right, the sign of price elasticity is negative. We normally ignore the sign of elasticity and concentrate on the coefficient. Greater the absolute coefficient, greater is the price elasticity.

♦ In point elasticity, we measure elasticity at a given point on a demand curve. When the price change is somewhat larger or when price elasticity is to be found between two prices or two points on the demand curve, we use arc elasticity

♦　Income elasticity of demand is the percentage change in quantity demanded of a commodity as a result of a percentage change in income of the consumer. Goods and services are classified as luxuries, normal or inferior, depending on the responsiveness of spending on a product relative to percentage change in income.

♦　The cross elasticity of demand is the percentage change in the quantity demanded of commodity X as a result of a percentage change in the price of some related commodity Y. Products can be substitutes, and their cross elasticity is then positive; cross elasticity is negative for products that are complements.

♦　Advertisement elasticity of sales or promotional elasticity of demand measures the responsiveness of a good's demand to changes in the firm's spending on advertising.

UNIT -2: THEORY OF CONSUMER BEHAVIOUR

LEARNING OUTCOMES

After studying this unit, you would be able to:

♦   Explain the meaning of utility.

♦   Describe how consumers try to maximize their satisfaction by spending on different goods.

♦   Explain the law of diminishing marginal utility with examples.

♦   Describe the concept of consumer surplus with examples.

♦   Describe the meaning of indifference curve and the price line and show how these help in explaining consumer equilibrium.

2.0   NATURE OF HUMAN WANTS

In economics, the term 'want' refers to a wish, desire or motive to own or/and use goods and services that give satisfaction. Wants may arise due to physical, psychological or social factors. Since the resources are limited, we need to make a choice between the urgent wants and the not so urgent wants.

♦   All wants of human beings exhibit some characteristic features.

♦   Wants are unlimited in number. All wants cannot be satisfied.

♦   Wants differ in intensity. Some are urgent, others are less intensely felt

♦   "Utility" depends on intensity of wants.

♦   In general, Utility is satisfaction. But in economic sense, Utility is a want satisfying power of a commodity.

♦   Each want is satiable

♦ Wants are competitive. They compete each other for satisfaction because resources are scarce in relation to wants

♦ Wants are complementary. Some wants can be satisfied only by using more than one good or group of goods

♦ A particular want may be satisfied in alternative ways

♦ Wants are subjective and relative. And hence, utility is also subjective or relative concept.

♦ Wants vary with time, place, and person and hence utility.

♦ Some wants recur again whereas others do not occur again and again

♦ Wants may become habits and customs

♦ Wants are affected by income, taste, fashion, advertisements and social norms and customs

♦ Wants arise from multiple causes such as physical and psychological instincts, social obligations and individual's economic and social status

♦ Utility is a psychological concept. It is different from usefulness and has no concern with moral or ethical values.

♦ The two important concepts of utility are Total Utility (TU) and Marginal Utility (MU) which are useful in theories of consumer behaviour.

♦ TU refers to the sum total of utilities derived from the consumption of all the units of a commodity consumed by a consumer at a given time. In other words, it is a sum of marginal utilities up to the units consumed by a consumer. **TU = $\sum$ MU**

♦ MU is the additional utility derived from the consumption of an additional unit of the commodity. **MU = $TU_n - TU_{n-1}$ Or MU = $\Delta TU / \Delta N$**

2.1 CLASSIFICATION OF WANTS

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

Necessaries:

Necessaries are those which are essential for living. Necessaries are further sub-divided into necessaries for life or existence, necessaries for efficiency and conventional necessaries. 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 necessaries for efficiency. Conventional necessaries 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.

Comforts:

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

Luxuries:

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

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 necessaries today.

2.2   RELATIONSHIP BETWEEN TU & MU

There is a unique relationship between TU and MU which can be explained with the help of below schedule and diagram.

Total and Marginal Utility Schedule

UNITS	Total Utility (TU)	Marginal Utility (MU)
0	0	-
1	10	10
2	18	8
3	23	5
4	25	2
5	25	0
6	23	-2

- Both TU and MU are interrelated.

  TU = ∑ MU & **MU = TU$_n$ – TU$_{n-1}$**

- At first unit, TU = MU.

- Initially, when TU is increasing at decreasing rate, MU is decreasing but remains positive.

- When TU is maximum and constant, MU = 0 (zero).

- When TU starts decreasing, MU becomes negative.

2.3　LAW OF DIMINISHING MARGINAL UTILITY

The law of diminishing marginal utility is based on an important fact that while total wants of a person are virtually unlimited, each single want is satiable i.e. each want is capable of being satisfied.

Since each want is satiable, as a consumer consumes more and more units of a good, the intensity of his want for the good goes on decreasing and a point is reached where the consumer no longer wants it.

In simple words it says that as a consumer takes more units of a good, the extra satisfaction that he derives from an extra unit of a good goes on falling. It is to be noted that it is the marginal utility and not the total utility which declines with the increase in the consumption of a good.

Total and Marginal Utility Schedule

Quantity of tea consumed (cups per day)	Total Utility	Marginal Utility
1	30	30
2	50	20
3	65	15
4	75	10
5	83	8
6	89	6
7	93	4
8	96	3
9	98	2
10	99	1
11	95	- 4

Let us illustrate the law with the help of an example. Consider table in which we have presented the total utility and marginal utility derived by a person from cups of tea consumed per day. When one cup of tea is taken per day, the total utility derived by the person is 30 **utils (unit of utility)** and marginal utility derived is also 30 utils with the consumption of 2nd cup per day the total utility rises to 50 but marginal utility falls to 20.

However, when the cups of tea consumed per day increases to 11, then instead of giving positive marginal utility, the eleventh cup gives negative marginal utility because it may cause him sickness.

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

(i)   The different units consumed should be identical in all respects. The habit, taste, treatment and income of the consumer also remain unchanged.

(ii)   The different units consumed should consist of standard units. If a thirsty man is given water by successive spoonful, the utility of second spoonful may conceivably be greater than the utility of the first.

(iii) There should be no time gap or interval between the consumption of one unit and another unit i.e. there should be continuous consumption.

(iv)   The law may not apply to articles like gold, cash where a greater quantity may increase the lust for it.

(v)   The shape of the utility curve may be affected by the presence or absence of articles which are substitutes or complements.

2.4   CONSUMER SURPLUS

The concept of consumer surplus was propounded by Alfred Marshall. Consumer surplus is a measure of welfare that people gain from consuming goods and services. It measures the benefits buyers receive from participating in a market. This concept occupies an important place not only in economic theory but also in economic policies of government and in decision-making of business firms.

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. The willingness to pay of each individual consumer based on his utility determines the demand curve. When price is less than or equal to the willingness to pay, the potential consumer purchases the good.

It is common knowledge 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 referred to as consumer surplus by Alfred Marshall. Consumer surplus is defined as the difference between the total amount that consumers are willing and able to pay for a good or service (indicated by the demand curve) and the total amount that they actually do pay (i.e. the market price).

Marshall defined the concept of consumer 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 consumers surplus."

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

The concept of consumer surplus is derived from the law of diminishing marginal utility. As we know, according to the law of diminishing marginal utility, the more of a thing we have, the lesser the 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 surplus.

Consider Table 7 in which we have illustrated the measurement of consumer surplus in case of commodity X. There is only one price for a commodity in the market at a particular point of time. The price of X is assumed to be ₹ 20.

Table 7: Measurement of Consumer Surplus

No. of units	Marginal Utility (worth ₹)	Price (₹)	Consumer 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 the 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 market price is assumed to be 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 of8 [28 – 20]. This continues and he enjoys consumer 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 worth 10 + 8 + 6 + 4 + 2 + 0 = 30.

The concept of consumer surplus is closely related to the demand curve for a product. The demand curve reflects buyer's willingness to pay; we can also use it to measure consumer surplus. As we know, the height of the demand curve measures the value buyers place on the good as measured by their willingness to pay for it. We have already seen above that the difference between the willingness to pay and the market price is each buyer's consumer surplus. The difference between his willingness to pay and the price that he actually pays is the net gain to the consumer, the individual consumer surplus.

The total consumer surplus in a market which is the sum of all individual consumer surpluses in a market is equal to the area below the market demand curve but above the price. The term consumer surplus is often used to refer to both individual and total consumer surplus.

Thus, the total area below the demand curve and above the price is the sum of the consumer surplus of all buyers in the market.

The concept of consumer surplus can be illustrated graphically. Consider figure 15. 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. MU is the marginal utility curve which slopes downwards, indicating that as the consumer buys more units of the commodity, its marginal utility falls. Marginal utility shows the price which a person is willing to pay for the different units rather than go without them. 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. The last unit, i.e., Q[th] unit does not yield any consumer surplus because here price paid is equal to the marginal utility of the Qth unit. For all units before the Qth unit, the marginal utility is greater than price and thus these units fetch consumer surplus to the consumer.
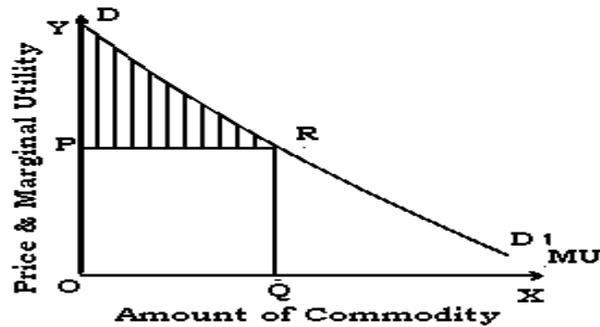
Fig. 15: Marshall's Measure of Consumer Surplus

In Figure 15, 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 surplus.(The portion of demand curve RD1 is not relevant for our consumer as MUx is less than Px in this part and therefore, the consumer will not buy any quantity beyond Q.)

The consumer welfare derived from a good is the benefit a consumer gets from consuming that good minus what the consumer paid to buy the good. Consumer surplus is the buyer's net gain from purchasing a good. Graphically, it is the triangular area below the demand curve and above the price line. The size of the consumer surplus triangle depends on the price of the good. A rise in the price of a good reduces consumer surplus; a fall in the price increases consumer surplus. Thus, a higher price results in a smaller consumer surplus and a lower price generates a larger consumer surplus. The change in consumer surplus on account of a fall in price can be illustrated with the help of figure 16.
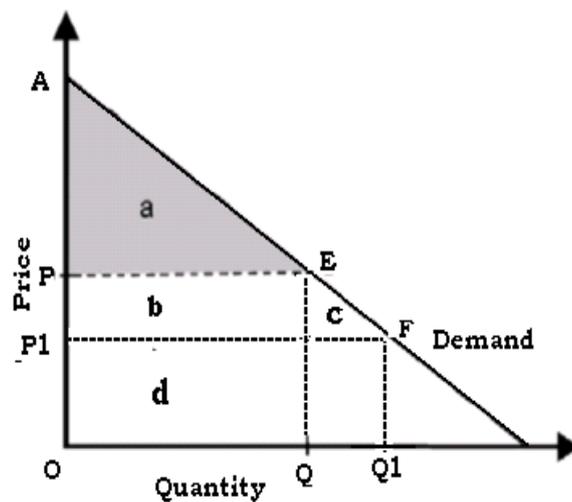
Fig.16: Change in Consumer Surplus Due to a Fall in Price

A fall in price from P to P1 increases consumer surplus from APE to A P1F.The increase in consumer surplus has two components.

(a)   The increase in consumer surplus of existing buyers who were earlier paying price P (the rectangle marked b).

(b)   The consumer surplus now available to the new buyers who started buying the commodity due to lower prices (the triangle c)

2.4.1 Applications

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

(1)   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.

(2)   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.

(3)   Large scale investment decisions involve cost benefit analysis which takes into account the extent of consumer surplus which the projects may fetch.

(4)   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.

(5)   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 surplus because the loss of welfare to citizens will be minimal.

2.4.2 Limitations

It is often argued that this concept of consumer surplus is hypothetical and illusory. In real life, the surplus satisfaction cannot be measured accurately.

♦   Consumer surplus cannot be measured precisely - because it is difficult to measure the marginal utilities of different units of a commodity consumed by a person.

♦   In the case of necessaries, the marginal utilities of the earlier units are infinitely large. In such case the consumer surplus is always infinite.

♦   The consumer surplus derived from a commodity is affected by the availability of substitutes.

♦   There is no simple rule for deriving the utility scale of articles which are used for their prestige value (e.g., diamonds).

♦   Consumer 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).

♦   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.

2.5   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 demand is the ordinal utility approach. This approach uses a different tool namely indifference curve to analyse consumer behaviour and is based on consumer preferences. The approach is based on the belief that that human satisfaction, being a psychological phenomenon, cannot be measured quantitatively in monetary terms as was attempted in Marshall's utility analysis. Therefore, it is 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.

2.5.0 Assumptions Underlying Indifference Curve Approach

(i)   The foundation of consumer behaviour theory is the assumption that the consumer knows his own tastes and preferences and possesses full information about all the relevant aspects of economic environment in which he lives.

(ii)   The consumer is rational and tends to take rational actions that result in a more preferred consumption bundle over a less preferred bundle.

(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 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. This is sometimes referred to as the "more is better" assumption or the assumption of non-satiation.

2.5.1 Indifference Curves

The ordinal analysis of demand (here we will discuss the one given by Hicks and Allen) is based on indifference curve which represent the consumer's preferences graphically. 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 completely indifferent among them. Or, it represents the set of all bundles of goods that a consumer views as being equally desirable. 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. 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 in table 8:

Table 8: 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 17, 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.
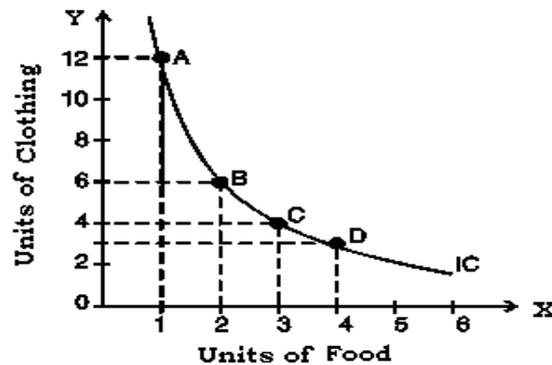
Fig. 17: A Consumer's Indifference Curve

2.5.2 Indifference Curve Map

The entire utility function of an individual can be represented by an indifference curve map which is a collection of indifference curves in which each curve corresponds to a different level of satisfaction. In short, a set of indifference curves is called an indifference curve map. Each indifference curve is a set of points and each point shares a common level of utility with the others. Combinations of goods lying on indifference curves which are farther from the origin are preferred to those on indifference curves which are closer to the origin. Moving upward and to the right from one indifference curve to the next represents an increase in utility, and moving down and to the left represents a decrease. An indifference curve map thus depicts the complete picture of consumer tastes and preferences.

In Figure 18, an indifference curve map of a consumer is shown which consists of three indifference curves.

We have marked 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.
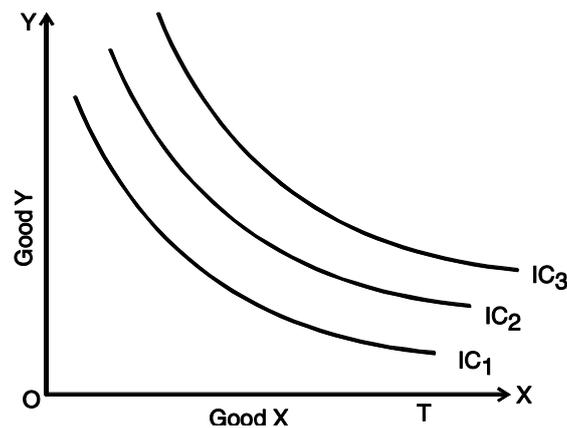
Fig. 18 : Indifference Map

2.5.3. Marginal Rate of Substitution

The Marginal Rate of Substitution (MRS) is the rate at which a consumer is prepared to exchange goods X and Y, holding the level of satisfaction constant (i.e., moving along an indifference curve).

The marginal rate of substitution along *any segment* of an indifference curve refers to the maximum rate at which a consumer would willingly exchange units of Y for units of X. The MRS at *any point* on the indifference curve is equal to the (absolute value of) the slope of the curve at that point. When measured at a point, the MRSxy tells us the maximum rate at which a consumer would willingly trade good Y for a infinitesimal bit more of good X.

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.
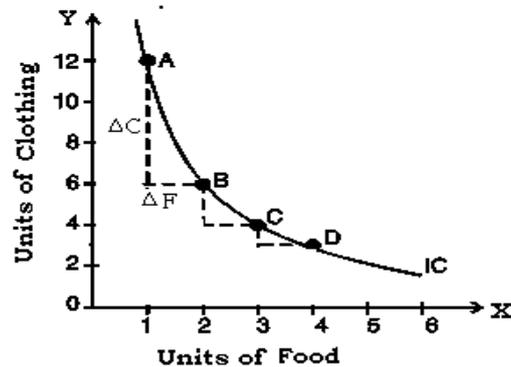
Figure 19: Diminishing Marginal Rate of Substitution

We notice that MRS is falling i.e., as the consumer has more and more units of food, the trade –off or rate of substitution becomes smaller and smaller; i.e. he is prepared to give up less and less units of clothing.(Refer   figure 19). When a consumer moves down his indifference curve, he gains utility from the consumption of additional units of good X, but loses an equal amount of utility due to reduced consumption of Y. But at each step, the utility levels from which the consumer begins is different. At point A in figure 19, the consumer consumes only a small quantity of food; and therefore his marginal utility of food at that point is high. At A, then, an additional unit of food adds a lot to his total utility. But at A he already consumes a large quantity of clothing; his marginal utility of clothing at that point is low. This means that it takes a large reduction in the quantity of clothing consumed to counterbalance the increased utility he gets from the extra unit of food.

On the contrary, consider point C. we find that the consumer consumes a much larger quantity of food and a much smaller quantity of clothing than at point A. This means that an additional unit of food adds only lesser utility, and a unit of clothing forgone costs more utility, than at point A. So the consumer is willing to give up less units of clothing in return for another unit of food at C(he gives up only 2 units of clothing for 1unit of food, whereas he gives up 6 units of clothing at point A for one unit of food).

Moving down the indifference curve—reducing consumption of clothing and increasing food consumption—will produce two opposing effects on the consumer's total utility: reduction in total utility due to reduced consumption of clothing, and increase in total utility due to higher food consumption. In order to keep the levels of satisfaction constant, these two effects must exactly cancel out as the consumer moves down the indifference curve. The principle of diminishing marginal rate of substitution thus states that the more of good Y a person consumes in proportion to good X, the less Y he or she is willing to substitute for another unit of X.

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.

We know that along the indifference curve:

(Change in total utility due to lower clothing consumption) = (Change in total utility due to higher food consumption)

Change in total utility due to a change in clothing consumption = $MU_c \times \Delta Q_c$

Change in total utility due to a change in food consumption = $MU_f \times \Delta Q_f$

Therefore, along the indifference curve: $-MU_c \times \Delta Q_c = MU_f \times \Delta Q_f$

Note that the left-hand side of the equation has a minus sign as it represents the loss in total utility from decreased clothing consumption. This must equal the gain in total utility from increased food consumption, represented by the right-hand side of the equation. Along the indifference curve:

$$\frac{\Delta Q_c}{\Delta Q_f} = \frac{-MU_f}{MU_c}$$

To generalize, the marginal rate of substitution of X for Y (MRSxy) is the slope of the indifference curve.

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

As the number of units of Y the consumer is willing to sacrifice gets lesser and lesser, the marginal rate of substitution gets smaller and smaller as we move down and to the right along an indifference curve. That is, the indifference curve becomes flatter (less sloped) as we move down and to the right.

2.5.4 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 of 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.

(1) When two goods are perfect substitutes of each other, the consumer is completely indifferent as to which to consume and is willing to exchange one unit of X for one unit of Y. His indifference curves for these two goods are therefore straight, parallel lines with a constant slope along the curve, or the indifference curve has a constant MRS.[Figure 20(A)].

(2) Goods are perfect complements when a consumer is interested in consuming these only in fixed proportions. When two goods are perfect complementary goods (e.g. left shoe and right shoe), the consumer consumes only bundles like A and B in figure 20(B) in which both X and Y in equal proportions. With a bundle like A or B, he will not substitute X for Y because an extra piece of the other good (here a single shoe) is worthless for him. The reason is that neither an additional left shoe nor a right shoe without a paired one of each, adds to his total utility. In such a case, 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. [Figure 20(B)] Avery interesting fact about this is that in the case of perfect complements, the marginal rate of substitution is undefined because an individual's preferences do not allow any substitution between goods.
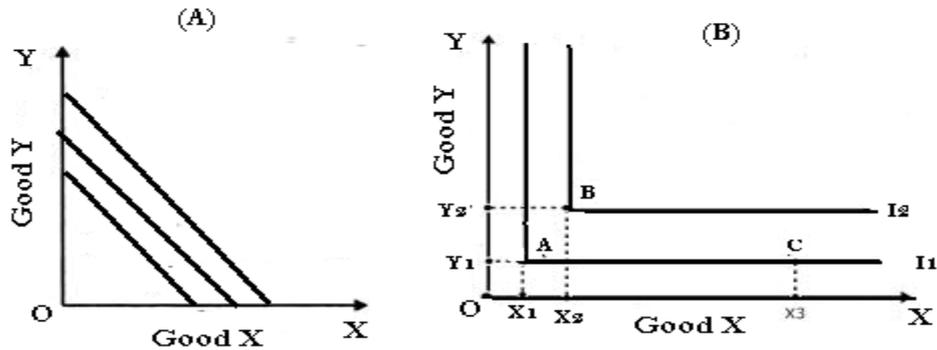
**Fig. 20: Indifference Curve of Perfect Substitutes and perfect Complements**

(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 21.
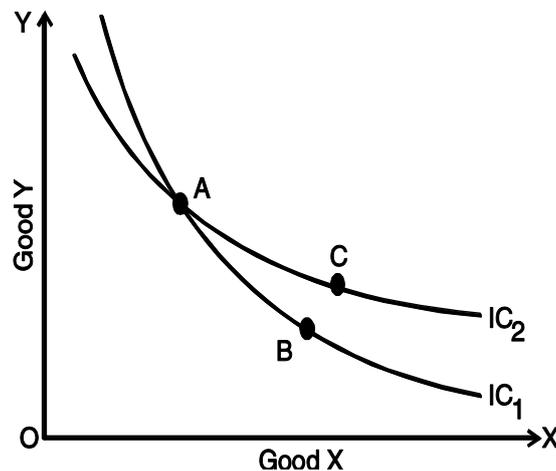
Fig. 21 : Intersecting Indifference Curves

In figure21, 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 22, 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.
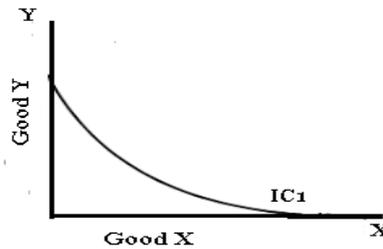
Fig. 22: Impossible Indifference Curve

2.5.5 The Budget Line

From the ordinal utility analysis discussed above, we have understood one part of a person's consumption behavior namely, consumer preference. A higher indifference curve shows a higher level of satisfaction than a lower one. Therefore, a consumer, in his attempt to maximize satisfaction will try to reach the highest possible indifference curve. But in his pursuit of buying more and more goods and thus obtaining more and more satisfaction, he has to work under two constraints: first, he has to pay the prices for the goods and, second, he has a limited money income with which to purchase the goods.

Consumers maximize their well-being subject to constraints. The most important constraint all of us face in deciding what to consume is the budget constraint. In other words, consumers almost always have limited income, which constrains how much they can consume. 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.

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.

The requirement illustrated by the equation above that a consumer must choose a consumption bundle that costs no more than his or her income is known as the consumer's budget constraint. A consumer's consumption possibilities are the set of all consumption bundles that can be consumed given the consumer's income and prevailing prices.

We assume that the consumer in our analysis uses up his entire nominal money income to purchase the commodities. So that his budget constraint is

$$P_X Q_X + P_Y Q_Y = B$$

The following table shows the combinations of Ice cream and chocolates a consumer can buy spending the entire fixed money income of ₹100, with the prices ₹ 20 and ₹10 respectively.

Table: 9 Consumption Possibilities

	Ice Cream	Chocolate
A	0	10
B	1	8
C	2	6
D	3	4
E	4	2
F	5	0

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. The consumer could, of course, buy any bundle that cost less than ₹ 100.(e.g. Point K)
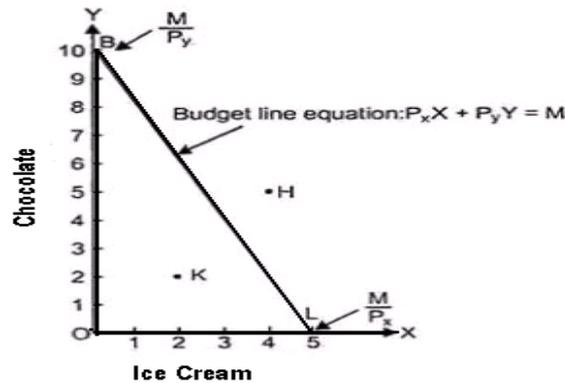
Fig. 23: Price Line or the Budget Line

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.

The slope of the budget line is determined by the relative prices of the two goods. It is equal to 'Price Ratio' of two goods i.e. P_X / P_Y i.e. It measures the rate at which the consumer can trade one good for the other.

The budget line will shift when there is:

♦ A change in the prices of one or both products with the nominal income of the buyer (budget) remaining the same.

♦ A change in the level of nominal income of the consumer with the relative prices of the two goods remaining the same.

♦ A change in both income and relative prices

2.5.6 Consumer Equilibrium

Having explained indifference curves and budget line, we are in a position to explain how a consumer reaches equilibrium position by choosing his optimal consumption bundle, given the constraints. 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:

(i) The consumer has a given indifference map which shows his scale of preferences for various combinations of two goods X and Y.

(ii) He has a fixed money income which he has to spend wholly on goods X and Y.

(iii) Prices of goods X and Y are given and are fixed.

(iv)   All goods are homogeneous and divisible, and

(v)   The consumer acts 'rationally' and maximizes his satisfaction.
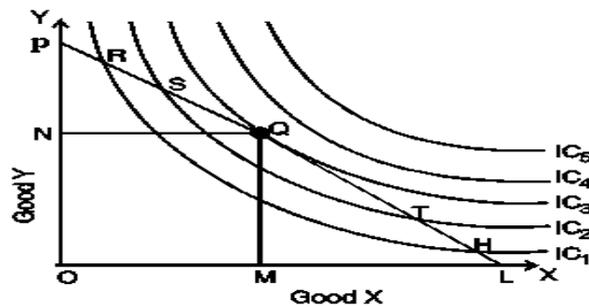
Fig. 24 : Consumer's Equilibrium

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 24, in which IC_1, IC_2, IC_3, IC_4 and IC_5 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? A consumer's optimal choice should satisfy two criteria:

1.   It will be a point on his budget line; and

2.   It will lie on the highest indifference curve possible

The consumer can arrive this choice moving down his budget line starting from point R. While doing this, he will pass through a variety of indifference curves (To make the diagram simple, we have drawn only a few). Suppose he chooses R. We see that R lies on a lower indifference curve IC_1, when he can very well afford S, Q or T lying on higher indifference curves. Similar is the case for other combinations on IC_1, like H. Again, suppose he chooses combination S (or T) lying on IC_2. 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 IC_3 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., IC_3. The consumer can very well wish to reach IC_4 or IC_5, but these indifference curves are beyond his reach given his money income. Thus, the consumer will be at equilibrium at point Q on IC_3. What do we notice at point Q? We notice that at this point, his budget line PL is tangent to the indifference curve IC_3. In this equilibrium position (at Q), the consumer will buy OM of X and ON of 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 (MRSxy) which is equal to $\dfrac{MU_x}{MU_y}$ while the slope of the price line indicates the ratio between the prices of two goods i.e., $\dfrac{P_x}{P_y}$

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.

We have seen that the consumer attains equilibrium at the point where the budget line is tangent to the indifference curve and

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

In fact the slope of the indifference curve points to the rate at which the consumer is willing to give up good Y for good X. The slope of the budget line tells us the rate at which the consumer is actually able to trade good X and good Y. When both these are equal, he will be maximizing his satisfaction given the constraints.

The indifference curve analysis is superior to utility analysis: (i) it dispenses with the assumption of measurability of utility (ii) it studies more than one commodity at a time (iii) it does not assume constancy of marginal utility of money (iv) it segregates income effect from substitution effect.

SUMMARY

- ◆ The existence of human wants is the basis for all economic activities in the society. All desires, tastes and motives of human beings are called wants in Economics.

- ◆ In Economics, wants are classified in to necessaries, comforts and luxuries.

- ◆ Utility refers to the want satisfying power of goods and services. It is not absolute but relative. It is a subjective concept and it depends upon the mental attitude of people.

- ◆ There are two important theories of utility, the cardinal utility analysis and ordinal utility analysis.

- ◆ The law of diminishing marginal utility states that as a consumer increases the consumption of a commodity, every successive unit of the commodity gives lesser and lesser satisfaction to the consumer.

- ◆ Consumer surplus is the difference between what a consumer is willing to pay for a commodity and what he actually pays for it.

- ◆ Consumer surplus is the buyer's net gain from purchasing a good. Graphically, it is the triangular area below the demand curve and above the price line.

- ◆ A rise in the price of a good reduces consumer surplus; a fall in the price increases consumer surplus

- ◆ The indifference curve theory, which is an ordinal theory, shows the household's preference between alternative bundles of goods by means of indifference curves.

- ◆ Marginal rate of substitution is the rate at which the consumer is prepared to exchange goods X and Y.

- ◆ The important properties of an Indifference curve are: Indifference curve slopes downwards to the right, it is always convex to the origin, two ICs never intersect each other, it will never touch the axes and higher the indifference curve higher is the level of satisfaction.

- ◆ When two goods are perfect substitutes of each other, indifference curves for these two goods are straight, parallel lines with a constant slope along the curve, or the indifference curve has a constant MRS

- ◆ Goods are perfect complements when a consumer is interested in consuming only in fixed proportions. In such a case, 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.

♦ Budget line or price 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.

♦ The slope of the budget line is determined by the relative prices of the two goods. It is equal to 'Price Ratio' of two goods. i.e. PX/PY i.e .It measures the rate at which the consumer can trade one good for the other .

♦ The budget line will shift when there is a change in the prices of one or both products with the nominal income of the buyer (budget) remaining the same or when there is a change in the level of nominal income of the consumer with the relative prices of the two goods remaining the same.

♦ A consumer is said to be in equilibrium when he is deriving maximum possible satisfaction from the goods and is in no position to rearrange his purchase of goods.

♦ The consumer attains equilibrium at the point where the budget line is tangent to the indifference curve and $MU_x / P_x = MU_y / P_y = MU_z / P_z$

UNIT -3: SUPPLY

LEARNING OUTCOMES

After studying this unit, you would be able to:

♦   Explain the meaning of supply.

♦   List and provide specific examples of determinants of supply and elasticity of supply.

♦   Describe the law of supply.

♦   Describe the difference between movements on the supply curve and shift of the supply curve.

♦   Explain the concept of elasticity of supply with examples.

♦   Illustrate how the concepts of demand and supply can be used to determine price.

3.0   INTRODUCTION

In a market economy, sellers of products and services constitute the supply side. The sellers may include individuals, firms and governments. 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.

Three important points apply to supply:

(i)   Supply refers to what a firm offer for sale in the market, not necessarily to what they succeed in selling. What is offered may not get sold.

(ii)　　Supply requires both willingness and ability to supply. Production cost is often the primary influence on ability.

(iii)　　Supply is a flow. Supply is identified for a specified time period. The quantity supplied is 'so much' per unit of time, per day, per week, or per year.

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. When a seller can get a higher price for a good, producing and selling it becomes more profitable. Producers will allocate more resources towards its production even by drawing resources from other goods they produce. For example, a rise in the price of comic books will encourage publishers to shift resources out of the production of other books (such as novels) and use them in the production of comic books. As another example, if price of wheat rises, the farmers may shift their land to wheat production away from corn and soya beans. It implies that, if the price of Y rises, the quantity supplied of X will fall.

(iii)　　Prices of factors of production: Cost of production is a significant factor that affects supply. If the firm's cost exceeds what it can earn from selling the good, the firm sells nothing. A rise in the price of an input causes a decrease in supply. When the cost of resources such as wages, raw material prices and interest rates increase, producers decrease the amount they are willing to supply. Lower input costs indeed, make production more profitable, encourage existing firms to expand production and new firms to enter the market.

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. Thus, a change in the price of one

factor of production will cause changes in the relative profitability of different lines of production and will cause producers to shift from one line to another and thus supplies of different commodities will change.

(iv) **State of technology:** The supply of a particular product depends upon the state of technology also. The use of new technology in an industry (such as automation) increases production efficiency and reduces production costs.

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. Availability of spare production capacity and the ease with which factor substitution can be made and the cost of such substitution also determine supply.

(v) **Government Policy:** Government rules and regulations affect how much firms want to sell or are allowed to sell. The production of a good may be subject to the imposition of commodity taxes such as excise duty, sales tax and import duties. These taxes raise the cost of production and so the quantity supplied of a good would increase only when its price in the market rises. Subsidies and other funding programmes to producers, 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 consumer products and 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.

(vii) **Expectations**: Choices of firms in respect of selling the product now or later depends on expectations of future prices. Sellers compare current prices with future prices. An increase in the anticipated future price of a good or service reduces its supply today; and if sellers expect a fall in prices in future, more will be supplied now.

(viii) **Number of sellers:** 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.

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 etc.

3.2 THE LAW OF SUPPLY

In general, producers are prepared to sell their product for a price if that price is at least as high as the cost to produce an additional unit of the product. Therefore, the willingness to supply depends on the price at which the good can be sold as well as the cost of production for an additional unit of the good. The greater the difference between those two values, the greater is the willingness of producers to supply the good.

Supply refers to the relationship of quantity supplied of a good with one or more related variables which have an influence on the supply of the good. Normally, supply is related with price, but it can also be related with other factors such as the type of technology used, scale of operations etc.

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.

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 incentive 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.

The behaviour of supply is also affected by the time period under 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.

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, with all other variables held constant.   Consider the following hypothetical supply schedule of good X.

Table 10: Supply Schedule of Good 'X'

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

The table shows the quantities of good X that would be produced and offered for sale at a number of alternative prices. At Re 1, for example, 5 kilograms of good X are offered for sale and at ₹ 3 per kg. 45 kg. would be forthcoming for sale.

We can now plot the data in table 10 on a graph. In Figure 25, price is plotted on the vertical axis and quantity on the horizontal axis, and various price-quantity combinations of the schedule 10 are plotted.
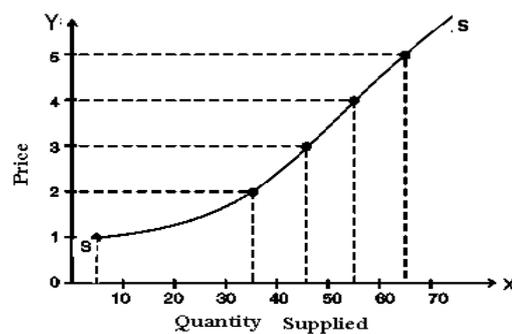
Fig. 25: Supply Curve

When we draw a smooth curve through the plotted points, what we get is the supply curve of good X. The supply curve is a graphical presentation of the supply schedule. The supply curve shows the quantity of a good that producers are willing to sell at a given price, holding constant any other factor that might affect the quantity supplied. The supply curve is thus a relationship between the quantity supplied and the price. To be more precise, the supply curve shows simultaneously:

(a)   the highest quantity willingly supplied by the suppliers at each price and

(b)   the minimum price which will induce suppliers to offer the various quantities for sale

The supply curve slopes upwards towards right (positive slope) showing that as price increases, the quantity supplied of X increases and vice-versa. This direct relationship between price and quantity is reflected in the positive slope of the supply curve.

The market supply, like market demand, is the sum of supplies of a commodity made by all individual firms or their supply agencies. The market supply of a commodity gives the amounts of the commodity supplied per time period at various alternative prices by all the producers of this commodity in the market. It is derived by adding the quantity supplied by each seller at different prices. The market supply curve for 'X' can be obtained by adding horizontally the supply curves of various firms. The market supply is governed by the law of supply and depends on all the factors that determine the individual producer's supply and, in addition, on the number of producers of the commodity in the market.

⏱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 an upward movement on the supply curve. A rise in market price causes an expansion of supply; there is a upward movement on the supply curve and producers offer more for sale. When market price falls, there is contraction of supply as producers have less incentive to offer products for sale in the market. (See Figure 26)
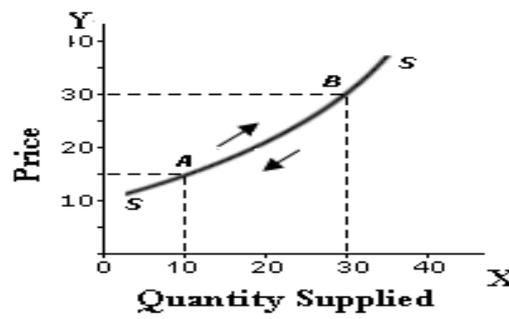

Fig. 26: Figure Showing Change in Quantity Supplied as a Result of Price Change

⏱3.4   SHIFTS IN SUPPLY CURVE – INCREASE OR DECREASE IN SUPPLY

While a change in quantity supplied is a movement along a given supply curve, a change in supply is a shift of the supply curve. 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 the supply curve shifts to the right, more is offered for sale at each price. In figure 27(i), we find that at price P, the quantity supplied rises from Q to Q1. When the factors other than price change and cause the supply curve to shift to the left, we call it decrease in supply. When the supply curve shifts to the left, less quantity is offered for sale at each price. In figure 27(ii), we find that at price P the quantity supplied falls from Q to Q1.
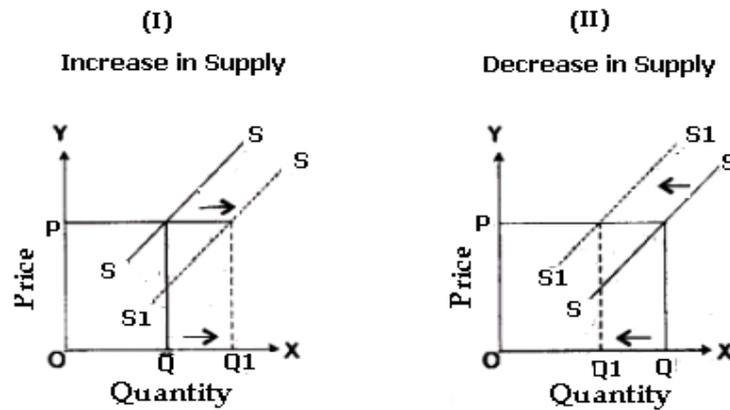
Fig. 27: Shifts in Supply Curves

Just as in the case of demand curves, a change in the price of a good itself will result in a movement along the supply curve and a change in quantity supplied, a change in any variable other than own-price will cause a shift in the supply curve, called a change in supply.

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.,

$$E_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in Price}}$$

Or

$$\frac{\dfrac{\text{Change in quantity supplied}}{\text{quantity supplied}}}{\dfrac{\text{Change in price}}{\text{Price}}}$$

or

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

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 Δq = 500 units $\Delta p = ₹100$

p   = ₹ 2000   q = 2500 units

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

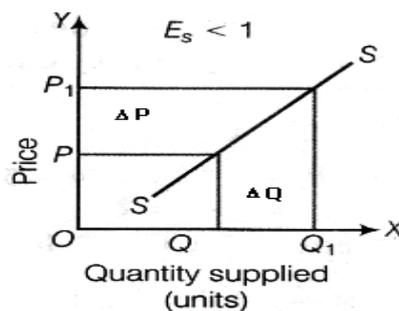Elasticity of Supply = 4.

3.5.0 Types 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 ($E_s = 0$.). The vertical supply curve in Figure 28 shows that irrespective of price change, the quantity supplied remains unchanged. In other words, the quantity supplied is unaffected by any change in price. As the elasticity rises, the supply curve gets flatter, which shows that the quantity supplied responds more to changes in price.
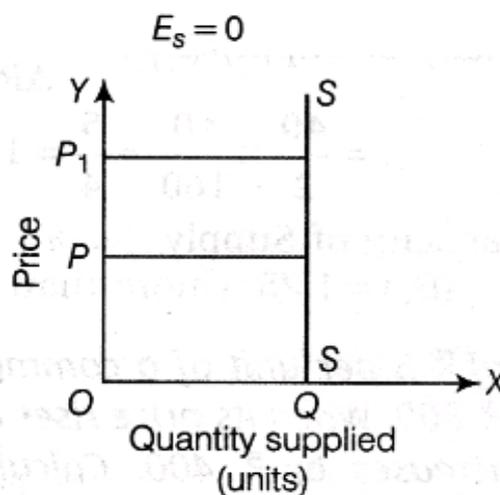

Fig. 28: Supply Curve of Zero Elasticity

(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. In this case, the coefficient of elasticity falls in the range 0 < Es < 1. The percentage change in quantity is less than the percentage change in price. In other words, the quantity is not very responsive to price. Figure 29 shows that the relative change in the quantity supplied (ΔQ) is less than the relative change in the price (ΔP).


Fig. 29: 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. The percentage change in quantity is greater than the percentage change in price. The coefficient of elasticity falls in the range 1 < E < ∞.Figure 30, shows that the relative change in the quantity supplied (ΔQ) is greater than the relative change in the price.
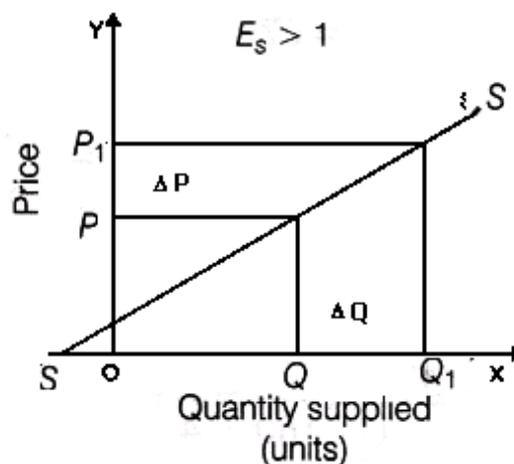

Fig. 30: Showing Relatively Greater Elastic Supply

(iv) **Unit-elastic:** In this case, the coefficient of elasticity is one.(Es = 1). 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. The percentage change in quantity is equal to the percentage change in price. Unit elasticity is essentially a dividing line or boundary between the elastic and inelastic ranges. In Figure31, the relative change in the quantity supplied (ΔQ) is equal to the relative change in the price (ΔP).
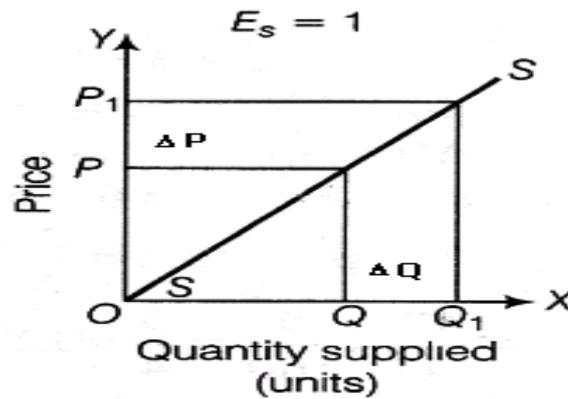
Fig. 31: Showing Unitary Elasticity

(v) **Perfectly elastic supply:** At the opposite extreme of zero elasticity supply is perfectly elastic. This occurs as the price elasticity of supply approaches infinity and the supply curve becomes horizontal. Elasticity of supply is said to be infinite (E = ∞)or perfectly elastic when nothing is supplied at a lower price and an infinitesimally small change in price results in an infinitely large change in quantity supplied indicating that producers will supply any quantity demanded at that price. Figure 32 shows infinitely elastic supply.
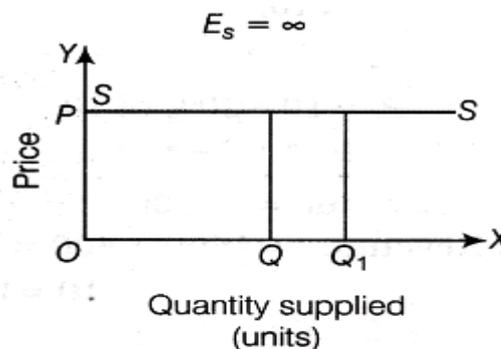
Fig. 32: Supply Curve of Infinite Elasticity

In some cases, the elasticity of supply is not constant but varies over the supply curve. Figure33 shows the case of an industry with limited capacity for production. For low levels of quantity supplied, firms respond substantially to changes in price. When there is a small rise in price from P1 to P2, the quantity supplied increases more than proportionately (Q1 to Q2). In this region, firms have idle capacity and therefore when price rises, they respond by increase in quantity supplied using the idle capacity available. Once firms reach their full capacity, further increase in production is possible only by building new plants and incurring expenses towards this. To induce firms to increase output, price must rise substantially (P3 to P4) and supply becomes less elastic.
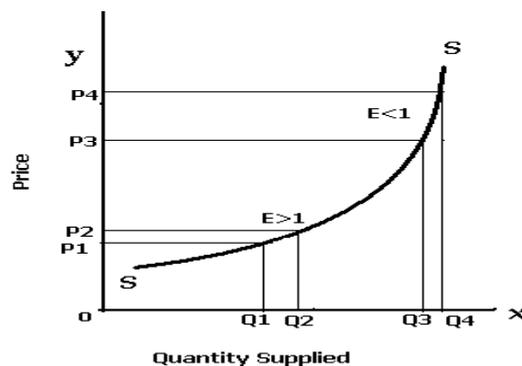
Fig. 33: Supply curve of Industry with Limited Production Capacity

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:

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

Es: 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)

$$q = 50$$

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

or $\qquad E_S = 3$

Where $\dfrac{dq}{dp}$ 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:

$$E_s = \frac{Q_2 - Q_1}{Q_2 + Q_1} \times \frac{P_2 + P_1}{P_2 - P_1}$$

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:

$$E_s = \frac{50 - 20}{50 + 20} \times \frac{15 + 12}{15 - 12}$$

$$= \frac{30}{70} \times \frac{27}{3} = + 3.85$$

3.5.2 Determinants of Elasticity of Supply

The price elasticity of supply depends on the flexibility sellers have, to change the amount of the good they produce and sell. The more easily sellers can change the quantity they produce, the greater the price elasticity of supply. Following are the general determinants of elasticity of supply:

♦ If increase in production causes substantial increase in costs, producers will have less incentive to increase quantity supplied in response to increase in price and therefore, price elasticity of supply would be less. If there are constant costs or negligible rise in costs as output increases, supply will be elastic. Products that involve more complex production processes or require relatively longer time to produce exhibit lower elasticity of supply. For example the supply of aircrafts and cruise ships is less elastic compared to supply of motor bikes.

♦ The longer the period of time, the more responsive the quantity supplied to changes in price and the greater the supply elasticity. A shorter time period does not allow sellers sufficient time to find resources and alternatives and to adjust their production decisions

to changes in price. In the long run, firms can build new plants or new firms may be able to enter the market and increase the supply.

♦ Supply is more elastic when there is large number of producers and there is high degree of competition among them. Supply elasticity is also higher when there are fewer barriers of entry into the market.

♦ Supply will be elastic if firms are not working to full capacity. If spare production capacity is available with the firms, they can increase output without a rise in costs. The greater the spare capacity available, the greater will be the elasticity of supply.

♦ If key raw materials and inputs are easily and cheaply available, then supply will be elastic. If drawing productive resources into the industry is easier, the supply curve is more elastic. In case it is difficult to procure resources economically, the cost of production increases and supply will become less elastic.

♦ If firms have adequate stocks of raw materials, components and finished products, they will be able to respond with higher supply as price rises. Generally, those commodities which can be easily and inexpensively stored without losing value may have elastic supply.

♦ The ease with which factor substitution can be made and the costs of such factor substitution also determine price elasticity of supply. If the factors of production used in the production of the commodity are commonly available and can be easily substituted or increased, then the firms will be able to produce quickly and respond to an increase in price. If a production process involves use of materials which are in short supply, or those that take longer delivery period or which are highly specialized, then supply elasticity will be low. If the labour employed is scarce or are required to be highly skilled and specific and if they require longer training period, then elasticity of supply will be low. For example, physicians in healthcare industry and chartered accountants in accounting service.

♦ If both capital and labour are occupationally mobile, then the elasticity of supply for a product is higher than if capital and labour cannot be easily switched. For example, a printing press can easily switch between printing magazines and greeting cards. Similarly falling prices of a particular vegetable encourage farmers to switch to the production of another. Products which are more continuously produced have greater supply elasticity than those which are produced infrequently.

♦ Expectations about future prices also affect elasticity of supply. Expectation of substantial rise in prices in future will make the sellers respond less to a current rise in price.

3.6. EQUILIBRIUM PRICE

In the previous sections, we have discussed both demand and supply theories. We shall now use demand and supply to determine equilibrium market price. The equilibrium price in a market is determined by the intersection between demand and supply. It is also called the market equilibrium. At this price, the amount that the buyers want to buy is equal to the amount that sellers want to sell. The competitive market equilibrium represents the 'unique' point at which both consumers and suppliers are satisfied with price and quantity. 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 presents the concept of the equilibrium price

Table 11: 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 11, 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 till it reaches the level where the quantity demanded becomes equal to the quantity supplied. Opposite will happen when quantity demanded is more than the quantity supplied at a particular price.
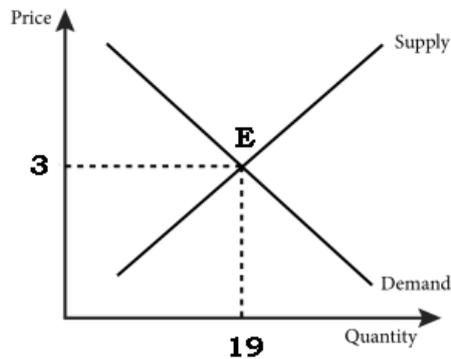
Fig. 34: Equilibrium Price

3.6.1 Market Equilibrium and Social Efficiency

Social efficiency represents the net gains to society from all exchanges that are made in a particular market. It consists of two components: consumer surplus and producer surplus. We have already learned that consumer surplus is a measure of consumer welfare. There is welfare gain to producers as well when they participate in the market, namely producer surplus. Producer surplus is the benefit derived by producers from the sale of a unit above and beyond their cost of producing that unit. This occurs when the price they receive in the market is more than the minimum price at which they would be prepared to supply. It is represented by the area above the supply curve and below the price line
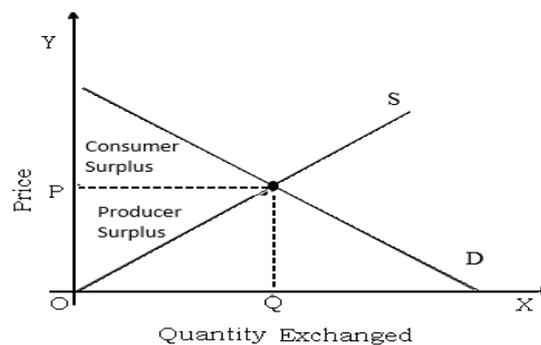
Fig. 35: Equilibrium Price and Social Efficiency

For all quantities below OQ, we find that there is a difference between the price that producers are willing to accept for supplying the good and the price that prevails in the market (P). Producer surplus disappears when market price is at equilibrium i.e the price at which sellers are willing to offer for sale is equal to the price that they receive.

From figure 35, we find that at price P, when the market is in equilibrium, social efficiency is achieved with both producers and consumers enjoying maximum possible surplus.

SUMMARY

- Supply means the quantity of goods (or commodities) offered for sale at a particular price at a certain point of time. Supply always relates to price.

- The determinants of supply other than its own price are: prices of the related goods, prices of factors of production, state of technology, government policy and other factors.

- The law of supply states that when the price of the good rises, the corresponding quantity supplied increases and when the price reduces, the quantity supplied also reduces. There is a direct relationship between price and quantity supplied.

- The supply curve establishes the relationship between the amount of supply and the price. It is an upward sloping curve showing a positive relationship between price and quantity supplied.

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

- Elasticity of supply means the responsiveness of supply to change in the price of the commodity.

- The elasticity of supply can be classified in to perfectly inelastic supply, relatively less-elastic supply, relatively greater-elastic supply, unit-elastic and perfectly elastic supply.

- The measurement of supply-elasticity is of two types- point elasticity and arc-elasticity.

- Elasticity of supply can be considered with reference to a given point on the supply curve (point elasticity) or between two points on the supply curve (arc elasticity).

- The general determinants of elasticity of supply are change in costs as output changes, complexity of production processes, the time period, number of producers and degree of competition, barriers of entry into the market, availability of spare production capacity, availability and stocks of key raw materials and inputs, the ease of factor substitution and mobility and expectations about future prices

- Equilibrium price is one at which the wishes of both the buyers and the sellers are satisfied. At this price, the amount that buyers want to buy and sellers want to sell will be equal.

♦ The welfare gain to producers is producer surplus, which is the benefit derived by producers from the sale of a unit above and beyond their cost of producing that unit. This occurs when the price they receive in the market is more than the minimum they would be prepared to supply for.

♦ At equilibrium price, when the market is in equilibrium, social efficiency is achieved with maximum social surplus to both producers and consumers enjoying maximum possible surplus.

TEST YOUR KNOWLEDGE

Multiple Choice 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)   Less 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?

     (a)   When goods are substitutes, a fall in the price of one (ceteris paribus) leads to a fall in the quantity demanded of its substitutes.

     (b)   When commodities are complements, a fall in the price of one (other things being equal) will cause the demand of the other to rise

     (c)   As the income of the consumer increases, the demand for the commodity increases always and vice versa.

     (d)   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)

     (a)   .5

     (b)   .8

     (c)   1.0

     (d)   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)

(a)　.8

(b)　1.0

(c)　1.25

(d)　1.50

24.　When the numerical value of cross elasticity between two goods is very high, it means

(a)　The goods are perfect complements and therefore have to be used together

(b)　The goods are perfect substitutes and can be used with ease in place of one another

(c)　There is a high degree of substitutability between the two goods

(d)　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)

(a)　.67

(b)　1.5

(c)　2.0

(d)　3.0

26.　If electricity demand is inelastic, and electricity charges increase, which of the following is likely to occur?

(a)　Quantity demanded will fall by a relatively large amount.

(b)　Quantity demanded will fall by a relatively small amount.

(c)　Quantity demanded will rise in the short run, but fall in the long run.

(d)　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:

(a)　Large fall in quantity demanded.

(b)　Large fall in demand.

(c)　Small fall in quantity demanded.

    (d)   *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 in 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?

    (a) Given scale of preferences as between different combinations of two goods.

    (b) Diminishing marginal rate of substitution.

    (c) Diminishing marginal utility of money

    (d) Consumers would always prefer more of a particular good to less of it, other things remaining the same.

36. An indifference curve slopes down towards right since more of one commodity and less of another result in:

    (a) Same level of satisfaction.

    (b) Greater satisfaction.

    (c) Maximum satisfaction.

(d)   Any of the above

37.   Suppose that workers in a steel plant managed to force a significant increase in their wage package. How would the new wage contract be likely to affect the market supply of steel, other things remaining the same?

(a)   Supply curve will shift to the left.

(b)   Supply curve will shift to the right.

(c)   Supply will not shift, but the quantity of cars produced per month will decrease.

(d)   Supply will not shift, but the quantity of cars produced per month will increase.

38.   Which of the following statements is incorrect?

(a)   An indifference curve must be downward-sloping to the right.

(b)   Convexity of a curve implies that the slope of the curve diminishes as one moves from left to right.

(c)   The income elasticity for inferior goods to a consumer is positive

(d)   The total effect of a change in the price of a good on its quantity demanded is called the price effect.

39.   The successive units of stamps collected by a little boy give him greater and greater satisfaction. This is a clear case of

(a)   Operation of the law of demand.

(b)   Consumer surplus enjoyed in hobbies and rare collections

(c)   Exception to the law of diminishing utility.

(d)   None of the above

40.   What will happen in the rice market if buyers are expecting higher rice prices in the near future?

(a)   The demand for rice will increase and the demand curve will shift to the right

(b)   The demand for rice will decrease and the demand curve will shift to the left

(c)   The demand for rice will be unaffected as it is a necessity

(d)   The demand for wheat will increase and the demand curve will shift to the right

41.   In the case of a Giffen good, the demand curve will usually be:

(a)   horizontal.

(b)   downward-sloping to the right.

(c)   vertical.

(d)   upward-sloping to the right.

42.   *By consumer surplus, economists mean*

(a)   The area inside the budget line above the price of the commodity

(b)   The area between the average revenue and marginal revenue curves.

(c)   The difference between the maximum amount that a person is willing to pay for a good and its market price.

(d)   The difference between the market price and the supply curve

43.   *Which of the following is a property of an indifference curve?*

(a)   It is convex to the origin due to diminishing marginal rate of substitution

(b)   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 budget 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.   *For a normal good with a downward sloping demand curve:*

(a)   The price elasticity of demand is negative; the income elasticity of demand is negative.

(b)   The price elasticity of demand is positive; the income elasticity of demand is negative.

(c)   The price elasticity of demand is positive; the income elasticity of demand is positive.

(d)   The price elasticity of demand is negative; the income elasticity of demand is positive.

47.   An increase in the supply of a good is caused by :

(a)   Improvements in its production technology

(b)   Fall in the prices of other goods which can be produced using the same inputs.

(c)   Fall in the prices of factors of production used in its 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 inferior goods have

(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 necessaries 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. Suppose potatoes have (-).0.4 as income elasticity. We can say from the data given that:

    (a)   Potatoes are superior goods.

    (b)   Potatoes are necessities.

    (c)   Potatoes are inferior goods.

    (d)   There is a need to increase the income of consumers so that they can purchase potatoes.

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 sold 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 because they are substitutes

    (b) decrease because they are substitutes

    (c) remain the same because real income is increased

    (d) decrease as real income decreases

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 goods 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

(a)   is actually bought during a given time period at a given price

(b)   producers wish they could sell at a higher price

(c)   producers plan to sell during a given time period at a given price

(d)   people are willing to buy during a given time period at a given price

72.   Supply is the

(a)   limited resources that are available with the seller

(b)   cost of producing a good

(c)   entire relationship between the quantity supplied and the price of good.

(d)   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)   a decrease in the number of book publishers

(b)   a decrease in the price of the book

(c)   an increase in the future expected price of the book

(d)   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 :

(a)   2.5

(b)   0.4

(c)   (-) 2.5

(d)   (-) 0.4

75.   An increase in the number of sellers of bikes will increase the

(a)   The price of a bike

(b)   Demand for bikes

(c)   The supply of bikes

(d)   Demand for helmets

76.   If the supply of bottled water decreases, other things remaining the same, the equilibrium price ——————————————— and the equilibrium quantity ———————————

(a)   increases; decreases

(b)   decreases; increases

(c)   decreases; decreases

(d)   increases; increases

77.   A decrease in the demand for cameras, other things remaining the same will

(a)   Increase the number of cameras bought

(b)   Decrease the price but increase the number of cameras bought

(c)   Decrease in quantity of camera demanded

(d)   Decrease the price and decrease in the number of cameras bought.

78.   Which of the following statements about inferior goods is/are false?

I.   Inferior goods are those that we will never buy, no matter how cheap they are.

II.   Inferior goods are those that we buy more of, if we become poorer.

III.   Inferior goods are those that we buy more of, if we become richer.

(a)   I and III only.

(b)   I only

(c)   III only.

(d)   I, II, and III.

79.   Comforts lie between

(a)   inferior goods and necessaries

(b)   luxuries and inferior goods

(c)   necessaries and luxuries

(d)   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)   lesser quantity is supplied at a given price

(b)   larger quantity is supplied at a given price

(c)   prices have fallen and quantity is supplied at a lower price

(d)   none of the above

82.   When supply curve moves to right, it means

(a)   supply increases and more quantity is supplied at a given price

(b)   supply decreases and less quantity is supplied at a given price

(c)   supply remains constant at a given price

(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.*

(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.*
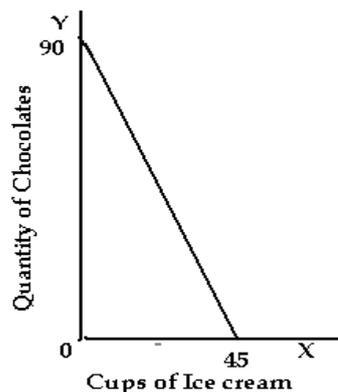
The prices of these two commodities respectively are:

(a)   ₹ 10 and ₹ 20

(b)   ₹ 20 and ₹ 10

(c)   ₹ 10 and ₹ 5

(d)   *Any of the above*

91.   *'No matter what the price of coffee is, Arjun always spend a total of exactly 100 per week on coffee.' The statement implies that:*

(a)   *Arjun is very fond of coffee and therefore he has an inelastic demand for coffee*

(b)   *Arjun has elastic demand for coffee*

(c)   *Arjun's demand for coffee is relatively less elastic*

(d)   *Arjun's demand for coffee is unit elastic*

92.   *A firm learns that the own price elasticity of a product it manufactures is 3.5. What would be the correct action for this firm to take if it wishes to raise its total revenue?*

(a)   *Lower the price because demand for the good is elastic.*

(b)   *Raise the price because demand for the product is inelastic.*

(c)   *Raise the price because demand is elastic.*

(d)   *We need information in order to answer this question.*

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 of demand since it is a small change*

(b)   *Arc elasticity of demand since it is a small change*

(c)   *Price elasticity based on average prices method*

(d)   *Any of the above*

95. Given the following four possibilities, which one will result in an increase in total expenditure of the consumer?

    (a) Demand is unit elastic and price rises

    (b) Demand is elastic and price rises

    (c) Demand is inelastic and price falls

    (d) demand is inelastic and price rises

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 highly perishable commodities during very short period is generally ——

    (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.   The cross elasticity between personal computers and soft wares is:

   (a)   Positive

   (b)   Zero

   (c)   Negative

   (d)   One

103.   The cross elasticity between Bread and DVDs is:

   (a)   Positive

   (b)   Negative

   (c)   Zero

   (d)   One

104.   Which of the following statements is correct?

   (a)   With the help of statistical tools, the demand can be forecasted with perfect accuracy

   (b)   The more the number of substitutes of a commodity, the more elastic is the demand.

   (c)   Demand for butter is perfectly elastic.

   (d)   Gold jewellery will have negative income elasticity.

105.   Suppose the income elasticity of education in private school in India is 3.6. What does this indicate:

   (a)   Private school education is highly wanted by rich

(b)   *Private school education is a necessity.*

(c)   *Private school education is a luxury.*

(d)   *We should have more private schools.*

106.   *If the organizers of an upcoming cricket match decide to increase the ticket price in order to raise its revenues, what they have learned from past experience is;*

     (a)   *The percentage increase in ticket rates will be always equal the percentage decrease in tickets sold*

     (b)   *The percentage increase in ticket rates will be always greater than the percentage decrease in tickets sold*

     (c)   *The percentage increase in ticket rates will be less than the percentage decrease in tickets sold*

     (d)   *(a) and (c) above are true*

107.   *Data on production of vegetables for the past two years showed that, despite stable prices, there is a substantial decline in output of cabbage leading to lower supply into the market. Which of the following can possibly be the reason?*

     (a)   *An increase in the price of cauliflower which is equally preferred by consumers*

     (b)   *Announcement of a subsidy by government on vegetable production*

     (c)   *More farmers producing cabbage and the increasing competition among them*

     (d)   *A substantial decrease in the price of capsicum*

108.   *The following diagram shows the relationship between price of Good X and quantity demanded of Good Y. What we infer from the diagram is;*
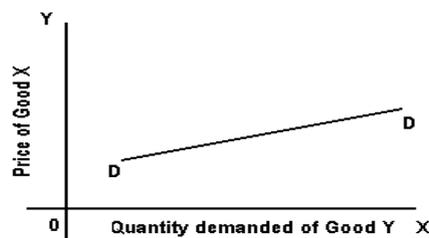
     (a)   *Good X and Good Y are perfect complements*

     (b)   *Good X and Good Y are perfect substitutes*

   (c)   *Good X and Good Y are remote substitutes*

(d)   Good X and Good Y are close substitutes

109.   The diagram given below shows
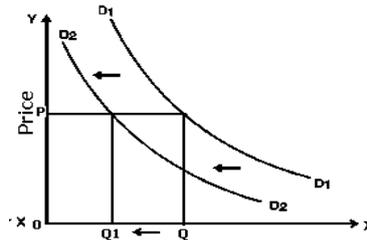
(a)   A change in demand which may be caused by a rise in income and the good is a normal good

(b)   A shift of demand curve caused by a fall in the price of a complementary good

(c)   A change in demand which is caused by a rise in income and the good is an inferior good

(d)   A shift of demand curve caused by a rise in the price of a substitute and the good is a normal good.

110.   Which of the following alternatives would be true if the event presented in the following diagram occurs?
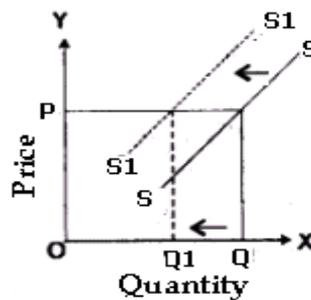
(a)   A fall in wage costs of the firm along with a fall in consumer incomes

(b)   A shortage of raw materials and consequent increase in raw material price

(c)   An increase in subsidy by the government and a reduction in taxes

(d)   Decrease in the market price of the commodity in question

111.   The demand curve of a normal good has shifted to the right. Which of the four events would have caused the shift?

(a)   A fall in the price of a substitute with the price of the good unchanged

(b) A fall in the nominal income of the consumer and a fall in the price of the normal good

(c) A fall in the price of a complementary good with the price of the normal good unchanged

(d) A fall in the price of the normal good, other things remaining the same

112. If roller- coaster ride is a function of amusement park visit, then, if the price of amusement park entry falls

(a) The demand for roller- coaster rides will rise and the demand curve will shift to right

(b) The demand for roller coaster ride cannot be predicted as it depends on the tastes of consumers for the ride

(c) There will be an expansion in the demand for roller coaster drive as it complementary

(d) None of the above

113. If a short run supply curve is plotted for the following table which presents price and quantity of fighter aircrafts, what will be its shape?

Price in millions of $	Number of Aircrafts
124	28
140	28
150	28
160	28
175	28

(a) Horizontal straight line parallel to the quantity axis

(b) Steeply rising with elasticity less than one

(c) Vertical straight line parallel to Y axis

(d) A perfectly elastic supply curve

114. *The average income of residents of two cities A and B and the corresponding change in demand for two goods is given in the following table. Which of the following statements is true?*

City	%Increase In Income	% change in demand for Good X	% change in demand for Good Y
A	12	6.5	- 2.3
B	9	5.6	1.6

(a) *Both goods are normal goods in both cities A and B*

(b) *Good X is a normal good in both cities; good Y is an inferior good in city A*

(c) *Good X is a normal good in both cities; good Y is an inferior good in city B*

(d) *Need more information to make an accurate comment*

Refer to the figure below. Answer questions 115 and 116

115. *If this consumer is spending her entire income and consuming at point B, what advise will you give her?*
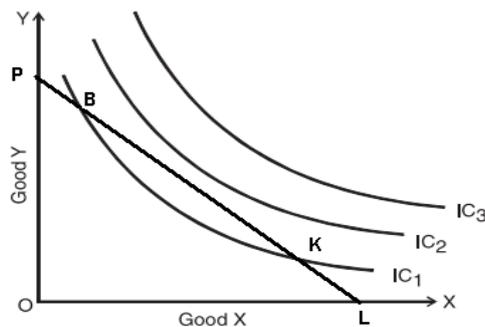
(a) *No advise needed, as she is maximizing her utility at B*

(b) *Consume more of Good X and less of Good Y*

(c) *Consume more of X and less of Y and reach point K*

(d) *Consume same quantity of Good Y and more of Good X*

116. *Which of the following statements is true about this consumer?*

(a) *The consumer is not maximizing her utility at point K*

(b) *The consumer is spending her entire income on both goods*

(c) *The consumer gets equal pleasure at points B and K*

(d) *All the above*

Refer to the figure below. Answer questions 117 and 118

117. *The effect on consumer surplus of a fall in price from E to F is*
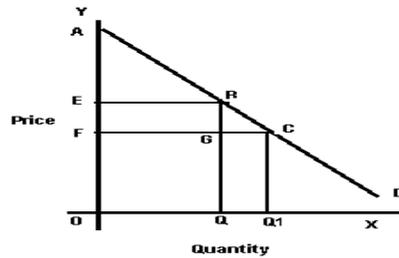
    (a) *A decrease in consumer surplus by EFGR*

    (b) *A decrease in consumer surplus by AER*

    (c) *A decrease in consumer surplus by EFCR*

    (d) *None of the above*

118. *When price rises from F to E, the increase in revenue earned by the seller is*

    (a) *Equivalent to area EFGR*

    (b) *Equivalent to area EFCR*

    (c) *Equivalent to area AER*

    (d) *None of the above*

119. *How would that budget line be affected if the price of both goods fell?*

    (a) *The budget line would not shift.*

    (b) *The new budget line must be parallel to the old budget line.*

    (c) *The budget line must be shifting to the left*

    (d) *The new budget line will have the same slope as the original so long as the prices of both goods change in the same proportion.*

120. *During a recession, economies experience increased unemployment and a reduced level of income. How would a recession likely to affect the market demand for new cars?*

    (a) *Demand curve will shift to the right.*

    (b) *Demand curve will shift to the left.*

    (c) *Demand will not shift, but the quantity of cars sold per month will decrease.*

    (d) *Demand will not shift, but the quantity of cars sold per month will increase.*

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.	**(a)**
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.	**(c)**	78.	**(a)**
79.	**(c)**	80.	**(b)**	81.	**(a)**	82.	**(a)**	83.	**(a)**	84.	**(c)**
85.	**(a)**	86.	**(a)**	87.	**(c)**	88.	**(a)**	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.	**(d)**
109	**(c)**	110	**(b)**	111	**(c)**	112	**(a)**	113	**(c)**	114	**(b)**
115	**(b)**	116	**(d)**	117	**(d)**	118	**(a)**	119	**(d)**	120	**(b)**