BUSINESS ECONOMICS

CHAPTER 2:

THEORY OF DEMAND AND SUPPLY

By CA SANCHIT GROVER

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About the Author

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<u>Theory of Demand and Supply</u>

This Chapter has been primarily divided into the following 3 units:-

Unit 1:- Theory of Consumer Behaviour

Unit 2:- Theory of Demand

Unit 3:- Theory of Supply

2.1:- <u>Theory of Consumer Behaviour</u>

<u>*What to Study in this Chapter*</u>

- Concept of Utility
- Law of Diminishing Marginal Utility
- Concept of Consumer Surplus
- Consumer Equilibrium as per Cardinal Approach
- Consumer Equilibrium as per Ordinal Approach

Concept of "Wants" in Economics

Meaning	✓ All desires, tastes and motives of human beings are called wants in Economics. ✓ Wants may arise due to elementary and psychological causes. ✓ Since the resources are limited, we have to choose between the urgent wants and the not so urgent wants
Features of 'Wants'	All wants of human beings exhibit some characteristic features:- 1) Wants are unlimited in number. They are never completely satisfied. 2) Wants differ in intensity. Some are urgent, others are felt less intensely. 3) Each want is satiable. 4) Wants are competitive. They compete each other for satisfaction because resources are scarce to satisfy all wants. 5) Wants are complementary. Some wants can be satisfied only by using more than one good or group of goods. 6) Wants are alternative. 7) Wants are subjective and relative. 8) Wants vary with time, place, and person. 9) Some wants recur again whereas others do not occur again and again. 10) Wants may become habits and customs. 11) Wants are affected by income, taste, fashion, advertisements and social customs. 12) Wants arise from multiple causes such as natural instincts, social obligation and individual's economic and social status
Classification of 'Wants'	In Economics, wants are classified into three categories, viz., necessaries, comforts and luxuries. | Necessaries	Necessaries are those which are essential for living. Necessaries are further sub-divided into:- necessaries for life or existence, necessaries for efficiency and conventional necessaries.	

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		1) *Necessaries for life* are things necessary to meet the minimum physiological needs for the maintenance of life such as minimum amount of food, clothing and shelter. 2) *Necessaries for Efficiency*:- Man requires something more than the necessities of life to maintain longevity, energy and efficiency of work, such as nourishing food, adequate clothing, clean water, comfortable dwelling, education, recreation etc. These are necessaries for efficiency. 3) *Conventional necessaries* arise either due to pressure of habit or due to compelling social customs and conventions. They are not necessary either for existence or for efficiency.
	Comforts	While necessaries make life possible comforts make life comfortable and satisfying. Comforts are less urgent than necessaries. Tasty and wholesome food, good house, clothes that suit different occasions, audio-visual and labour saving equipments etc. make life more comfortable.
	Luxuries	Luxuries are those wants which are superfluous and expensive. They are not essential for living. Items such as expensive clothing, exclusive motor cars, classy furniture, goods used for vanity etc fall under this category. The above categorization is not rigid as a thing which is a comfort or luxury for one person or at one point of time may become a necessity for another person or at another point of time. As all of us are aware, the things which were considered luxuries in the past have become comforts and necessaries today.

Concept of Utility

The concept of utility is used in neo classical Economics to explain the operation of the law of demand.

Meaning	Utility is the want satisfying power of a commodity. It is the expected satisfaction to a consumer when he is willing to spend money on a stock of commodity which has the capacity to satisfy his want *Point to Remember*:- Utility is the anticipated satisfaction by the consumer, and satisfaction is the actual satisfaction derived. A commodity has utility for a consumer even when it is not consumed.
Features of Utility	✓ It is a subjective entity and varies from person to person. ✓ A commodity has different utility for the same person at different places or at different points of time. ✓ *Utility v/s Usefulness*:- It should be noted that utility is not the same thing as usefulness. From the economic standpoint, even harmful things like liquor, may be said to have utility because people want them. Thus, in Economics, the concept of utility is ethically neutral.
Various Approaches to utility	From time to time, different theories have been advanced to explain consumer behaviour and thus to explain his demand for the product. Two important theories are (i) Marginal Utility Analysis propounded by **Marshall**, and (ii) Indifference Curve Analysis propounded by **Hicks and Allen**

Cardinal Approach of Utility Analysis

This theory which is formulated by Alfred Marshall, a British economist, seeks to explain how a consumer spends his income on different goods and services so as to attain maximum satisfaction.

Concept of Total Utility and Marginal Utility

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Total Utility	Assuming that utility is measurable and additive, total utility may be defined as the sum of utility derived from different units of a commodity consumed by a consumer. Total utility is the sum of marginal utilities derived from the consumption of different units i.e. TU= MU1+MU2+.....+MUn Where *MU1*, MU2,.....,MUn etc are marginal utilities of the successive units of a commodity
Marginal Utility	It is the addition made to total utility by the consumption of an additional unit of a commodity. In other words, it is the utility derived from the marginal or one additional unit consumed or possessed by the individual. Marginal utility = the addition made to the total utility by the addition of consumption of one more unit of a commodity. Symbolically, $MU_n = TU_n - TU_{n-1}$ Where, ▪ MU_n is the marginal utility of the nth unit ▪ TU_n is the total utility of the nth unit, and ▪ TU_{n-1} is the total utility of the (n-1)th unit.

Assumption of Cardinal Approach

Rationality:	A consumer is rational and attempts to attain maximum satisfaction from his limited money income.
Cardinal Measurability of Utility:	According to neoclassical economists, utility is a cardinal concept i.e., utility is a measurable and quantifiable entity. It implies that utility can be measured in cardinal numbers and assigned a cardinal number like 1, 2, 3 etc. Marshall and some other economists used a psychological unit of measurement of utility called **utils**. Thus, a person can say that he derives utility equal to 10 utils from the consumption of 1 unit of commodity A and 5 from the consumption of 1 unit of commodity B. ***Use of Money for measuring Utility*** Since a consumer can quantitatively express his utility, he can easily compare different commodities and express which commodity gives him greater utility and by how much. Utilities from different units of the commodity can be added as well. According to this theory, money is the measuring rod of utility. **The amount of money which a person is prepared to pay for a unit of a good, rather than go without it, is a measure of the utility which he derives from the good.**
Constancy of the Marginal Utility of Money:	The marginal utility of money remains constant throughout when the individual is spending money on a good. This assumption, although not realistic, has been made in order to facilitate the measurement of utility of commodities in terms of money. If the marginal utility of money changes as income changes, the measuring-rod of utility becomes unstable and therefore would be inappropriate for measurement.
The Hypothesis of Independent Utility:	The total utility which a person gets from the whole collection of goods purchased by him is simply the sum total of the separate utilities of the goods. The theory ignores complementarity between goods.

Law of Diminishing Marginal Utility

What is the law	Marshall who was the exponent of the marginal utility analysis, stated the law as follows: ***"The additional benefit which a person derives from a given increase in the stock of a thing diminishes with every increase in the stock that he already has."*** In other words, as a consumer increases the consumption of any one commodity keeping constant the consumption of all other commodities, the marginal utility of the variable commodity must eventually decline.

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|	
	Remember:- *It is the marginal utility and not the total utility which declines with the increase in the consumption of a good.*
Explanation of law	The law of diminishing marginal utility is based on an important fact that while total wants of a person are virtually unlimited, *each single want is satiable* i.e., each want is capable of being satisfied. Since each want is satiable, as a consumer consumes more and more units of a good, the intensity of his want for the good goes on decreasing and a point is reached where the consumer no longer wants it. *Thus, the greater the amount of a good a consumer has, the less an additional unit is worth to him or her.*

Numerical Illustration

Table : Utility Schedule

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

Observations from above Table

♦ The above table shows that as the consumer goes on consuming rossgullas, the additional or marginal utility goes on diminishing.

♦ The consumption of 3rd unit of rossgulla gives no additional utility and the 4th unit is giving negative utility.

♦ The 4th unit instead of giving satisfaction causes dissatisfaction

Graphical Representation
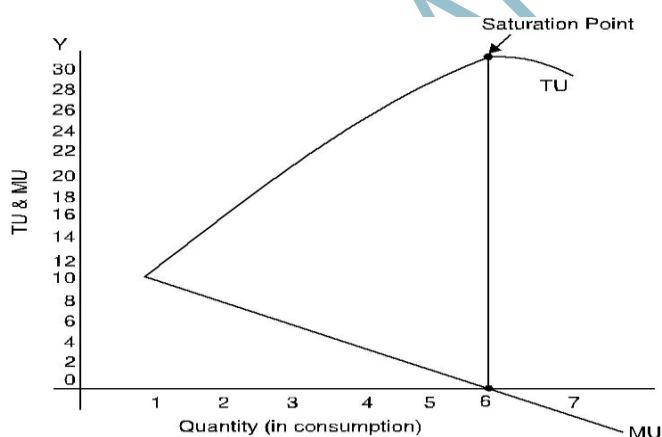
Conclusions about Relationship between TU and MU
1) Total utility rises as long as MU is positive, but at a diminishing rate because MU is diminishing.
2) Marginal utility diminishes throughout.
3) When marginal utility is zero, total utility is maximum. **It is a saturation point.**
4) When marginal utility is negative, total utility is diminishing
5) MU is the rate of change of TU or the slope of TU.
6) MU can be positive ,zero or negative

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<u>**Are there any exceptions to this Law**</u>

In some cases a consumer gets increasing marginal utility with the increase in consumption.

Such cases are called as exception which are as follows-

1. **Hobbies and Rare Collections:** The law does not hold good in case of hobbies and rare collections like reading, collection of stamps, coins, etc. Every additional unit gives more satisfaction i.e. the marginal utility tends to increase.

2. **Abnormal Persons:** The law does not apply to abnormal persons like misers, drunkards, musicians, drug addicts, etc. who want more and more of the commodity they are in love with.

3. **Indivisible Goods:** The law cannot be applied in case of indivisible bulky goods like T. V. set, house, scooter, etc. No one purchases more than one unit of such goods at a time.

Remember:- While this may be true in initial stages, beyond a certain limit these will also be subjected to diminishing utility.

<u>Concept of Consumer Equilibrium</u> – **Single product**

➢ A consumer tries to equalize marginal utility of a commodity with its price in order to maximize the satisfaction. A consumer thus compares the price with the marginal utility of a commodity.

➢ He keep on purchasing a commodity till MU > R In other words, so long as price is less, he buys more which is also the basis of the law of demand.

➢ The consumer is at equilibrium where:

Marginal Utility of the commodity = Price of the commodity

$MU_x = P_x$. MU money

$\dfrac{MU_x}{P_x}$ = MU money

<u>Impact of Change in Price of good on Consumer Equilibrium</u>

The equality between marginal utility and price is disturbed when the price of the good falls.

1) *<u>What will happen in case price decreases</u>*
   The consumer will consume more of the good so as to restore the equality between the marginal utility and price. The marginal utility from the good will fall when he consumes more of the good. He will continue consuming more till the marginal utility becomes equal to the new lower price.

2) *<u>What will happen in case price increases</u>*
   When price of the good increases, he will buy less so as to equate the marginal utility to the higher price.

<u>Conclusion</u>

We can say that the downward sloping demand curve is directly derived from the marginal utility curve

<u>Concept of Consumer Equilibrium</u> – **Two products**

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

➢ The law states that a consumer will allocate his expenditure in a way that the utility gained from the last rupee spent on each commodity is equal or the marginal utility each commodity is proportional to its price.

➢ The consumer is said to be equilibrium when the following condition is met-

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

OR

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

Notes

Assumptions/Limitations of this Law of Diminishing Marginal Utility

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

a) **Homogenous units:** The different units consumed should be identical in all respects. The habit, taste, temperament and income of the consumer also should remain unchanged.

b) **Standard units of Consumption:** The different units consumed should consist of standard units. If a thirsty man is given water by successive spoonfuls, the utility of the second spoonful of water may conceivably be greater than the utility of the first.

c) **Continuous Consumption:** There should be no time gap or interval between the consumption of one unit and another unit i.e. there should be continuous consumption.

d) **The Law fails in the case of prestigious goods:** The law may not apply to articles like gold, cash, diamonds etc. where a greater quantity may increase the utility rather than diminish it. It also fails to apply in the case of hobbies, alcohol, cigarettes, rare collections etc.

e) **Case of related goods:** Utility is not in fact independent. The shape of the utility curve may be affected by the presence or absence of articles which are substitutes or complements. The utility obtained from tea may be seriously affected if no sugar is available and the utility of bottled soft drinks will be affected by the availability of fresh juice.

f) *Based on unrealistic assumptions:* The assumptions of cardinal measurability of utility, constancy of marginal utility of money, continuous consumption and consumer rationality are unrealistic

Concept of Consumer Surplus

➢ In our daily expenditure, we often find that the price we pay for a commodity is less than the satisfaction derived from its consumption.

➢ Therefore, we are ready to pay much higher price for a commodity than we actually have to pay.

E.g. Commodities like salt, newspaper, match box, etc. are very useful, but they are also very cheap.

➢ From the purchase of such commodities we derive a good deal of extra satisfaction or surplus over and above the price that we pay for them. This is consumer's surplus.

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

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

= Sum of Marginal Utilities - (Price × Units Purchased)

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= Total Utility - Total amount spent

Measurement of Consumer's Surplus

No. of units	Marginal Utility (Rs.)	Price (Rs.)	Consumers Surplus
1	25	10	15
2	20	10	10
3	15	10	05
4	10	10	00
Total Units purchased	Total Utility = 70	Total Amt. Spent = 40	30

When the consumer buy first unit of commodity he is ready to pay Rs. 25 for it as he expects satisfaction worth Rs. 25 from it and thus gets a surplus worth Rs. 15. For second unit he is ready to pay only Rs. 20 for it as he expects lesser satisfaction from it and thus gets surplus worth Rs. 10 only. The consumer will go on buying the commodity till Marginal Utility = Price & consumer surplus is Zero i.e. upto 4th unit.

Here, Consumer Surplus = Total Utility - Total Amt. Spent = Rs. 70 - Rs. 40 = Rs. 30.

We can represent consumers surplus with the following diagram.
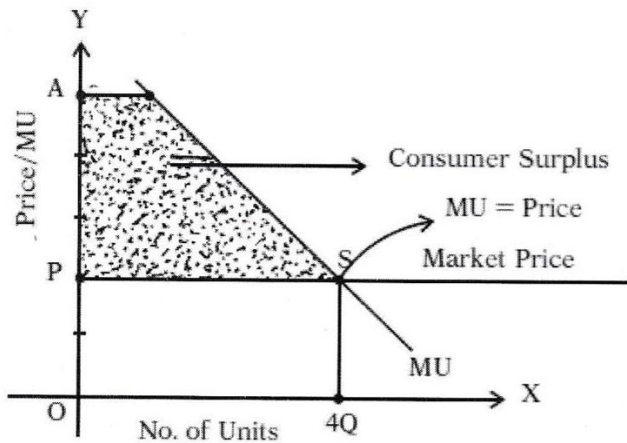
In the diagram MU is the marginal utility curve. OP (Rs. 10) is the market price. In equilibrium, consumer would buy OQ (4) units (at this MU = P). For OQ (4) units he is required to pay OQ (4 units) × OP (Rs. 10) = OQSP(Rs. 40). The consumer was ready to pay (by MU curve) OQ SA(Rs. 70). Thus, he derives surplus of satisfaction. OQSA(Rs. 70) - OQSP(Rs. 40) = PSA(Rs. 30)

Uses/Importance of the consumer surplus concept are as follows:-

1. **Study of Consumer behaviour to ensure repeated purchases:**
   Consumer surplus is a measure of the welfare that people gain from consuming goods and services. It is very important to a business firm to reflect on the amount of consumer surplus enjoyed by different segments of their customers because **consumers who perceive large surplus are more likely to repeat their purchases**.

2. **Helpful in Price Discrimination**
   Understanding the nature and extent of surplus can help business managers make better decisions about setting prices. If a business can identify groups of consumers with different elasticity of demand within their market and the market segments which are willing and able to pay higher prices for the same products, then firms can profitably use price discrimination.

3. **Useful in Investment decisions**
   Large scale investment decisions involve cost benefit analysis which takes into account the extent of consumer surplus which the projects may fetch.

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4. **<u>Useful in Pricing Decisions</u>**
   Knowledge of consumer surplus is also important when a firm considers raising its product prices Customers who enjoyed only a small amount of surplus may no longer be willing to buy products at higher prices. Firms making such decisions should expect to make fewer sales if they increase prices.

5. **<u>Useful in deciding Taxation Policy</u>**
   Consumer surplus usually acts as a guide to finance ministers when they decide on the products on which taxes have to be imposed and the extent to which a commodity tax has to be raised. It is always desirable to impose taxes or increase the rates of taxes on commodities yielding high consumer's surplus because the loss of welfare to citizens will be minimal

<u>CRITICISMS of the consumer's surplus concept</u> are as follows:-

1. **<u>Imaginary:</u>** The concept of consumer's surplus is quite imaginary idea. One has to imagine what you are prepared to pay and you proceed to deduct from that what you actually pay. It is all hypothetical and unreal.

2. **<u>Cardinal measurement is not possible</u>**: Consumer's surplus cannot be measured precisely because it is difficult to measure the total utilities and marginal utilities of the commodities consumed in quantitative terms.

3. **<u>Ignores the interdependence between goods</u>**: The concept of consumer's surplus does not consider the effect of availability and non-availability of substitutes and complementary goods on the consumption of a particular commodity. Actually consumer surplus derived from a commodity is affected by substitutes and complementary goods.

4. **<u>Cannot be measured in terms of money</u>**: This is because the marginal utility of money changes as purchases are made and the consumer's stock of money diminishes. But, Marshall assumed that the marginal utility of money to be constant.

5. **<u>Not applicable to Necessaries</u>**: It does not apply to the necessaries of life. In such cases the surplus is immeasurable e.g. - Food and Water. Consumer surplus is infinite because a consumer will stake whole of his income rather than go without them.

6. **<u>Not applicable to prestige</u>**: e.g. - Diamonds jewellery, etc. fall in their prices lead to a fall in consumer's surplus.

<u>Indifference Curve Analysis</u> – *by Hicks and Allen*

Basic Rationale behind this approach

➢ This approach to consumer behaviour is based on **<u>consumer preferences.</u>**
➢ It believes that human satisfaction, being a psychological phenomenon, cannot be measured quantitatively in monetary terms as was attempted in Marshall's utility analysis. In this approach, it is felt that it is much easier and scientifically more **<u>sound to order preferences than to measure them in terms of money</u>**

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

<u>Assumptions of this Approach</u>

Rationality	The consumer is rational and possesses full information about all the relevant aspects of economic environment in which he lives.
Capacity of Consumer to give preferences	The indifference curve analysis assumes that utility is only ordinally expressible. The consumer is capable of ranking all conceivable combinations of goods according to the satisfaction they yield.
	Thus, if he is given various combinations say A, B, C, D and E, he can rank them as first preference, second preference and so on. However, if a consumer happens to prefer A to B, he cannot tell quantitatively how much he prefers A to B.

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Transitive	Consumer's choices are assumed to be transitive. If the consumer prefers combination A to B, and B to C, then he must prefer combination A to C. In other words, he has a consistent consumption pattern
Law of monotonic Consumer Preference	If combination A has more commodities than combination B, then A must be preferred to B.

Concept of Indifference Curve

➤ An indifference curve is a curve which represents all those combinations of two goods which give same satisfaction to the consumer.

➤ Since all the combinations on an indifference curve give equal satisfaction to the consumer, the consumer is *indifferent* among them. In other words, since all the combinations provide the same level of satisfaction the consumer prefers them equally and does not mind which combination he gets.

➤ An Indifference curve is also called iso- utility curve or equal utility curve.

Table : Indifference Schedule

Schedule I			Schedule II		
Combinations	BURGER	SANDWICHES	Combinations	BURGER	SANDWICHES
A	1	10	E	2	12
B	2	6	F	3	8
C	3	3	G	4	5
D	4	2	H	5	4

In the schedule I above, the consumer is indifferent whether he gets combination A, B, C or D. This is because all combinations give him same amount of satisfaction and therefore equally preferable to him. He gets as much satisfaction from 1 burger and 10 sandwiches as from 3 burgers and 3 sandwiches.

By plotting the above combinations on a graph, we can derive an indifference curve as shown in the following figure:
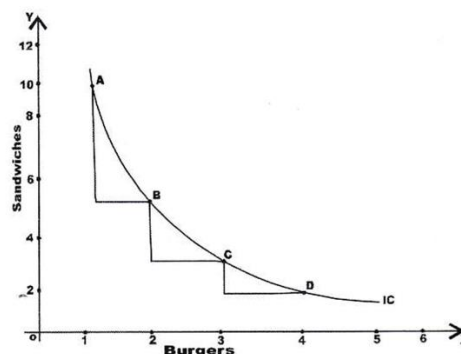

Figure : A Consumer's Indifference Curve

In the diagram, quantity of burger is measured on X-axis and quantity of sandwiches on Y-axis. The various combinations A, B, C, D are plotted and on joining them, we get a curve known as indifference curve. All combinations lying on the indifference curve give the same level of satisfaction to the consumer. Hence, the consumer is indifferent among them

Concept of Marginal Rate of Substitution

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Marginal Rate of Substitution (MRS) is the rate at which a consumer is prepared to exchange goods X and Y. We can define MRS of X for Y as the amount of Y whose loss can just be compensated by a unit gain of X in such a manner that the level of satisfaction remains the same.

The marginal rate of substitution of X for Y (MRSxy) is equal to MUx/ MUy

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

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

Properties of Indifference Curve

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

> *Exam points*
>
>

(ii) **Indifference curves are always convex to the origin**: Reason: *Diminishing MRS*
   It has been observed that as more and more of one commodity (X) is substituted for another (Y), the consumer is willing to part with less and less of the commodity being substituted (i.e. Y). This is called diminishing marginal rate of substitution. Thus, in our example of burger and sandwich, as a consumer has more and more units of burger, he is prepared to forego less and less units of sandwich. This happens mainly because the want for a particular good is satiable and as a person has more and more of a good, his intensity of want for that good goes on diminishing. In other words, the subjective value attached to the additional quantity of a commodity decreases fast in relation to the other commodity whose total quantity is decreasing. This diminishing marginal rate of substitution gives convex shape to the indifference curves.

> **Two Extreme Situations**
>
> A. *Shape of IC in case of Perfect Substitutes*
>   When two goods are perfect substitutes of each other, the indifference curve is a **straight line** on which MRS is constant. Example:-
>
>

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B. *<u>Shape of IC in case of Perfect Complementary Goods</u>*

When two goods are perfect complementary goods the indifference curve will consist of two straight lines with a right angle bent which is convex to the origin, or in other words, it will be L shaped.

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iii) <u>Indifference curves can never intersect each other</u>: Reason: *<u>Law of Monotonic Consumer Preference</u>*

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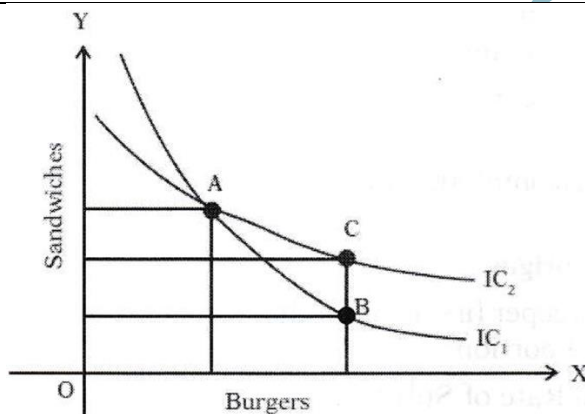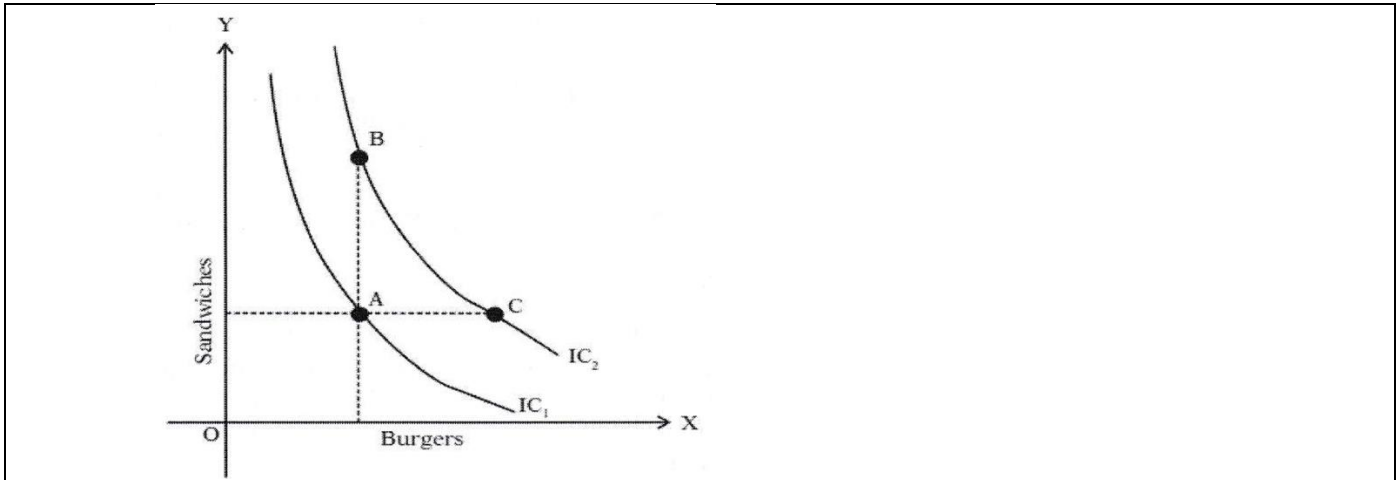

In the diagram two IC intersect each other at point A. On IC_1, combinations A = B and on IC_2, Combinations A = C. Therefore, by assumption of transitivity if, A= B and A = C B = C. But C > B as it lie on higher IC giving higher satisfaction due to more quantity of sandwiches. So two IC cannot intersect.

iv) <u>Higher Indifference Curves Represents Higher Level of Satisfaction</u>

In an indifference map, combinations lying on a higher IC gives higher level of satisfaction than the combinations lying on a lower IC. But how much higher cannot be indicated.

<u>*REASON:*</u> This is because combinations on higher IC contains more quantity of either sandwiches or burger without having less of other as shown in the following diagram

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- ▢ Combinations B and C on IC_2 will be preferred by the consumer than the combination A on IC_1.
- ▢ Combination B on IC_2 contains more quantity of sandwiches without having less of burgers compared to combination A on IC_1
- ▢ Hence, all combinations on IC_2 gives more satisfaction to consumer. Thus, higher IC represents higher satisfaction

v) Indifference curve will not touch either X-axis or Y-axis

This is because we have assumed that consumer is considering the different combinations of TWO commodities.

- ▪ If IC touches either of the axis, it would mean that consumer is interested in one commodity only.
- ▪ In the diagram IC touches X-axis at point B and Y-axis at point A.
- ▪ At point B the consumer is satisfied with OB quantity of X-commodity and zero quantity of A. This is against the definition of IC. **Therefore, IC curve will not touch either axis**

Concept of Budget Line or Price Line

- ▪ A higher indifference curve shows a higher level of satisfaction than lower one. Therefore, to maximize satisfaction consumer will try to reach the highest possible indifference curve.
- ▪ He will try to buy more and more goods to get more and more satisfaction. But, what and how much a consumer can actually buy depends on -
  - a) The money income of consumer, &
  - b) Prices of goods he wants to buy.

They are the two objective factors which form the budgetary constraint of the consumer.

What does Budget Line show

The budgetary position of the consumer can be graphically shown by BUDGET LINE. A budget line or price line shows maximum quantity of the different combinations of TWO GOODS that the consumer can purchase with his given money income and given market prices of goods.

Example:

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The consumer's money income is Rs. 100 to spend on X and Y.

Price of X is Rs. 5 per unit Price of Y is Rs. 2 per unit

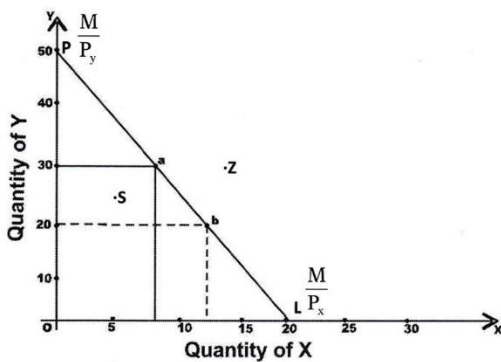Therefore, the consumer can get either 20 units of X and no Y.

OR

50 units of Y and no X.

OR

Combination of X and Y

Hence, 20 X and 50 Y form the two extreme limits of his expenditure. But the consumer can buy any ONE of the many combinations of X and Y' within these limits. Graphically it can be shown as follows:-

This budget line corresponds to the following equation, called Budget Line Equation

$P_x . X + P_y . Y = M$

Where-

M = Total Money Income

P_x = Price of commodity 'X'

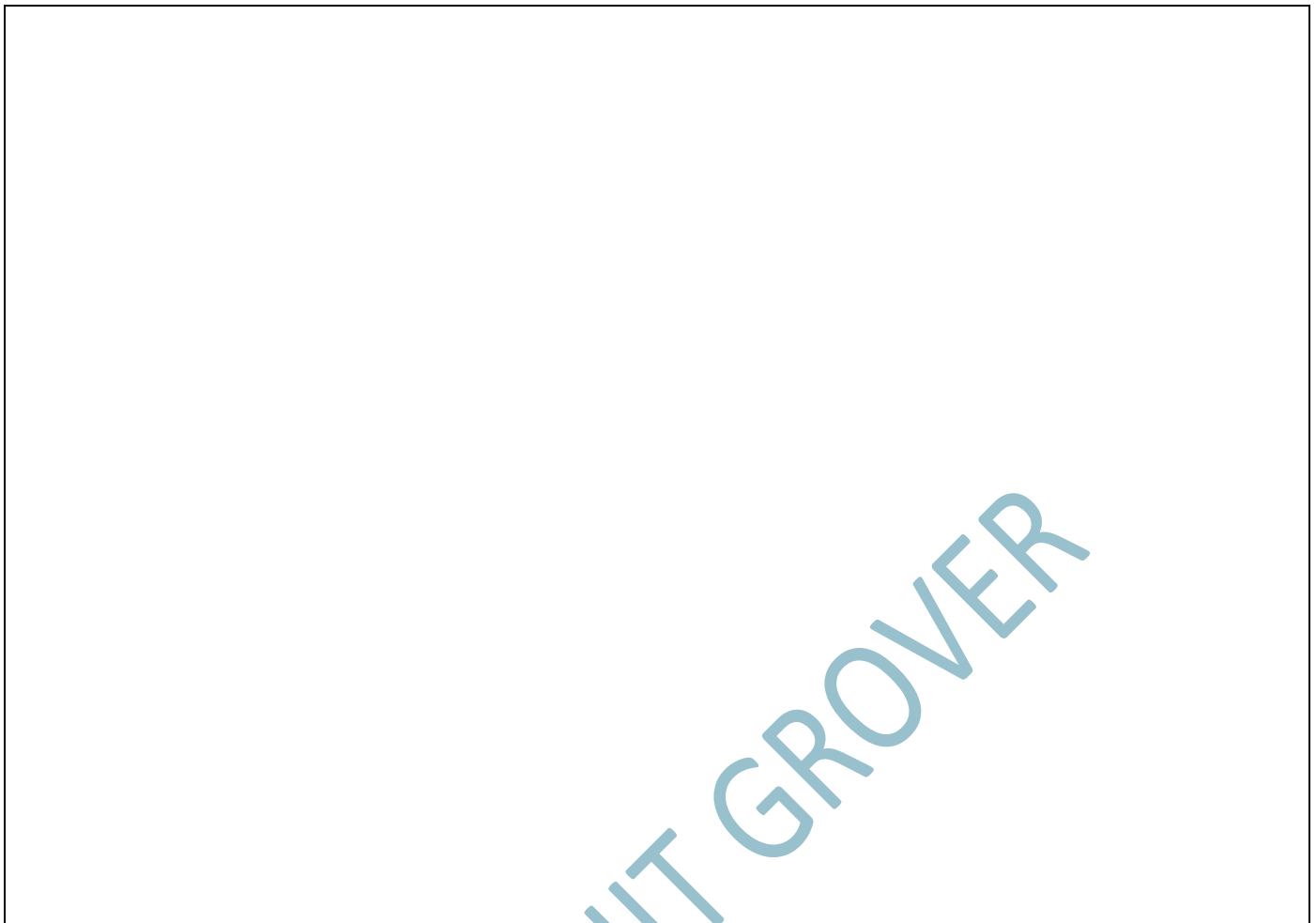X = Quantity of X commodity

P_y = Price of commodity

Y = Quantity of 'Y' commodity

Observations from Diagrammatic Representation of Budget Line

➢ *Attainable Combinations*:- All points on the budget line represent those combinations of goods that can be purchased with the given amount of budget and at which complete budget is spent. On the other hand, points inside budget line represents those combinations at which entire budget is not spent i.e. some part of it remains unspent

➢ **Unattainable Combinations**:- Any point outside Budget line represents unattainable combination i.e. these goods cannot be purchased with the given budget and price levels. These can become attainable only in following scenarios:-
   a) When prices of goods decrease
   b) When budget of the customer increases

➢ **Slope of Budget Line** :-

   The slope of budget line is equal to the ratio of the prices of two goods i.e. ratio of the prices of X to the price of Y. Thus, the slope of the budget line PL is $\frac{Px}{Py}$

Some other worth noting points about Budget Line

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Consumer Equilibrium under Ordinal Approach

Meaning	The consumer is said to be in equilibrium when he maximizes his satisfaction {i.e. utility), given the constraint of his limited budget
Assumptions:	1. The consumer has a fixed amount of money income to spend.
	2. The consumer intends to buy TWO GOODS.
	3. The Consumer is RATIONAL and tries to maximise his satisfaction.
	4. The prices of two goods are GIVEN and are CONSTANT. Therefore, budget line has constant slope.
	5. Goods are HOMOGENEOUS and DIVISIBLE.
	6. The scale of preference of consumer i.e. his taste & preferences remains unchanged. Scale of preference is expressed through indifference map.

How do we achieve Consumer Equilibrium

To explain the consumer's equilibrium under ordinal approach, we have to make use of TWO TOOLS of indifference curve analysis namely-

1. *the consumer's INDIFFERENCE MAP,* and

2. *his PRICE/BUDGET LINE.*

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- The CONSUMER'S INDIFFERENCE MAP shows all indifference curves which rank the consumer's preferences between various possible combinations of TWO commodities.
- To maximises his satisfaction consumer would like to reach highest possible indifference curve.
- The slope of IC at any one point shows the MARGINAL RATE OF SUBSTITUTION (which diminishes).

Thus, $MRSxy = \dfrac{MU_x}{MU_y}$

- To maximise satisfaction consumer will try to reach the highest possible IC and so will try to buy more and more of the two commodities.

But there are limits to which he can go on and on.

♦ These limits are imposed **(i)** his money income, & **(ii)** prices of the commodities. These limits are described by PRICE/BUDGET LINE which shows the various combinations of two commodities the consumer can afford to buy.

♦ All the combinations lying on the budget line are affordable by the consumer. Any, combination lying beyond budget line is unaffordable.

♦ The slope of budget/price line shows the ratio of the prices of two commodities i.e. $\dfrac{P_x}{P_y}$

♦ Now we can show how a consumer reaches equilibrium i.e., how he allocates his money expenditure between commodities X and Y and gets maximum satisfaction.

♦ For showing this, we will have to superimpose the price line on the indifference map as follows-
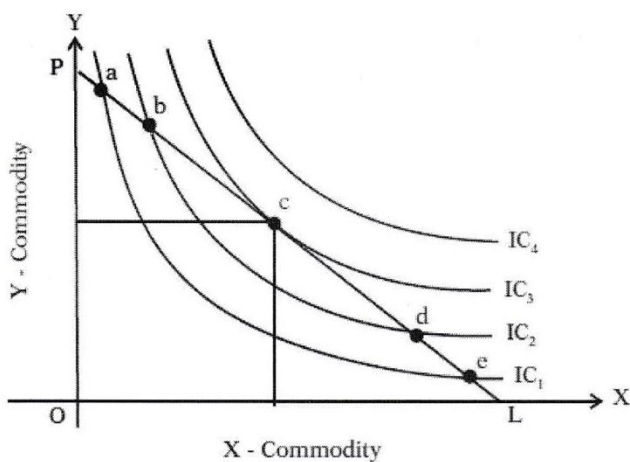
♦ In order to maximise his satisfaction, the consumer will try to reach highest IC i.e. IC$_4$.

♦ But the budget constraint forces him to remain ON THE BUDGET LINE.

♦ In the diagram, budget line PL shows all the combinations of X & Y that the consumer can buy. In diagram, we find combinations a, b, c, d, e lie on budget line PL and hence are affordable.

2.2 <u>Law of Demand and Elasticity of Demand</u>

- Law of Demand and Determinants of Demand
- Expansion and Contraction of Demand
- Increase and Decrease in Demand
- Elasticity of Demand
- Demand Forecasting

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The market system is governed by market mechanism. In a market system, the price of a commodity or service is determined by the forces of demand and supply. While buyers constitute the demand side of the market, sellers make the supply side of that market

Meaning of Demand

Initial Concept	The concept 'demand' refers to the quantity of a good or service that consumers are willing and able to purchase at various prices during a given period of time
Demand v/s Desire	It is to be noted that demand, in Economics, is something more than the desire to purchase, though desire is one element of it. A beggar, for instance, may desire food, but due to lack of means to purchase it, his demand is not effective. Thus, effective demand for a thing depends on desire means to purchase and willingness to use those means for that purchase. Unless desire is backed by purchasing power or ability to pay, and willingness to pay, it does not constitute demand. *Remember:- It is only the Effective demand alone which would figure in economic analysis and business decisions.*
Points to be noted about quantity demanded	Two things are to be noted about the quantity demanded:- The quantity demanded is always expressed **at a given price**. At different prices, different quantities of a commodity are generally demanded. The quantity demanded is a **flow**. We are concerned not with a single isolated purchase, but with a continuous flow of purchases and we must therefore express demand as 'so much per period of time' i.e., one thousand dozens of oranges per day, seven thousand dozens of oranges per week and so on
Final Definition of Demand	*"By demand, we mean the various quantities of a given commodity or service which consumers would buy in one market during a given period of time, at various prices, or at various incomes, or at various prices of related goods".*

Determinants of Demand

Price of the commodity:	Ceteris paribus i.e. other things being equal, the demand for a commodity is **inversely related** to its price. It implies that a rise in the price of a commodity brings about a fall in the quantity purchased and vice-versa. This happens because of income and substitution effects – *discussed in detail later on in the Chapter*
Price of related commodities:	Related commodities are of two types: (a) complementary goods and (ii) competing goods or substitutes. **Complementary goods** These are those goods which are consumed together or simultaneously. For example; tea and sugar, automobile and petrol and pen and ink. When two commodities are complements, a fall in the price of one (other things being equal) will cause the demand for the other to rise. For example, a fall in the price of petrol-driven cars would lead to a rise in the demand for petrol. Similarly, a fall in the price of fountain pens will cause a rise in the demand for ink. The reverse will be the case when the price of a complement rises. *Conclusion:- Thus, there is an inverse relation between the demand for a good and the price of its complement*. **Substitute Goods**

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	Two commodities are called competing goods or substitutes when they satisfy the same want and can be used with ease in place of one another. For example, tea and coffee, ink pen and ball pen, are substitutes for each other and can be used in place of one another easily. When goods are substitutes, a fall in the price of one (ceteris paribus) leads to a fall in the quantity demanded of its substitutes. For example, if the price of tea falls, people will try to substitute it for coffee and demand more of it and less of coffee i.e. the demand for tea will rise and that of coffee will fall. **Conclusion:**- *There is direct or positive relation between the demand for a product and the price of its substitutes*
Income of the consumer:	Other things being equal, the demand for a commodity depends upon the money income of the consumer. The purchasing power of the consumer is determined by the level of his income. **Normal Goods** In most cases, the larger the average money income of the consumer, the larger is the quantity demanded of a particular good. The nature of relationship between income and quantity demanded depends upon the nature of consumer goods. Most of the consumption goods fall under the category of normal goods. **These are demanded in increasing quantities as consumers' income increases**. Household furniture, clothing, automobiles, consumer durables and semi durables etc. fall in this category. Essential consumer goods such as food grains, fuel, cooking oil, necessary clothing etc., satisfy the basic necessities of life and are consumed by all individuals in a society. A change in consumers' income, although will cause an increase in demand for these necessities, but this increase will be less than proportionate to the increase in income. This is because as people become richer, there is a relative decline in the importance of food and other non durable goods

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	in the overall consumption basket and a rise in the importance of durable goods such as a TV, car, house etc. **Inferior Goods** There are some commodities for which the quantity demanded rises only up to a certain level of income and decreases with an increase in money income beyond this level. These goods are called inferior goods. ***How to differentiate between normal goods and inferior goods*** A same good may be normal for one condition and may be inferior in another. For example Bajra may become an inferior good for a person when his income increases above a certain level and he can now afford better substitutes such as wheat. Demand for luxury goods and prestige goods arise beyond a certain level of consumers' income and keep rising as income increases. ***How is this factor relevant for decision making*** Business managers should be fully aware of the nature of goods which they produce (or the nature of need which their products satisfy) and the nature of relationship of quantities demanded with changes in consumer incomes. For assessing the current as well as future demand for their products, they should also recognize the movements in the macro economic variables that a_ect the incomes of the consumers
Tastes and preferences of consumers:	The demand for a commodity also depends upon the tastes and preferences of consumers and changes in them over a period of time. Goods which are modern or more in fashion command higher demand than goods which are of old design and out of fashion. Consumers may perceive a product as obsolete and discard it before it is fully utilised and prefer another good which is currently in fashion. For example, there is greater demand for LCD/LED televisions and more and more people are discarding their ordinary television sets even though they could have used it for some more years. ***'Demonstration effect' or 'bandwagon effect'***:- It plays an important role in determining the demand for a product. An individual's demand for LCD/LED television may be affected by his seeing one in his neighbour's or friend's house, either because he likes what he sees or because he figures out that if his neighbour or friend can afford it, he too can. A person may develop a taste or preference for wine after tasting some, but he may also develop it after discovering that serving it enhances his prestige. ***Snob Effect or Veblen Effect*** On the contrary, when a product becomes common among all, some people decrease or altogether stop its consumption. This is called ***'snob effect'.*** Highly priced goods are consumed by status seeking rich people to satisfy their need for conspicuous consumption. This is called ***'Veblen effect'*** (named after the American economist Thorstein Veblen). In any case, people have tastes and preferences and these change, sometimes, due to external and sometimes, due to internal causes and influence demand.
Consumers' Expectations:	Consumers' expectations regarding future prices, income, supply conditions etc. in_uence current demand. If the consumers expect increase in future prices, increase in income and shortages in supply, more quantities will be demanded. If they expect a fall in price, they will postpone their purchases of nonessential commodities and therefore, the current demand for them will fall
Other Factors	
Size of population:	Generally, larger the size of population of a country or a region, greater is the demand for commodities in general

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Composition of population	If there are more old people in a region, the demand for spectacles, walking sticks, etc. will be high. Similarly, if the population consists of more of children, demand for toys, baby foods, toffees, etc. will be more
The level of National Income and its Distribution	The level of national income is a crucial determinant of market demand. **Higher the national income, higher will be the demand for all normal goods and services.** The wealth of a country may be unevenly distributed so that there are a few very rich people while the majority are very poor. Under such conditions, the propensity to consume of the country will be relatively less, because the propensity to consume of the rich people is less than that of the poor people. Consequently, the demand for consumer goods will be comparatively less. If the distribution of income is more equal, then the propensity to consume of the country as a whole will be relatively high indicating higher demand for goods.
Consumer-credit facility and interest rates:	Availability of credit facilities induces people to purchase more than what their current incomes permit them. Credit facilities mostly determine the demand for durable goods which are expensive and require bulk payments at the time of purchase. Low rates of interest encourage people to borrow and therefore demand will be more. Apart from above, factors such as government policy in respect of taxes and subsidies, business conditions, wealth, socioeconomic class, group, level of education, marital status, weather conditions, salesmanship and advertisements, habits, customs and conventions also play an important role in influencing demand

Demand Function

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

$$Dx = f (PX, M, PY, PC, T, A)$$

Where Dx is the quantity demanded of product X

PX is the price of the commodity

M is the money income of the consumer

PY is the price of its substitutes

PC is the price of its complementary goods

T is consumer tastes, and preferences

A is advertisement expenditure

Law of Demand

According to the law of demand, other things being equal, if the price of a commodity falls, the quantity demanded of it will rise and if the price of a commodity rises, its quantity demanded will decline. Thus, there is an inverse relationship between price and quantity demanded, *ceteris paribus*

Definition of the Law of Demand

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

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Demand Schedule

- ➢ A demand schedule is a table which presents the different prices of a good and the corresponding quantity demanded per unit of time.
- ➢ A demand schedule is drawn upon the assumption that all the other influences remain unchanged. It thus attempts to isolate the influence exerted by the price of the good upon the amount sold.

Demand schedule and curve may be two types:

(A) Individual demand schedule: It shows the quantity of the commodities that one consumer will buy at selected prices.

Price of sugar Rs. per kg.	Quantity Demanded kgs. per month
1	5
2	4
3	3
4	2
5	1

(B) Market demand schedule: It is a table showing different quantities of a commodity that ALL THE CONSUMERS are willing to buy at different prices, during a given period of time When we add the individual demands for various schedules we get market demand schedule.

Price of sugar Rs. per kg.	Quantity Demanded p.m. kgs.		Market Demand A + B
	Consumer A	Consumer B	
1	5	6	5 + 6=11
2	4	5	4 + 5 = 9
3	3	4	3 + 4 = 7
4	2	3	2 + 3 = 5
5	1	2	1+2 = 3

It indicates that both individual demand and market demand have inverse relationship between price and quantity demanded.

Demand Curve

- ➢ **A demand curve** is a graphical representation of a demand schedule or demand function.
- ➢ A demand curve for any commodity can be drawn by plotting each combination of price and demand on a graph. Price (independent variable) is taken on the Y-axis and quantity demanded (dependent variable) on the X-axis
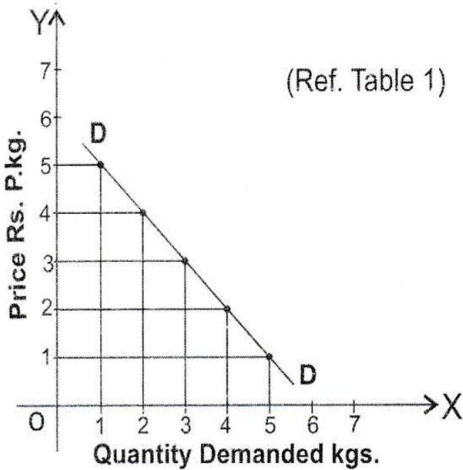
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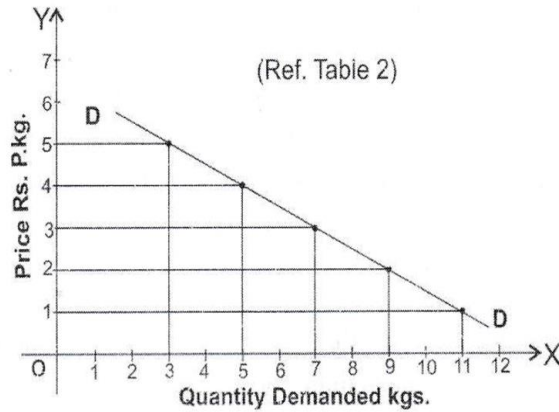(9310824912)

Figure: Individual Demand Curve

Figure: Market Demand Curve

Remember:- *Market Demand Curve is flatter than individual Demand Curve*

Rationale of Law of Demand

Different economists have given different explanations for the operation the of law of demand. These are given below:-

1) Law of diminishing marginal utility	A consumer is in equilibrium (i.e. maximises his satisfaction) when the marginal utility of the commodity and its price equalize. **According to Marshall, the consumer has diminishing utility for each additional unit of a commodity and therefore, he will be willing to pay only less for each additional unit**. A rational consumer will not pay more for lesser satisfaction. He is induced to buy additional units only when the prices are lower. The operation of diminishing marginal utility and the act of the consumer to equalize the utility of the commodity with its price result in a downward sloping demand curve.
2) Price effect:	The total fall in quantity demanded due to an increase in price is termed as Price effect. The law of demand can be dubbed as "Negative Price Effect" with some exceptions. The price effect manifests itself in the form of income effect and substitution effect. **(a) Substitution effect:** Hicks and Allen have explained the law in terms of substitution effect and income effect. When the price of a commodity falls, it becomes relatively cheaper than other commodities. Assuming that the prices of all other commodities remain constant, it induces consumers to substitute the commodity whose price has fallen for other commodities which have now become relatively expensive. The result is that the total demand for the commodity whose price has fallen increases. This is called **substitution effect**. **(b) Income effect:** When the price of a commodity falls, the consumer can buy the same quantity of the commodity with lesser money or he can buy more of the same commodity with the same amount of money. In other words, as a result of fall in the price of the commodity, consumer's real income or purchasing power increases. **This increase in the real income induces him to buy more of that commodity**. Thus, the demand for that commodity (whose price has fallen) increases. This is called **income effect**.
3) Arrival of new consumers:	When the price of a commodity falls, more consumers start buying it because some of those who could not afford to buy it earlier may now be able to buy it. This raises the number of consumers of a commodity at a lower price and hence the demand for the commodity in question

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

Exceptions to the Law of Demand

The law of demand is valid in most cases; however there are certain cases where this law does not hold good. The following are the important exceptions to the law of demand.

| *Conspicuous goods:*	Articles of prestige value or snob appeal or articles of conspicuous consumption are demanded only by the rich people and these articles become more attractive if their prices go up. Such articles will not conform to the usual law of demand. This was found out by Veblen in his doctrine of "Conspicuous Consumption" and hence this effect is called Veblen effect or prestige goods effect. Veblen effect takes place as some consumers measure the utility of a commodity by its price i.e., if the commodity is expensive they think that it has got more utility. As such, they buy less of this commodity at low price and more of it at high price. Diamonds are often given as an example of this case. Higher the price of diamonds, higher is the prestige value attached to them and hence higher is the demand for them
Giffen Goods	Sir Robert Giffen, a Scottish economist and statistician, was surprised to find out that as the price of bread increased, the British workers purchased more bread and not less of it. This was something against the law of demand. Why did this happen? The reason given for this is that when the price of bread went up, it caused such a large decline in the purchasing power of the poor people that they were forced to cut down the consumption of meat and other more expensive foods. Since bread, even when its price was higher than before, was still the cheapest food article, people consumed more of it and not less when its price went up. Such goods which exhibit direct price-demand relationship are called 'Giffen goods'. Generally those goods which are inferior, with no close substitutes easily available and which occupy a substantial place in consumer's budget are called 'Giffen goods'. **All Giffen goods are inferior goods; but all inferior goods are not Giffen goods**. Inferior goods ought to have a close substitute. Moreover, the concept of inferior goods is related to the income of the consumer i.e. the quantity demanded of an inferior good falls as income rises, price remaining constant as against the concept of giffen goods which is related to the price of the product itself. Examples of Giffen goods are coarse grains like bajra, low quality rice and wheat etc.
Conspicuous necessities:	The demand for certain goods is affected by the demonstration effect of the consumption pattern of a social group to which an individual belongs. These goods, due to their constant usage, become necessities of life. For example, in spite of the fact that the prices of television sets, refrigerators, coolers, cooking gas etc. have been continuously rising, their demand does not show any tendency to fall.
Future expectations about prices:	It has been observed that when the prices are rising, households expecting that the prices in the future will be still higher, tend to buy larger quantities of such commodities. For example, when there is wide-spread drought, people expect that prices of food grains would rise in future. They demand greater quantities of food grains as their price rise. However, it is to be noted that here it is not the law of demand which is invalidated but there is a change in one of the factors which was held constant while deriving the law of demand, namely change in the price expectations of the people

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Irrational behaviour of Consumers	The law has been derived assuming consumers to be rational and knowledgeable about market-conditions. However, at times, consumers tend to be irrational and make impulsive purchases without any rational calculations about the price and usefulness of the product and in such contexts the law of demand fails.
Demand for necessaries:	The law of demand does not apply much in the case of necessaries of life. Irrespective of price changes, people have to consume the minimum quantities of necessary commodities. Similarly, in practice, a household may demand larger quantity of a commodity even at a higher price because it may be ignorant of the ruling price of the commodity. Under such circumstances, the law will not remain valid. For example Food, power, water, gas
Speculative goods:	In the speculative market, particularly in the market for stocks and shares, more will be demanded when the prices are rising and less will be demanded when prices decline.

<u>Expansion and Contraction of Demand</u> (changes in quantity demanded. Or **movement** along a **demand curve**)

Expansion and contraction of demand means changes in quantity demanded due to change in the price of the commodity other determinants like income, tastes, etc. remaining constant or unchanged.

- ➢ When price of a commodity falls, its quantity demanded rises. This is called expansion of demand.
- ➢ When price of a commodity rises, its quantity demanded falls. This is called contraction of demand.

As other determinants of price like income, tastes, price of related goods etc. are constant, the position of the demand curve remains the same. The consumer will move upwards or downwards on the same demand curve.
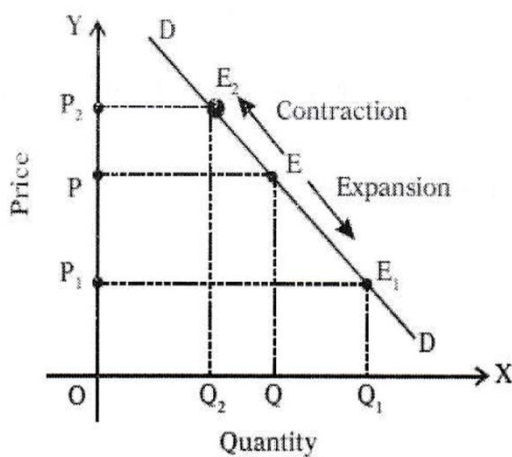
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♦ At price OP quantity demanded is OQ.

♦ With a fall in price to OP$_1$, the quantity demanded rises from OQ to OQ$_1$. The coordinate point moves down from E to E$_1$. This is called 'expansion of demand' or 'a rise in quantity demanded' or 'downward movement on the same demand curve'.

♦ At price OP quantity demanded is OQ.

♦ With a rise in price to P$_2$, the quantity demanded falls from OQ to OQ$_2$. The coordinate point moves up from E to E$_2$. This is called **'contraction of demand'** or 'a **fall in quantity demanded'** or **'upward movement on the same demand curve'.**

 Figure : Expansion and Contraction of Demand

♦ Thus, the downward movement on demand curve is known as expansion in demand and an upward movement on demand curve is known as contraction of demand.

<u>Increase and Decrease in demand</u> (changes in demand OR **shift in demand** curve)

♦ When there is change in demand due to change in factors **other than price** of the commodity, it is called **increase or decrease in demand.**

♦ It is the result of change in consumer's income, tastes and preferences, changes in population, changes in the distribution of income, etc.

- ➢ Thus, price remaining the same when demand rises due to change in factors other than price, it is called **increase in demand. Here, more quantity is purchased at same price or same quantity is purchased at higher price.**

- ➢ Likewise price remaining the same when demand falls due to change in factors other than price, it is called **decrease in demand. Here, less quantity is purchased at same price or** same **quantity is purchased at lower price.**

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> In above cases demand curve shifts from its original position **to rightward when demand increases** and to **leftward when demand decreases.** Thus, change in demand curve as a result of increase or decrease in demand, is technically called **shift in demand curve.**
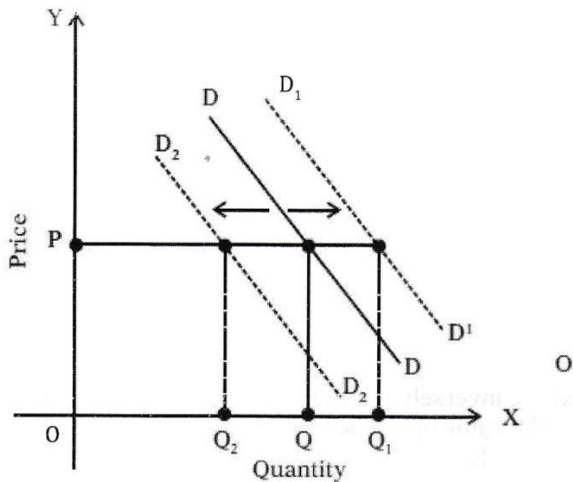
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■ Original demand curve is DD. At OP price OQ quantity is being demanded.

■ As the demand changes, the demand curve shifts either to the right (D_1D_1) or to the left

(D_2D_2)

■ At D_1D_1, OQ_1 quantity is being demanded at the price OP. **This shows increase in demand (rightward shifts in demand curve)** due to factor other than price.

Figure : Increase and Decrease in demand

♦ At D_2D_2, QO_2 quantity is being demanded at the price OP. **This shows decrease in demand (leftward shift in demand curve)** due to a factor other than price.

♦ **When demand of a commodity INCREASES due to factors other than price, firms can sell a larger quantity at the prevailing price and earn higher revenue.**

♦ **The aim of advertisement and sales promotion activities is to shift the demand curve to the right and to reduce the elasticity of demand.**

Elasticity of Demand

Definition: Elasticity of demand is defined as the responsiveness of the quantity demanded of a good to changes in one of the variables on which demand depends. More precisely, elasticity of demand is the percentage change in quantity demanded divided by the percentage change in one of the variables on which demand depends.

> These variables are price of the commodity, prices of the related commodities, income of the consumers and other factors on which demand depends.
> Thus, we have price elasticity, cross elasticity, income elasticity, advertisement elasticity and elasticity of substitution,.
> It is to be noted that when we talk of elasticity of demand, unless and until otherwise mentioned, we talk of price elasticity of demand. In other words, it is price elasticity of demand which is usually referred to as elasticity of demand

1) **Price Elasticity**
   > Price elasticity measures the degree of responsiveness of quantity demanded of a commodity to a change in its price, given the consumer's income, his tastes and prices of all other goods. **It reflects how sensitive buyers are to change in price.**
   > Price elasticity of demand can be defined **'(as a ratio of the percentage change in the quantity demanded of a commodity to the percentage change in its own price".**

It may be expressed as follows:

$$E_p = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}} = \frac{\frac{\text{Change in Price}}{\text{Original Price}} \times 100}{\frac{\text{Change in Quantity}}{\text{Original Quantity}} \times 100}$$

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$$\frac{\text{Change in Quantity demanded}}{\text{Quantity demanded}} \div \frac{\text{Change in Price}}{\text{Price}}$$

$$= E_p = \frac{\Delta q}{q} \div \frac{\Delta p}{P}$$

Rearranging the above expression we get:

$$E_P = \frac{\Delta q}{q} \times \frac{P}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{P}{q}$$

Where—

q = Original quantity demanded

p = Original price

Δ = indicates change

E_p = price elasticity

<u>*Remember:-*</u> Since price and quantity demanded are inversely related, the value of price elasticity coefficient will always be negative. But for the value of elasticity coefficients we ignore the negative sign and consider the numerical value only.

Illustrations

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

Solution: Price elasticity = (-) Δ q / Δ p × p/q = 5/2 × 6/10 = (-) 1.5

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

Solution :- Price elasticity = Percentage change in quantity demanded Percentage change in price = 15% / 5% = 3 Comment: The good in question has elastic demand.

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

Solution:- Ep = _q/_p * p/q , Here Δ q 40 100 30 x = 1.5 1.5 x 1200 100 = = 18 Δ q

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

The degrees (types) of price elasticity of demand.

Price elasticity measures the degree of responsiveness of quantity demanded of a commodity to a change in its price. Depending upon the degree of responsiveness of the quantity demanded to the price changes, we can have the following kinds of price elasticity of demand.

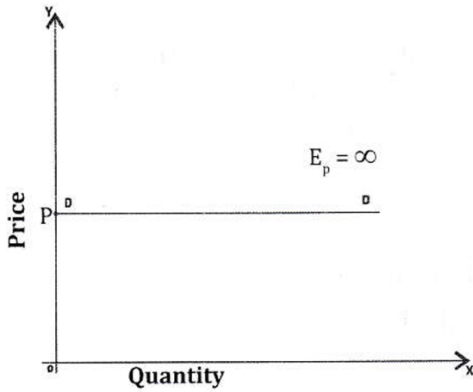**1. Perfectly Inelastic Demand:** (E_p = 0):
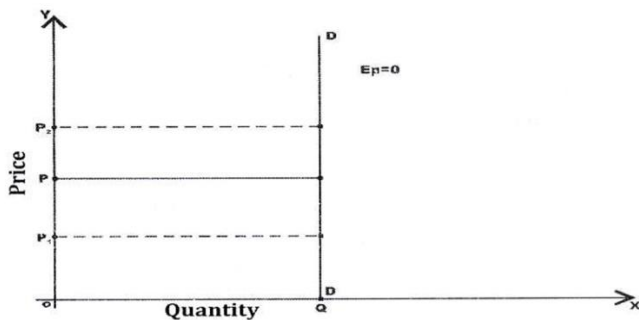
When change in price has no effect on quantity demanded, then demand is perfectly inelastic. E.g. - If price falls by 20% and the quantity demanded remains unchanged then,

$E_P = \frac{0}{20} = 0$. In this case, the demand curve is a vertical straight line curve parallel to y-axis as shown in the figure.

The figure shows that, whatever the price, quantity demanded of the commodity remains unchanged at OQ.

2. Perfectly Elastic Demand: ($E_p = \infty$):

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When with no change in price or with very little change in price, the demand for a commodity expands or contracts to any extent, the demand is said to be perfectly elastic. In this case, the demand curve is a horizontal and parallel to X-axis.

The figure shows that demand curve DD is parallel to X-axis which means that at given price, demand is ever increasing.
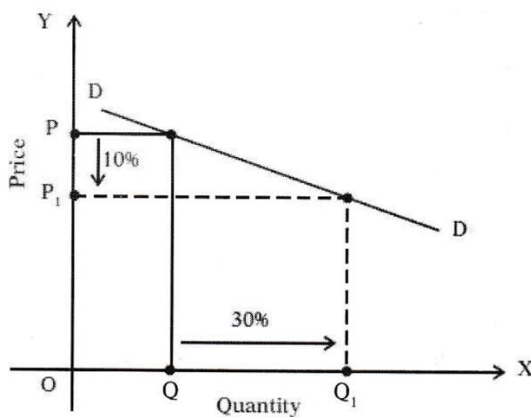
3. **Unit Elastic Demand:** (E = 1):
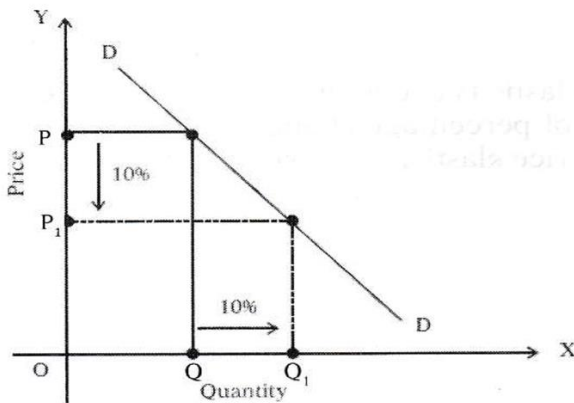
When the percentage or proportionate change in price is equal to the percentage or proportionate change in quantity demanded, then the demand is said to be unit elastic. E.g. If price falls by **10%** and the demand rises by **10%** then, **Demand Curve DD is a rectangular hyperbola curve suggesting unitary elastic demand.**
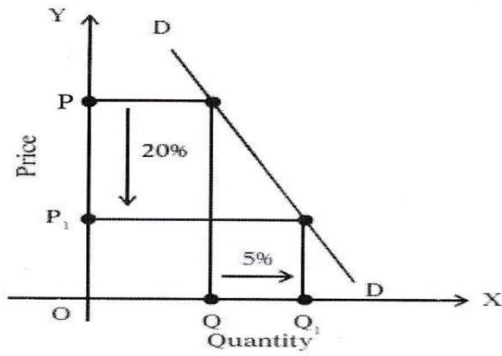
$$E_P = \frac{10}{10} = 1$$

4. Relatively Elastic Demand: (E_p >1):

When a small change in price leads to more than proportionate change in quantity demanded then the demand is said to be relatively elastic E.g. If price falls by 10% and demand rises by 30% then, $E_p = \frac{30}{10} = 3 > 1$. The coefficient of price elasticity would be somewhere between ONE and INFINITY. The elastic demand curve is flatter as shown in figure.

Demand curve DD is flat suggesting that the demand is relatively elastic or highly elastic. Relatively elastic demand occurs in case of less urgent wants or if the expenditure on commodity is large or if close substitutes are available

5. **Relatively Inelastic Demand:** (E_P < 1):

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When a big change in price leads to less than proportionate change in quantity demanded, then the demand is said to be relatively inelastic. E.g. If price falls by 20% and demand rises by 5%

then, $Ep = \frac{5}{20} = \frac{1}{4} < 1$ The coefficient of price

elasticity is somewhere between ZERO and ONE. The demand curve in this case has steep slope.

Demand curve DD is steeper suggesting that demand is less elastic or relatively inelastic. Relatively inelastic demand occurs in case compulsory goods i.e. necessities of life.

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

Measurement of price elasticity of demand.

The different methods of measuring price elasticity of demand are:

1. The Percentage or Ratio or Proportional Method,

2. The Total Outlay Method,

3. The Point or Geometrical Method, and

4. The Arc Method.

1. The Percentage Method:

This method is based on the definition of elasticity of demand. The coefficient of price elasticity of demand is measured by taking ratio of percentage change in demand to the percentage change in price. Thus, we measure the price elasticity by using the following formula—

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

Where—

Δ q = Change in quantity demanded

q = Original quantity demanded

Δ p = change in price

p = Original price

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- If the coefficient of above ratio is equal to ONE or UNITY, the demand will be unitary.
- If the coefficient of above ratio is MORE THAN ONE, the demand is relatively elastic.
- If the coefficient of above ratio is LESS THAN ONE, the demand is relatively inelastic.

2. The Total Outlay or Expenditure Method or Seller's Total Revenue Method:

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

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

TO = P × Q

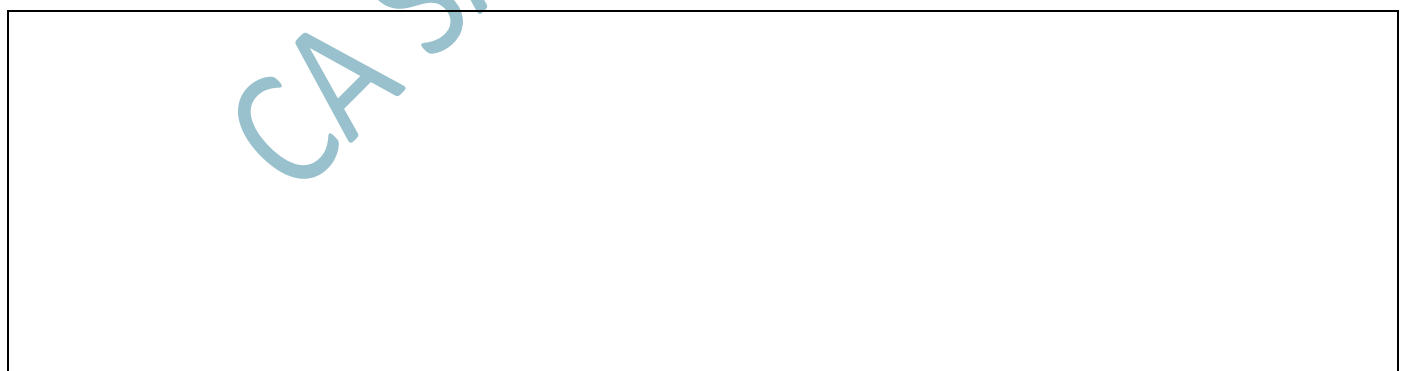In this method, we measure price elasticity by examining the change in total outlay due to change in price.

Dr. Alfred Marshall laid the following propositions:

(a) When with the change in price, the TO remains unchanged, $E_p = 1$.

(b) When with a rise in price, the TO falls or with a fall in price, the TO rises, $E_p > 1$.

(c) When with a rise in price, the TO also rises and with a fall in price, the TO also falls, $E_p < 1$.

Price per Unit (Rs.)	Quantity Demanded	Total Outlay (P × Q)	Elasticity of Demand
5	20 Units	100	$E_P = 1$
4	25 Units	100	Unitary
5	20 Units	100	$E_P > 1$
4	30 Units	120	Elastic
5	20 Units	100	$E_P < 1$
4	22 Units	88	Inelastic

■ However, total outlay method of measuring price elasticity is less exact. This method only classifies elasticity into elastic, inelastic and unit elastic.

■ The exact and precise coefficient of elasticity cannot be found out with this method.

3. The Point Method or Geometric Method:

- The point elasticity method, we measure elasticity at a given point on a demand curve.
- This method is useful when changes in price and quantity demanded are very small (infinitesimal) so that they can be considered one and the same point only.

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E.g. If price of X commodity was Rs. 5,000 per unit and now it changes to Rs. 5002 per unit which is very small change. In such a situation we measure elasticity at a point on demand curve by using formula $\frac{\Delta q}{\Delta p} \times \frac{P}{q}$

■ Diagrammatically also we can find elasticity at a point by using the formula—

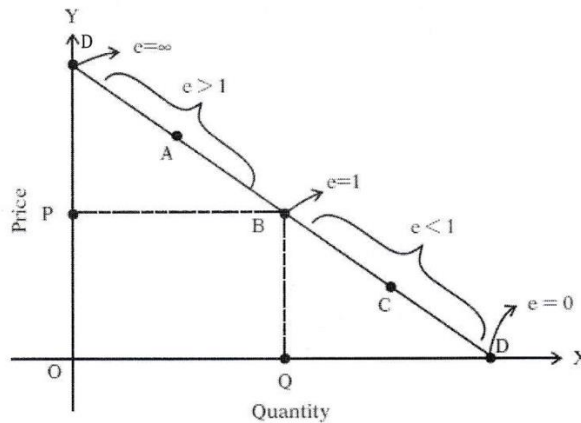$E_P = \dfrac{\text{Lower Segment of the Demand Curve}}{\text{Upper Segment of the Demand Curve}}$


Figure :

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

4. The Arc Elasticity Method:

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

■ The arc elasticity is a measure of the "average elasticity" i.e. elasticity at MID-POINT that connects the two points on the demand curve.

■ Thus, an arc is a portion of a curved line, hence a portion of a demand curve. Here instead of using original or new data as the basis of measurement, we use average of the two.
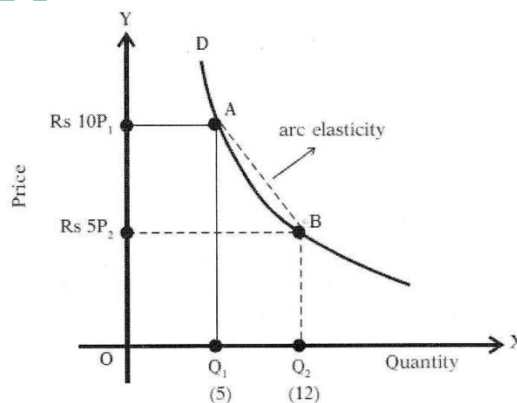
♦ The formula used is—

$E_P = \dfrac{q_1 - q_2}{q_1 + q_2} \times \dfrac{p_1 + p_2}{p_1 - p_2}$

Where – P_1 & q_1 = Original price and quantity

p_2 & q_2 = new price and quantity

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

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

$E_p = 1.23$

Determinants of Price Elasticity of Demand

Availability of substitutes:	One of the most important determinants of elasticity is the degree of availability of close substitutes. In case of commodities like butter, cabbage, Maruti Car, Coca Cola, etc. having close substitutes, a change in the price of these commodities, the prices of the substitutes remaining constant, can be expected to cause quite substantial substitution – a fall in price leading consumers to buy more of the commodity in question and a rise in price leading consumers to buy more of the substitutes. Commodities such as salt, housing, and all vegetables taken together, have few, if any, satisfactory substitutes and a rise in their prices may cause a smaller fall in their quantity demanded. *Thus, we can say that goods which typically have close or perfect substitutes have highly elastic demand curves. Moreover, wider the range of substitutes available, the greater will be the elasticity.* <u>*Point to be noted*</u>:- It should be noted that while as a group, a good or service may have inelastic demand, but when we consider its various brands, we say that a particular brand has elastic demand. Thus, while the demand for a generic good like petrol is inelastic, the demand for Indian Oil's petrol is elastic. Similarly, while there are no general substitutes for health care, there are substitutes for one doctor or hospital.
Position of a commodity in a consumer's budget:	*The greater the proportion of income spent on a commodity; generally the greater will be its elasticity of demand and vice- versa.* The demand for goods like common salt, matches, buttons, etc. tend to be highly inelastic because a household spends only a fraction of their income on each of them. On the other hand, demand for goods like clothing, tends to be elastic since households generally spend a good part of their income on clothing
Nature of the need that a commodity satisfies:	In general, *luxury goods are price elastic while necessities are price inelastic*. Thus, while the demand for television is relatively elastic, the demand for food and housing, in general, is inelastic. *If it is possible to postpone the consumption of a particular good, such good will have elastic demand*. Consumption of necessary goods cannot be postponed and therefore, their demand is inelastic.
Number of uses to which a commodity can be put:	*The more the possible uses of a commodity, the greater will be its price elasticity and vice versa*. When the price of a commodity which has multiple uses decreases, people tend to extend their consumption to its other uses. To illustrate, milk has several uses. If its price falls, it can be used for a variety of purposes like preparation of curd, cream, ghee and sweets. But, if its price increases, its use will be restricted only to essential purposes like feeding the children and sick persons.
Time period:	*The longer the time-period one has, the more completely one can adjust*. For example:- In response to a higher petrol price, one can, in the short run, make fewer trips by car. In the longer run, not only can one make fewer trips, but he can purchase a car with a smaller engine capacity when the time comes for replacing the existing one. Hence one's demand for petrol falls by more when one has made long term adjustment to higher prices

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Consumer habits:	If a consumer is a habitual consumer of a commodity, no matter how much its price change, the demand for the commodity will be inelastic
Tied demand:	The demand for those goods which are tied to others is normally inelastic as against those whose demand is of autonomous nature. For example printers and ink cartridges
Price range:	Goods which are in very high price range or in very low price range have inelastic demand, but those in the middle range have elastic demand

How is concept of Price Elasticity relevant in Business Economics

Relevance for Business Managers	Knowledge of the price elasticity of demand and the factors that may change it is of key importance to business managers *because it helps them recognise the effect of a price change on their total sales and revenues*. Price elasticity of demand for the goods they sell helps them in arriving at an **optimal pricing strategy**. If the demand for a firm's product is relatively elastic, the managers need to recognize that lowering the price would expand the volume of sales, and result in an increase in total revenue. On the other hand, if demand were relatively inelastic, the firm may safely increase the price and thereby increase its total revenue as they know that the fall in sales would be less than proportionate.
Relevance for Governments	Knowledge of price elasticity of demand is important for governments *while determining the prices of goods and services provided by them*, such as, transport and telecommunication. Further, it also helps the governments to understand the nature of responsiveness of demand to the increase in prices *on account of additional taxes and the implications of such responses on the tax revenue*s. Elasticity of demand explains why Governments are inclined to raise the indirect taxes on those goods that have a relatively inelastic demand, like alcohol and tobacco products.

Income Elasticity of Demand

♦ The income elasticity of demand measures the degree of responsiveness of quantity demanded to changes in income of the consumers.

♦ The income elasticity is defined as a ratio of percentage change in the quantity demanded to the percentage change in income.

Income Elasticity = $\dfrac{\text{\% Change in Quantity Demanded}}{\text{\% Change in Income}}$

Symbolically - $E_Y = \dfrac{\Delta Q}{\Delta Y} \times \dfrac{Y}{Q}$

Where - ΔQ & ΔY denote new quantity & income.

Q & Y denote original quantity & income.

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

1. Zero Income Elasticity:

- It means that a given increase in income does not at all lead to any increase in quantity demanded of the commodity.

- In other words, demand for the commodity is completely income inelastic or E = 0. ' '

- Commodities having zero income elasticity are called NEUTRAL GOODS.

E.g. - Demand in case of SALT, MATCH BOX, KEROSENE OIL, POST CARDS, etc.

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2. Negative Income Elasticity:

- It means that an increase in income results in fall in the quantity demanded of the commodity or $E_y < 0$.

- Commodities having negative income elasticity are called INFERIOR GOODS. **E.g.** - Jawar, Bajra, etc.

3. Unitary Income Elasticity:

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

4. Income Elasticity Greater Than Unity:

- It refers to a situation where the consumers spends GREATER proportion of his income on a commodity when he becomes richer. $E_y > 1$,

E.g. In the case of **LUXURIES** like cars, TV. sets, music system, etc.

5. Income Elasticity Less Than Unity:
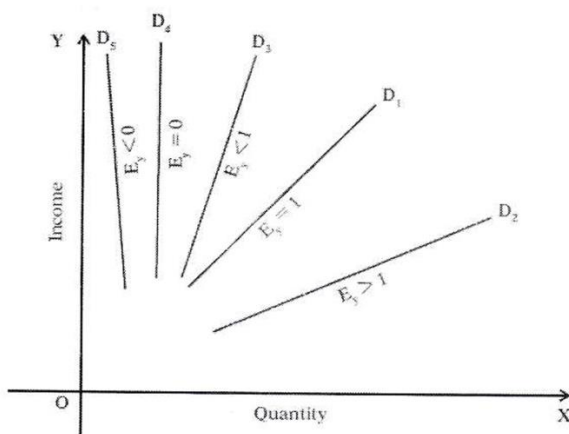
- It refers to a situation where the consumer spends a SMALLER proportion of his income on a commodity when he becomes richer. $E_y < 1$,

E.g. In the case of **NECESSITIES** like rice, wheat, etc.

ig. Income Elasticity

Point to remember:-

It is to be noted that the words 'luxury', 'necessity', 'inferior good' do not signify the strict dictionary meanings here. In economic theory, we distinguish them in the manner shown above (i.e. based on their income elasticity)

How is Income Elasticity relevant in Business Economics

Knowledge of income elasticity of demand is very useful for a business firm in estimating future demand for its products. *Knowledge of income elasticity of demand helps firms predict the outcome of a business cycle on its market demand*. This enables the firm to carry out appropriate production planning and management

Cross Elasticity of Demand

➤ Many times demand for two goods are related to each other.
➤ Therefore, when the price of a particular commodity changes, the demand for other commodities changes, even though their own prices have not changed. We measures this change under cross elasticity.
➤ The cross elasticity of demand can be defined **"as the degree of responsiveness of demand for a commodity to a given change in the price of some RELATED commodity" OR "as the ratio of percentage change in quantity demanded of commodity X to a given percentage change in the price of the related commodity Y".** Symbolically:

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$$E_c = \frac{\%\text{Change in demand of X}}{\%\text{ Change in the price of Y}}$$

$$E_C = \frac{\Delta qx}{\Delta py} \times \frac{py}{qx}$$

Where E_c = cross elasticity

qx = Original quantity of X which is demanded

py = Original price of Y
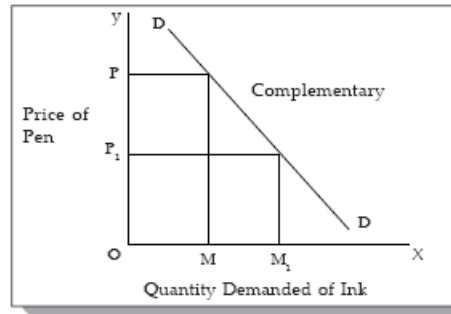
Δ = denotes change

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

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

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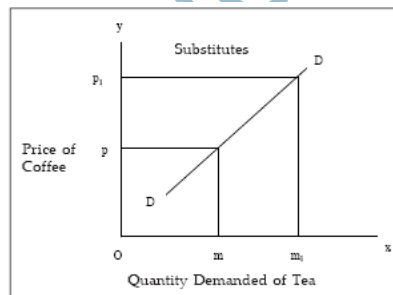
♦ Cross elasticity of demand can be used to classify goods as follows:-

1. Substitute Goods: E.g.: Tea and Coffee. The cross elasticity between two substitutes is always POSITIVE. In the case of substitute commodities, the cross demand curve slopes upwards (i.e. positively) showing that more quantities of a commodity, will be demanded whenever there is a rise in the price of a substitute commodity. *If cross elasticity is infinite, the two goods are perfect substitute* and if it is greater than zero but less than infinity, the goods are substitutes.

2. **Independent Goods: E.g.:** Pastry and Scooter. The two commodities are not related. The cross elasticity in such cases is ZERO.

3. **Complementary Goods: E.g.:** Petrol and Car. If the price of petrol rise, its demand falls and along with it demand for cars also falls. The cross elasticity in such cases is NEGATIVE. In the case of complementary goods, as shown in the figure below, a change in the price of a good will have an opposite reaction on the demand for the other commodity which is closely related or complementary. *Higher the negative cross elasticity, higher will be the extent of complementarity.*

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Relevance of Cross Elasticity in Business Economics

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

Advertisement Elasticity

♦ Demand of many goods is also influenced by advertisement or promotional efforts.

♦ It means that the demand for a good is responsive to the advertisement expenditure incurred by a firm.

♦ The measurement of the degree of responsiveness of demand of a good to a given change in advertisement expenditure is called advertisement or promotional elasticity of demand.

♦ It measures the percentage change in demand to a give ONE PERCENTAGE change in advertising expenditure. It helps a firm to know the effectiveness of its advertisement campaign.

♦ Advertisement elasticity of demand is POSITIVE. Higher the value, higher is change in demand to change in advertisement expenditure.

$$E_a = \frac{\% \text{ Change in Demand}}{\% \text{ Change in Advertisement Expenditure}}$$

$$E_a = \frac{\Delta Q}{\Delta A} \times \frac{A}{Q}$$

Where -

A = advertisement expenditure

Q = quantity demanded

Δ =change

♦ The value of advertisement elasticity varies between **zero and infinity.** If-

1. $E_a = 0$, no change in demand to increase in advertisement expenditure

2. $E_a > 0$ but < 1, less than proportionate change in demand to a change in advertisement expenditure

3. $E_a = 1$, change in demand is equal to change in advertisement expenditure

4. $E_a > 1$, higher rate of change in demand than change in advertisement expenditure

Relevance of Advertisement Elasticity for Business Managers

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

Demand Forecasting

Meaning	Forecasting of demand is the *art and science* of predicting the probable demand for a product or a service at some future date on the basis of

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	certain past behaviour patterns of some related events and the prevailing trends in the present. It should be kept in mind that demand forecasting is no *simple guessing*, but it refers to estimating demand *scientifically and objectively* on the basis of certain facts and events relevant to forecasting.
Why is it useful	
Demand forecasting is an important function of managers as it reduces uncertainty of environment in which DECISIONS are made. Further, it helps in PLANNING for future level of production. Its significance can be stated as follows:	
Production Planning:	Demand forecasting is a pre-requisite for planning of production in a firm. Expansion of production capacity depends upon likely demand for its output. Otherwise, there may be overproduction or underproduction leading to losses
Sales Forecasting	Sales forecasting depends upon demand forecasting. Promotional efforts of the firm like advertisements, suitable pricing etc. should be based on demand forecasting
Control of Business	Demand forecast provide information for budgetary planning and cost control in functional area of finance and accounting
Inventory Control	Demand forecasting helps in exercising satisfactory control of business inventories like raw-materials, intermediate goods, semi-finished goods, spare parts, etc. Estimates of future requirement of inventories is to be done regularly and it can be known from demand forecasts
Capital Investments	Capital investments yield returns over many years in future. Decision about investment is to be taken by comparing **rate of return on capital investment and current rate of interest.** Demand forecasting helps in taking investment decisions

Scope of Forecasting

➢ Demand forecasting can be at the **international level** depending upon the area of operation of the given economic institution.

➢ It can also be **confined to a given product or service** supplied by a small firm in a local area.

How to decide the scope

▪ The scope of the forecasting task will depend upon *the area of operation of the firm* in the present as well as what is proposed in future.

▪ Much would depend upon the *cost and time involved in relation to the benefit* of the information acquired through the study of demand. The necessary *trade-off* has to be struck between the cost of forecasting and the benefits flowing from such forecasting.

Types of Forecasts

Based on Scope of Study	
Macro-level forecasting	It deals with the general economic environment prevailing in the economy as measured by the Index of Industrial Production (IIP), national income and general level of employment etc.
Industry-level forecasting	It is concerned with the demand for the industry's products as a whole. For example, demand for cement in India.
Firm-level Forecasting	It refers to forecasting the demand for a particular firm's product, say, the demand for ACC cement.
Based on time period	
Short-term demand forecasting	It covers a short span of time, depending of the nature of industry. It is done usually for six months or less than one year and is generally useful in tactical decisions

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Long-term forecasts	These are for longer periods of time, say two to five years and more. It provides information for major strategic decisions of the firm such as expansion of plant capacity

Demand Distinction

A) Producer's goods v/s Consumer's Goods	
Producer's Goods	Producer's goods are those which are used for the production of other goods - either consumer goods or producer goods themselves. Examples of such goods are machines, plant and equipments
Consumer's Goods	Consumer's goods are those which are used for final consumption. Examples of consumer's goods are readymade clothes, prepared food, residential houses, etc.
B) Durable Goods v/s Non-durable goods	
Durable Goods	Durable goods do not quickly wear out, can be consumed more than once and yield utility over a period of time. Examples of durable consumer goods are: cars, refrigerators and mobile phones. Building, plant and machinery, office furniture etc are durable producer goods. The demand for durable goods is likely to be derived demand.
Non-durable goods	Non-durable goods are those which cannot be consumed more than once. Raw materials, fuel and power, packing items etc are examples of non-durable producer goods. Beverages, bread, milk etc. are examples of non-durable consumer goods. These will meet only the current demand.
Semi-durable goods	Goods like clothes and umbrella are semi-durable in nature since they possess the characteristics of both types of goods
C) Derived Demand v/s Autonomous Demand	
Derived Demand	The demand for a commodity that arises because of the demand for some other commodity called 'parent product', 'is called derived demand. For example, the demand for cement is derived demand, being directly related to building activity. In general, the demand for producer goods or industrial inputs is derived demand. Also the demand for complementary goods is derived demand
Autonomous Demand	If the demand for a product is independent of the demand for other goods, then it is called autonomous demand. It arises on its own out of an innate desire of the consumer to consume or to possess the commodity *Remember:- This distinction between derived and autonomous demand is purely arbitrary and it is very difficult to find out which product is entirely independent of other products*.
D) Demand for Firm v/s Industry Demand	
Industry Demand	The term industry demand is used to denote the total demand for the products of a particular industry, e.g. the total demand for steel in the country
Demand for Firm's products	The demand for firm's product denotes the demand for the products of a particular firm, i.e. the quantity that a firm can dispose off at a given price over a period of time. E.g. demand for steel produced by the Tata Iron and Steel Company. The demand for a firm's product when expressed as a percentage of industry demand signifies the market share of the firm.
E) Short-run Demand and Long-run Demand	
Short run demand	Short-run demand refers to demand with its immediate reaction to changes in product price and prices of related commodities, income fluctuations, ability of the consumer to adjust their consumption pattern, their susceptibility to advertisement of new products etc.
Long-run demand	Long-run demand refers to demand which exists over a long period. Most generic goods have long-term demand. Long term demand depends on long-term income trends, availability of substitutes, credit facilities etc.

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	In short, long-run demand is that which will ultimately exist as a result of changes in pricing, promotion or product improvement, *after enough time is allowed to let the market adjust to the new situation*. For example, if electricity rates are reduced, in the short run, the existing users will make greater use of electric appliances. In the long-run, more and more people will be induced to use electric appliances

Analysis of Demand Specific Factors

Factors affecting demand of non-durable consumer goods	
Disposable income:	Other things being equal, the demand for a commodity depends upon the disposable income of the household. Disposable income is found out by deducting personal taxes from personal income.
Price	Other things being equal, the demand for a commodity depends upon its own price and the prices of related goods (its substitutes and complements). While the demand for a good is inversely related to its own price and the price of its complements, it is positively related to the price of its substitutes.
Demography	This involves the characteristics of the population, human as well as non-human, using the product concerned. For example, it may pertain to the number and characteristics of children in a study of demand for toys and characteristics of automobiles in a study of the demand for tyres or petrol
Remember Non-durables are purchased for current consumption only. From a business firm's point of view, demand for non-durable goods gets repeated depending on the nature of the non-durable goods. Usually, non-durable goods come in wide varieties and there is competition among the sellers to acquire and retain customer loyalty	
Factors affecting demand of durable-consumer goods	
Postponement of demand	A consumer can postpone the replacement of durable goods. Whether a consumer will go on using the good for a long time or will replace it depends upon factors like his social status, prestige, level of money income, rate of obsolescence etc.
Special facilities	These goods require special facilities for their use e.g. roads for automobiles, and electricity for refrigerators and radios. The existence and growth of such factors is an important variable that determines the demand for durable goods
Impact of Households	As consumer durables are used by more than one person, the decision to purchase may be influenced by family characteristics like income of the family, size, age distribution and sex composition. Likely changes in the number of households should be considered while determining the market size of durable goods.
Replacement demand	Replacement demand is an important component of the total demand for durables. Greater the current holdings of durable goods, greater will be the replacement demand. Therefore, all factors that determine replacement demand should be considered as a determinant of the demand for durable goods
Prices and Credit availability	Demand for consumer durables is very much influenced by their prices and credit facilities available to buy them like hire purchase, low interest rates, etc. available to buy them. More the easy credit facilities higher is the demand for goods like two wheelers, cars TVs. etc
Factors affecting demand of producer goods	
Derived Demand	Since producers' goods or capital goods help in further production, the demand for them is **derived demand**, derived from the demand of consumer goods they produce. The demand for them depends upon the *rate of profitability of user industry and the size of the market of the user industries*. Hence data required for estimating demand for producer goods (capital goods) are: (i) growth prospects of the user industries; (ii) norms of consumption of capital goods per unit of installed capacity.

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

Methods of Demand Forecasting

The firm has to apply a proper mix of judgment and scientific formulae in order to correctly predict the future demand for a product. The following are the commonly available techniques of demand forecasting:

Survey of Buyers' Intentions:	In this method, customers are asked what they are planning to buy for the forthcoming time period usually a year.
	1. This method involve use of conducting direct interviews or mailing questionnaire asking customers about their intentions or plans to buy the product.
	2. The survey may be conducted by any of the following methods:
	■ Complete Enumeration where all potential customers of a product are interviewed about what they are planning or intending to buy in future. It is cumbersome, costly and time consuming method.
	■ Sample Survey where only a few customers are selected and interviewed about their future plans. It is less cumbersome and less costly method.
	■ End-use method, especially used in forecasting demand for inputs, involves identification of all final users, fixing suitable technical norms of consumption of the product under study, application of the norms to the desired or targeted levels of output and aggregation.
	Drawbacks of this method
	Thus, under this method the burden of forecasting is put on the customers. it would not be wise to depend wholly on the buyers' estimates and they should be used cautiously in the light of the seller's own judgement. A number of biases may creep into the surveys. The customers may themselves misjudge their requirements, may mislead the surveyors or their plans may alter due to various factors which are not identified or visualised at the time of the survey
	Suitability of this Method
	This method is useful for short-term forecasts. This method is useful when bulk of sale is made to industrial producers who generally have definite future plans. In the case of household customers, this method may not prove very helpful for several reasons viz. irregularity in customers' buying intentions, their inability to foresee their choice when faced with multiple alternatives, and the possibility that the buyers' plans may not be real, but only wishful thinking.

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Collective opinion Method:	The method is also known as **sales force opinion method or grass roots approach.**
	Under this method, salesmen are asked to estimate expectations of sales in their territories. Salesmen are considered to be the nearest persons to the customers retailers and wholesalers and have good knowledge and information about the future demand trend. These estimates of salesmen are consolidated to find out the total estimated sales.
	Adjustments to Salesmen's estimates
	These estimates are reviewed to *eliminate the bias of optimism* on the part of some salesmen and pessimism on the part of others. These revised estimates are further examined in the light of factors like proposed changes in selling prices, product designs and advertisement programmes, expected changes in competition and changes in secular forces like purchasing power, income distribution, employment, population, etc. The final sales forecast would emerge after these factors have been taken into account.
	Merits of this method This method is based on first hand knowledge of the salesmen who are most directly connected with sales and the customers. This method may be quite useful when decisions are to be taken in short term and without spending large resources on market research etc.
	Demerits of this method This method is subjective as personal opinions can possibly influence the forecast. Moreover salesmen may be unaware of the broader economic changes which may have profound impact on future demand This method may not be suitable for long run analysis
Expert Opinion Method (Delphi Method):	Under this method of demand forecasting views of **specialists/experts and consultants** are sought to estimate the demand in future. This, coupled with their varied experience, enables them to provide reasonably reliable estimates of probable demand in future. These experts may be of the firm itself like the executives and sales managers or consultant firms who are professionally trained for forecasting demand. Information is elicited from them through appropriately structured unbiased tools of data collection such as **interviews and questionnaires**.
	Use of Delphi Method
	The Delphi technique, developed by **OLAF HEMLER** at the **Rand Corporation of the U.S.A.** provides a useful way to obtain informed judgments from diverse experts by avoiding the disadvantages of conventional panel meetings. Under this method, instead of depending upon the opinions of buyers and salesmen, firms solicit the opinion of specialists or experts *through a series of carefully designed questionnaires*. Experts are asked to provide forecasts and **reasons** for their forecasts. Experts are provided with information and opinion feedbacks of others at different rounds without revealing the identity of the opinion provider. These opinions are then exchanged among the various experts and the process goes on until convergence of opinions is arrived at.
	Suitability of this method
	This method is best suited in circumstances where intractable changes are occurring and the relevant knowledge is distributed among experts. Delphi technique is widely accepted due to its broader applicability and ability to address complex questions. It also has the advantages of speed and cheapness.

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Statistical Method	Statistical method have proved to be very useful in demand forecasting. Statistical methods are **superior, more scientific, reliable and free from subjectively.** The important statistical methods of demand forecasting are:
	1. <u>Trend Projection Method:</u> The method is also known as **Classical Method.** It is considered as a **'naive' approach** to demand forecasting.
	Under this, data on sales over a period of time is chronologically arranged to get a **'time series'.** The time series shows the past sales pattern. It is assumed that the past sales pattern will continue in the future also. The techniques of trend projection based on, time series data are **Graphical Method and Fitting trend equation or Least Square Method.**
	2. <u>Graphical Method:</u> This is the simplest technique to determine the trend.
	Under this method, all values of sales for different years are plotted and free hand curve is drawn passing through as many points as possible. The direction of the free hand curve shows the trend. The main drawback of this method is that it may **show trend but not measure it.**
	3. <u>Fitting Trend Equation/Least Square Method:</u> This method is based on the assumption that the past rate of change will continue in the future.
	➤ It is a mathematical procedure for fitting a time to a set of observed data points in such a way that the sum of the squared deviation between the calculated and observed values is minimized.
	➤ This technique is used to find a trend line which best fit the available data.
	➤ This trend is then used to project the dependant variable in the future. This method is very popular because it is simple and inexpensive. Moreover, the trend method provides fairly reliable estimates of future demand.
	➤ **Assumption:-** The least square method is based on the assumption that the past rate of change of the variable under study will continue in the future. The forecast based on this method may be considered reliable only for the period during which this assumption holds.
	➤ **Limitation:-** The major limitation of this method is that it cannot be used where trend is cyclical with sharp turning points of troughs and peaks. Also, this method cannot be used for short term forecasts.
	4. <u>Regression Analysis:</u> This is a very common method of forecasting demand.
	▪ Under this method, a quantitative relationship is established between quantity demanded **(dependent variable)** and the independent variables like income, price of good, price of related goods, etc. Based on this relationship, an estimate is made for future demand.
	▪ It can be expressed as follows-
	$Y = a + b X$
	Where
	X, Y are variables a, b are constants
	There could also be a curvilinear relationship between the dependent and independent variables. Once the regression equation is derived, the value of Y i.e. quantity demanded can be estimated for any given value of X
Controlled Experiments	▪ Under this method, future demand is estimated by conducting market studies and experiments on consumer behaviour under actual, though controlled, market conditions. This method is also known as market experiment method.
	▪ An effort is made to vary separately certain determinants of demand which can be manipulated, for example, price, advertising, etc., and conduct the experiments assuming that the other factors would remain constant. Thus, the effect of demand determinants like price, advertisement, packaging, etc., on sales can be assessed by

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	either varying them over different markets or by varying them over different time periods in the same market.
	▪ The responses of demand to such changes over a period of time are recorded and are used for assessing the future demand for the product. For example, different prices would be associated with different sales and on that basis the price-quantity relationship is estimated in the form of regression equation and used for forecasting purposes. It should be noted however, that the market divisions here must be homogeneous with regard to income, tastes, etc.
	▪ **Suatiability:-** The method of controlled experiments is used relatively less because this method of demand forecasting is expensive as well as time consuming.
	▪ **Limitations:-** Moreover, controlled experiments are risky too because they may lead to unfavourable reactions from dealers, consumers and competitors. It is also difficult to determine what conditions should be taken as constant and what factors should be regarded as variable so as to segregate and measure their influence on demand. Besides, it is practically difficult to satisfy the condition of homogeneity of markets.
	▪ Market experiments can also be replaced by 'controlled laboratory experiments' or 'consumer clinics' under which consumers are given a specified sum of money and asked to spend in a store on goods with varying prices, packages, displays etc. The responses of the consumers are studied and used for demand forecasting
Barometric Method of forecasting	▪ These methods are based on past experience and try to project the past into the future. Such projection is not effective where there are economic ups and downs.
	▪ As mentioned above, the projection of trend cannot indicate the turning point from slump to recovery or from boom to recession. Therefore, in order to find out these turning points, it is necessary to find out the general behaviour of the economy.
	▪ Just as meteorologists use the barometer to forecast weather, the economists use economic indicators to forecast trends in business activities. This information is then used to forecast demand prospects of a product, though not the actual quantity demanded.

	▪ For this purpose, an index of relevant economic indicators is constructed. Movements in these indicators are used as basis for forecasting the likely economic environment in the near future. **There are leading indicators, coincidental indicators and lagging indicators**.
	
	  ➤ The **leading indicators** move up or down ahead of some other series. For example, the heavy advance orders for capital goods give an advance indication of economic prosperity.
	  ➤ The **lagging indicators** follow a change after some time lag. The heavy household electrical connections confirm the fact that heavy construction work was undertaken during the past with a lag of some time.
	  ➤ The **coincidental indicators**, however, move up and down simultaneously with the level of economic activities. For example, rate of unemployment.

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<u>Chapter 2.3:- Concept of Supply</u>

Meaning	Supply of a commodity refers to the quantity of commodity offered for sale at a particular price during a given period of time. **Thus, the supply of a commodity may be defined as the amount of commodity which the sellers or producers are able and willing to offer for sale at a particular price, during a given period of time**
Features	1. Supply of a commodity is always with reference to a PRICE. 2. Supply of a commodity is to be referred to IN A GIVEN PERIOD OF TIME. 3. Supply of a commodity depends on the ABILITY OF SELLER TO SUPPLY A COMMODITY. However, ability of a seller to supply a commodity depends ON THE STOCK available with him. 4. Supply of a commodity also depends on the WILLINGNESS OF SELLER TO SUPPLY A COMMODITY. E.g. A dairy farm's **daily** supply of milk at the **price** of Rs. **12 per litre** is **600 litres**

Determinants of Supply

Supply of a commodity depends on many factors like price of the commodity, price of related goods, prices of factors of production, technology, etc. All determinants of supply can be expressed in the form of supply function as follows-

$S_x = f(P_x, P_r, P_f > T, O \dots\dots)$

Where - S_x = Quantity supplied of commodity x

f = function of (depends on)

P_x = Price of commodity x

P_r = Price of related commodities

P_f = Prices of factors of production.

T = Technology

O = Objectives/Goals of the firm

Price of the commodity	1. Other things being equal the supply of a commodity is DIRECTLY related with its price. 2. It means that, larger quantity of a commodity is offered for sale at higher price and vice versa. 3. This is because the profits of the firm increases if the price of its product increases.
Price of the related commodities	If the prices of other goods rise, they become relatively more pro_table to the _rm to produce and sell than the good in question. It implies that, if the price of Y rises, the quantity supplied of X will fall. For example, if price of wheat rises, the farmers may shift their land to wheat production away from corn and soya beans
Prices of factors of production	1. Supply of a commodity depends on the **cost of production.** The cost of production itself depends upon the prices of various factors of production. 2. So, if the price of any factor of production rises, the production costs would be higher for the same level of output (and vice versa), Hence the supply will tend to decrease. 3. Conversely, a fall in the cost of production tends to increase the supply
State of technology	1. A change in technology affects the supply of commodity.

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	2. A technological progress and improvement in the methods of production increases productivity, reduce the cost of production and increases the profits. As a result more is produced and supplied. 3. Also discoveries and innovations bring new variety of goods
Government Policy	1. The supply of a commodity is also affected by the economic policies followed by the Government. 2. The Government may **impose taxes** on commodities in the form of excise duty, sales tax and import duties **or** may **give subsidies.** 3. Any **increase in such taxes** will raise the cost of production and so the quantity supplied will fall. Under such conditions supply will increase only when its price in the market rises. **4. Subsidies** reduce the cost of production and thus encourages firms to produce and sell more
Nature of competition and size of industry:	Under competitive conditions, supply will be more than that under monopolized conditions. If there are large number of _rms in the market, supply will be more. Besides, entry of new _rms, either domestic or foreign, causes the industry supply curve to shift rightwards.
Other Factors:	The quantity supplied of a good also depends upon government's industrial and foreign policies, goals of the _rm, infrastructural facilities, natural factors such as weather, _oods, earthquake and man-made factors such as war, labour strikes, communal riots and etc.

Law of Supply

♦ The Law of Supply express the nature of functional relationship between the price of a commodity and its quantity supplied.

♦ It simply states that supply varies DIRECTLY to the changes in price i.e. supply of a commodity expands when price rises and contracts when price falls.

♦ "The Law of Supply **states that the higher the price, the greater the quantity supplied or the** lower **the price the smaller the quantity supplied, other things remaining the same." (Dooley)**

♦ Thus, there is DIRECT RELATIONSHIP between supply and price.

#> It is assumed that other determinants of supply are constant and ONLY PRICE IS THE VARIABLE AND INFLUENCING FACTOR. Thus,"the law of supply is based on the following main assumptions:-

1. Cost of production remains unchanged even though the price of the commodity changes.

2. The technique of production remains unchanged.

3. Government policies like taxation policy, trade policy, etc. remains unchanged.

4. The prices of related goods remains unchanged.

5. The scale of production remains unchanged etc.

♦ The law can be explained with the help of supply schedule and a corresponding supply curve.

Table : Supply Schedule

Price Rs. per unit	Supply per week in units
10	20
20	30
30	40
40	50

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50	60

♦ The supply schedule shows that when price rises from Rs.10 per unit to Rs. 20 per unit, the supply also rises from 20 units per week to 30 units per week and so on.

♦ Thus, it shows a direct relationship between price and quantity supplied other things being equal.

♦ A supply curve is the supply schedule depicted on the graph. The supply curve shows the same information as the supply schedule.
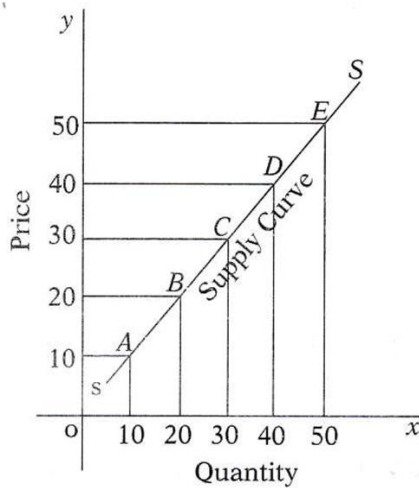
♦ In the diagram, the supply curve is sloping upwards from left to right showing a direct relationship between the price and quantity supplied.

♦ A single point on supply curve show a single price-supply relationship E.g. - Point 'C' show that if price is Rs. 30, quantity supplied is 40 units.

♦ The law of supply states that, supply of a commodity varies directly with its price.

.

Figure : Supply Curve

.Changes in Quantity Supplied OR Expansion & Contraction of supply OR Movement along a supply curve	Changes in supply OR Increase and decrease in Supply OR Shift in Supply curve
(a) - When supply of a commodity changes only due to change in the price of commodity other determinants remaining unchanged, it is called changes in quantity supplied. - Changes in quantity supplied thus means -expansion of supply & contraction of supply - When price of a commodity rises, quantity supplied also rises. This is called expansion of supply. - When price of a commodity falls, quantity supplied also falls. This is called contraction of supply.	(a) - When there is change in supply due to change in factors other than price of the commodity, it is called changes in supply. - It is the result of change in technology, govt, policies, prices of related goods etc. - Change in supply means- increase in supply & decrease in supply. - Price remaining the same when supply rises due to change in factors other than price, it is called increase in supply. - Likewise, price remaining the same when supply falls due to change in factors other than price, it is called decrease in supply.
(b) - As other determinants of supply like price of related commodities, prices of factors of production, state of technology, etc. are assumed to be constant, the position of the supply curve remains the same. - **The seller will move upwards or downwards on the same supply curve**	(b) - In this case the supply curve shifts from its original position to **rightward when supply** increases and to **leftward when supply** decreases. - Thus, change in supply curve as a result of increase and decrease in supply, is technically called **shift in supply curve.**

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(c)	(c)
(d) In the figure above - ♦ At price OP quantity supplied is OQ ♦ With a rise in price to OP$_1$, the quantity supplied rises from OQ to OQ$_1$. The co-ordinate point moves up from E to E$_1$ This is called '**a rise in quantity supplied'.** ♦ With a fall in price to OP$_2$, the quantity supplied falls from OQ to OQ$_2$. The co-ordinate point moves down from E to E$_2$. This is called (a **fall in quantity supplied'.**	(d) In the figure above- ♦ Original supply curve is SS. At OP price, OQ quantity is being supplied. ♦ As the supply changes, the supply curve shifts either to the right (S$_1$S$_1$)or to the left (S$_2$S$_2$) ♦ At S$_1$S$_1$, OQ$_1$ quantity is being supplied at the price OP. This shows **increase in supply.** More quantity is being supplied at same price. It is denoted by rightward shift in supply curve. ♦ At S$_2$S$_2$, OQ$_2$ quantity is being supplied at the price OP. This shows **decrease in supply.** Less quantity is being supplied at same price. It is denoted by **leftward shift in supply curve.**

Elasticity of supply

♦ Price elasticity of supply measures the degree of responsiveness of quantity supplied of a commodity to a change in its own price.

♦ In other words, the elasticity of supply shows the degree of change in the quantity supplied in response to change in the price of the commodity.

♦ Elasticity of supply can be defined **'(as a ratio of the percentage change in the quantity supplied of a commodity to the percentage change in its own price".**

♦ It may be expressed as follows-

$$E_s = \frac{\text{Percentage Change in Quantity Supplied}}{\text{Percentage Change in Price}}$$

$$= \frac{\text{Change in quantity supplied}}{\text{Quantity supplied}} \div \frac{\text{Change in Price}}{\text{Price}} \text{ Or } E_s = \frac{\Delta q}{q} \div \frac{\Delta p}{P}$$

Where - Es = Elasticity of supply

Q = Original quantity supplied

P = Original price

Δ = indicates change

Rearranging the above expression we get - $Es = \frac{\Delta q}{q} \times \frac{p}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{P}{q}$

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♦ Since the law of supply establishes positive relationship between price and quantity supplied, the elasticity of supply would be **positive.**

♦ The value of elasticity co-efficient will vary from zero to infinity.

The elasticity of supply, according to its degree, may be of following types:-

1. Perfectly Inelastic Supply: $E_s = 0$:

When a change in the price of a commodity has no effect on its quantity supplied, then supply is perfectly inelastic. E.g. - If price rises by 20% and the quantity supplied remains

unchanged then $E_s = \frac{0}{20} = 0$. In this case, the supply curve is a vertical straight line curve parallel to Y-axis as shown in the Figure.

Figure : Perfectly Inelastic Supply
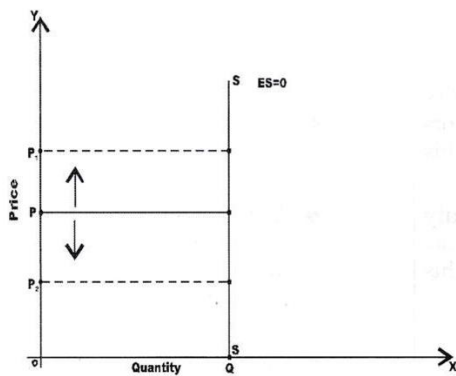
The figure shows that, whatever the price quantity supplied of the commodity remains unchanged at OQ.

2. Perfectly Elastic Supply: $(E_s = \infty)$:

When with no change in price or with very little change in price, the supply of a commodity expands or contracts to any extent, the supply is said to be perfectly elastic. In this case, the supply is a horizontal straight line and parallel to X-axis.

Figure : Perfectly Elastic Supply
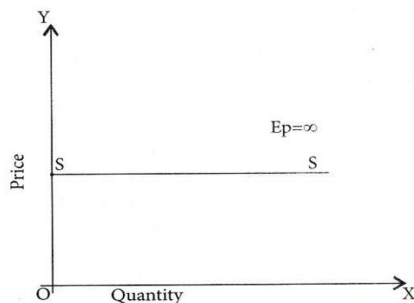
The figure shows $(E_s = \infty)$ that, at given price supply is ever increasing.

Figure : Unit Elastic Supply
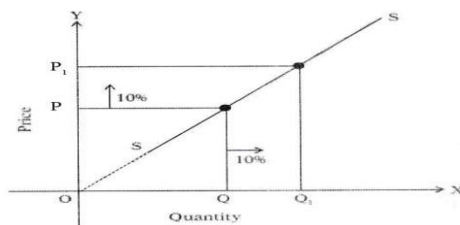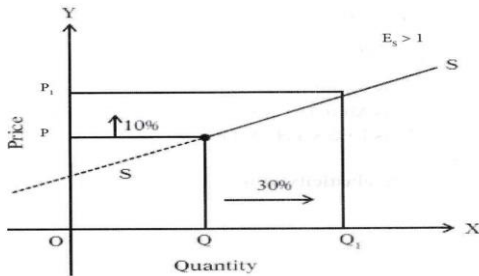
3. Unit Elastic Supply : $(E_s = 1)$:

When the percentage change in price is equal to percentage change in quantity supplied, then the supply is said to be unit elastic. E.g. - If price rises by 1096 and the supply also rises by 1096 then, $Es = \frac{10}{10} = 1$

In this case the straight line supply curve SS when extended will pass through origin.

4. Relatively/More Elastic Supply: $(E_S > 1)$:

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When a small change in price leads to big change in quantity supplied, then the supply is said to be relatively or more elastic. E.g. - If price rises by 1096 and supply rises by 3096 then, $E_s = \frac{30}{10} = 3 > 1$. The coefficient of elasticity would be somewhere between ONE and INFINITY. The elastic supply curve is flatter as shown below-

Supply curve SS is flat suggesting that the supply is more elastic. In this case the supply curve SS when extended will pass through Y-axis.

Figure : More Elastic Supply

5. Relatively Inelastic Or Less Elastic Supply: (E_S <1) •

When a big change in price leads to small change in quantity supplied, then supply is said to relatively inelastic or less elastic. E.g. - If price rises by 30% and supply rises by

10% then, $E_s = \frac{10}{30} = \frac{1}{3} < 1$. The coefficient of elasticity would be somewhere between

ZERO and ONE. The supply curve in this case has steep slope as shown below –
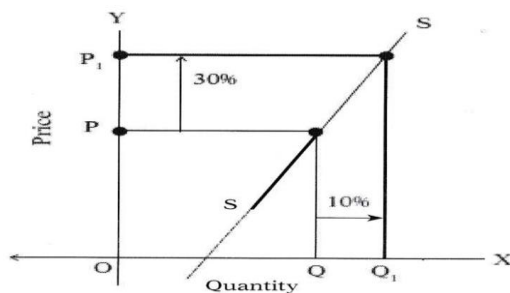
Supply curve SS is steeply sloped suggesting that supply is less elastic. In this case the supply curve SS when extended will pass through X-axis.

Figure : Less Elastic Supply

Measurement of Elasticity of Supply.

The different methods of measuring price elasticity of supply are:

1. The Percentage or Ratio or Proportional Method,

2. The Arc Method

1. The Percentage Method:

Thus method is based on the definition of elasticity of supply. The coefficient of price elasticity of supply is measured by taking ratio of percentage change in supply to the percentage change in price. Thus, we measure the elasticity by using the following formula-

$$E_s = \frac{\text{Pecentage Change in Supply}}{\text{Percentage Change in Price}} \text{ OR } = \frac{\Delta q}{q} \times \frac{P}{\Delta p}$$

♦ If the coefficient of above ratio is equal to ONE, the supply will be unitary.

♦ If the coefficient of above ratio is MORE THAN ONE, the supply is relatively elastic.

♦ If the coefficient of above ratio is LESS THAN ONE, the supply is relatively inelastic.

2. The Arc Elasticity Method:

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Under this method we measure elasticity of supply over an ARC of the supply curve. The arc elasticity is a measured of the "average elasticity" i.e. elasticity at MID-POINT that connects the two points on the supply curve. Thus, an arc is a portion of a curved line, hence a portion of supply curve. The formula used is -
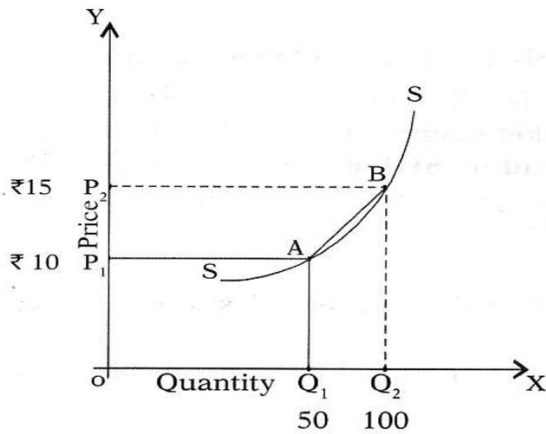
$$E_s = \frac{q_1 - q_2}{q_1 + q_2} \times \frac{P_1 + P_2}{P_1 - P_2}$$

Where – P_1 & q_1 = Original price and quantity P_2 & q_2 = New price and quantity.

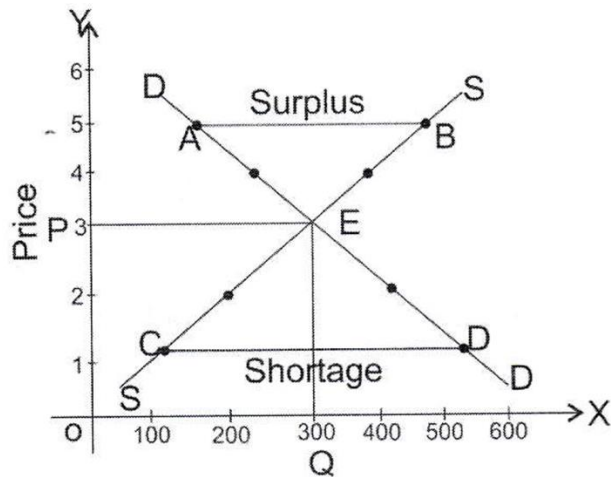$$E_s = \frac{50 - 100}{50 + 100} \times \frac{10 + 15}{10 - 15}$$

$$\frac{-50}{150} \times \frac{25}{-5}$$

$$= +1.66$$

Concept of Equilibrium Price

♦ Equilibrium means a market situation where the quantity demanded is equal to quantity supplied. Thus, the two factors determining **equilibrium price** are market demand and market supply.

♦ **Equilibrium price** is the price at which the sellers of a good are willing to sell the quantity which buyers want to buy. **Thus, equilibrium price (also called market clearing price) is the price at which demand and supply are equal.**

♦ At equilibrium price both sellers and buyers are satisfied.

♦ At equilibrium price, **there is neither SHORTAGE nor SURPLUS. So at equilibrium price, market is said to be CLEARED.**

♦ The following table and figure explains the equilibrium price.

Price of Good-X (Rs.)	Quantity Demanded of Good-X (units)	Quantity Supplied of Good-X (units)	Effect on Price
5	100	500	Downward
4	200	400	Downward
3	300	300	**Equilibrium**
2	400	200	Upward
1	500	100	Upward

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♦ Equilibrium is struck a point **E** where the demand and supply curve intersect each other.

♦ At **E,** equilibrium price is OP i.e. Rs. 3 and equilibrium quantity is OQ i.e. 300 units.

♦ When the price is Rs. 5 per unit, the quantity demanded is 100 units and quantity supplies is 500 units. It is situation where **market demand < market supply** and there is **excess supply i.e., surplus supply.** At a given price, sellers are willing to sell more than what buyers are ready to buy. **As a result of pressure of excess supply the market price falls to Rs. 4.**

♦ At a price of Rs. 4, the pressure of excess supply still continues and hence the price falls further to Rs. 3.

♦ At a price of Rs. 3, **the market is CLEARED** as the quantity demanded and supplied are equal to each other. **There, is no SURPLUS.**

♦ **Thus, we can conclude that pressure of excess supply (surplus) reduces the price.**

♦ Similarly, if the price is Rs. 1, the quantity demanded is 500 units and quantity supplied is 100 units. It is a situation where **market demand > market supply** and there is **excess demand or SHORTAGE of supply. As a result of excess demand or SHORTAGE of supply the market price will rise.** So long as pressure of excess demand continues price will rise i.e. till point **E.** At point **E,** excess demand is eliminated and quantity demand and supplied are equal to each other. **The market has CLEARED.**

♦ **Thus, we can conclude that pressure of excess demand (shortage of supply) increases the price.**

♦ The equilibrium price is determined by the intersection between demand and supply **therefore, it is also called as the MARKET EQUILIBRIUM**

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