assuming other factors

13 Price Elasticity of Demand : Meaning :*

Though the law of demand states that a fall in price is accompanied by extension of demand for a commodity and vice versa, *it does not tell us anything about the proportionate changes. In other words, the law of demand indicates only the direction of change in demand but not the rate of change in demand,* that is, it does not state the rate at which the demand will change as a result of change in price. For an example, a fall in the price of a commodity by 2 per cent may result in the extension of demand by 5 per cent or 1 per cent, i.e. the percentage change in demand may be more or less than the percentage change in price. The price elasticity of demand attempts to measure the relationship between the percentage change in price and percentage change in demand for a given commodity. It is a measure of the responsiveness of demand to a change in price.

$$\text{Thus, } E_d = \frac{\text{Percentage Change in Demand for X}}{\text{Percentage Change in Price of X}}$$

Symbolically, we may state it as under :

$$E_d = \frac{\bar{o}Q_x}{\bar{o}P_x}$$ Where $\bar{o}$ = Percentage change

Q_x = Quantity of X demanded

P_x = Price of X

If, price falls by, say 1% and quantity of X demanded rises by 20 % we have

$$E_d = \frac{\bar{o}Q_x}{\bar{o}P_x} = \frac{20\%}{-1\%} = -20$$

It may be noted that price elasticity of demand is negative since there is an inverse relationship between change in price of a commodity and change in its demand. It is for the sake of convenience that economists ignore the negative sign and generally use a positive figure. In the above

* What is price elasticity of demand ?

example, the elasticity is -20 but we refer to it as + 20. Besides the negative sign leads to a wrong conclusion. Suppose the price of goods A and B falls by 5 % and the demand for A expands by 10% and that of B by 15 %. Hence, E_d for A will be $\frac{10}{-5} = -2$ and for B = $\frac{15}{-5} = -3$. But – 3 is less than – 2 and not more. Therefore, demand for B is less elastic, which is wrong. Demand for B is actually more elastic.

14 Types of Price Elasticity of Demand :*

The degree of responsiveness of demand to a change in price of a commodity is not always the same. For different commodities it is bound to be different. It is, therefore, good to classify price elasticity in terms of degrees of responsiveness of demand to price changes. The economists speak of five different price elasticities of demand.

(I) Perfectly Elastic Demand or e = α : When an insignificant or extremely small change in price causes the extraordinarily large change in demand, we have the case of perfectly elastic demand. A slight rise in price reduces the demand to zero and a slight fall in price increases demand to infinity. The demand curve in such case is as depicted in Fig. 9.

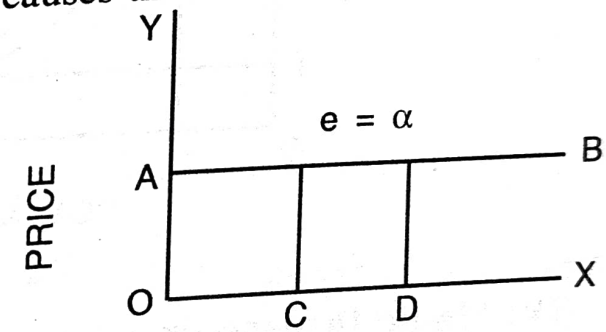


Fig. : 9

(II) Perfectly Inelastic Demand or e = 0 : When the demand for the commodity remains constant irrespective of the change in the price of the commodity, we have a case of perfectly inelastic demand. Here, the change in price fails to bring about any change in the demand for the commodity. Perfectly inelastic demand, like the perfectly elastic demand, is rare to come across in real life but both of these are useful theoretical concepts. When e is = 0 the demand curve of a commodity is drawn as in Fig. 10.

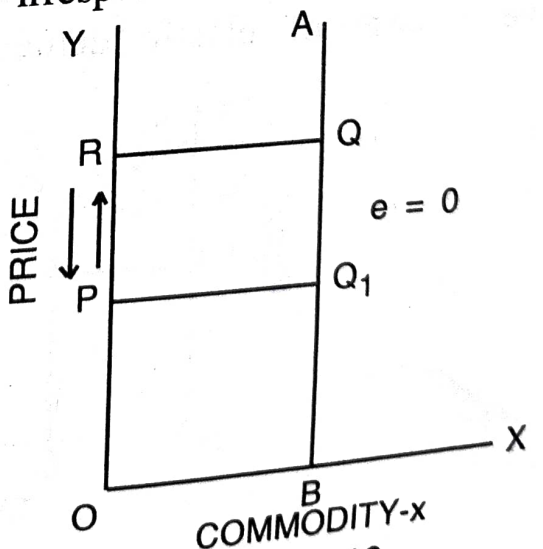


Fig. : 10

* Explain the types of price elasticity of demand with diagrams.

(III) Unitary Elastic Demand or e = 1 : When a given percentage change in the price of a commodity brings about the same percentage change in the demand for that commodity, the demand is unitary elastic or e = 1. Note that in such a case, the proportionate changes in price and the quantity demanded will be equal and opposite. A 5 % fall in the price will be accompanied by 5 % rise in demand. The total expenditure on the commodity purchased will, therefore, remain constant. The demand curve in such a case will be a rectangular hyperbola as depicted in Fig.11.

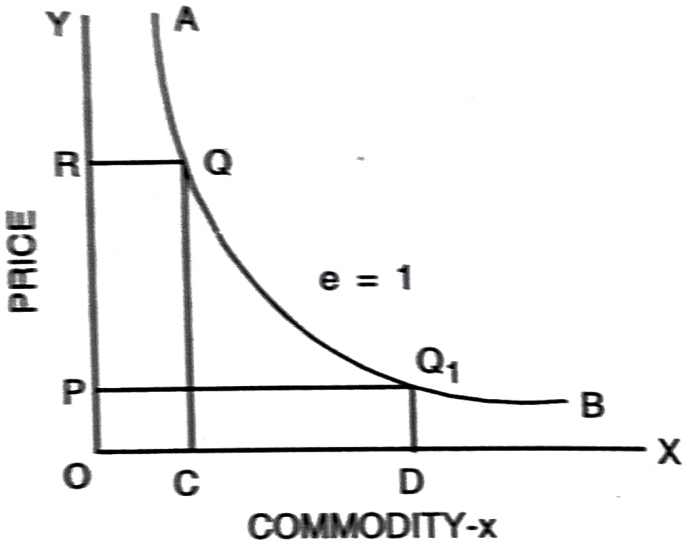


Fig. : 11

(IV) Elastic Demand or e > 1 : When a given percentage change in the price of a commodity causes more than proportionate change in the demand for the commodity; we have a case of elastic demand or e > 1. If, for example, price falls by, 2 % but demand rises by 3 %, we have a case of elastic demand. This is depicted in Fig. 12.

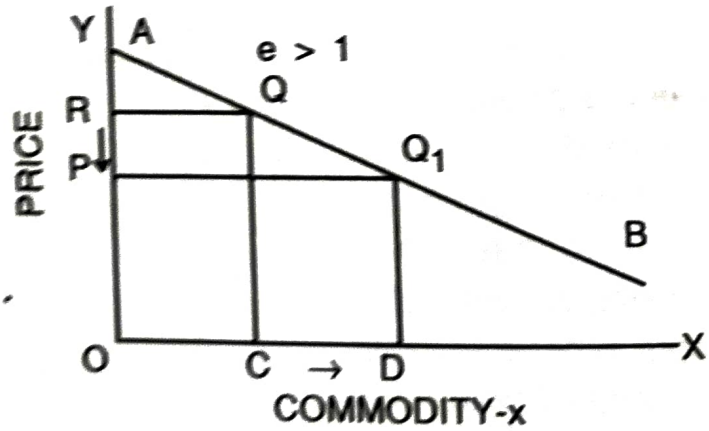


Fig. : 12

(V) Inelastic Demand or e < 1 : Demand is inelastic or e < 1 when a given percentage change in the price of commodity brings about less than proportionate change in the demand for it. Thus, a fall in the price of X by 2 % might raise the demand by only 1 %. This is a case of inelastic demand and is depicted in Fig. 13.

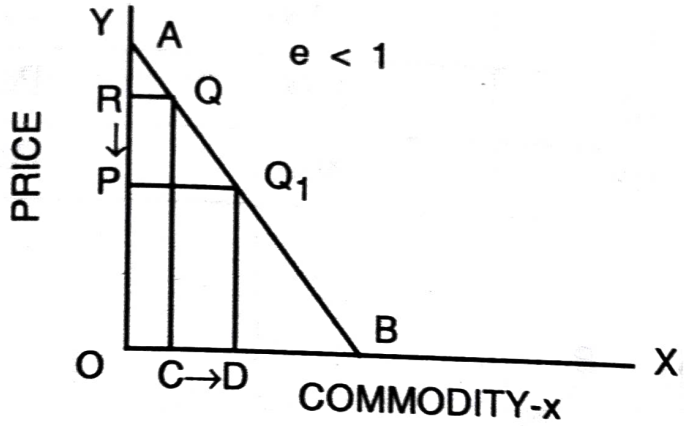


Fig. : 13

15. Methods of Measurement :

Price elasticity of demand is measured mainly by three methods. They are :

(a) Precentage Method, (b) Total Outlay (Expenditure) Method, and (c) Point Method. We shall examine each in turn.

(a) Percentage Method : This is the simplest method of measuring price elasticity of demand

$$Ed = \frac{\text{Percentage Change in Demand for X}}{\text{Percentage Change in Price of X}}$$

We can get any of the five figures in discending under as e = –e > 1, e = < 1 and e = 0. We have already discussd five types of price elasticities. The classification is based on the numerical values of price elasticities worked out on the basis of the percentage method.+

(b) Total Outlay Method : Prof. Marshall suggested change in the total outlay (expenditure) on the commodity caused by a change in the price as a criterion for measuring elasticity of demand. If the outlay on the commodity remains constant, irrespective of the change in the price of the commodity, demand is unitary; if it increases, demand is elastic and if it decreses, demand is inelastic. Exmaine the table below :

+ See poinr 13

Price of X	Demand for X	Total Outlay on X	Elasticity of Demand
10	100	1000	–
8	150	1200	Elastic
8	120	960	Inelastic
8	125	1000	Unitary elastic
8	400	3200	Perfectly elastic
8	100	800	Perfectly inelastic

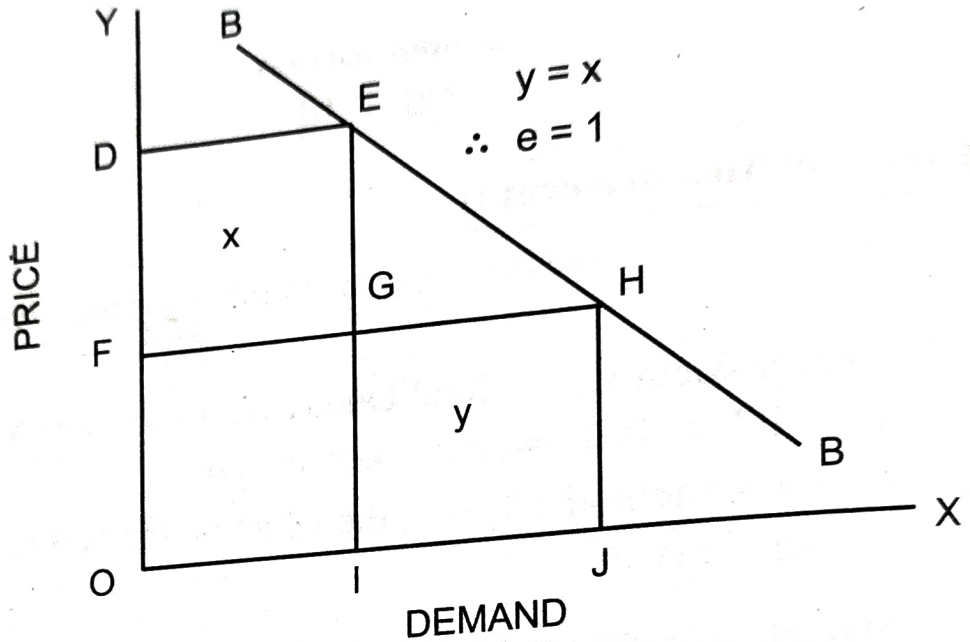


Fig. 14

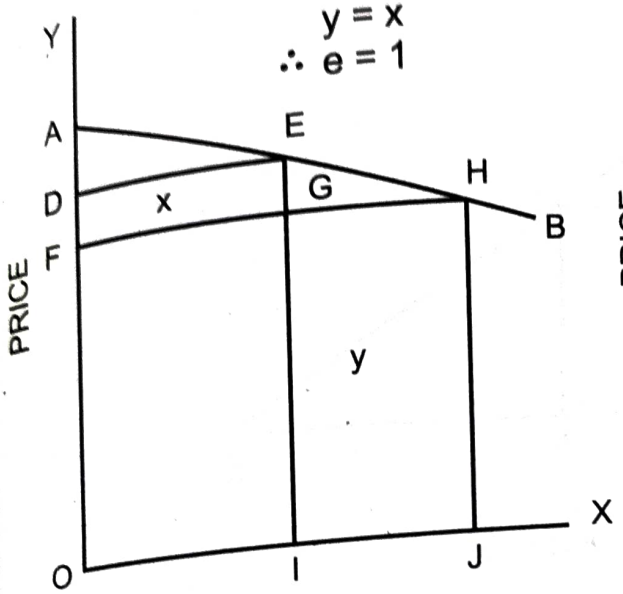
Y = X

∴ e = 1

The perfectly elastic demand curve and the perfectly inelastic demand curves are shown respectively in Fig. 1 and Fig. 2 above. Consider now Fig. 14, 15 and Fig. 16.

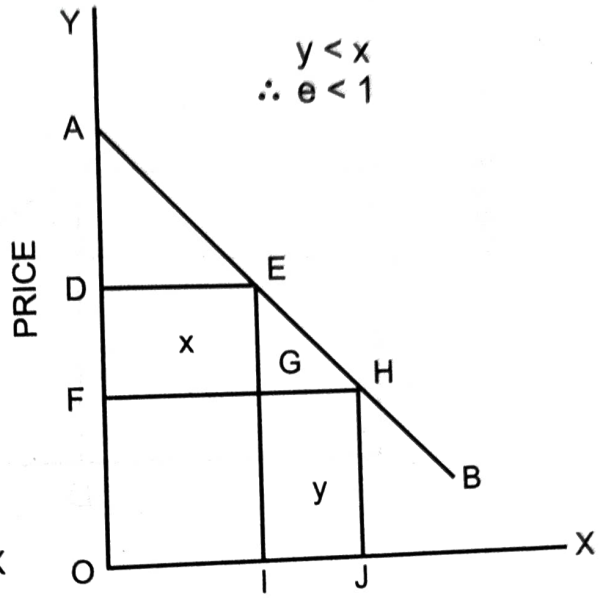
In Fig. 14, the change in price from E1 to HJ. changes the total outlay on the commodity from DEIO to FHJO. These two rectangles are equal and y = x. Thus, in Fig. 6, total outlay remains the same after the change in price. Hence, e = 1. But in Fig. 15, y > x. Therefore, e > 1 and in Fig.

15. $y < x$. So $e < 1$. The students are advised to work out why elasticity is greater than one in Fig. 15 and less than one in Fig. 16.



Demand

Fig. 15



Demand

Fig. 16

(c) Point Method : Price-elasticity of demand at different points on the the same demand curve is not the same. It would, therefore, be incorrect to say, as we did, that the demand is elastic or inelastic with reference to the whole demand curve. The concept of elasticity refers to a particular point on the demand curve rather than the entire demand curve. The point method of measuring elasticity of demand, therefore, attempts to measure numerical elasticity of demand at a paricular point on the given demand curve.

In Fig. 17. AB is the straightline demand curve and at CD price, demand is OD. When the price falls to EF, demand rises to OF. We attempts to find the elasticity of demand at C. For the sake of simplicity. We assume that points C and E are very close to each other. By this simplifying assumption, we can treat the price elasticity at C to be the same as that at E. (For Fig. 17)

16 Factors Affecting Price Elasticity of Demand* :

Price elasticity of demand is relative. A change in demand for a given commodity in response to a change in its price may differ from person to person. Although it is not possible to say exactly on the basis of the nature of the commodity as to whether the demand for a commodity is elastic or inelastic, some general indications can be given. In other words, we can say in general terms whether elasticity of demand for a given commodity is more than unity or less than unity, considering the nature of the commodity, level of its price and the economic status of the buyer. The following factors affect the price elasticity of demand :

(i) **Necessaries and Conventional Necessaries :** Demand for such commodities or services is largely fixed, or it changes less than proportionately to change in the price. Thus, we find that demand for food, salt, tea etc. is generally inelastic.

(ii) **Luxuries :** By contrast, the demand for luxuries (like washing machine, television, refrigerators etc.) is elastic. A slight fall in price may induce more than proportionate increase in demand. It may be noted that luxury is a relative term and we, cannot therefore, generalise. What may be a luxury for one may be a necessity for other, e.g. very costly saries is a luxury for a household woman but a necessity for a film actress.

(iii) **Substitute Goods :** The demand for a commodity which has substitutes is generally elastic. For an example, if the price of coffee falls relatively to tea, the demand for coffee will rise more than proportionately. The consumers who formerly were taking tea may turn to coffee. Here, too, the degree of substitution is a relevant factor. That substitute goods have elastic demand is merely a general statement. Tea and coffee may not be close substitutes for many.

(iv) **Goods with Several Uses :** If a particular commodity or service has many uses, the demand for it is said to be elastic. Take the case of coal or electricity. Electricity can be used for light, cooking, ironing and many other domestic and industrial purposes. A fall in price will increase demand for such goods for hitherto neglected purposes. Hence, demand for such goods is thought to be elastic.

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* Explain : The factor affecting price elasticity of demand.

(v) Durable Goods : Demand for goods which are serviceable over a period of time is elastic. These goods are durable consumption goods like fountain pens, shoes, T.V. etc. If the price of shoes goes up, it is likely that consumers will postpone their purchases of new pairs for quite sometime. The demand will thus be adversely affected. In case of furniture or buildings also, the demand can be postponed and, therefore, it is elastic.

(vi) Level of Prices : The demand for goods whose prices are either very high or very low is inelastic. Generally, very high-priced goods are purchased by the rich and their demand is inelastic. They do not worry over price. Similarly, the very low-priced goods are generally necessaries and hence the demand for them is inelastic. Hence, they have got to be purchased at any cost.

(vii) Time-interval : Generally speaking, elasticity of demand is lower in the short period than in the long period. This is because, the consumers have no time or very little time in adjusting their demand to change in prices. In the long run, however, as they get adequate time for adjustments, elasticity of demand is generally high.

(viii) Postponement : Commodities whose consumption can be postponed tend to have a more elastic demand than those whose consumption cannot be postponed.

(ix) Force of Habits : Likewise, commodities to which people are habituated to consume have a less elastic demand, because irrespective of price changes, they will purchase that commodity because of force of habits.

(x) Proportion of Consumer's total Expenditure on the Commodity : Demand for goods like salt, ink, newspaper etc. is inelastic because they absorb a very small portion of total monthly expenditure of the consumer. On the other hand, demand for goods like cosmetics and recreation etc. is elastic, because they account for substantial portion of total monthly expenditure of the consumer. Thus price elasticity of demand for a commodity depends on its importance in consumer's budget also.

17 Income Elasticity of Demand : Meaning * :

Demand for a commodity is a function of many variables of which price is one. Among other variables influencing demand income of the potential buyer is very important. The income elasticity of demand shows how the quantity demanded will change in response to a given change in the income of the prospective buyer, all other factors including price remaining constant. It expresses relationship between percentage change in income and the corresponding percentage change in demand for the commodity.

$$\text{Thus, } e_y = \frac{\text{Proprotionate (Percentage) Change in Demand}}{\text{Proportionate (Percentage) Change in Income}}$$

Normally, demand for a commodity has a tendency to increase as income increases. Therefore, income elasticity of demand (e_y) is generally positive. But, this may not be so in case of inferior goods. The demand for "inferior" goods diminishes as the income of the consumer rises because he turns to other goods which he considers to be 'superior'. In such 'exceptional' cases the income elasticity of demand may be 'negative'.

18 Types of Income Elasticity of Demand :*

(a) $e_y > 1$: When the proportionate change in demand is greater than proportionate change in income, income elasticity is more than unity (elastic).

(b) $e_y < 1$: When the proportionate change in demand is less than proportionate change in income, elasticity is less than unity (inelastic).

(c) $e_y = 1$: When the proportionate change in demand is equal to the proportionate change in income, income elasticity is equal to unity.

(d) $e_y = 0$: When there is no change whatsover in demand in response to change in income, income elasticity is zero (perfectly inelastic).

(e) e_y is negative : When an increase in income of the prospective buyer brings about reduction in demand for the commodity income elasticity is negative.

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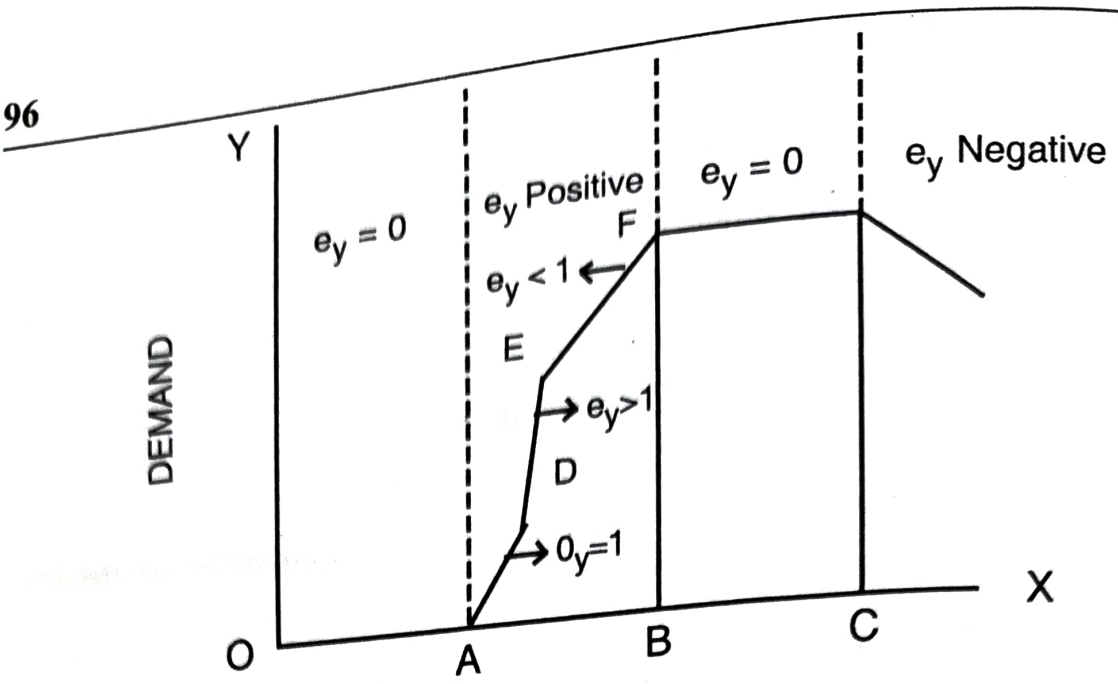
* What is Income elasticity of demand
* Explain types of Income Elasticity.



INCOME

(Fig : 23)

In Fig. 23, in the income range OA, $e_y = 0$; in the income range AB, e_y is positive; in the income range BC again $e_y = 0$ and beyond the income range OC, e_y is negative. It may be seen in the diagram that upto income level OA, demand is zero and increase in income does not make any impact on demand. As the income increases beyond OA and upto OB, demand rises as income rises. Note that income elasticity is not the same, although it is positive. It may be more than one, less than one or equal to one according as the demand responds to a change in income. Between OB and OC, elasticity is zero once again and thereafter, it becomes negative. In other words, beyond OC level of income the commodity in question becomes an 'inferior' goods.

We may, thus, make the following observations from a study of the income elasticity of demand :

Income elasticity of demand is :

(i) positive for normal goods
(ii) negative for inferior goods
(iii) more than unity for luxurious and semi-luxurious goods.
(iv) less than unity for necessaries
(v) may be zero for such articles as salt, thread and needle etc.

19. Factors Affecting Income Elasticity of Demand :

(I) The main factor influencing income elasticity of demand is the **level of income** itself. At very high level of income, elasticity is likely to be low. As **Lipsey** has pointed out, an initial increase in the income of a poor family is more likely to be spent than saved. Thus, the demand for certain essentials will increase more than proportionately with the increase in the income of a poor household. But, as income goes on increasing, the elasticity which is positive will go on diminishing. It may become zero and even negative at a very high level of income.

(II) Generally, the income elasticity of demand for **luxuries** viz jewellery, cars, refrigerators etc. is high; whereas the same for low-priced **necessaries** like salt, matches or cheap food is likely to be low.

(III) If a very **small portion** of the income of the family is spent on the given commodity, the income elasticity of demand for it would be low. Conversely, income elasticity of demand for the commodities on which a **significant portion** of the family's income is spent would tend to be high.

(IV) In cases, where such commodities happened to be **'inferior goods'** for the family, the income elasticity may turn out to be 'negative'.

20. Meaning of Cross Elasticity of Demand :

Demand for a commodity is influenced not only by its own price but by the prices of the related goods also. Thus, demand for tea depends on the price of coffee also. The cross elasticity of demand expresses a relationship between the change in the demand for a given commodity in response to the change in the price of some other commodity.

$$E_c = \frac{\text{Proportionate change in the Demand for X}}{\text{Proportionate change in the Price of Y}}$$

Thus, E_c is a measure of the change in demand for X resulting from the change in price of Y.

In terms of symbols,

$$E_c \text{ of } X = \frac{\Delta Dx}{Dx} \div \frac{\Delta Py}{Py}$$

Where, D_x = original demand for X

ΔD_x = change in demand for X

Give the meaning and types of Corss Elasticity of Demand.

P_y = original price of Y

ΔP_x = change in price of Y.

21. Types of Cross Elasticity of Demand :

The cross elasticity of demand is positive or negative according as the two commodities being considered are substitutes or complements of each other.

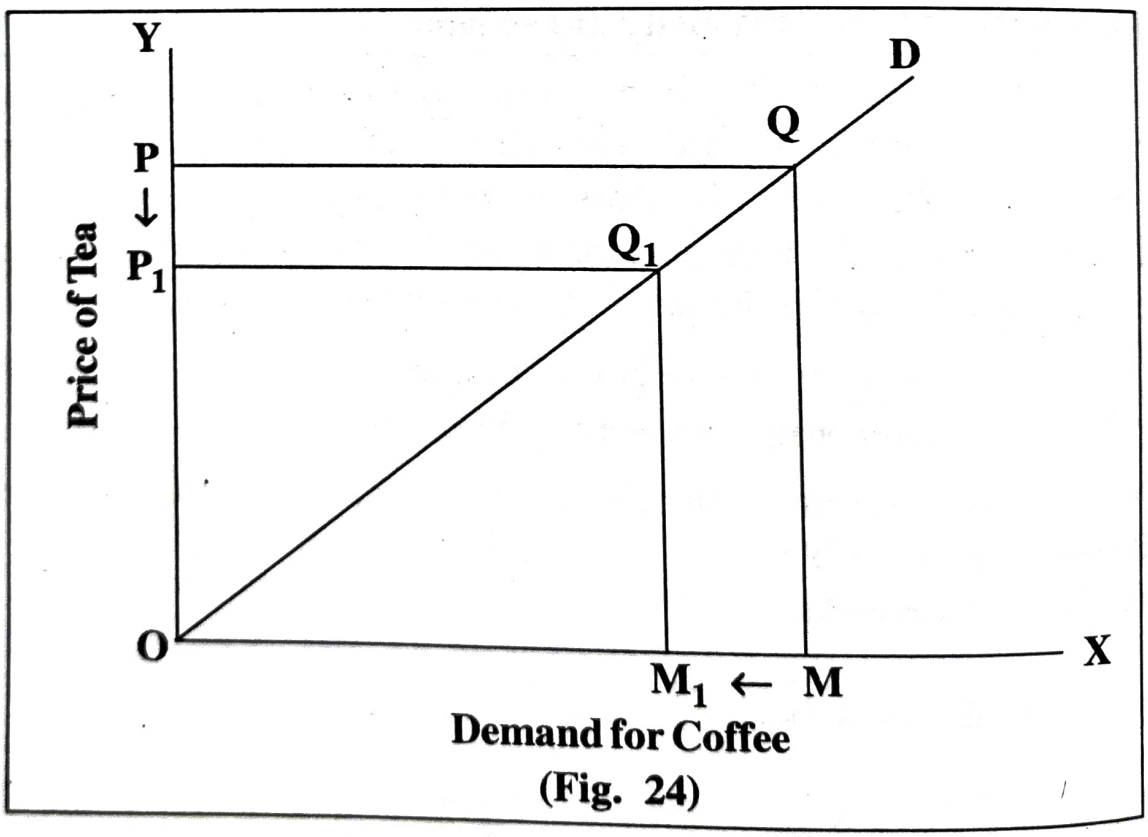
(A) Possitive Cross Elasticity :

Take the case of tea and coffee which we may consider as substitutes. If the price of tea falls (as per the law of demand) demand for tea rises. But the demand for tea would rise at the cost of coffee. Therefore, the demand for coffee would fall in response to a fall in the price of tea. We can put it as follows :

$$E_c = \frac{\text{Proportionate change in the Demand for Coffee}}{\text{Proportionate change in the Price of Tea}}$$

In this case, E_c is **positive** because a fall in price of tea is followed by a fall in demand for coffee. See figure-24.

See the figure below :



(Fig. 24)

It is shown in Fig : 24 that when price of tea falls from p or P_1, demand for coffee decreases from M to M_1. Both changes are negative.

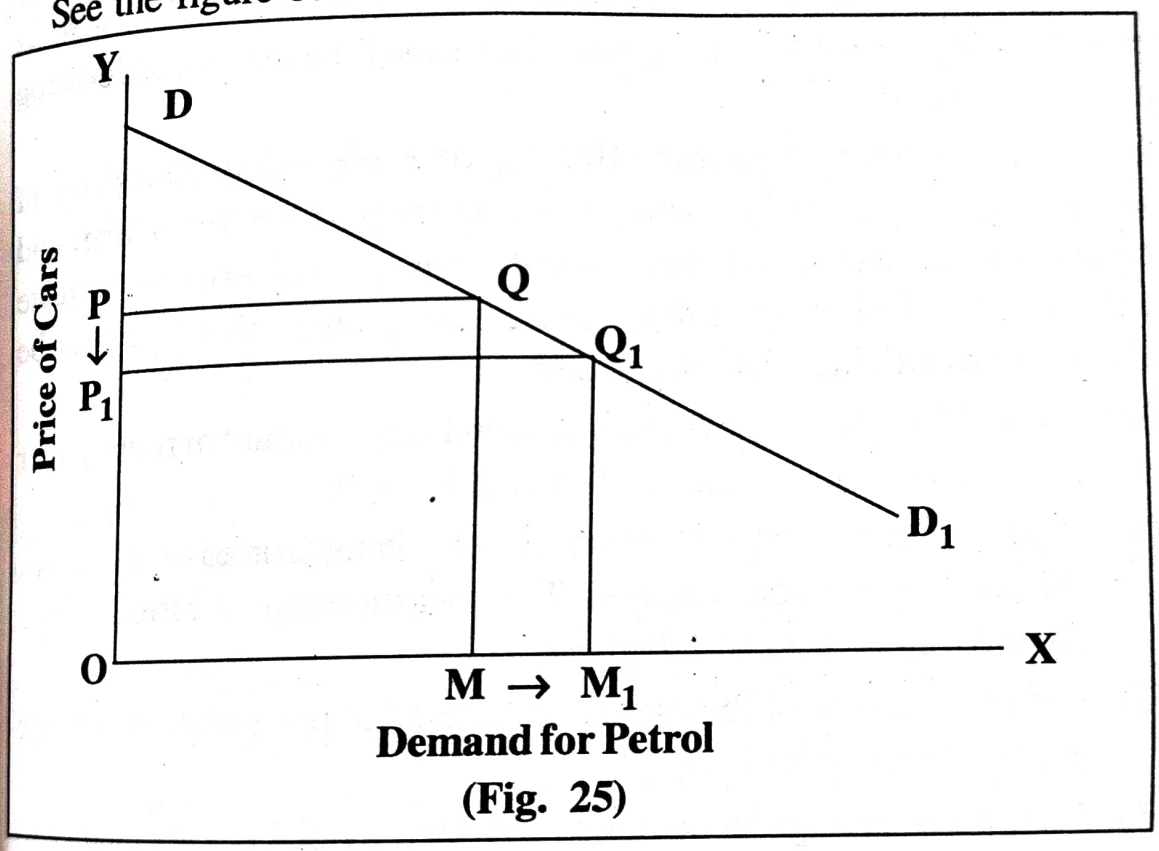
(B) Negative Cross Elasticity :

Similarly for two complementary commodities cross elasticity of demand will be negative, e.g. petrol & car.

$$E_c = \frac{\text{Proportionate change demand for Petrol}}{\text{Proportionate change in price of Car}}$$

In this case, a fall in the price of car raises the demand for car. Petrol being a **complement** of car, the demand for petrol also rises. The cross elasticity of demand is therefore negative.

See the figure below :



Demand for Petrol

(Fig. 25)

It is shown in Fig. 25 that when price of cars falls from P to P_1, demand for petrol increases from M to M_1 price change is negative whereas change in demand is positive.

In short :

(i) When two products are substitutes to each other, cross elasticity of demand is **positive.**

(ii) When two products are complementary products, cross elasticity of demand is **negative.**

iii) When two products are neither substitutes nor complementary, cross elasticity of demand is **zero.**

22 Advertising Elasticity of Demand :

It is the measure of the change in demand to proportionate change in advertising expenditure. The formula used to measure advertising elasticity of demand is as follows :

Formula :

$$\frac{Q_2 - Q_1}{Q_2 + Q_1} \div \frac{A_2 - A_1}{A_2 + A_1} = Ea$$

Where, Q refers to sales and A refers to advertising expenditure. $Q_2 - Q_1 \div Q_2 + Q_1$ is proportionate change in sales, while $A_2 - A_1 \div A_2 + A_1$ is proportionate change in advertising expenditure and Ea stands for advertising elasticity of demand.

Meaning Types and Factor affecting of Advertising Elasticity of Demand : Morden time is a competitive strategic time for a firm and advertising has a great significance role in it. Purpose of advertising to create or increase demand. How much demand increase through advertising can be measured by advertising elasticity of demand ?

Meaning : In modern times producer spend huge amount of money after advertisement and wants to increase thier market sell.

(1) If all other factor remain constant, due to changes on advertisements, the demand of goods changes. This measurement or ratio is called advertising elasticity of demand.

(2) It is the measure of the change in demand to proportionate change in adverting expenditure.

(3) Percentage change in demand is divided by percentage change in advertisement cost is known as advertisement elasticity of demand.

(4) Is a measure of a market's sensitivity to increase or decrease in advertising saturation ? AED is a measure of an advertising campaign's effectiveness in generating new sales.

• Advertisment Elasticity of Demand :

$$\frac{\text{Percentage change in quantity}}{\text{Percentage change in advertisment cost}}$$

* What is Advertising Elasticity of Demand ? Explain its types and factors affecting it.

- Advertising elasticity of demand is a measure of a market's sensitivity to increase or decrease in advertising situation. Advertising elasticity is a measure of an advertising campaign's effectiveness in generating new sales it is calculated by dividing the percentage change in the quantity demanded by the percentage change in advertising expenditure. A positive advertising elasticity indicate that in increase in advertising leadas to a rise in demand for the advertised goods or services.
- Types of Advertising Elasticity of Demand :

Value of Elasticity	Types	Meaning
$E_A > 1$	Elastic	% change in demand / sales is higher than the % change in advertisement expenditure.
$E_A = 1$	Unitary	Both are equal
$E_A < 1$	Inelastic	% change in demand/sales is lower than % change in advertisement expenditure.

- **Examples :** Suppose, the advertisement expenditure of an organization increase from Rs. 25,000 to Rs. 60,000 consequently the demand of organization's products.
- Solution : $\Delta D = 70,000 - 4,00,000 = 30,000$ units

  ΔA = Rs. 60,000 – Rs. 25,000 = Rs. 35,000
- The formula for calculating the advertisement elasticity of demand is $E_A = (\Delta D / \Delta A) \times (\Delta / A)$
- Substituting the value in the formula

  $E_A = (3,00,000 / 35,000) \times (40,000 / 25,000)$

  = 1.2 (greater than one)
- **Factor Affecting Advertisement Elasticity of Demand**

  (1) Income of the people of the economy of demand

  (2) Price of the product

  (3) Quality appeal of the advertisement

  (4) Timing of the promotional activities

  (5) Product stage (New old)

  (6) Promotional activities of the competitors.

(7) Nature of the product (Consumer durable, immediate responses goods)

- **Importance :**

(1) Firm can focus on the promotional activity.

(2) Positivive relation between advertisement expenditure and demand of goods.

(3) It is necessary to survive in the competition.

- It shows how successful a 1% rise in advertising spend is on raising sales in a specific sector when all other factors are the same.

23 Factors Influencing Advertising Elasticity of Demand :

Sales change with advertising expenditure. But sales of different goods change differently to the same amount of advertising expenditure. Some products are more responsive to advertising, for an example, cosmetics, while some products are less responsive to advertising, for an example, necessities. This means that advertising elasticity of demand differs between products. What is more important, advertising elasticity of demand is different also between different levels of sales of the same product. Hence, it is essential to know what are the factors influencing advertising elasticity of demand for goods. The main factors are as follows :

(1) Stage of Product Market : One of the factors affecting advertising elasticity of demand is the stage of product market. For an example, advertising elasticity of demand tends to be low for a new product as compared to an old product. Similarly, advertising elasticity of demand is low for a product if its market is saturated, while it is high for a product if its market is growing.

(2) Time Element : The response of sales to advertising is a matter of time. Generally, sales do not react immediately to advertising expenditure. There is a time lag between an increase in advertising expenditure and resultant increase in sales. The degree of time lag depends on various factors, one of them being type of product. For an example, in case of durable goods, the effect of advertisement on sales is much more delayed, because the buyers will go for purchase only after the existing articles are fully used up. Secondly, the degree of time lag depend, also on the economic environment. The effect will be more delayed when the economy is in the grip of depression

and unemployment. The degree of time lag depends to some extent on the media chosen also, because some media such as T. V. are more effective than others such as advertisement in newspapers. It follows that advertising elasticity of demand is different for different products because of the difference in time lag of response of their sales to advertising.

(3) **Advertising by Rivals :** The effect of advertising on sales of the product of a firm depends also on the reaction of rival firms in the market. The effect will be stronger if the rival firms do not react at all. But the effect will be less powerful if rival firms also resort to advertising to defend their products. The type of media used by the rivals and also the level of their advertising will to a large extent determine how much additional output the initiating firm will be able to sell through advertisement.

(4) **Market Structure :** In monopolistic competition, the number of firms is so large that an individual firm's actions have an insignificant impact on the sales of the rival products. Therefore, rival firms may not react to advertising campaign of a firm. Hence, advertising results into a larger increase in sales. On the other hand there is a strong interdependence among firms in oligopoly market. Hence, an oligopolist must expect a noticeable impact of its advertising on the sales of the products of rival firms. The rival firms react to its advertising reducing advertising elasticity of demand for its product.

(i) ... goods (ii) Derived demand.*(Oct., 2013)*

13. Explain the law of demand. Discuss its exceptions. *(Oct., 2015)*

Short Questions with Answers

Q. 1 What is demand function ?

(Oct., 2006, 2007, April, 2008)

Ans.: Demand function states the functional relationship between the demand for a product and various factors affecting it. In terms of equation, it is expressed as follows :

$$Dx = f(Px, Pr, I, T, U).$$

In which, Dx = Demand for commodity x

f = functional relation.

P_x = Price of x

P_r = Prices of related goods.

I = Consumers' income.

by the capacity and willingness of the people to pay for it.

Q. 3 What is price elasticity of demand ?

Ans.: Price-elasticity of demand attempts to measure the relationship between price and demand for the given commodity. It is a measure of the responsiveness of demand to a change in price. Thus,

$$Ed = \frac{\text{PercentageChange in Demand for X}}{\text{PercentageChange in Price of X}}$$

Symbolically, we may state it as under :

$$E_d = \frac{\Delta Q_x}{\Delta P_x}$$ Where, Δ = Percentage change

Q_X = Quantity of X demanded

Px = Price of X

If, price falls by 1% and quantity of X demanded rises by 20 per cent we have

$$Ed = \frac{\Delta Q_x}{\Delta P_x} = \frac{20\,\%}{-1\,\%} = -20$$

wrong. ... equally more elastic. ...

Point out the types of income elasticity of demand.

Q. 4

Ans.: The income-elasticity of demand expresses relationship between percentage change in income and the corresponding percentage change in demand for the commodity.

$$\text{Thus, } Ey = \frac{\text{Proportionate (Percentage) Change in Demand}}{\text{Proportionate (Percentage) Change in Income.}}$$

(1) $e_y > 1$: When the proportionate change in demand as greater than proportionate change in income, income-elasticity is more than unity (elastic).

(2) $e_y < 1$: When the proportionate change in demand is less than proportionate change in income, income-elasticity is less than unity (inelastic).

(3) $e_y = 1$: When the proportionate change in demand is equal to the proporationate change in income, income-elasticity is equal to unity.

(4) $e_y = 0$: When there is no change whatsoever in demand in response to change in income, income elasticity is zero (perfectly inelastic).

(5) e_y is negative : When an increase in income of the prospective buyer brings about reduction in demand for the commodity, income-elasticity is negative.

$= \frac{16}{16} \times \frac{2}{2}$

$= 1$

Q. 6 **Demand for a commodity is 500 units when a consumer's income is Rs. 10,000. Demand increases to 750 units when income increases to Rs. 12,500. Find out income elasticity of demand. State also the type of commodity in question.**

Ans.: Income elasticity of demand in this case is 2.

$$\frac{\frac{\Delta D}{D}}{\frac{\Delta Y}{Y}}$$

$$= \frac{250}{500} \div \frac{2500}{10,000}$$

$$= \frac{25}{50} \div \frac{100}{25}$$

$$= \frac{25}{50} \times \frac{100}{25}$$

$$= \frac{100}{50}$$

$$= 2$$

Since income elasticity of demand is greater than unity, this commodity must be a luxury.

Q. 7 **State the four methods of measuring price elasticity of demand.** ***(Oct., 2012)***

Ans.: The methods of measuring price elasticity of demand are as follows :

(i) Percentage change method
(ii) Total outlay method
(iii) Point elasticity method
(iv) Arc elasticity method.

1 Meaning of Demand Forecasting* :

Demand forecasting occupies a very important place in business planning. Knowing the demand for its product is a significant activity of the firm. The firm must know as to what will be the current demand – say over a month or a half year or a year – for its product so as to avoid over production or under production. This will enable a firm to formulate its pricing and promotional policy. Such information about the current demand for a firm's product is known as demand estimation.

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* What is demand forecasting ? *(April, 2004)*

[NB \ REGEDIT]

influence future sales forecast. It should be noted that a firm undertakes forecasts.

4 Factors to be Taken into Account while Forecasting Demand :

The following factors should be taken into consideration while forecasting the demand of a product :

(i) Time Period : It is necessary to be clear about the time period of demand forecasting, that is, whether it is for a short period or for a long period. Short term demand forecasting is made within the limits of the existing available resources, while long term demand forecasting involves planning for additional resources – human and financial.

(ii) Level of Demand Forecasting : Demand forecasting generally may be undertaken at three different levels :

(a) Macro level demand forecasting is concerned with the overall business conditions prevailing in the economy as a whole and is measured by trends in national income, expenditure, savings, investment, industrial production etc.

(b) Industry level demand forecasting which is prepared by different industry and trade associations. Macro level forecasts help considerably, the forecasts for products of different industries.

(c) Firm level demand forecasting : Firm level demand forecasting is important from business and managerial point of view. We are more concerned with firm level demand forecasting, which is immensely aided by industry level forecasts.

(iii) Nature of Demand Forecast : The firm should be clear whether it is interested in general forecasting or specific forecasting. In general forecasting, 'demand' is accepted as a general concept, while specific forecasting involves forecasting the demand for a specific product.

(iv) Nature of the Product : We have to be clear, whether demand forecasting is to be made for the established product or for a new product. The problems and methods of demand forecasting are different for old and established products and new products.

Likewise, it is also important to classify products into producers' goods, consumers' goods and further into producers' durables and non-durables, consumers's durables and also non-durable. While machine is a producer durable oil for lubricating machine is a producer non-durable. Shoes is a case consumer durable and sugar is an example of consumer non-durable.

(v) Nature of Competition : It is also necessary to have a clear idea about the nature and extent of competition in the market.

(vi) Selection of Appropriate Method : Selection of an appropriate method of demand forecasting is an equally important task. This may be done after taking into account the nature of the product, available information regarding the demand for the producer.

(vii) Interpretation of the Results Obtained : It is also necessary to interpret correctly and accurately the results obtained through demand forecasting.

5 Objectives of Demand Forecasting :

The purposes of demand forecasting can be studied under two heads :

(A) Short term demand forecasting.

(B) Long term demand forecasting.

(A) Objectives of Short term Demand Forecasting :

(i) To formulate appropriate production policy so as avoid over production or under production.

(ii) To reduce the cost of raw materials and control inventories.

(iii) To determine appropriate price policy and fix sales targets.

(iv) To arrange for short-term financial requirements.

(B) Objectives of Long term Demand Forecasting :*

(i) To plan for a new unit or expansion of the existing unit.

(ii) To plan for product diversification.

(iii) To arrange for long-term financial requirements - equity capital, bonds, debentures etc.

(iv) To plan for man-power requirement - arrangements for training of technical and managerial personnel.

6 Methods of Demand Forecasting :

There are broadly two methods of demand forecasting :

(A) Direct methods (B) Indirect methods. (Statistical methods)

(A) Direct Methods of Demand Forecasting :

These methods mainly include the following :

(i) Consumers Survey (ii) Experts' Opinion and (iii) Controlled Market Experiments.

(1) Consumers' Survey or Survey of Buyers' Intentions :*

Under this method of demand forecasting, intentions of the buyers as to what they intend to buy, how much quantity to buy at different prices etc. are known through personal contacts. Thus, this method shifts the burden of demand forecasting on to the buyers. This may be done through personal interviews, mail or postal survey or telephone interview. Questonaires are prepared to find out the buyers' intentions with regard to say price of the product, its quality, design, packing etc. This work of consumers' survey is entrusted to trained, reliable and experienced investigators. Questionaires should be simple and easy to understand. In personal interview method, door to door survey is made. One advantage of this method is that the interviewer can explain questions to the buyers and thus record their opinions in person.

Limitations :

(I) This method is expensive and time consuming.

(II) In the case of postal or mail survey, although the cost is less and larger coverage is possible, there is no personal meeting and explanation of questions is not possible. As such, there is a great possibility of irrelevant answers being received.

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* Objectives of long term demand forecasting.

* Discuss Survey method for demand forecasting

(III) Telephone interviews have the advantage of personal touch and they also save time and money, but in underdeveloped countries, telephone facilities are not available to all customers. Besides long and comprehensive interviews cannot be conducted on telephone.

(IV) Buyers intentions regarding purchase are mere wishful thinking, rather than concrete plans of purchase. This method is not suitable for consumer goods as their buyers are too many. However, it is may be tried for producer's goods like machinery as their buyers are few.

There are two types of consumer's survey :

(a) Complete Enumerative Survey.

(b) Sample Survey.

(a) Complete Enumerative Survey :*

Under this method all the potential buyers of the product are contacted; their interviews are conducted to find out the probable demand. Having ascertained the individual demand for the product by complete enumerative method, these are added together to find out the probable demand. Suppose, out of all buyers interviewed, **n** number of buyers show their willingness to buy the product and indicate their likely purchases by X_1, X_2, X_3 etc. representing the quantity demanded, then the total demand forecast will be as follows :

$$D_x = X_1 + X_2 + X_3 \ldots\ldots Xn$$

Here, Dx is demand for product X and X_1, X_2, X_3 etc. are individual quantities which the consumers are willing to purchase.

The main advantage of this method is that since all potential buyers are contacted, there is a greater degree of accuracy. Besides, this method is useful when new products are introduced by a firm.

But this method is expensive, time consuming and is of little use when the consumers are spread over a larger area.

(b) Sample Survey Method :*

In view of the limitations of the complete enumerative method, sample survey method has become more popular for forecasting the demand. Under this method, only a few customers are selected from the potential buyers of the product; they are interviewed and then average demand is calculated. By

* Describe the complete enumeration method of demand forecasting.

multiplying the total number of consumers by the average demand, we can predict the aggregate demand of the product.

Suppose, there are 1000 potential consumers of which 100 are selected by some sample method for interview. We may indicate their individual demand as $X_1, X_2, X_3, X_4, \ldots$ 100 and find out the average as under :

$$Ax = \frac{X_1 + X_2 + X_3 + X_4 \ldots\ldots X_{100}}{100}$$

Here, Ax is average demand for product X,

Now to find out the total demand

We have,

$$Dx = Ax \times Cn$$
$$= Ax \times 1000$$

Here, Ax is average demand, Cn is total number of potential buyers and Dx is demand for product x.

The chief merit of this method is that it is less costly and less time consuming. But the efficiency and accuracy of this method depends upon the competence of field investigators and experts. There is a relative shortage of such personnel in developing countries. Besides, if there is no careful planning and proper procedure sample survey method may lead to inaccurate and misleading results.

(B) Indirect Methods of Demand Forecasting (Statistical Methods) :*

Trend Projection Method :*

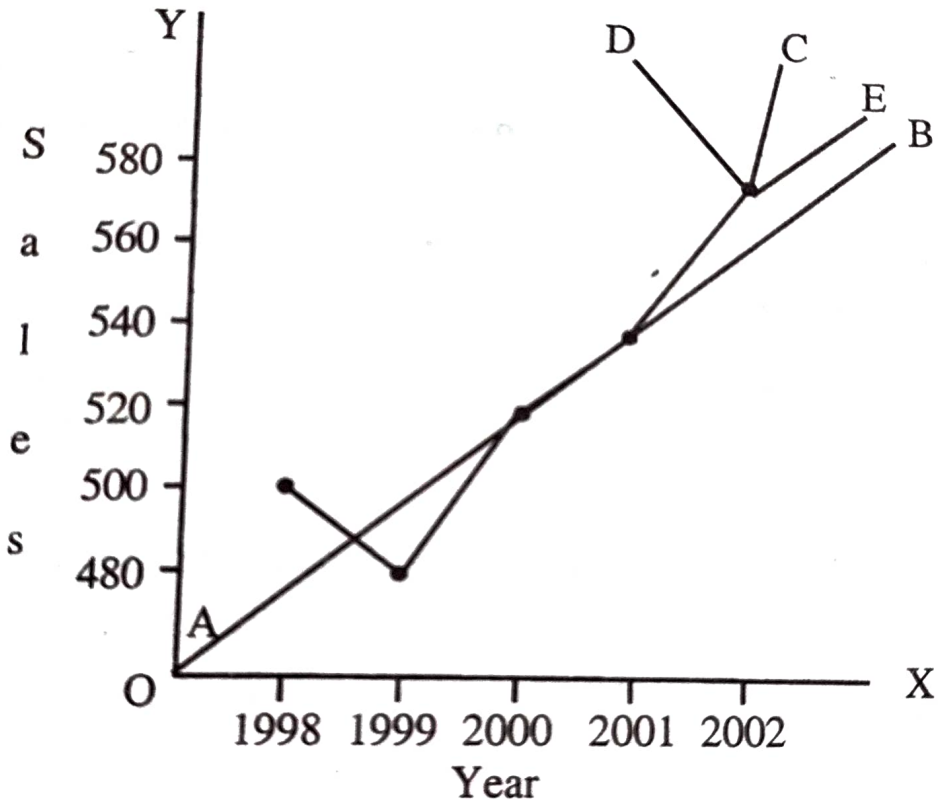
Under the trend projection method which is one of the indirect methods of demand forecasting, past data is used to project the sales in the coming years. A firm which has been in existence for a long period has at its disposal considerable data on sales pertaining to different time periods. Forecast for the future involves gathering of the past information on the subject which calls for the use of statistical data which is collected at regular intervals of time. This type of data is known as "time series". Thus, when data for different points of time are collected for sales, production, imports, exports, etc. say for a period of five years, such data constitutes time series. A firm with a long standing may collect time-series data on sales from its own sales department. New firms can obtain similar data from other established firms

* Explain : Trend method for demand forecasting.

in the same industry. The time-series data can be used to project the demand for a product through a graph or least square method. Such data can be presented graphically or in a tabular form for further analysis. Thus, for an example, we collect the data about the sales of the product in the past five years, the resulting trend is then extrapolated into future periods. The results and indicated sales level are used as the basis for demand forecasting.

Years	Sales (in units)
1998	500
1999	480
2000	520
2001	540
2002	580

The trend line can be drawn further to know the likely trend of sales in years to follow :



It should be noted here that, although this method is simple and less expensive, it gives information only about the increasing, decreasing or constant trend and not the actual quantity likely to be demanded. Besides, extension of trend line involves subjectivity and personal judgment which may vary from person to person. Hence, conclusions drawn by different persons may differ and therefore the results may not be reliable.

Limitations :

(1) This method can be used only by companies which have long been in business.

(2) It is based on the assumption that what has happened in the past will happen in future which is not always true. Therefore, forecast based on this method may be considered to be reliable only for the period during which this assumption holds good.

(3) It cannot be used for a new product.

7 Forecasting the Demand for a New Product :*

The problem of forecasting the demand for a new product is, in many ways, quite different from that of an existing product. For new products, past trends are not available and therefore how far the new product will be acceptable to the consumers, what would be their response etc. is a mere guess work. However, **Prof Joel Dean** has suggested a number of possible methods or approaches to the problem of forecasting the demand for new products.

(i) The Evolutionary Approach : This consists of projecting the demand for the new product as an outgrowth and evolution of an existing old product. For example, black and white television and colour television; radio operated by electricity and transistor radio etc.

(ii) The Substitute Approach : According to this approach, the new product is analysed as a substitute for some existing product. For an example, synthetic textiles and cotton textiles.

(iii) The Growth Curve Approach : It estimates the rate of growth and ultimate level of demand for the new product on the basis of the growth pattern of an already established product. For an example, old household appliances and new appliances.

(iv) The Opinion-Poll Approach : It seeks to make direct inquiry from the ultimate buyers either by the use of samples or on a full scale. For an example, washing soaps, detergents etc.

(v) The Experimental Approach : Here the product is offered for sale in a particular area. This gives an idea about the probable demand for the product. Thus, for an example, the new product may first be put to sale in

* Forecasting the demand for a New Product.

metropolitan cities and then gradually extended to other areas in the light of the experience.

(vi) **The Sales Experience Approach :** Under this approach the new product is offered for sale in a sample market by direct mail or through multiple shop organisation.

(vii) **Indirect Approach :** It refers to surveying of consumers' reactions to a new product indirectly through the eyes of specialised dealers who are supposed to be well informed about the needs of the consumers.

8 Criteria of a Good Demand Forecasting Method :*

The main criteria of a good demand forecasting method are as follows :

(i) **Accuracy :** It is essential to check the accuracy of the past forecasts against present performance and of present forecasts against future performance. Some comparison of the model with what actually happens and of the assumptions with what is borne out in practice is most desirable.

(ii) **Simplicity and Ease of Comprehension :** The method of demand forecasting should be as simple and easy as possible. Management must be able to understand the technique of demand forecasting used and must have confidence in the same. Too much of mathematical and econometric procedures may not find favour with the management. If it does not really understand what the forecaster is doing and fails to understand to procedure.

(iii) **Economy :** A good demand forecasting method is one which is highly economical. Thus, it is necessary to compare the cost of the forecasting method against its likely benefits. It is desirable therefore to undertake cost-benefit analysis.

(iv) **Effective :** The technique used for demand forecasting should be able to give meaningful results as early as possible. Technique which take a long time to work out may produce useful information too late for effective management decisions. Hence it should be effective and productive.

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

(vi) **Flexibility :** The forecasting procedure should permit changes to be made in the relationship between different variables as and when needed. It should not be rigid.

* Explain the criteria of a good demand forecasting method.

(vii) Maintenance of Timeliness : The technique of demand forecasting should be such as can be maintained on an up-to-date basis. There must be continuous alterations and additions involving latest information and data.

(viii) It is easy to judge the existing trend, but for a good forecast it is necessary that it should also predict deviations and turning points, so that the forecasts are more effective.

(ix) Normally, there is a time gap between the occurrence of an event and its forecast which is known as the **lead time**. Now, longer the lead the forecast has before the event, the greater will be its usefulness. It may be that one would prefer even to sacrifice some accuracy for gaining a lead rather than sacrifice lead for accuracy.

Short Questions with Answers

Q. 1 Which are the methods of demand forecasting ?

(Oct., 2008)

Ans. : There are broadly two methods of demand forecasting : (1) Direct methods, and (2) Indirect methods.

The direct methods include the following :

(i) Consumer's survey, (ii) Expert opinion, and (iii) Controlled market experiments.

There are two types of consumer's survey :

(a) Complete enumerative survey, and (b) Sample survey.

The indirect methods include the following :

(i) Trend projection method, (ii) Test marketing, (iii) Economic indicator method, and (iv) Barometric forecasting.

Q. 2 What is an active demand forecasting and a passive demand forecasting ? *(Oct., 2008)*

Ans.: Passive forecasts of demand anticipate future demand without any positive actions being taken by the firm :

Active forecasts of demand anticipate future demand in the light of some deliberate actions taken by the firm.

Q. 3 State the objectives of long term demand forecasting. *(April, 2008; Oct., 2012)*

Ans.: The long term objectives of demand forecasting are as follows :

(1) To plan for the expansion of the existing unit or to set up a new unit.

(2) To plan for the diversification of the product.

(3) To arrange for long term financial requirements of the firm.

(4) To plan for the man power requirement of the firm.

Q. 4 What are the objectives of short term demand forecasting ?

Ans.: The objectives of short term demand forecasting are as follows :

(1) To formulate appropriate production policy so as avoid over production or under production.

(2) To reduce the cost of raw materials and control inventories.

(3) To determine appropriate price policy and fix sales targets.

(4) To arrange for short-term financial requirements.

(5) To lay down sales targets and provide for controls and incentives.

(6) To ensure regular availability of labour force.

(7) To ensure full utilization of existing production capacity.

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ns.:

What are the factors involved in demand forecasting ?

The following factors should be taken into consideration while forecasting the demand of a product :

(1) **Time Period :** It is necessary to be clear about the time period of demand forecasting, that is, whether it is for a short period or for a long period.

(2) **Level of Demand Forecasting :** Demand forecasting generally may be undertaken at three different levels :

(a) Macro level demand forecasting is concerned with the overall business conditions prevailing in the economy as a whole and is measured by trends in national income, expenditure, savings, investment, industrial production etc.

(b) Industry level demand forecasting which is prepared by different industry and trade associations. Macro level forecasts help considerably, the forecasts for products of different industries.

(c) Fire level demand forecasting : Firm level demand forecasting is important from business and managerial point of view. The firm level demand forecasting, is immensely aided by industry level forecasts.

(3) **Nature of Demand Forecast :** The firm should be clear whether it is interested in general forecasting or specific forecasting.

(4) **Nature of the Product :** We have to clear, whether demand forecasting is to be made for the established product or for a new product. Into producer's goods, consumers' goods and durable, non-durable goods.

Q. 6 What are the criteria of a good demand forecasting ?

Ans.: The main criteria of a good demand forecasting method are as follows :

(1) **Accuracy :** It is essential to check the accuracy of the past forecasts against present performance and of present forecasts against future performance.

(2) **Simplicity and Ease of Comprehension :** The method of demand forecasting should be as simple and easy as possible.

(3) **Economy :** A good demand forecasting method is one which is highly economic.

(4) **Effectiveness :** The technique used for demand forecasting should be able to give meaningful results as early as possible.

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

(6) **Flexibility :** The forecasting procedure should permit changes to be made in the relationship between different variables as and when needed. It should not be rigid.

(7) **Maintenance of Timeliness :** The technique of demand forecasting should be such as can be maintained on an up-to-date basis.

(8) **Deviations :** It is easy to judge the existing trend, but for a good forecast it is necessary that it should also predict deviations and turning point, so that the forecasts are more effective.

(9) **Lead Time :** Normally, there is a time gap between the occurrence of an event and its forecast which is known as the **lead time.** Now, longer the lead the forecast has before the event, the greater will be its usefulness.

Q. 7 Give an idea of the consumers' survey method.

Ans.: Under this method of demand forecasting, intentions of the buyers as to what they intend to buy, how much quantity to buy at different price etc. are known through personal contacts. This may be done through personal interviews,

mail or postal survey or telephone interview. Questonnaries are prepared to find out the buyers's intentions with regard to price of the product, its quality, design, packing etc. This work of consumers' survey is entrusted to trained, reliable and experienced investigators.

There are two types of consumer's survey : (a) Complete Enumerative Survey (b) Sample Survey-

(a) Complete Enumerative Survey : Under this method all the potential buyers of the product are contacted; their interviews are conducted to find out the probable demand. Having ascertained the individual demand for the product by complete enumerative method, these are added together to find out the probable demand.

(b) Sample Survey Method : Under this method, only a few customers are selected from the potential buyers of the product; they are interviewed and then average demand is calculated. By multiplying the total number of consumers by the average demand, we can predict the aggregate demand of the product.

What is Time series method of Demand forecasting ?

Under the trend projection method past data is used to project the sales in the coming years. A firm which has been in existence for a long period has at its disposal considerable data on sales pertaining to different time periods. Forecast for the future involves gathering of the past information on the subject which calls for the used of statistical data which is collected at regular intervals of time. This type of data is known as "time series". Thus, when data for different points of time are collected for sales, production, imports, exports etc. say for a period of five years, such data constitutes time series. A firm with a long standing may collect time-series data on sales from its own sales department. New firms can obtain similar 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 least square method. Such data can be presented graphically or

in a tabular form for further analysis. The trend line can be drawn further to know the likely trend of sales in years to follow.

It should be noted hear that, although this method is simple and less expensive, it gives information only about the increasing, decreasing or constant trend and not the actual quantity likely to be demanded. Besides, extension of trend line involves subjectivity and personal judgment which may vary from person to person. Hence, conclusions drawn by different persons may differ and therefore the results may be reliable.

Q. 9 What does demand forecasting mean ? *(Oct., 2015)*

Ans.: Every firm must know as to what will be the current demand – say over a month or a half year or a year – for its product so as to avoid over production or under production. This information about current demand for a firm's product is known as demand estimatation.

Besides this, the firm is also interested in knowing the future demand – say over next five or ten years – for its product so that it can take appropriate decisions regarding production planning, investment for expansion, raising of financial resources, arrangements for adequate man power requirements etc. This prediction about future demand is known as demand forecasting.

Demand forecasting thus, is a technique to predict and anticipate future demand of a firm's product.

According to American Marketing Association, "It is an estimate of sales in dollars or physical units for a specified future period under a proposed marketing plan or programme or under an assumed set of economic and other forces outside the firm. The forecasts may be for a specified item or for entire line."

In the words of **Phillip Kotler,** "The sales forecast is an expected level of sales based on a chosen marketing plan and assumed environmental conditions."