3A Demand Analysis

Introduction :

You have already studied the concept of utility in the previous chapter. Utility is the basis of demand. Utility may generate a desire or a need to have a particular commodity, but utility on its own cannot generate demand for the commodity. This chapter is an effort to analyse the concept of demand. Demand analysis is concerned with consumer behaviour.

Meaning of Demand :

In ordinary language, demand means a desire. Desire means an urge to have something. In Economics, demand means a desire which is backed by willingness and ability to pay.

For example, if a person has the desire to purchase a television set but does not have the adequate purchasing power then it will be simply a desire and not a demand.

Thus, demand is an effective desire. All desires are not demand.

In short,

Demand = Desire + willingness to purchase + Ability to pay.

Try this :

Identify the concepts :

1) A poor person wants to have a car ……
2) A rich person bought a car ……

Definition of Demand :

According to 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."

Thus, following are the features of demand :

1) Demand is a relative concept.
2) Demand is essentially expressed with reference to time and price.

Demand Schedule :

Demand schedule is a tabular representation of the functional relationship between price and quantity demanded for a particular commodity.

A demand schedule may be either individual demand schedule or market demand schedule.

Individual Demand Schedule :

Individual demand is the quantity of a commodity demanded by a consumer at a given price during a given period of time.

Individual demand schedule is a tabular representation showing different quantities of commodities that an individual consumer is prepared to buy at various prices over a given period of time.

This can be explained with the help of the following individual demand schedule.

Individual demand schedule :

Table 3.1

Price of commodity '*x*' (₹)	Quantity demanded of commodity '*x*' (in kgs)
10	1
8	2
6	3
4	4
2	5

Table 3.1 shows different quantities of commodity '*x*' purchased by an individual consumer at various prices. It can be observed that less quantity of commodity is demanded at rising prices and more quantity of commodity is demanded at falling prices. It indicates an inverse relationship between price and quantity demanded.

Individual Demand Curve :

Individual demand curve is a graphical representation of the individual demand schedule.

Fig. 3.1 represents an individual demand curve

which is based on table 3.1

Individual Demand Curve

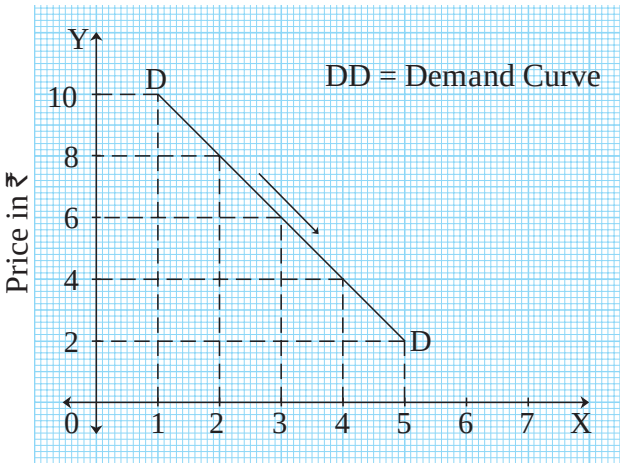


Fig. 3.1

In figure 3.1, X axis represents quantity demanded and Y axis represents the price of the commodity. The demand curve DD slopes downward from left to right, indicating an inverse relationship between price and quantity demanded.

Fig. 3.2 Individual Demand

Market Demand Schedule :

Market demand is total demand for a commodity from all the consumers at a given price during a given period of time.

Market demand schedule is a tabular representation showing different quantities of commodity which all consumers are prepared to buy at various prices over a given period of time.

It is obtained by a horizontal summation of the demand of all consumers at various prices. It also indicates an inverse relationship between price and quantity demanded.

This can be explained with the help of following market demand schedule.

Market demand schedule :

Table. 3.2

Price of commodity	Quantity of '*x*' demanded Kgs.			Market demand
'*x*'(₹)	Con-sumer	Con-sumer	Con-sumer	A + B + C
	A	B	C	
10	5	10	15	30
8	10	15	20	45
6	15	20	25	60
4	20	25	30	75
2	25	30	35	90

Table 3.2 shows different quantities of commodity *x* purchased by different consumers (A, B, C) at various prices. It can be observed that less quantity of commodity is demanded at rising prices and more quantity of commodity is demanded at falling prices. Thus, there is an inverse relationship between price and quantity demanded.

Market Demand Curve :

Graphically, the market demand curve is a horizontal summation of individual demand curves. It is based on the market demand schedule. Fig. 3.3 represents the market demand curve

Market Demand Curve

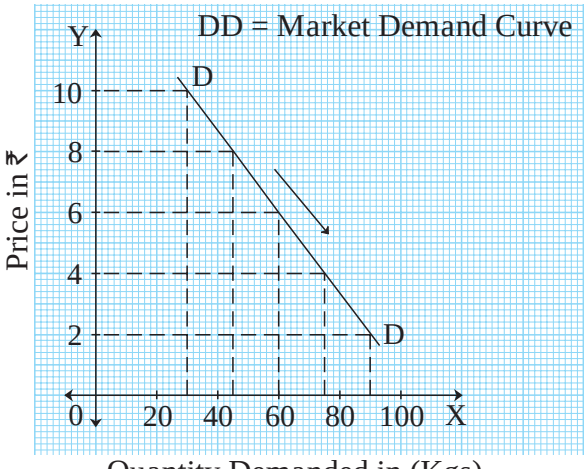


Fig. 3.3

In figure 3.3, X axis represents market demand and Y axis represents the price of the commodity. The market demand curve 'DD' slopes downward from left to right, indicating an inverse relationship between price and market demand.

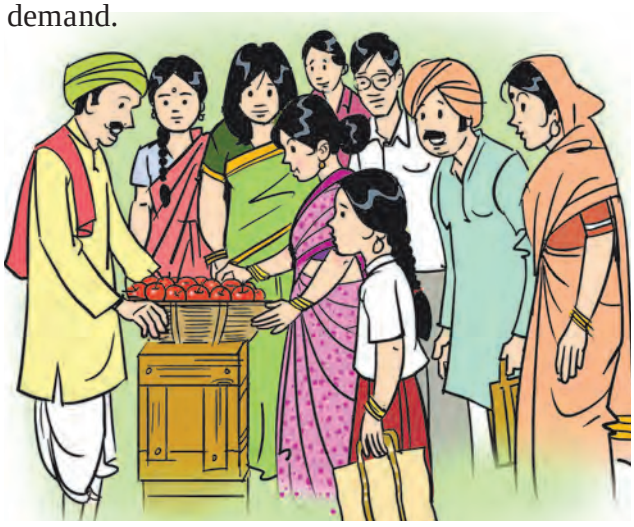


Fig. 3.4 Market Demand

Try this :

Prepare a monthly demand schedule of your family for various commodities. For example, vegetables, fruits, medicines etc.

Reasons justifying downward sloping demand curve are as follows :

1) **Law of Diminishing Marginal Utility :** We have seen that marginal utility goes on diminishing with an increase in the stock of a commodity and vice-versa. Therefore, a consumer tends to buy more when price falls and vice-versa. This implies that demand curve is downward sloping.

2) **Income effect :** In the case of normal goods, when price falls, purchasing power (real income) of a consumer increases which enables him to buy more of that commodity. This is known as income effect.

3) **Substitution effect :** In case of substitute goods, when the price of a commodity rises, the consumer tends to buy more of its substitute and less of that commodity whose price has increased. This is known as substitution effect.

4) **Multi-purpose uses :** When a commodity can be used for satisfying several needs, its demand will rise with a fall in its price and fall with a rise in its price.

5) **New Consumers :** When the price of a commodity falls, a new consumer class appears who can now afford the commodity. Thus, total demand for commodity increases with fall in price.

Try this :

Complete the following hypothetical demand schedule.

Price of commodity '*x*'(₹)	Qty. Demanded kgs
350	3
300	
250	10
200	
150	
100	30

Types of Demand :

Types of Demand

1) Direct demand
2) Indirect demand
3) Complementary/Joint demand
4) Composite demand
5) Competitive demand

1) **Direct demand :** It is the demand by the consumer for goods which satisfy their wants directly. They serve direct consumption needs of the consumers. Thus, it is the demand for consumer goods. For example, demand for cloth, sugar, etc.

2) **Indirect demand :** Indirect demand is also known as derived demand. It refers to demand for goods which are needed for further production. It is the demand for producer's goods. Hence, all factors of production have indirect or derived demand. For example, demand for workers in a sugar factory is derived or indirect demand.

3) **Complementary/Joint demand :** When two or more goods are demanded jointly to satisfy a single want, it is known as joint or complementary demand. For example, car and fuel etc.

4) **Composite demand :** The demand for a commodity which can be put to several uses is known as composite demand. For example, electricity is demanded for several uses such as light, fan, washing machine etc.

5) **Competitive demand :** It is demand for those goods which are substitute for each other. For example, tea or coffee, sugar or jaggery etc.

Try this :

Complete the table

Type of demand	Example
Direct demand	[ ] [ ]
[ ]	Workers in cotton textile industry
Joint demand	For preparing Coffee → Coffee Powder, [ ], [ ], [ ]
[ ]	CNG and petrol, pen and pencil
[ ]	Milk → Tea, Curd, Direct consumption, Sweets

Determinants of Demand :

The demand for goods is determined by the following factors :

1) **Price :** Price determines the demand for a commodity to a large extent. Consumers prefer to purchase a product in large quantities when price of a product is less and they purchase a product in small quantities when price of a product is high.

2) **Income :** Income of a consumer decides purchasing power which in turn influences the demand for the product. Rise in income will lead to a rise in demand for the commodity and a fall in income will lead to a fall in demand for the commodity.

3) **Prices of Substitute Goods :** If a substitute good is available at a lower price then people will demand cheaper substitute good than costly good. For example, if the price of sugar rises then demand for jaggery will rise.

4) **Price of Complementary Goods :** Change in the price of one commodity would also affect the demand for other commodity. For example, car and fuel. If the price of fuel rises, then demand for cars will fall.

5) **Nature of product :** If a commodity is a necessity and its use is unavoidable, then its demand will continue to be the same irrespective of the corresponding price. For example, medicine to control blood pressure.

6) **Size of population :** Larger the size of population, greater will be the demand for a commodity and smaller the size of population smaller will be the demand for a commodity.

7) **Expectations about future prices :** If the consumer expects the price to fall in future, he will buy less in the present at the prevailing price. Similarly, if he expects the price to rise in future, he will buy more in the present at the prevailing price.

8) **Advertisement :** Advertisement, sales promotion scheme and effective sales-manship tend to change the preferences of the consumers and lead to demand for many products. For example, cosmetics, tooth brush etc.

9) **Tastes, Habits and Fashions :** Taste and habits of a consumer influence the demand for a commodity. If a consumer likes to

eat chocolates or consume tea, he will demand more of them. Similarly, when a new fashion hits the market, the consumer demands that particular type of commodity. If a commodity goes out of fashion then suddenly the demand for that product tends to fall.

10) **Level of Taxation :** High rates of taxes on goods or services would increase the price of the goods or services. This, in turn would result in a decrease in demand for goods or services and vice-versa.

11) **Other factors :**

1) Climatic conditions
2) Changes in technology
3) Government policy
4) Customs and traditions etc.

Law of Demand :

Introduction :

The law of demand was introduced by Prof. Alfred Marshall in his book, 'Principles of Economics', which was published in 1890. The law explains the functional relationship between price and quantity demanded.

Statement of the Law :

According to Prof. Alfred Marshall, "Other things being equal, higher the price of a commodity, smaller is the quantity demanded and lower the price of a commodity, larger is the quantity demanded."

In other words, other factors remaining constant, if the price of a commodity rises, demand for it falls and when price of a commodity falls demand for the commodity rises. Thus, there is an inverse relationship between price and quantity demanded.

Symbolically, the functional relationship between demand and price is expressed as :

$Dx = f(Px)$

Where D = Demand for a commodity

x = Commodity

f = Function

Px = Price of a commodity

Assumptions :

Law of demand is based on the following assumptions :

1) **Constant level of income :** If the law of demand is to find true operate then, consumers' income should remain constant. If there is a rise in income, people may demand more at a given price.

2) **No change in size of population :** It is assumed that the size of population remains unchanged. Any change in the size and composition of population of a country affects the total demand for the product.

3) **Prices of substitute goods remain constant :** It is assumed that the prices of substitutes remain unchanged. Any change in the price of the substitute will affect the demand for the commodity.

4) **Prices of complementary goods remain constant :** It is assumed that the prices of complementary goods remain unchanged because a change in the price of one good will affect the demand for the other.

5) **No expectations about future changes in prices :** It is assumed that consumers do not expect any further change in price in the near future. If consumers expect a rise in prices in future, they may demand more in the present even at existing high price.

6) **No change in tastes, habits, preferences, fashions etc. :** It is assumed that consumers' tastes, habits, preferences, fashions etc. should remain unchanged. Any change in these factors will lead to a change in demand.

7) **No change in taxation policy :** Taxation policy of the government has a great impact on demand for various goods and services.

Therefore, it is assumed that there is no change in the policy of taxation declared by Government.

The law of demand is explained with the help of the following demand schedule and diagram.

Demand schedule :

Table. 3.3

Price of commodity '*x*' (₹)	Quantity demanded of commodity '*x*' (in kgs.)
50	1
40	2
30	3
20	4
10	5

As shown in Table 3.3 when price of commodity '*x*' is ₹ 50, quantity demanded is 1 kg. When price falls from ₹ 50 to ₹ 40, quantity demanded rises from 1 kg to 2 kgs. Similarly, at price ₹ 30, quantity demanded is 3 kgs and when price falls from ₹ 20 to ₹ 10, quantity demanded rises from 4 kg sto 5 kgs

Thus, as the price of a commodity falls, quantity demanded rises and when price of commodity rises, quantity demanded falls. This shows an inverse relationship between price and quantity demanded.

Demand Curve

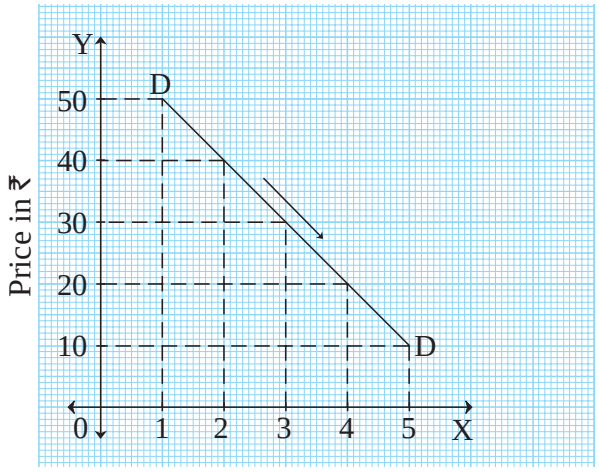


Fig. 3.5

In fig. 3.5, X axis represents the demand for the commodity and Y axis represents the price of commodity *x*. DD is the demand curve which slopes downward from left to right due to an inverse relationship between price and quantity demanded.

Try this :

Draw a demand curve from the following demand schedule :

Price of Apple (₹) per kg	Quantity demanded (in kgs.)
40	5
50	4
60	3
70	2
80	1

Exceptions to the Law of Demand :

There are certain exceptions to the law of demand. It means that under exceptional circumstances, consumer buys more when the price of commodity rises and buys less when price of commodity falls. In such cases, demand curve slopes upwards from left to right. i.e. the demand curve has a positive slope as shown in fig. 3.6.

Exceptional Demand Curve

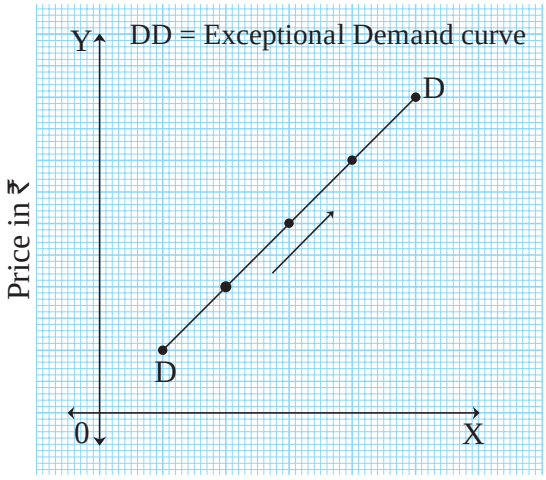


Fig. 3.6

Following are the exceptions to the law of demand:

1) **Giffen's paradox :** Inferior goods or low quality goods are those goods whose demand does not rise even if their price falls. At times, demand decreases when the price of such commodities fall.

Sir Robert Giffen observed this behaviour in England in relation to bread. He noted that, when the price of bread declined, people did not buy more because of an increase in their real income or purchasing power. They preferred to buy superior good like meat. This is known as Giffen's paradox.

2) **Prestige goods :** Expensive goods like diamond, gold etc. are status symbol. So rich people buy more of it, even when their prices are high.

3) **Speculation :** The law of demand does not hold true when people expect prices to rise still further. In this case, although the prices have risen today, consumers will demand more in anticipation of further rise in price. For example, prices of oil, sugar etc. tend to rise before Diwali. So people go on purchasing more at a high price as they anticipate that prices may rise during Diwali.

4) **Price illusion :** Consumers have an illusion that high priced goods are of a better quality. Therefore, the demand for such goods tend to increase with a rise in their prices. For example, branded products which are expensive are demanded even at a high price.

5) **Ignorance :** Sometimes, due to ignorance people buy more of a commodity at high price. This may happen when consumer is ignorant about the price of that commodity at other places.

6) **Habitual goods :** Due to habit of consumption, certain goods like tea is purchased in required quantities even at a higher price.

Find out :

Examples of the given exceptions to the law of demand.

1) Prestigious goods – _____ _____

2) Habitual goods – _____ _____

3) Branded goods – _____ _____

Variations in Demand :

When the demand for a commodity falls or rises due to a change in price alone and other factors remain constant, it is called variations in demand. It is of two types :

1) **Expansion of demand :** Expansion of demand refers to rise in quantity demanded due to fall in price alone while other factors like tastes, income of the consumer, size of population etc. remain unchanged.

Demand moves in downward direction on the same demand curve.

This is explained with the help of following fig. 3.7

Expansion of Demand

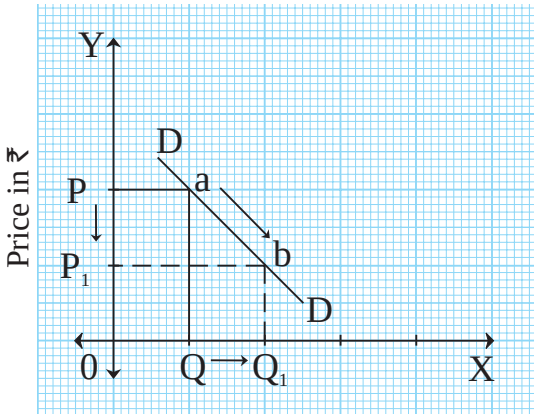


Fig. 3.7

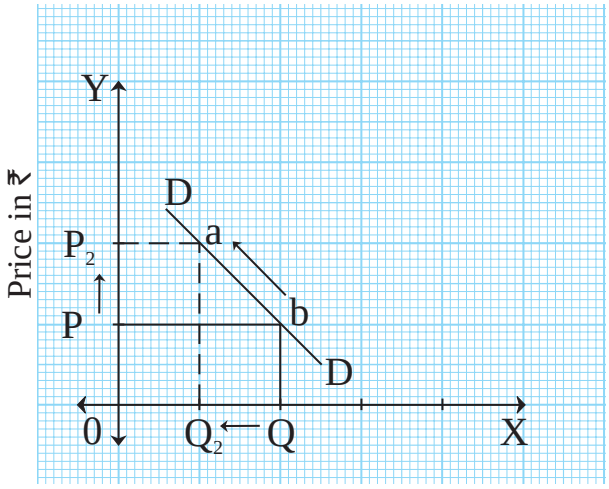
As shown in fig. 3.7, DD is demand curve. A downward movement on the same demand curve from point a to point b indicates an expansion of demand.

2) **Contraction of Demand :** Contraction of demand refers to a fall in demand due to rise in price alone. Other factors like tastes, income of the consumer, size of population etc. remain unchanged.

Demand curve moves in the upward direction on the same demand curve.

This can be explained with the help of following fig. 3.8

Contraction of Demand



Quantity Demanded in kgs

Fig. 3.8

As shown in fig. 3.8, DD is a demand curve. An upward movement on the same demand curve from point b to point a shows contraction of demand.

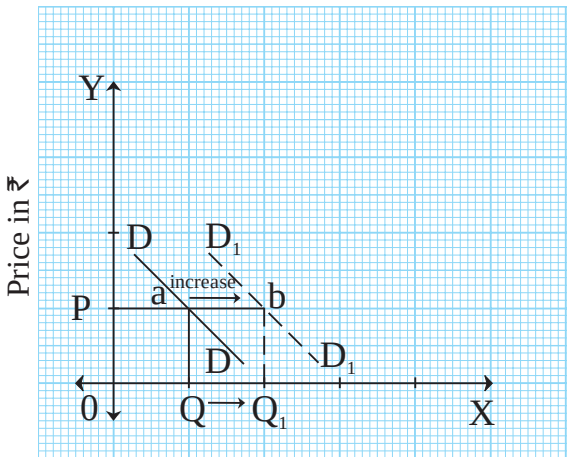
Changes in Demand :

When demand for a commodity increases or decreases due to changes in other factors and price remains constant, it is known as changes in demand. It is of two types :

1) **Increase in demand :** It refers to increase in quantity demanded due to favourable changes in other factors like tastes, income of the consumer, climatic conditions etc. and price remains constant.

Demand curve shifts to the right hand side of the original demand curve. This can be explained with the help of fig. 3.9

Increase in Demand



Quantity Demanded in kgs

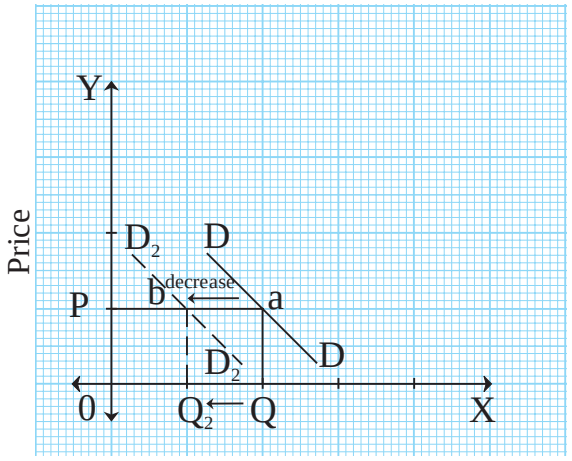
Fig. 3.9

As shown in fig. 3.9, DD is the original demand curve. Demand curve shifts outward to the right from DD to D_1D_1 which indicates increase in demand.

2) **Decrease in demand :** It refers to decrease in quantity demanded due to unfavourable changes in other factors like tastes, income of the consumer, climatic conditions etc. and price remains constant.

Demand curve shifts to left hand side of the original demand curve. This can be explained with the help of fig. 3.10

Decrease in Demand



Quantity Demanded

Fig. 3.10

As show in fig. 3.10, DD is the original demand curve. It shifts inward to the left from DD to D_2D_2 which indicates decrease in demand.

You should know :

1) Demand is a micro economic concept. Demand is that quantity of a commodity which a person is ready to buy at a particular price and during a specific period of time.

2) Aggregate demand is a macro economic concept. It refers to the total amount of sales proceeds which an entrepreneur actually expects from the sale of output produced at a given level of employment during the year.

EXERCISE

Q. 1. Complete the following statments :

1) The relationship between demand for a good and price of its substitute is……..
   a) direct
   b) inverse
   c) no effect
   d) can be direct and inverse

2) The relationship between income and demand for inferior goods is…….
   a) direct
   b) inverse
   c) no effect
   d) can be direct and inverse

3) Symbolically, the functional relationship between Demand and Price can be expressed as .....
   a) Dx = f(Px)
   b) Dx = f(Pz)
   c) Dx = f(y)
   d) Dx = f(T)

4) When less units are demanded at high price it shows .....
   a) increase in demand
   b) expansion of demand
   c) decrease in demand
   d) contraction in demand

Q. 2. Give economic terms :

1) A situation where more quantity is demanded at lower price ……
2) Graphical representation of demand schedule ……
3) A commodity which can be put to several uses ……
4) More quantity is demanded due to changes in the factors determining demand other than price ……
5) A desire which is backed by willingness to purchase and ability to pay ……

Q. 3. Distinguish between :

1) Desire and Demand
2) Expansion of demand and Contraction of demand
3) Increase in demand and Decrease in demand

Q. 4. State with reasons whether you agree or disagree with the following statements :

1) Demand curve slopes downward from left to right.
2) Price is the only determinant of demand.
3) When price of Giffen goods fall, the demand for it increases.

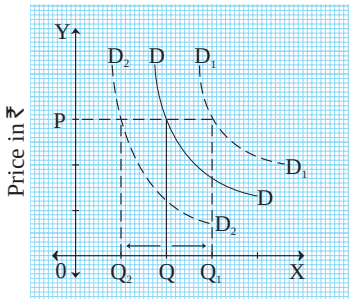
Q. 5. Observe the following table and answer the following questions :

Quantity demanded				
Price per kg. in ₹	**Con-sumer A**	**Con-sumer B**	**Con-sumer C**	**Market demand (in kgs) (A+B+C)**
25	16	15	12	
30	12	11	10	
35	10	09	08	
40	08	06	04	

a) Complete the market demand schedule.

b) Draw market demand carve based on above market demand schedule.

2) Observe the given diagram and answer the following questions :



Quantity Demanded in kgs

1) Rightward shift in demand curve .....

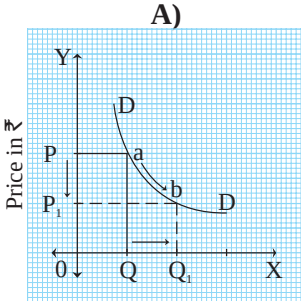
2) Leftward shift in demand curve .....

3) Price remains .....

4) Increase and decrease in demand comes under.....

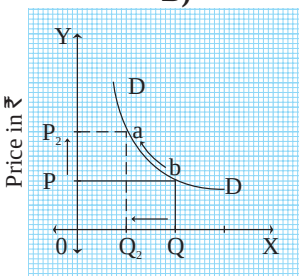
3) Explain the diagrams :

A)



Quantity Demanded in kgs

B)



Quantity Demanded in kgs

A)

1) Diagram A represents ..... in demand

2) In diagram A movement of demand curve is in ..... direction

B)

1) Diagram B represents ..... in demand

2) In diagram B movement of demand curve is in ..... direction

Q. 6. Answer in detail :

1) State and explain the law of demand with exceptions.

2) Explain in detail the determinants of demand.

❍❍❍

3B Elasticity of Demand

Introduction :

In the previous chapter you have already studied the law of demand which shows the inverse relationship between quantity demanded and price of a commodity. The law of demand does not explain the extent of a change in demand due to a change in the price. Thus, law of demand fails to explain the quantitative relationship between price and quantity demanded. Therefore, Prof. Alfred Marshall explained the concept of elasticity of demand.

Concept of Elasticity of Demand :

The term elasticity indicates responsiveness of one variable to a change in the other variable. Elasticity of demand refers to the degree of responsiveness of quanitity demanded to a change in its price or any other factor.

According to Prof. Marshall, "Elasticity of demand is great or small according to the amount demanded which rises much or little for a given fall in price and quantity demanded falls much or little for a given rise in price."

It is clear from the above definition that elasticity of demand is a technical term which describes the responsiveness of change in quantity demanded to fall or rise in its price. In other words, it is the ratio of percentage change in quantity demanded of a commodity to a percentage change in price.

Types of Elasticity of Demand :

1) Income elasticity
2) Cross elasticity
3) Price elasticity

1) Income elasticity : It refers to the degree of responsiveness of a change in quantity demanded to a change in the income only, other factors including price remain unchanged. It is expressed as :

$$Ey = \frac{\text{Percentage change in Qty. Demanded}}{\text{Percentage change in Income}}$$

Symbolically,

$$Ey = \frac{\% \triangle Q}{\% \triangle Y}$$

$$= \frac{\triangle Q}{Q} \div \frac{\triangle Y}{Y}$$

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

Where,

$\triangle$ = Represents change

Q = Orignal demand

Y = Orignal income

$\triangle Q$ = Change in quantity demanded

$\triangle Y$ = Change in income of a consumer

You should know :

- **Positive income elasticity**
  Normal goods for which demand increases with increase in income.
- **Negative income elasticity**
  Inferior or goods for which demand decreases with increase in income of consumer.
- **Zero income elasticity**
  Necessary goods for which demand remains constant with increase in income of the consumer.

2) Cross elasticity : It refers to a change in quantity demanded of one commodity due to a change in the price of other commodity. (Complementary goods or substitutes)

$$Ec = \frac{\text{Percentage change in Qty. demanded of A}}{\text{Percentage change in Price of B}}$$

(A = Original commodity, B = Other commodity)

Symbolically, $Ec = \frac{\% \triangle Q_A}{\% \triangle P_B}$

$= \frac{\triangle Q_A}{Q_A} \div \frac{\triangle P_B}{P_B}$

$= \frac{\triangle Q_A}{Q_A} \times \frac{P_B}{\triangle P_B}$

Where,

Q_A = Original quantity demanded of commodity A

$\triangle Q_A$ = Change in quantity demanded of commodity A

P_B = Original price of commodity B

$\triangle P_B$ = Change in price of commodity B

You should know :

- Positive cross elasticity : Substitute goods. Example, tea and coffee.
- Negative cross elasticity : Complementary goods. Example, tea and sugar.
- Zero cross elasticity : Non-related goods. Example, tea and books.

3) Price elasticity : According to Prof. Alfred Marshall, price elasticity of demand is a ratio of proportionate change in the quantity demanded of a commodity to a given proportionate change in its price.

$$Ed = \frac{\text{Percentage change in Quantity Demanded}}{\text{Percentage change in Price}}$$

Symbolically, $Ed = \frac{\% \triangle Q}{\% \triangle P}$,

$Ed = \frac{\triangle Q}{Q} \div \frac{\triangle P}{P}$

$Ed = \frac{\triangle Q}{Q} \times \frac{P}{\triangle P}$

Where,

Q = Original quantity demanded

$\triangle Q$ = Difference between the new quantity and original quantity demanded

P = Original price

$\triangle P$ = Difference between new price and original price

Types of Price Elasticity of Demand :

1) Perfectly Elastic Demand (Ed = ∞) :

When a slight or zero change in the price brings about an infinite change in the quantity demanded of that commodity, it is called perfectly elastic demand. It is only a theoretical concept. For example, 10% fall in price may lead to an infinite rise in demand.

$$Ed = \frac{\text{Percentage change in Quantity Demanded}}{\text{Percentage change in Price}} = \infty$$

Ed = ∞

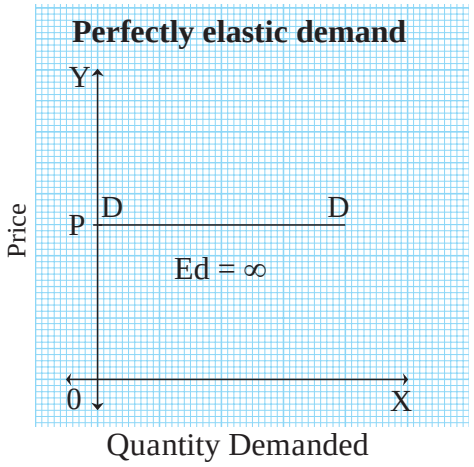


Fig. 3.11

In figure 3.11, the demand curve is a horizontal line parallel to the X axis indicating perfectly elastic demand.

2) Perfectly inelastic demand (Ed = 0) :

When a percentage change in price has no effect on the quantity demanded of a commodity it is called perfectly inelastic demand. For example, 20% fall in price will have no effect on quantity demanded.

$Ed = \frac{\% \triangle Q}{\% \triangle P}$

$Ed = \frac{0}{20} = 0$

Ed = 0

In practice, such a situation rarely occurs. For example, demand for salt, milk.

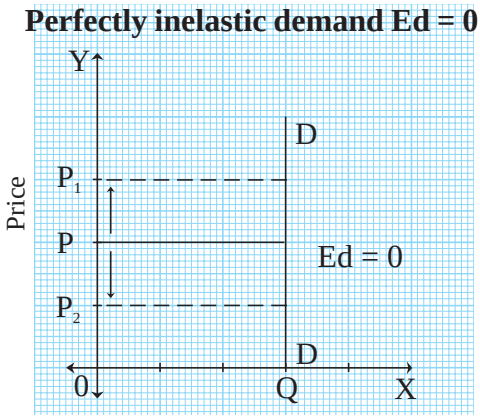


Fig. 3.12

In figure 3.12, when price rises from OP to OP_1 or when price falls from OP to OP_2, demand remains unchanged at OQ. Therefore, the demand curve is a vertical straight line parallel to the Y axis, indicating perfectly inelastic demand.

3) Unitary elastic demand (Ed = 1) :

When a percentage change in price leads to a proportionate change in quantity demanded then demand is said to be unitary elastic. For example, 50% fall in price of a commodity leads to 50% rise in quantity demanded.

$$Ed = \frac{\% \triangle Q}{\% \triangle P} = \frac{50}{50} = 1 \qquad \therefore Ed = 1$$

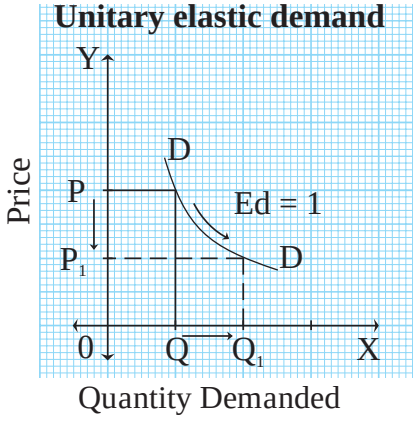


Fig. 3.13

In figure 3.13, when price falls from OP to OP_1 (50%), demand rises from OQ to OQ_1 (50%). Therefore, the slope of the demand curve is a 'rectangular hyperbola'.

4) Relatively elastic demand (Ed >1) :

When a percentage change in price leads to more than proportionate change in quantity demanded, the demand is said to be relatively elastic. For example, 50% fall in price leads to 100% rise in quantity demanded.

$$Ed = \frac{\% \triangle Q}{\% \triangle P}$$

$$Ed = \frac{100}{50} \qquad \therefore Ed = 2$$

$Ed > 1$

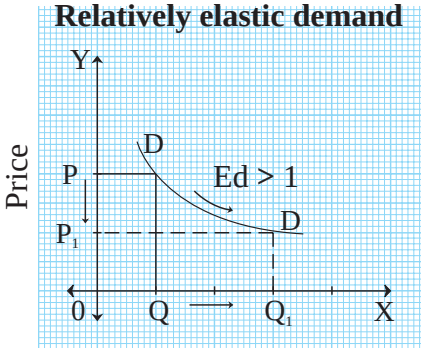


Fig. 3.14

In figure 3.14, when price falls from OP to OP_1 (50%), demand rises from OQ to OQ_1 (100%). Therefore, the demand curve has a flatter slope.

5) Relatively inelastic demand (Ed < 1) :

When a percentage change in price leads to less than proportionate change in the quantity demanded, demand is said to be relatively inelastic. For example, 50% fall in price leads to 25% rise in quantity demanded.

$$Ed = \frac{\% \triangle Q}{\% \triangle P} = \frac{25}{50} = 0.5$$

$Ed = 0.5 \qquad \therefore Ed < 1$

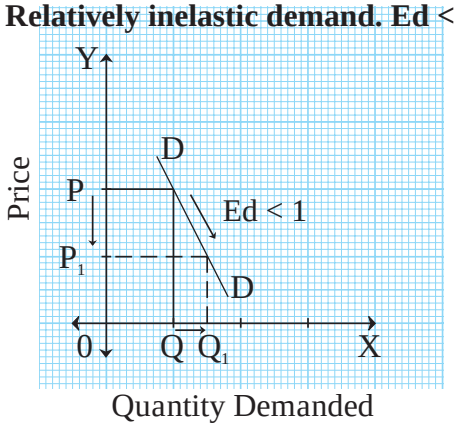


Fig. 3.15

In figure 3.15, when price falls from OP to OP_1 (50%), demand rises from OQ to OQ_1 (25%). Therefore, the demand curve has a steeper slope.

Find out :

Identify the type of price elasticity of demand for the following goods.

1) Cosmetics 2) Medicine

3) School uniform 4) Air conditioners

Try this :

Complete the table

Sr. No.	Degree of elasticity of demand	Types of elasticity of demand	Description Percentage
1		Perfectly inelastic	Change in price does not affect demand at all.
2	Ed = 1		Change in demand is equal to change in price
3	Ed > 1	Relatively elastic	
4		Relatively inelastic	Change in demand is less than change in price
5	Ed = ∞		Slight change in price brings infinite change in demand.

Methods of Measuring Price Elasticity of Demand :

1) **Ratio or Percentage method :** Ratio method is developed by Prof. Marshall. According to this method, elasticity of demand is measured by dividing the percentage change in demand by the percentage change in price. Percentage method is also known as Arithmetic method. Price elasticity is measured as :

$$Ed = \frac{\text{Percentage change in Quantity demanded}}{\text{Percentage change in Price}}$$

$$Ed = \frac{\% \triangle Q}{\% \triangle P}$$

Mathematically, the above formula can be presented as under.

$$Ed = \frac{\triangle Q}{Q} \div \frac{\triangle P}{P} \quad \therefore Ed = \frac{\triangle Q}{Q} \times \frac{P}{\triangle P}$$

Numerical example :

Price (₹)	Qty. Demanded (in Kg)	Formula
20 25	10 09	$Ed = \frac{\triangle Q}{Q} \times \frac{P}{\triangle P}$

Original Price, P = 20, New price P = 25

△P = 5 (Difference between new and original price)

Original Quantity Demanded, Q = 10, New demand = 9

△Q = 1 (Difference between new and original quantity demanded)

$$Ed = \frac{\triangle Q}{Q} \times \frac{P}{\triangle P}$$

$$Ed = \frac{1}{10} \times \frac{20}{5}$$

$$Ed = 0.4$$

$$Ed < 1$$

It means elasticity of demand is relatively inelastic.

Do you know?

While using percentage method of measuring price elasticity of demand we must keep following points in our mind :

1) Value of elasticity of demand is negative because of the negative slope of demand curve but for the sake of simplicity we ignore negative sign.

2) Price elasticity of demand is a pure number. It does not depend upon units in which price of the commodity and its quantity are measured.

2) Total Expenditure Method : This method was developed by Prof. Marshall. In this method, total amount of expenditure before and after the price change is compared.

Here the total expenditure refers to the product of price and quantity demanded.

Total expenditure = Price × Quantity demanded

In this connection, Marshall has given the following propositions :

A) Relatively elastic demand (Ed >1) :
When with a given change in the price of a commodity total outlay increases, elasticity of demand is greater than one.

B) Unitary elastic demand (Ed = 1) :
When price falls or rises, total outlay does not change or remains constant, elasticity of demand is equal to one.

C) Relatively inelastic demand (Ed <1) :
When with a given change in price of a commodity total outlay decreases, elasticity of demand is less than one.

This can be explained with the help of the following example.

Table 3.4 : Total outlay method

Price in ₹ (P)		Quantity demanded in units (Q)	Total outlay (P×Q) ₹	Elasticity of demand
A	10	6	60	Ed >1
	20	5	100	
B	30	4	120	Ed = 1
	40	3	120	
C	50	2	100	Ed <1
	60	1	60	

In table 3.4 in example 'A' original price is ₹ 10 per unit and quantity demanded is 6 units. Therefore, total expenditure incurred is ₹ 60. When price rises to ₹ 20 quantity demanded falls to 5 units, the total expenditure incurred is ₹ 100. In this case, total outlay is greater than original expenditure. Hence, in this example elasticity of demand is greater than one. (Ed >1) that is relatively elastic demand.

In example 'B', original price is ₹ 30 per unit and quantity demanded is 4 units. Therefore total expenditure is ₹ 120. When price rises to ₹ 40 quantity demanded falls to '3' units. Total expenditure incurred is ₹ 120. In this case total outlay is same (equal) to original expenditure. Hence, in this example, elasticity of demand is equal to one (Ed = 1) that is unitary elastic demand.

In example 'C', original price is ₹ 50 per unit and quantity demanded is 2 units. Therefore total expenditure is ₹ 100. When price rises to ₹ 60, quantity demand falls to 1 unit and total expenditure incurred is ₹ 60. In this case total outlay is less than original expenditure. Hence, elasticity of demand is less than one (Ed <1) that is relatively inelastic demand.

Find out :

As the price of peanut packets increases by 5% the demand for number of peanut packets falls by 8%. What is the elasticity of demand for peanut packets?

Apply the formula, $Ed = \frac{\% \triangle Q}{\% \triangle P}$

3) Point method or Geometric Method : Prof. Marshall has developed another method to measure elasticity of demand, which is known as point method or geometric method. The ratio method and total outlay methods are unable to measure elasticity of demand at a given point on the demand curve.

At any point on the demand curve, elasticity of demand is measured with the help of the following formula :

$$\text{Point elasticity of demand (Ed)} = \frac{\text{Lower segment of demand curve below a given point (L)}}{\text{Upper segment of demand curve above a given point (U)}}$$

Demand curve may be either linear or non-linear as shown below :

A) Linear Demand Curve : When the demand curve is linear i.e. a straight line, we extend the demand curve to meet the Y axis at 'A' and X axis at 'B'. Price elasticity of demand at 'X' axis is zero and 'Y' axis is infinite. Elasticity of demand will be different at each point.

Point method (Linear demand curve)

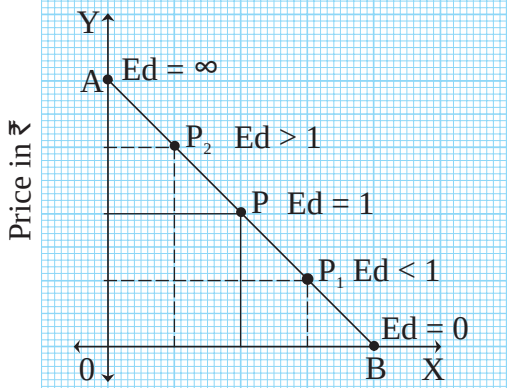


Fig. 3.16

Let us assume that AB is a demand curve and its length is 8 cm. Point elasticity at various points on a linear demand curve can be measured as follows :

1) At point P, the point elasticity is measured as :
$P = \frac{PB}{PA} = \frac{4}{4} = 1$
Thus, at point P, demand is unitary elastic (ed = 1)

2) At point P_1, the point elasticity is measured as :
$P_1 = \frac{P_1B}{P_1A} = \frac{2}{6} = 0.33$
Thus, at point P_1, demand is relatively inelastic (ed < 1)

3) At point P_2, the point elasticity is measured as :
$P_2 = \frac{P_2B}{P_2A} = \frac{6}{2} = 3$
Thus, at point P_2, demand is relatively elastic (ed > 1)

4) At point A, the point elasticity is ∞ because upper segment is zero. (perfectly elastic demand)

5) At point B, the point elasticity is zero because lower segment is zero (perfectly inelastic demand.)

B) Non-linear demand curve : When the demand curve is non-linear i.e. convex to origin, to measure price elasticity of demand we have to draw a tangent 'AB' touching the given point on the demand curve and extending it to meet 'Y' axis at point 'A' and 'X' axis at point 'B'.

$$Ed = \frac{\text{Lower segment of the tangent below a given point}}{\text{Upper segment of the tangent above a given point}} = \frac{L}{U}$$

Point method - Non-linear demand curve

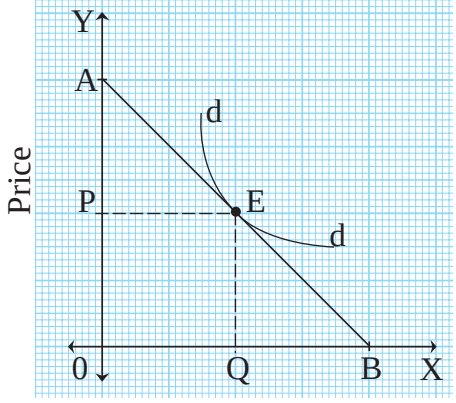


Fig. 3.17

If EB = EA (Ed = 1) - Unitary elastic demand

EB > EA (Ed >1) - Relatively elastic demand

EB < EA (Ed <1) - Relatively inelastic demand

Factors influencing the elasticity of demand :

Elasticity of demand depends upon several factors which are discussed below :

1) **Nature of commodity :** By nature we can classify commodities as necessaries, comforts and luxury goods. Demand for necessaries like foodgrains, medicines, textbooks etc. is relatively inelastic and for comforts and luxury goods like cars, perfumes, furniture etc. demand is relatively elastic.

2) **Availability of substitutes :** Demand for a commodity will be more elastic, if its close substitutes are available in the market. For example, lemon juice, sugarcane juice etc. But commodities having no close substitutes like salt the demand will be inelastic.

3) **Number of uses :** Single use goods have a less elastic demand. Multi-use goods have more elastic demand, For example, coal, electricity etc.

4) **Habits :** Habits make demand for certain goods relatively inelastic. For example, addicted goods, drugs etc.

5) **Durability :** The demand for durable goods is relatively elastic. For example, furniture, washing machine etc. Demand for perishable goods is inelastic. For example, milk, vegetables etc.

6) **Complementary goods :** The demand for a commodity which is used in conjunction with other commodities to satisfy a single want is relatively inelastic. For example, a fall in the price of mobile handsets may lead to rise in the demand for sim cards.

7) **Income of the consumer :** Demand for goods is usually inelastic, if the consumer has high income. The demand pattern of a very rich and an extremely poor person is rarely affected by significant changes in the price.

8) **Urgency of needs :** Goods which are urgently needed will have relatively inelastic demand. For example, medicines. Luxury goods which are less urgent have relatively elastic demand.

9) **Time period :** Elasticity of demand is always related to period of time. It varies with the length of time period. Generally speaking, longer the duration of period greater will be the elasticity of demand and vice-versa. This is because a consumer can change the consumption habits in the long run in favour of cheaper substitutes of the commodities.

You should know :

Determinants	Nature	Price elasticity of demand
1) Availability of factors	a) Abundant	a) Relatively elastic
	b) Few	b) Relatively inelastic
2) Nature of commodity	a) Necessary goods	a) Relatively inelastic
	b) Luxury goods	b) Relatively elastic
3) Habits	a) Habituated	a) Relatively inelastic
	b) Not Habituated	b) Relatively elastic
4) Time period	a) Short-run	a) Relatively inelastic
	b) Long-run	b) Relatively elastic
5) Postponement of consumption	a) Possibility of Postponement	a) Relatively elastic
	b) Impossible to Postpone	b) Relatively inelastic
6) Number of uses of a commodity	a) Several	a) Relatively elastic
	b) Specific	b) Relatively inelastic

Importance of Elasticity of Demand :

The concept of elasticity of demand is of great importance to producers, farmers, workers and the Government. Lord Keynes considered this concept to be the most important contribution of Alfred Marshall. Significance of the concept becomes clear from the following applications :

1) **Importance to a Producer :** Every producer has to decide the price of his product at which he has to sell it. For this purpose, elasticity of demand becomes important. If the demand for a product is relatively inelastic, he will fix up a higher price and vice-versa. The concept of elasticity of demand is also useful to a monopolist to practice price discrimination.

2) **Importance to Government :** Taxation policy of the Government is based on the concept of elasticity of demand. Those commodities whose demand is relatively inelastic will be taxed more because it will not affect their demand much and vice-versa.

3) **Important in Factor Pricing :** The concept of elasticity of demand is useful in determination of factor prices. The factor of production for which demand is relatively inelastic can command a higher price as compared to those having elastic demand. For example, workers can ask for higher wages, if the demand for the product produced by them is relatively inelastic.

4) **Importance in Foreign Trade :** The concept of elasticity of demand is useful to determine terms and conditions in foreign trade. The countries exporting commodities for which demand is relatively inelastic can raise their prices. For example, Organization of Petroleum Exporting Countries (OPEC) have increased the price of oil several times. The concept is also useful in formulating export and import policy of a country.

5) **Public Utilities :** In case of public utilities like railways which have an inelastic demand, Government can either subsidise or nationalise them to avoid consumers exploitation.

6) **Proportion of expenditure :** If the proportion of expenditure in a person's income is small, then demand for the product is relatively inelastic. For example, news papers. If the proportion of expenditure is large, then demand for the product is relatively elastic.

EXERCISE

Q. 1. Complete the following statements :

1) Price elasticity of demand on a linear demand curve at the X axis is .....

   a) zero b) one

   c) infinity d) less than one

2) Price elasticity of demand on a linear demand curve at the Y-axis is equal to .....

   a) zero b) one

   c) infinity d) greater than one

3) Demand curve is parallel to X axis, in case of .....

   a) perfectly elastic demand

   b) perfectly inelastic demand

   c) relatively elastic demand

   d) relatively inelastic demand

4) When percentage change in quantity demanded is more than the percentage change in price, the demand curve is .....

   a) flatter

   b) steeper

   c) rectangular

   d) horizontal

5) Ed = 0 in case of .....
   a) luxuries
   b) normal goods
   c) necessities
   d) comforts

Q. 2. Give economic terms :

1) Degree of responsiveness of quantity demanded to change in income only.
2) Degree of responsiveness of a change in quantity demanded of one commodity due to change in the price of another commodity.
3) Degree of responsiveness of a change of quantity demanded of a good to a change in its price.
4) Elasticity resulting from infinite change in quantity demanded.
5) Elasticity resulting from a proportionate change in quantity demanded due to a proportionate change in price.

Q. 3. Complete the correlation :

1) Perfectly elastic demand : Ed = ∞ :: [ ] : Ed = 0
2) Rectangular hyperbola : [ ] : Steeper demand curve : Relatively inelastic demand.
3) Straight line demand curve : Linear demand curve :: [ ] : non linear demand curve.
4) Pen and ink : [ ] :: Tea and Coffee: Substitutes.
5) Ratio method : Ed = $\frac{\%\triangle Q}{\%\triangle P}$ :: [ ] : Ed = $\frac{\text{Lower segment}}{\text{Upper segment}}$

Q. 4. Assertion and Reasoning type questions :

1) **Assertion (A) :** Elasticity of demand explains that one variable is influenced by another variable.

   Reasoning (R) : The concept of elasticity of demand indicates the effect of price and changes in other factors on demand.

Options : 1) (A) is True, but (R) is False
2) (A) is False, but (R) is True
3) Both (A) and (R) are True and (R) is the correct explanation of (A)
4) Both (A) and (R) are True and (R) is not the correct explanation of (A)

2) **Assertion (A) :** A change in quantity demanded of one commodity due to a change in the price of other commodity is cross elasticity.

   Reasoning (R) : Changes in consumers income leads to a change in the quantity demanded.

Options : 1) (A) is True, but (R) is False
2) (A) is False, but (R) is True
3) Both (A) and (R) are True and (R) is the correct explanation of (A)
4) Both (A) and (R) are True and (R) is not the correct explanation of (A)

3) **Assertion (A) :** Degree of price elasticity is less than one in case of relatively inelastic demand.

   Reasoning (R) : Change in demand is less then the change in price.

Options : 1) (A) is True, but (R) is False
2) (A) is False, but (R) is True
3) Both (A) and (R) are True and (R) is the correct explanation of (A)
4) Both (A) and (R) are True and (R) is not the correct explanation of (A)

Q. 5. Distinguish between :

1) Relatively elastic and Relatively inelastic demand.
2) Perfectly elastic demand and Perfectly inelastic demand.

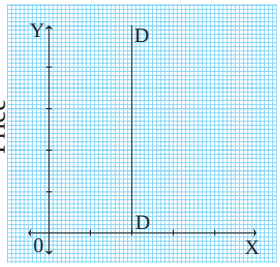
Q. 6. Answer the following questions :

1) Explain the factors influencing elasticity of demand.
2) Explain the total outlay method of measuring elasticity of demand?
3) Explain importance of elasticity of demand.

Q. 7. Observe the following figure and answer the questions :

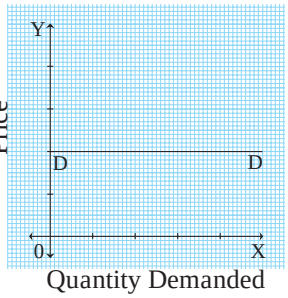
1) Identify and define the degrees of elasticity of demand from the following demand curves.

a)



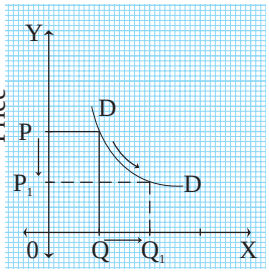
Quantity Demanded

b)



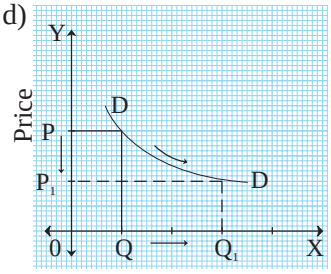
Quantity Demanded

c)



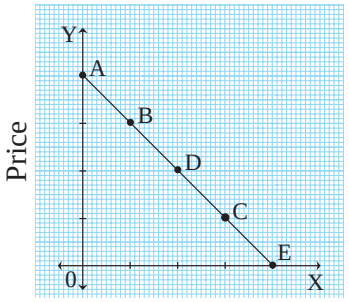
Quantity Demanded

d)



Quantity Demanded

2) In the following diagram AE is the linear demand curve of a commodity. On the basis of the given diagram state whether the following statements are True or False. Give reasons to your answer.



Quantity Demanded

1) Demand at point 'C' is relatively elastic demand.
2) Demand at point 'B' is unitary elastic demand.
3) Demand at point 'D' is perfectly inelastic demand.
4) Demand at point 'A' is perfectly elastic demand.

❍❍❍