**Chapter 2- Demand Analysis, Elasticity of Demand and Demand Forecasting**
Syllabus-
(Demand, Meaning, Types, Determinant of Demand, Demand Function, Law of Demand.

Price Elasticity of Demand, Income Elasticity of Demand, Cross elasticity of demand Advertising Elasticity of Demand, Meaning Types, Methods of Measurement (Numerical Calculation through Percentage Method only

Demand Estimation and Forecasting, Meaning, Significance of Methods (Survey and Trend Methods) and Criteria for an ideal method of demand forecasting)


# Demand Analysis

Ques. What is meant by demand?

Ans. Meaning of demand:

Demand must satisfy the following requisites:
    a. Desire for a specific commodity.
    b. Sufficient resources to purchase the desired goods.
    c. Willingness to spend the resources.
    d. Availability of the commodity at;
        ● Certain price,
        ● Certain place,
        ● Certain times.

In this way demand is an effective desire to obtain a certain commodity at a certain price, place, & time.

Ques. Give the definition of demand given by Prof. Benham, Prof. Bobber and Prof. Hibdon.

Ans. Definition:

According to Prof. Benham "The demand for anything at a given price is the amount of it, which will be bought per unit of time at that price."

In the words of Prof. Bobber "By demand we mean the various quantities of a given commodity or service which consumer would buy in one market in a given period of time at various prices."

In the words of Prof. Hibdon, "Demand means the various quantities of goods that would be purchased per time period at different prices in a given market".

Ques. What do you mean by Individual Demand & Market demand?

Explain both the concepts with the help of diagrams.

Ans. **Individual demand:** It shows the quantities of demand for a commodity by a particular consumer (or household) at various prices of that commodity.
 **Individual demand schedule:** It is the tabular representation of individual demand, which shows the inverse relationship between price of a commodity and demand of a person, say, Mohan's demand, Sohan's demand- individually etc.

 Following schedule is showing individual demand:

### Individual's Demand Schedule

| Price (Rs) | Quantitiy Demandeed |
|:---:|:---:|
| 60 | 2 |
| 40 | 3 |
| 30 | 5 |
| 24 | 7 |

Individual demand curve:

Individual demand curve is the graphical representation of individual demand schedules. In simple words, the individual demand curve shows demand for a commodity made by a person at different prices.



Individual Demand Curve

- Market demand:
The demand of the whole market at various prices of the commodity is known as market demand. It is shown by the market demand schedule and market demand curve.
**Demand schedule** is the tabular presentation of the inverse relationship between the price and the demand of the commodity.

**Market demand schedule:** It is the negative relationship between the price of a commodity and demand of more than one person.

We can arrive at a market demand schedule by adding individual demand schedules. For the sake of simplicity here we have assumed that these are only two consumer house-holds in the market (Amar, Ali and Alex). In the following example, the market demand schedule is constructed by adding these three individual demand schedules.

Market schedule:

| Price per kg of Apples (Rupees) | Demand by Consumers (in kg) | | | Market Demand (in kg) |
|---|---|---|---|---|
| | Amar | Ali | Alex | |
| 80 | 2 | 4 | 5 | 11 |
| 60 | 3 | 6 | 8 | 17 |
| 40 | 4 | 8 | 11 | 23 |
| 20 | 5 | 10 | 14 | 29 |

Market demand curve: The graphical representation of market demand schedule is known as market demand curve.
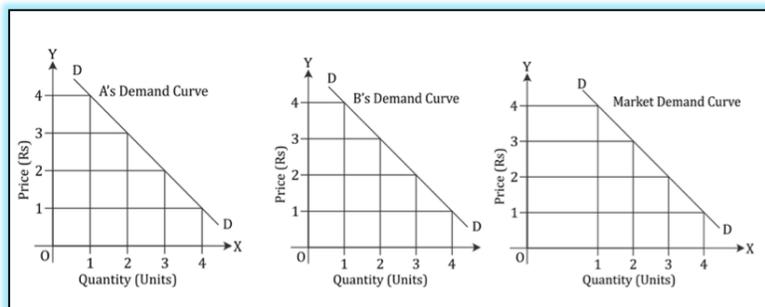


Ques. What is meant by demand function?
Ans. A demand function is a mathematical function describing the relationship between two variables, that is, demand for a commodity and its determinants.
In other words, demand for commodity X is the function of demand determinants.

$$D_x = f(P_x, P_r, Y, T, P_e, ...... \text{ etc.})$$

Wherein, $D_x$ is demand for X, f is function of X, $P_x$ is price of X, $P_r$ is price of related goods, Y is consumers income, T is taste and preference, $P_e$ is expected change in price.

The purpose of this function is to analyse the behaviour of consumers in a market and to help firms make pricing decisions.

Ques. What do you mean by demand? Explain the factors affecting it.

Ans. The determinants of demand / factor affecting demand are as follows:

1. Price of the commodity.
2. Price of the related commodity.
3. Income of the consumer.
4. Taste & preference of the consumer.
5. Size & composition of the population.
6. Distribution of the income.
7. Expected change in the price.
8. Consumers credit facility.
9. Climatic factor.
10. Government policy.

1. Price of the commodity (Px):

Generally demand of the commodity will increase when its price falls & vice-versa. It should be noted that it may not happen if other things do not remain the same.

2. Price of related commodities (Pr):

Change in the price of the **substitute** goods will affect the demand of other commodities, such as, increase in the price of tea will increase the demand of coffee. In the same way, changes in the price of **complementary goods** also change the demand of the commodity. For example, Increase in the price of ink will discourage the demand for pens.

❖ In case of substitute goods: Increase in the price of the commodity will increase demand for its substitute and vice versa.
❖ In case of complementary goods: Increase in the price of the complementary will decrease the demand of the complementary goods and vice-versa.

3. Income of the consumer:

Demand for the goods is directly related to the income of the consumer. Income increases the demand for the commodity in the same way the demand with fall. It is due to the factor that incomes provide purchasing power for the purchase of commodities.

4. Taste & preference of the consumer :

We like to consume only those commodities which suit our tastes. Demand for the goods in this way is affected by our habits, fashions, likes & dislikes.

5. Size and composition of the population :

The demand for the commodities will increase if there is a large population, which means the country is overpopulated & the demand for necessary goods will increase and vice-versa.

The demand of the commodities is directly related to income in this way we will have to study the different groups constituting the population. The distribution of the population will be made on the basis of income regions, sectors, literacy, etc. Each group has different requirements, so the demand for different commodities depends upon the composition of the population.

6. Distribution of income:

The entire income is distributed among various groups, sectors and regions. if income is equally distributed the demand for all commodities will remain in almost the same preposition. If these are more poor people the demand for necessaries will increase in the population of rich people will increase demand for luxury articles.

7. Expected changes in the price :

Expectation here means the anticipated price of the commodities in future. If it is expected that the price of the commodity will rise in future, the demand will increase, on the other hand if the price of the commodities will fall in future, the demand will decline.

8. Consumers credit facility:

If the credit facilities from the seller of the commodity, banks etc... are available, consumers would be encouraged to buy more than what they would buy in the absence of such facilities. Such credits mostly affect the expensive durable goods such as cars, residential houses etc. For example provisions for car loans at low rates of interest by no. of commercial banks increases the demand for cars.

9. Climatic factor:

Demand for different goods depends on the climatic factor because different goods are needed for different climates. For instance, in summer the demand for ice-creams, fans, cold drinks etc, increases.

10. Government policy.

If the Government imposes tax on various commodities in the form of sales excise duties, etc.. The prices of these commodities will increase as a result demand for these commodities will fall but if the government incurs more expenditure on construction of road, bridge, in setting up industries etc, the demand for cement, iron, and goods used for these purposes will increase.

Ques. Explain the **Law of demand** with the help of a schedule and a diagram.

Ans.
- ❖ Meaning: The law states that other things remaining the same, the consumer will demand less quantitiy of goods at higher price and more quantity of goods at lower price. Consumer's equilibrium is the basis of the law of demand.

- ❖ Definition: "The amount of demand increases with a fall in price & diminished with a rise in price."

Prof.Marshall

"Under the same conditions of demand the quantity of a commodity which will be purchased tends to vary inversely with its price"

Prof.Meyers

In simple words, the law of demand states that other things remain the same quantity demanded increases with the fall in its own price and quantity demanded decreases with the rise in its own price.

- ❖ EXAMPLE:

Let us suppose that milk is sold @ Rs.5 per liter and the quantity demanded is 100 liters if the price falls to Rs.4 per liter so, more people will start using milk or the existing people will use more quantity so, quantity demanded will be 200 liters, if the price still falls of Rs.3 and Rs.2 per liter the demanded also increase to 300 and 400 liter. It has been explained in the following schedule & diagram.
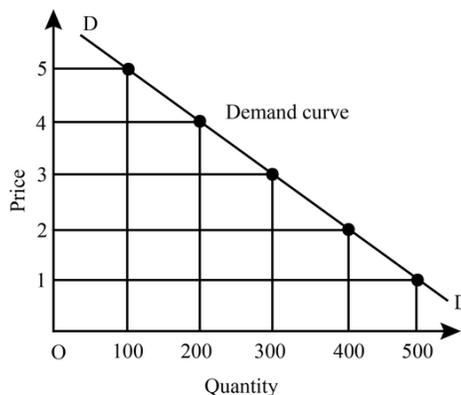


❖ Assumptions of the law of demand:

The law of demand will apply if there is,
1. No change in consumers' income
2. No change in price of related goods
3. No change in consumers' taste, nature and fashion
4. No new substitute of the commodity
5. No expectation of change in future price of the commodity
6. No change in population
7. No change in total assets.

❖ Exceptions to the law of demand: The law of demand, that is, more demand of the commodity at lower price and lesser demand at higher price do not apply in every case and situation. The circumstances when the law of demand becomes ineffective are known as exceptions to the law.

Following are the exceptions to the law of demand:
1. Giffen goods: The fall in the price of giffen goods does not increase its demand because the consumer will probably divert the extra purchasing power in purchasing the superior brand of the commodity. This situation is also known as the Giffen paradox. Examples of giffen goods are coarse grain, coarse cloth, inferior meat etc.
2. Conspicuous consumption: The law of demand will not apply in case of costly items such as diamond. These items are purchased by wealthy persons who will purchase these goods to distinguish themselves from average people even if the price of these commodities increases. These commodities will be demanded even if the prices have gone up very high.

3. Conspicuous necessities: Certain things become the necessity of modern life, so we have to purchase in spite of their price for e.g., demand for T.V. sets, automobiles, refrigerators etc. These things have become the symbol of status, so they are purchased in spite of their rising prices.
4. Expected changes in price: We may purchase larger quantities of goods in spite of their rising price, if we anticipate that the price will go still higher in future and vice-a-versa.
5. Ignorance: If the consumer is not aware of the competitive price of the commodity he may purchase more of the commodity even at higher prices. It may also be due to the phobia of the consumer that high priced commodities are always superior in quality.
6. Extra-ordinary situations: Wars, famines and riots are the extra- ordinary situations, when consumers' behavior becomes abnormal and they may purchase commodities at any price.
7. Change in fashion, habit, attitude and preference: Such changes in the behavior of the consumer are also responsible for making the law of demand ineffective and inoperative.

Ques. Why does the demand curve slope downward? Or Why does the law of demand operate?

Ans. According to the traditional approach; the cause for the sloping downward trend of the demand curve is the application of the law of diminishing marginal utility. This view is expressed by Prof. Marshall. In the opinion of Prof. J. R. Hicks, Prof. Allen and others, the modern economists argue that it is due to the income effect and substitution effect.

Causes of downward sloping of demand curve:
1. Effect of the law of diminishing utility: As we all know that the successive units of a commodity provide us lesser utility so we are prepared to pay lesser for that. As the price of the commodity remains almost constant, its demand falls. It shows the dependence of the law of demand on the law of diminishing utility. The consumer here maximizes his satisfaction by reaching the equilibrium, that is, the point where marginal utility) is equal to price of the commodity.
2. Change in the number of consumers: In case the price of a particular commodity falls, the old consumers start consuming more and some new consumers enter the market and start purchasing the commodity and vice-a-versa. The result of the consumers' behavior is the operation of the law of demand and the downward slope of the demand curve.
3. Price effect: More quantity is demanded as price falls and vice-a-versa (remaining the price of other goods constant). This is known as the price effect.
4. Substitution effect: When the price of a commodity falls it becomes cheaper in comparison to the other commodities. Thus consumers start to use/ substitute this commodity in place of the other commodities they have been using. In this way, the demand for this commodity increases. This is known as the substitution effect.
5. Income effect: As the price of a commodity falls, real income of the consumer increases. Now he can purchase more commodities with the same monetary income or after purchasing the same amount of commodity he will save some monetary income. Out of this saved income he will naturally spend some money on that commodity. Due to this behavior demand for that commodity will increase. This is known as the income effect.

Ques. Explain the importance of the law of demand.

Ans. Following are the importance of the law of demand:
1. Determination of price: The study of law of demand is helpful for a trader/producer to fix the price of a commodity. He can know how much demand will fall by an increase in price to a particular level and how much it will rise by decrease in price of the commodity. The schedule of market demand can supply the information about total market demand at different prices. It enables the management in deciding whether an increase or decrease in price of the commodity is desirable.
2. Important to the Finance minister: The study of this law is of great advantage to the Finance minister. If by raising the tax prices increases to such an extent that the demand is reduced considerably, then it is of no use to raise the tax because revenue will almost remain the same. The tax will be levied at a higher rate only on those goods whose demand is not likely to fall substantially with the increase in price.
3. Important to the farmers: Good or bad crops affect the economic condition of the farmers. If a good crop fails to increase the demand, the price of the crop will fall heavily. The farmer will have no advantage of the group crop and vice-a-versa.

Ques. Explain the types of demand.
Ans. There are three types of demand:
A. **Price demand:** It refers to the various quantities of a product purchased by the consumer at alternative prices. In price demand the demand function is based on the single price. Thus: $Dx = f(Px)$, where D refers to demand for x, f shows functional relationship and P denotes price of the product x.
   Usually, the price demand function has an inverse functional relationship between the price and the demand. The law of demand pertains to the consumer behavior regarding price demand.
B. **Income demand:** Other things remaining the same, income demand indicates the relationship between income of the consumer and the quantity of commodity demanded. In other words, it relates to the various quantities of a commodity that will be bought by the consumer at various levels of income, other things being equal. -Other things being equal are:Price of the commodity in question,Price of related commodities,Taste, nature and habits of the consumer,.. etc.

   So income demand function will be as under:

$Dx = f(Y)$ where, Dx is demand for commodity x, Y is consumer's income.

The income demand relationship is usually direct. The demand for the commodity increases with the rise in income and decreases with the fall in income.

*Demand for normal goods: As income increases demand also increases and as income decreases demand also decreases. Thus, the income demand curve has a positive slope i.e. an upward sloping curve towards the right.

* Demand for inferior goods: Demand decreases with the rise in income and increases with the fall in income. Here, the income demand curve has a negative slope.

C. **Cross demand:** It is a situation wherein, change in the price of one commodity results in change in the demand for other commodity. In this way, cross demand indicates how the demand for a commodity is affected by changes in the price of related goods. Cross demand function will be as under:

Dx = f(Py) where, Dx is demand for x, Py is price of commodity y.

* Related goods may be substitutes and complementary:
   a. Goods which can be used in place of other goods are known as substitute goods. The demand curve for substitutes is an upward sloping curve.
   b. Complementary goods are those goods which are required jointly. The demand curve for these goods will be a downward sloping curve.


## Elasticity of Demand


Ques What do you mean by Elasticity of demand?

Ans. The change in quantity demanded due to change in price of a commodity is known as elasticity of demand.

Ques. Define Elasticity of demand.

Ans. "Elasticity of demand is a measure of the relative change in the amount purchased in response to any change in price or a given demand curve".

By- Prof. Meyers

"The elasticity of demand in a market is great or small as the amount demanded increases much or little for a given fall in price and diminishes much or little for a given rise in price".

By- Prof. Marshall


Ques. Name the various concepts of elasticity of demand.

Ans. There are five concepts of elasticity of demand:

1. Price elasticity of demand.
2. Income elasticity of demand.
3. Elasticity of substitution.
4. Cross elasticity of demand.
5. Advertising elasticity of dernand.

Ques. Explain the types/kinds of price elasticity of demand.

Ans. Elasticity of demand can be categorized into five types according to its responsiveness to the price:

1) Perfectly inelastic demand or zero elastic demand (Ep=0):

When there is no change in quantity demanded due to change in price it is known as zero elastic demand. Here the demand curve is vertical or parallel to the y axis. Example- Salt. It is shown in the adjoining diagram1. When there is no change in quantity demanded due to change in price it is known as zero elastic demand. Here the demand curve is vertical or parallel to the y-axis. Example- Salt. It is shown in the adjoining diagram.


Fig. 2.
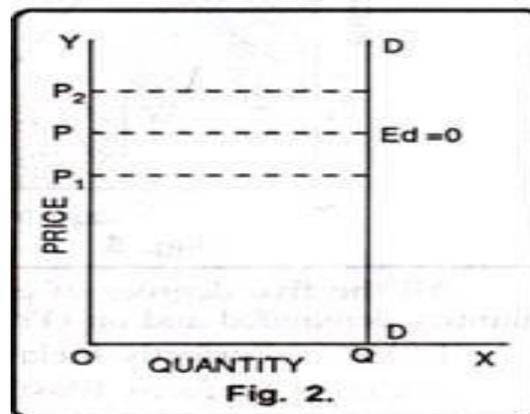
2) Perfectly elastic or infinite elastic demand (Ep=);

When with a very small rise in price, demand becomes zero or on the same price demand becomes infinite, it is known as perfectly elastic demand. Here, the elasticity of demand is equal to infinity and the demand curve becomes horizontal or parallel to the x-axis. It is shown in figure.

## Infinite/Perfectly Elastic Demand Curve
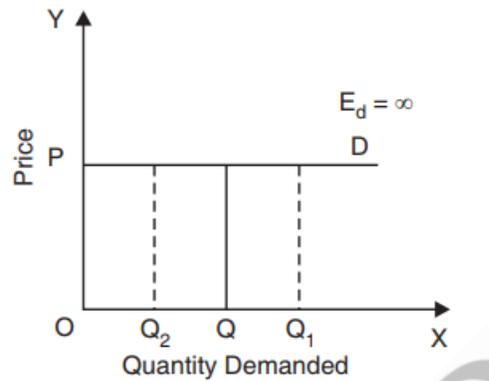


3) Unitary elastic demand (Ep=1):

When the demand changes in the same proportion as in the price of the commodity the EOD is equal to one. Demand curve takes the shape of a rectangular hyperbola. Here, the area under the demand curve will always be equal. Example cloth. It is shown in figure.
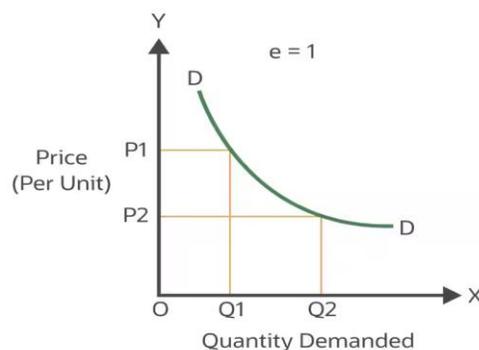


4) Less elastic demand (Ep<1):

When a considerable change in price does not lead to much change in demand it is known as less elastic demand. In this case, the proportionate change in demand is less than the proportionate change in price. In this diagram, demand increases from OQ1 to OQ2 due to a decline in the price of the commodity from OP1 to OP2. It shows that the change in the demand is much less in comparison to change in price. The slope of such a demand curve is more rapid or steep. Example-sugar. It is shown in figure.

**Relatively Inelastic Demand**
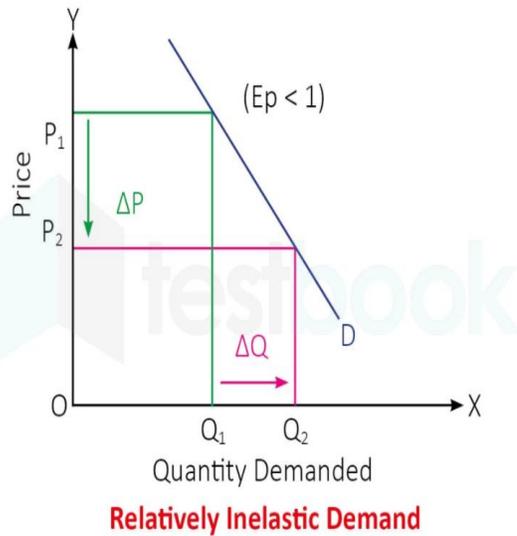
5) More elastic demand (Ep>1):

When a small change in price leads to a greater change in demand, the demand is said to be more elastic. In this case, the proportionate change in demand will be more than the proportionate change in price. In figure 5, DD is an elastic demand curve. It is clear that, when price declines from OP1 to OP2, demand increases from OQ1 to OQ2, which is much more than the change in price. The slope of this curve is flatter. Example-Petrol.
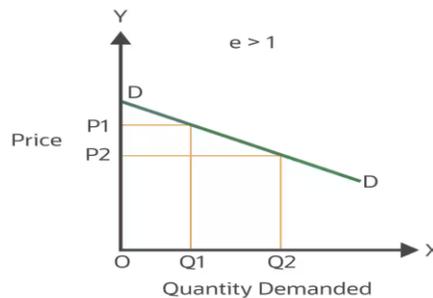


Ques. Mention the various methods of measuring Price elasticity of demand.

Ans. There are in all four methods of measuring P.E.D:
   A. Percentage method or proportionate method.
   B. Total outlay method or total revenue method.
   C. Geometrical method or Point method.
   D. Arc elasticity of demand.

Ques. Explain the percentage method of measuring Price elasticity of demand.

Ans. According to the percentage method elasticity of demand is measured by calculating % change in demand due to change in price. That is, if

a. % change in demand is greater than % change in price then elasticity of demand is greater than one. Ep>1
b. % change in demand is less than % change in price then elasticity is less than one. Ep < 1
c. % change in demand is equal to % change in price then elasticity is equal to one

Ep =1.

The formula for calculating PED is:

$$e_P = -\frac{Percentage\ change\ in\ quantity\ demanded}{Percentage\ change\ in\ price}$$

$$= -\frac{\%\Delta\ Qd}{\%\Delta\ P}$$

$$= -\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where,

$e_P$ = Price elasticity of demand
Q = Original quantity demanded
$\Delta$Q= Change in quantity demanded ($Q_1$ -Q)
P = Original price
$\Delta$P = Change in price ($P_1$ -P)

Let us explain it with an example,

| Price | Quantity Demanded |
|---|---|
| 75 | 2 |
| 50 | 4 |
| 25 | 7 |
| 10 | 8 |

$E_d = \dfrac{\Delta Q}{\Delta P} \times \dfrac{P}{Q}$

$\Delta Q = Q_1 - Q_2$

$\Delta Q = 4 - 7 = -3$

$\Delta P = P_1 - P_2$

$\Delta P = 50 - 25 = 25$

$E_d = \dfrac{-3}{25} \times \dfrac{50}{4} = -1.5$

$|E_d| = 1.5$

$E_d = 1.5 > 1$

| Price | Quantity Demanded |
|---|---|
| 75 | 2 |
| 50 | 4 |
| 25 | 7 |
| 10 | 8 |

$E_d = \dfrac{\Delta Q}{\Delta P} \times \dfrac{P}{Q}$

$\Delta Q = Q_1 - Q_2$

$\Delta Q = 4 - 7 = -3$

$\Delta P = P_1 - P_2$

$\Delta P = 50 - 25 = 25$

$E_d = \dfrac{-3}{25} \times \dfrac{50}{4} = -1.5$

$|E_d| = 1.5$

$E_d = 1.5 > 1$

Hence, the price elasticity of demand is 1.5%, which means that the demand is more elastic as it is greater than one.


Ques. What do you mean by income elasticity of demand?

Ans. By income elasticity of demand we mean the degree of change in the quantity of a product demanded as a result of change in income of the consumer. It expresses a ratio between the income of the consumer and his demand.

In other words, the sensitiveness or responsiveness of demand to a change in consumer's income is called as income alasticity of demand

- Measurement of income elasticity of demand:

IED may be measured with the help of the following formula-

$$Ey = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}}$$

$$= \frac{\dfrac{\text{change in quantity demanded}}{\text{initial quantity demanded}} \times 100\%}{\dfrac{\text{change in income}}{\text{initial income}} \times 100\%}$$

$$= \frac{\dfrac{Q2 - Q1}{Q1}}{\dfrac{Y2 - Y1}{Y1}}$$

$$= \frac{\Delta Q}{\Delta Y} \times \frac{Y1}{Q1}$$

*1. Suppose that the initial income of a person is Rs.2000 and quantity demanded for the commodity by him is 20 units. When his income increases to Rs.3000, quantity demanded by him also increases to 40 units. Find out the income elasticity of demand.*

**Solution:**

Here, $Q_1 = 20$ units, $Q_2 = 40$  So, $\Delta Q = (40-20)$ units $= 20$ units

$Y_1 = $ Rs.2000, $Y_2 = $ Rs. 3000 So ,$\Delta Y = $ Rs. (3000-2000) $=$ Rs.1000

Now,

$$e_Y = \frac{\Delta Q}{\Delta Y} \cdot \frac{Y}{Q} = \frac{20}{1000} \cdot \frac{2000}{20} = 2$$

Thus 1% increase in income leads to a rise of 2% in quantity demanded.

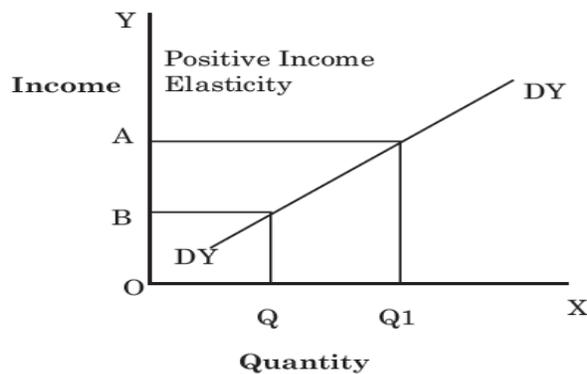Ques. Explain the types of income elasticity of demand.

Ans. There are mainly three types of IED:



A. Positive income elasticity of demand (upward sloping curve towards the right); when an increase in income leads to an increase in the quantity demanded, it is known as positive IED. Usually for normal and superior goods there is positive income elasticity of demand.

a. Positive IED may be of three types:

1. Income elasticity equal to one: IED will be equal to one when the quantity demanded changes in exact proportion to change in income. For example, a 10% change in income leads to a 10% change in demand.
2. Income elasticity greater than one: IED will be greater than one when the % change in the quantity demanded is more than the % change in income. For e.g. a 10% change in income leads to a 15% change in demand.
3. Income elasticity less than unity/one: it will be less than one when the proportionate change in quantity demanded is less than the proportionate change in income. For eg. a 10% change in income leads to a 7% change in demand.



b. Negative income elasticity of demand (downward sloping curve towards the right):When an increase in income leads to a fall in the quantity demanded of a product it is known as negative income elasticity of demand. In the case of inferior or giffen goods, income elasticity is negative, indicating that as income increases demand for such goods falls.



Fig. 19.
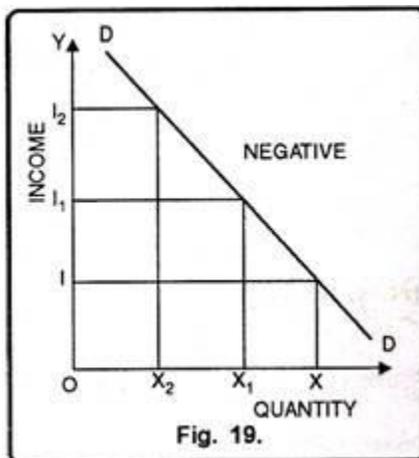
c. Zero income elasticity of demand: When there is no change in demand in spite of a rise or fall in the income of the consumer. The slope of zero elastic demand curves is a straight line parallel to y axis, which indicates that, in spite of a change in income the demand remains stable.
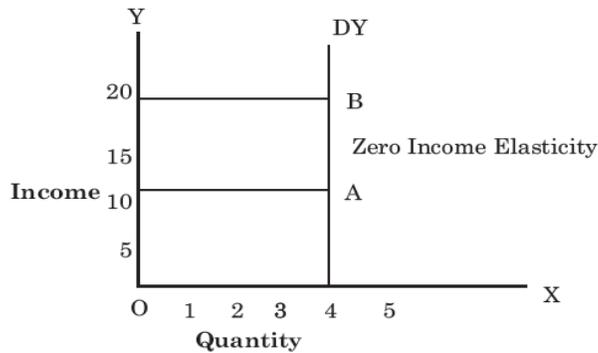
Ques. What do you mean by Cross Elasticity of Demand?

Ans. Cross elasticity of demand expresses a relationship between the changes in the demand for a given product in response to a change in the price of some other product.

In other words Cross elasticity of demand is the measure responsiveness of the demand for a product to a change in the price of its substitutes or complementary products

Measurement of Cross elasticity of demand-

If X and Y are two goods, then

$$e_c = \frac{Proportionate\ change\ in\ quantity\ of\ X}{Proportionate\ change\ in\ price\ of\ Y}$$

Symbolically,

$$e_c = \frac{\frac{\Delta Qx}{Qx}}{\frac{\Delta Py}{Py}} = \frac{\Delta Qx}{\Delta Py} \cdot \frac{Py}{Qx}$$

Where,
$e_c$ = Cross elasticity of demand
$Q_X$ = Original quantity demanded of good X
$\Delta Q_X$= Change in quantity demanded of X
$P_Y$ = Original price of good Y
$\Delta Py$ = Change in price of good Y

- Types of cross elasticity of demand: Any two goods can relate to each other in different ways. Either they can be substitutes or complementary or non-related.
  Depending on such fact, the types of cross elasticity of demand can be as follows:
1. Positive cross elasticity of demand: Here two goods X and Y are having substitute relation. Example- Tea and Coffee.
   There will be positive relations between X and Y. If the price of Y increases the demand for X will increase and vice versa.

Price of X — P₁, P, D, D, O, Q, Q₁ — Quantity demand for y

(Graph labels: $P_Y \uparrow \; Q_X \downarrow$ ; $P_Y \downarrow \; Q_X \uparrow$)
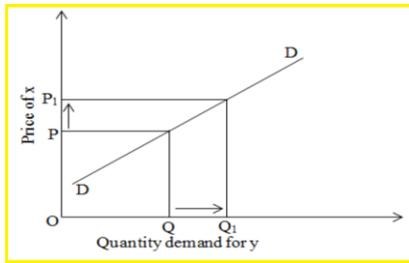
2. Negative cross elasticity of demand: Here two goods X and Y are having complementary relations. Example- Carand Petrol.
There will be inverse relations between X and Y. If the price of Y increases the demand for X will decrease and vice versa.



Price of Good Y — D, P₂, P₁, O, X₂, X₁, D — Quantity Demand of Good X

$$P_Y \uparrow \quad Q_X \downarrow$$
$$P_Y \downarrow \quad Q_X \uparrow$$
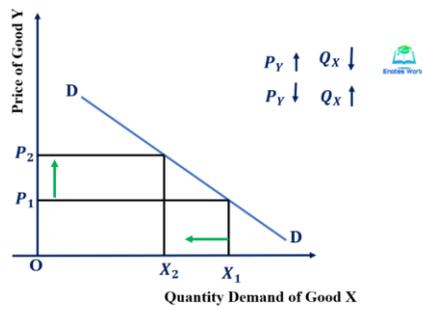
3. Zero cross elasticity of demand: Here two goods X and Y are having no relations. Example- Shoes and Clothes.
There will be no relations between X and Y. Whatever may be the change in the price of Y, the demand for X will remain the same.



Price of Good Y — D, P₂, P₁, D, O, X — Quantity Demand of Good X

$$P_Y \uparrow \; \Delta Q_X = 0$$
$$P_Y \downarrow \; \Delta Q_X = 0$$
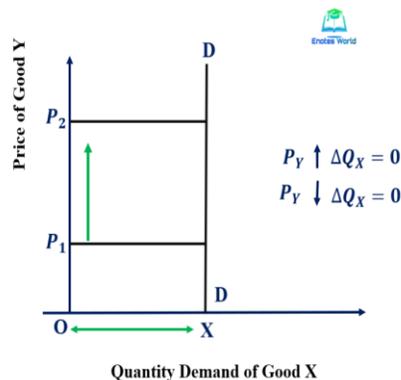
Ques. What do you mean by Advertising elasticity of demand?

Advertising elasticity of demand is the measure of the rate of change in demand due to change in advertising expenditure.



**Advertising Elasticity of Demand**

Advertising Elasticity of Demand = $\dfrac{\text{Proportionate change in Demand for product}}{\text{Proportionate change in Advertising expenditure}}$

i.e.

Advertising Elasticity of Demand = $\dfrac{\Delta qx}{Q} \div \dfrac{\Delta a}{A}$

● Types of advertising elasticity of demand:

1. Perfectly inelastic demand or zero elastic demand (Ep=0):
When there is no change in quantity demanded due to change in advertising expenditure, it is known as zero elastic demand. Here the demand curve is vertical or parallel to the y axis. When there is no change in quantity demanded due to change in advertising expenditure it is known as zero elastic demand. Here the demand curve is vertical or parallel to the y-axis.

2. Perfectly elastic or infinite elastic demand (Ep= ∞):

When with a very small rise in advertising expenditure, demand becomes zero or on the same price demand becomes infinite, it is known as perfectly elastic demand. Here, the elasticity of demand is equal to infinity and the demand curve becomes horizontal or parallel to the x-axis.

3. Unitary elastic demand (Ep=1):
When the demand changes in the same proportion as in the advertising expenditure of the commodity the EOD is equal to one. Demand curve takes the shape of a rectangular hyperbola. Here, the area under the demand curve will always be equal.

4. Less elastic demand (Ep<1):
When a considerable change in advertising expenditure does not lead to much change in demand it is known as less elastic demand. In this case, the proportionate change in demand is less than the proportionate change in advertising expenditure.The slope of such a demand curve is more rapid or steep.

5. More elastic demand (Ep>1):
When a small change in advertising expenditure leads to a greater change in demand, the demand is said to be more elastic. In this case, the proportionate change in demand will be more than the proportionate change in advertising expenditure. The slope of this curve is flatter.

Ques. Explain the relationship between Advertising expenditure and Sales.

Ans. The relationship between Advertising expenditure and Sales are as follows:

1. There is a direct relationship between A.E. and Sales, assuming other factors such as, price and quality of the product, distributive system etc. to be constant.
2. Even without incurring any type of advertising expenditure it is possible for a firm to sell a certain quantity of the product.
3. After a certain level, with an increase in the advertising expenditure the total sales will increase but at a diminishing.

The above given points may be clearer with the help of a below given diagram:



**Relationship Between Advertising Expenditure and Sales**
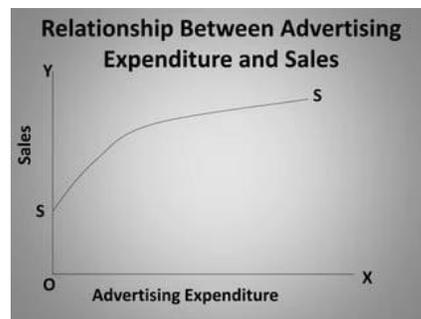
● It is clear from the diagram that,
1. SS is the sales curve, which is an upward sloping curve towards the right, showing a positive relationship between sales and advertisement expenditure.
2. Firm is having its total sales up to level OS without incurring any advertising expenditure, which shows the possibility of sales up to a certain level at zero advertisement.
3. The area of the sales curve up to point P shows sales at an increasing rate but after a particular level, with an increase in advertising expenditure the total sales increases but at a diminishing rate.

## Demand Forecasting

Ques. What do you mean by demand forecasting?
Ans. By demand forecasting we mean expectations about the future course of the market demand for a product. Demand forecasting is based on the statistical data about past behavior and empirical relationships of the demand determinants. It is an estimate of the future.

Ques. What do you mean by demand forecasting? Explain the significance of it.

Ans. The significance of demand forecasting is as follows:

1. Production planning: Demand forecasting is necessary for the production planning of a business form. Without it there may be underproduction or overproduction.
2. Sales forecasting: Promotional efforts of the firm should be based on sales forecasting.
3. Control of business: For controlling the business on a sound footing, it is essential to have a well conceived budgeting of costs and profits that is based on the forecast of annual demand, sales and prices.
4. Inventory control: A satisfactory control of business inventories, raw- materials, intermediate goods, semi-finished products etc., requires satisfactory estimates of the future requirement which can be known by demand forecasting.
5. Growth and long term investment programs: Demand forecasting is necessary for determining the growth rate of the firm and its long term investment programs and planning.
6. Stability: Stability in production and employment over a period of time can be made effective by the management in the light of suitable forecasting about market demand and other business variables.
7. Economic planning and policy making: Demand forecasting at macro level for the nation as a whole is of great help to the planners and policy makers for a better planning and rational allocation of the country's production resources.

Ques. Explain the criteria of a good forecasting method.

Ans. Following are the criteria for an ideal method good forecasting:

1) Accuracy: Forecast should be as accurate as possible. Its accuracy must be judged by examining the past forecast in the light of the present situation. Some comparison of the model with what actually happens and of the assumptions with what is borne out in practice is most desirable.

2) Plausibility: It implies management's understanding of the method used for forecasting. It is essential for a correct interpretation of the results. Too many mathematical and econometric procedures may not favor the management.

3) Simplicity: A simpler method is always more comprehensive than the complicated one.

4) Economy: It should involve lesser costs as far as possible. Its costs must be compared against the benefits of forecasts.

5) Quickness: It should yield quick results. A time consuming method may delay the decision making process.
6) Flexibility: Not only the forecast is to be maintained up-to-date, there should be possibility of changes to be incorporated in the relationships entailed in forecast procedure, time to time.

7) Durability: The technique of demand forecasting must be such as to prove useful in the long run.

8) Maintenance of timeliness: The technique of demand forecasting should be such that it can be maintained on an up-to-date basis. There must be continuous alterations and additions involving information and data.

9) A good forecasting should also predict deviations and turning points, besides judging the existing trend, so that the forecasts are more effective.

10) Time gap between the occurrence of an event and its forecast is known as the lead time. Now, the longer the lead the forecast has before the event, the greater will be its usefulness and vice-a-versa.

Ques . Explain the various methods of measuring demand forecasting.

Ans. The various methods of demand forecasting are as follows:

A] Direct methods:

i) Consumers' survey or survey of buyers intention,

ii) Expert's opinion survey and

iii) Controlled market experiments

B] Indirect methods:

i) Trend Projection method,

ii) Regression method,

iii) Leading indicator method, and

iv) Simultaneous equation method.

    A. Direct methods of measuring demand forecasting:

***Consumers' survey method:**

The first direct method of demand forecasting is to know the intentions of the buyers as to what they intend to buy.
This may be done through personal interview, mail or post or through telephonic interviews.
Again questionnaires are prepared to find out the buyers' intentions with regard to say, the price of the product, its quantity, design, packaging etc. Questionnaire should be simple and easy to understand.

a. In the personal interview method, a house to house survey is made.
b. In case of a post or mail survey, a questionnaire is sent through post or mail.
c. In telephone interviews, questions in questionnaires are asked on telephones.

There are two types of consumers' survey:

a) Complete Enumeration method and

b) Sample survey method

a) Complete Enumeration method: Under this method all the potential buyers of the product are contacted and their interviews are conducted to find out the probable demand.
Suppose, out of all buyers interviewed, 'n' number of buyers express their intention to buy the product and indicate their likely purchases by Xi, Xii, Xiii, Xiv representing the quantity demanded, then the total demand forecast will be as follows:

   Dx = Xi + Xii+ Xiii+---------- + Xn,
where Dx is the demand for product x, and Xi, Xii, Xiii, etc. are individual quantities which consumers are willing to buy.

- The main advantages of this method are:
1. This method is free from any bias or value judgment of the investigator,
2. Since all the potential buyers are consulted the degree of accuracy is more,
3. This method is more useful when a new product is launched.

- The disadvantages of the method re as follows:
1. Expensive,
2. Time consuming,
3. Is of little use when the consumers are spread over a larger area.

b) Sample survey method: Under this method, only a few consumers are selected from the potential buyers of the product. They are interviewed and then the average demand is calculated.

Suppose there are thousand (1000) potential buyers of which 100 are selected for a sample survey method, for an interview.
We may indicate their individual demand as Xi, Xii, Xiii—--------- X1oo and find out the average as under:

$$Ax = \frac{Xi + Xii + Xiii + X1oo}{100}$$

Here, Ax is the average demand, now to find the aggregate demand Dx,

   Dx = Ax' x Cn

Wherein, Dx= total demand for product X, Ax'=1000, Cn= Total no. of potential consumers.

The advantages of this method:
1. Less costly
2. Less time consuming.

- Conditions for sample survey method:
1. Efficiency and accuracy of this method depends upon the competence of field investigors and experts,
2. Careful and proper procedure of sample survey method is necessary,
3. Sample size should be sufficiently large,
4. It should be selected at ramdom so that it is free from bias.

Limitations of survey method:
1. The respondents may not give correct answers and simply repor what the questions would like to hear.
2. The consumer may not be able to give accurate answers to a given question with any degree of certainty.
3. The method is very expensive.
4. To get reliable information careful attention has to be paid to each phase of the process of a survey.

* **Expert's Opinion Survey:** Under this method, demand forecasting is made on the basis of expert's opinion. It is also known as sales-force polling. There are certain categories of people i.e., salesmen, market consultants, professional experts, marketing managers etc. dealing with the product and are in constant touch with the changing trends of consumers' demand and their reactions to price change, quality change, product advertising etc. Information and data collected by these experts is compiled, tabulated, computerized and then inferences are drawn about the likely demand for the product.

There are various methods of confirming the opinion regarding future demand by experts. One such method is the Delphi technique originated by Olaf Helmer in the late 1940s. Delphi method is used for conducting opinion polls or surveys. Under this method a group of experts are repeatedly questioned for their opinions or comments on some issues and their agreements and disagreements are clearly identified.

- The main advantages of this method:
1. Simple, almost direct and first hand information from the consumers.
2. Cheaper and easy to handle.
3. Less time consuming.
4. Enables the firm to forecast the current demand for its product in the short run.
5. Useful when the firm introduces a new product.

- Limitations of the method:
1. It is subjective,
2. Its accuracy depends on the intelligence of the reporting salesman,
3. It cannot be relied upon for long-term business planning,
4. Quite often outside experts charge huge fees for giving their opinion.
5. It may be possible that the experts may feel themselves as a perfect viewer of the market forecasting as a result there may not be any subsequent rounds of seeking their opinions about others' forecasts.

* **Controlled Market Experiments:** In this method a choice of the marketfor experiments is made. The business firm then conducts the experiment in this market, under controlled conditions, by changing one or more of the demand determinants like price, advertisement, packaging, etc. Consumer behavior in the market is then observed and recorded and the effects on demand are assessed. A firm, for example, may reduce the price of its product in one market and observe buyers' reaction and compare the sales resulting from price reduction with the sales in the past.

While selecting markets for controlled experiments it is essential that areas selected should have similar characteristics such as population, occupational distribution, social backgrounds, income levels, consumers' preferences etc. Besides, such experiments should be conducted over a wide period of time.

- Advantages of this method:

Provide more accurate results than the other methods as demand is estimaned on the basis of actual purchases (and not intentions or expectations) of the consumer under the given conditions.

- The main limitations of this method:
1. It is time consuminf and expensive.
2. It is risky as it may lead to unfavourable reactions on dealers, consumers and competitors.
3. The firm may have to lose its consumers if the experiment has to be done while having a rise in price of the product.
4. There may be long term damage to the firm's image and sales level, if the new sales promotion compaign fails in the experiment.
5. Controlled experiments may be biased.
6. While knowing that they are a part of an experiment, the consumers may not respond accurately.

## B. Indirect Methods of Demand Forecasting:

- **Trend Projection Method:** Trend refers to the long term persistent movement of data in one direction - upward or downward. Under the trend method, past data is used to

project the sales in coming years. A firm which has been in existence for a long period, has with it considerable data on sales pertaining to different time periods. Forecast for the future includes collecting of the past information with regards to historical changes in price, income and other relevant variables influencing demand for a commodity. This type of data collected is known as time series.

A firm with a long standing may collect time series data on sales from its own sales department. New firms can obtain such data from other established firms in the same industry. The time series data can be used to project the demand for a product through a graph or through least squares method. Such data can be presented in a tabular form or graphically for further analysis. This will be clear from the following table and diagram:

Sales of Firm A-

| Sr. no. | Year | Sales (in crores) |
|---------|------|-------------------|
| 1.      | 2020 | 20                |
| 2.      | 2021 | 25                |
| 3.      | 2022 | 22                |
| 4.      | 2023 | 30                |
| 5.      | 2024 | 35                |
| 6.      | 2025 | ?                 |



FIGURE 17.10 Trend Represented by a Linear Function for the Bicycle Sales Time Series
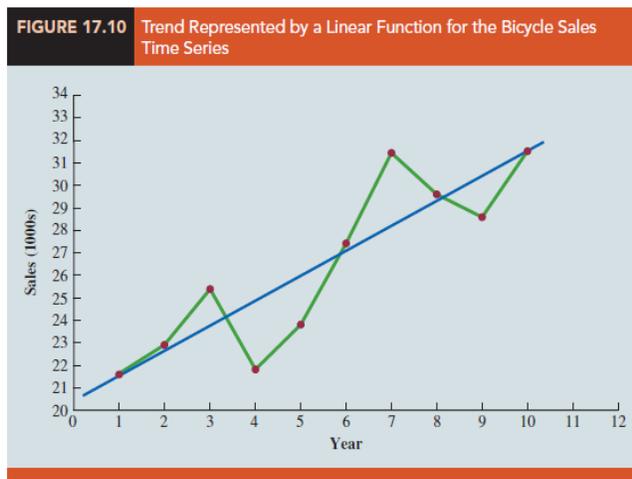
Diagram:

In the above given diagram, AB (blue line) is the trend line. The trend line can be drawn further to know the likely sales trend in years to follow.

- ● Advantages of the method:
1. Simple and less expensive,
2. Method depends upon time series data which often exhibit a persistent growth trend.

- ● Disadvantages of the method:
1. It gives information only about the trend (i.e. increase or decrease) and not the actual quantity likely to be demanded.
2. Extension of trend line involves subjective and personal judgment which may vary from person to person; hence such conclusions may not be too reliable.


The real challenge of forecasting is in the prediction of turning points rather than in the projection of trends. Normally four factors are responsible for these turning points-

a) Secular trends: It refers to changes that occur as a result of general tendency,

b) Seasonal variations: This refers to changes resulting from changes in climate and weather conditions.

c) Cyclical variations: These refer to changes arising out of booms and depressions.

d) Random factors: These are generally unpredictable like famines, floods, earthquakes etc.




**\* Econometric Method:** On the basis of economic theory, a mathematical model describing the relationship between different economic variables is established. Then, with the help of statistical devices, estimates of parameters are made and through these parameters, demand is forecasted.

- ● Advantages of this method:
1. This method not only enables us to forecast an economic phenomenon but also explains it.
2. It helps to explain the turning points in economic series.
3. This method helps to measure the elastic ties of the various determinants of demand like price, income, cross demand, advertising elasticity of demand etc.
4. The model can be modified if there is found to be a large discrepancy in the forecast values and actual values of a variable.