

Chapter -2
CONSUMER EQUILIBRIUM

Equilibrium refer to the state of balance.

OR

It is a situation at which there is no tendency to change.

Consumer Equilibrium is a situation at which a consumer get the maximum possible satisfaction with the help of given amount of income and there is no tendency to make any changes.

It can be determined with the help of following approaches:-

- Cardinal approach (utility approach)
- Ordinal approach (indifference curve analysis)
- **Cardinal approach (utility approach):-** It is introduced by Prof. Marshall and according to him, utility is measured in terms of cardinal no. Such as 1,2,3,4, etc.
- **Utility :-** It means want satisfying power of a commodity.

OR

It is the power or capacity of a commodity to satisfy the human wants.

Characteristics:

- It is measured in terms of cardinal no: such 1,2,3,4.....
- Measurement unit of utility is 'utils'
- It is subjective i.e. depends upon the intensity of wants.
- It is variable i.e. varies from person to person place to place and time to time.

It can be discuss into 2 parts:

1. Total utility :- It is the total satisfaction which a consumer derives from the consumption of no: of units of a commodity.
2. Marginal utility :- It is the additional change in T.U. due to additional change in no: of units of a commodity.

$$M.U. = \frac{\Delta TU}{\Delta Q}$$

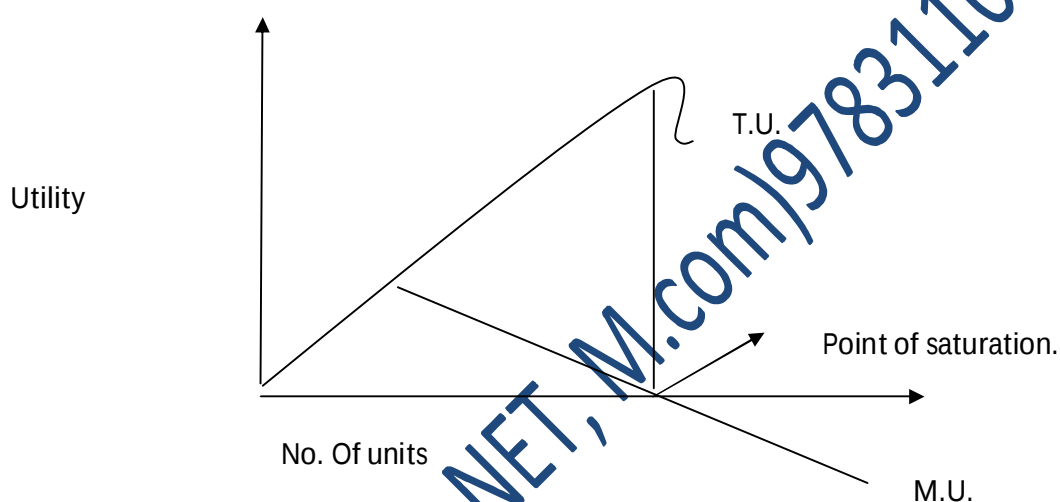
Or

$$M.U. = T.U_n - T.U_{n-1}$$

Relationship between T.U. and M.U. :-

It can be determined with the help of a utility schedule and diagram.

Units	T.U.	M.U.
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	-2

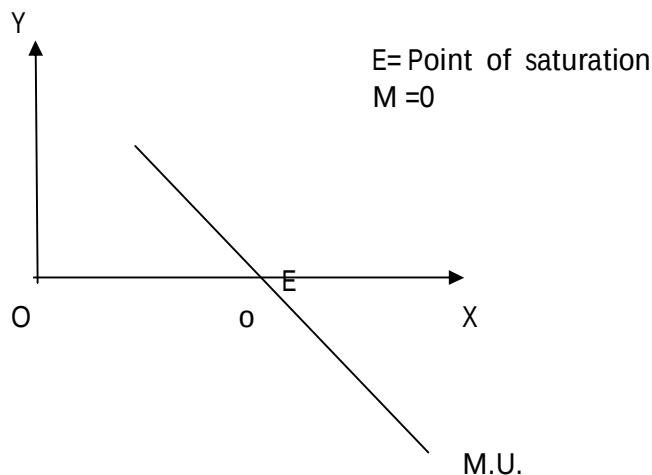


1. When T.U. increase at diminishing rate then M.U. falls.
2. When T.U. is at the maximum point then M.U. is zero.
3. When T.U. starts falling, then M.U. becomes negative.

Law of diminishing M.U. :- It is also known as "The First law of fossen".

According to it, when a consumer. Consumer a particular commodity in continuation, then satisfaction received from every next unit keeps on diminishing.

Units	M.U.
1	30
2	20
3	10
4	0
5	-10.



In this at point E, $MU = 0$ which shows the point of full satisfaction or point of saturation.

Assumptions:

- All the units of commodity must be same in all respect (size, color, design and quality).
- The units of commodity must be standard.
- Consumption of commodity must be continuous without any time interval.
- There should be no change in tastes, preferences, fashion, habit and income of the consumer.
- Consumer's state of mind is also constant.
- Price of the commodity should be constant during course of consumption.
- Consumer is rational (i.e. wants to maximize his satisfaction).
- Marginal utility of money remains constant.

Determination of consumer's Equilibrium.

According to utility approach there are two different situations of consumer's equilibrium.

1. Consumer's equilibrium in case of single commodity . (one commodity case).

Base : When a consumer buys a single commodity having single use, his behavior is guided by law of diminishing M.U.

Factors :-

- Price of a commodity (P_x).
- M.U. of a commodity ($M.U.x.$)
- M.U. of a money ($M.U.m.$) – It refers to the worth of a rupee to a consumer.

Consumer equilibrium can be determined with the help of schedule and diagram.

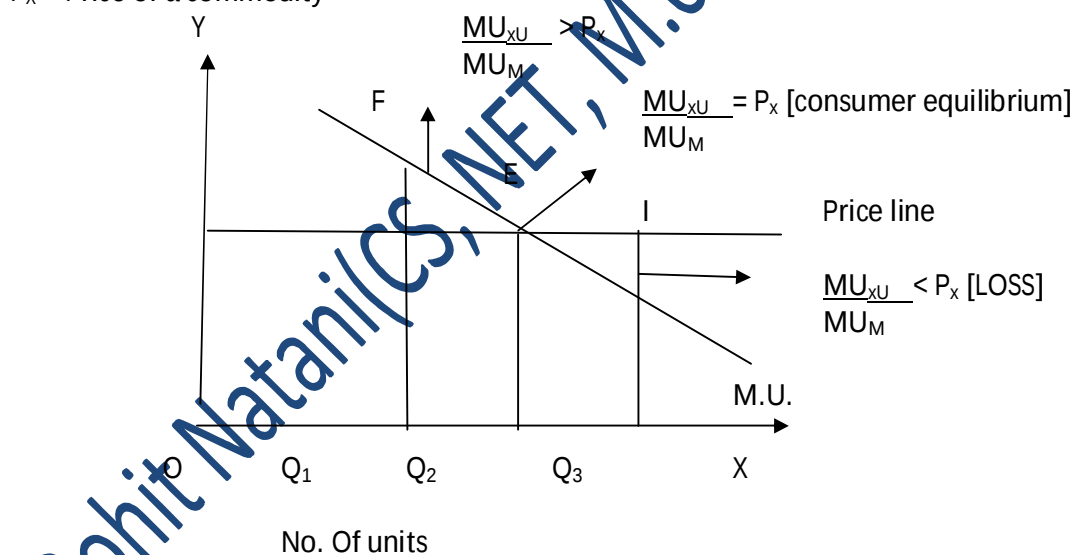
Units	T.U. _X	M.U. _X	$\frac{M.U._X}{M.U._M}$	P _X
1	10	10	10	6
2	18	8	8	6
3	24	6	6	6
4	28	4	4	6
5	30	2	2	6
6	30	0	0	6
7	28	-2	-2	6

$\frac{MU_X}{MU_M} > P_X$
 $\frac{MU_X}{MU_M}$
 $\frac{MU_X}{MU_M} = P_X$
 $\frac{MU_X}{MU_M} < P_X$

Here

$$M.U_M = \text{Re } 1 = 1 \text{ util}$$

P_X = Price of a commodity



Consumer Equilibrium is determined at point 'E' at which a consumer consumes OQ units of a commodity and $\frac{MU_X}{MU_M} = P_X$

But when a consumer stop the consumption at OQ₁ then consumer will not be able to utilize the gain equal to ΔEFG . Hence there should be the tendency to increase the consumption from OQ₁ to OQ.

On the other hand, if the consumer continues the consumption till OQ_2 units, then consumer will have to bear the loss equal to ΔEHI . Hence, there should be tendency to make the changes from OQ_2 to OQ .

2. Consumer Equilibrium in case of two commodities (Two commodity case)

Base:-

Consumer equilibrium will be determined by the "Law of Equi-Marginal Utility" which states that a consumer will get the maximum satisfaction or equilibrium when M.U. of various commodities are equal.

- A consumer will distribute his money income among those goods in such a way that he gets equal M.U. from all the goods.

Conditions – A consumer gets max. Satisfaction

(1) from commodities X and Y, when a rupee worth of M.U. is same for both the commodities.

- When a consumer consumes 'X' commodity then condition of equilibrium will be :

$$\frac{M.U._X}{P_X} = M.U._M$$

- When a consumer consumes 'Y' commodity, then the condition of equilibrium will be

$$\frac{M.U._Y}{P_Y} = M.U._M \dots\dots\dots (2)$$

- By equation 1 and 2, the condition for consumer's equilibrium for both X and Y commodity is

$$\frac{M.U._X}{P_X} = \frac{M.U._Y}{P_Y} = M.U._M$$

$$(2) \quad \frac{M.U._X}{P_X} = \frac{M.U._Y}{P_Y} \text{ Can also be written as } \frac{M.U._X}{M.U._Y} = \frac{P_X}{P_Y}$$

It implies that a consumer strikes his equilibrium when ratio of their M.U. $\left[\frac{M.U._X}{M.U._Y} \right]$

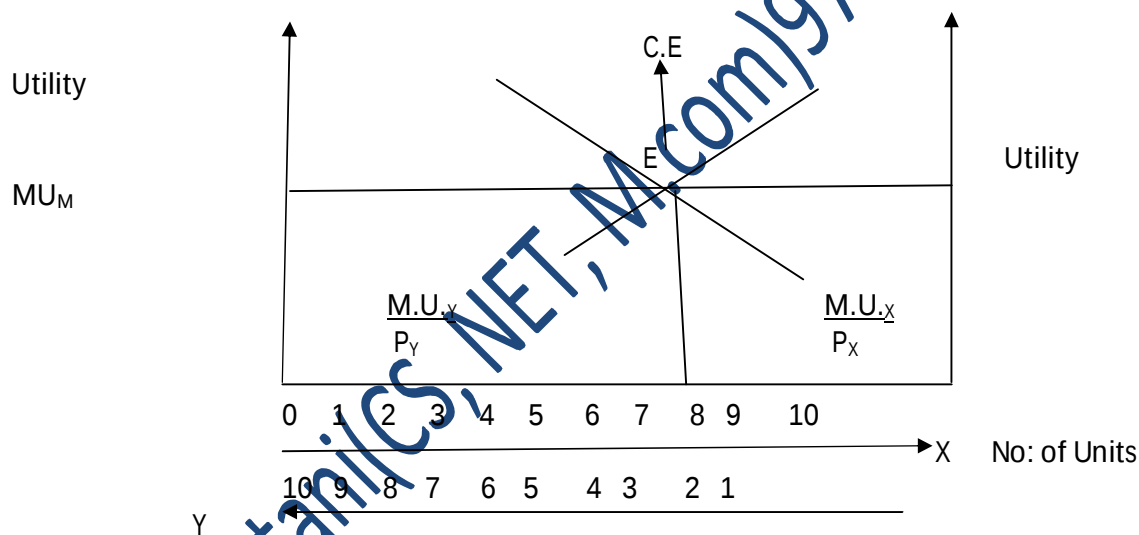
Is equal to the ratio of their prices $\left[\frac{P_X}{P_Y} \right]$

$$P_X = \text{Rs.5}$$

$$P_Y = \text{Rs.9}$$

$$MU_M = 10 \text{ units}$$

Units	MU_X	MU_Y	$\frac{M.U._X}{P_X}$	$\frac{M.U._Y}{P_Y}$	MU_M
1	120	198	24	22	10
2	110	189	22	21	10
3	90	171	18	19	10
4	80	135	16	15	10
5	70	126	14	14	10
6	50	117	10	13	10
7	40	108	8	12	10
8	30	90	6	10	10
9	10	81	2	9	10
10	0	63	0	7	10

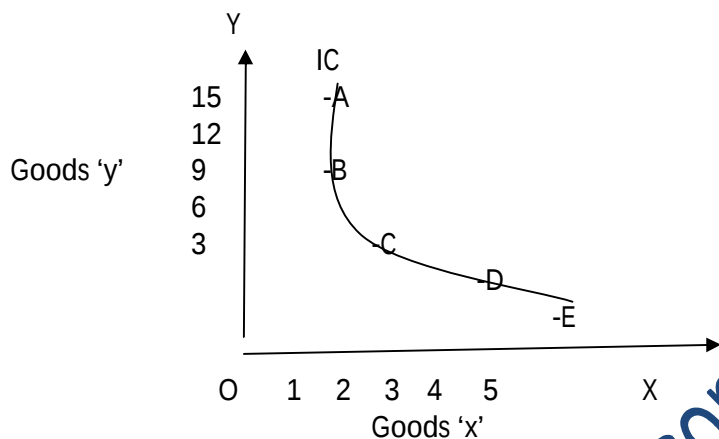


Consumer Equilibrium – ORDINAL Approach
(Indifference Curve analysis)

Indifference curve:- It shows various combinations of two commodities which give equal level of satisfaction to the consumer.

In other words, an indifference curve is a law of various combination of two commodities at which consumer is indifferent.

Combination	X	Y
A	1	14
B	2	8
C	3	4
D	4	2
E	5	1



IC is an indifference curve. Each point on the curve shows a combination of two goods ('X' and 'Y'), offering the same level of satisfaction to the consumer. Thus level of satisfaction of the consumer at point 'A' is the same as at point 'B', 'C', 'D' or 'E'.

IC is also known as "Iso-Utility Curve".

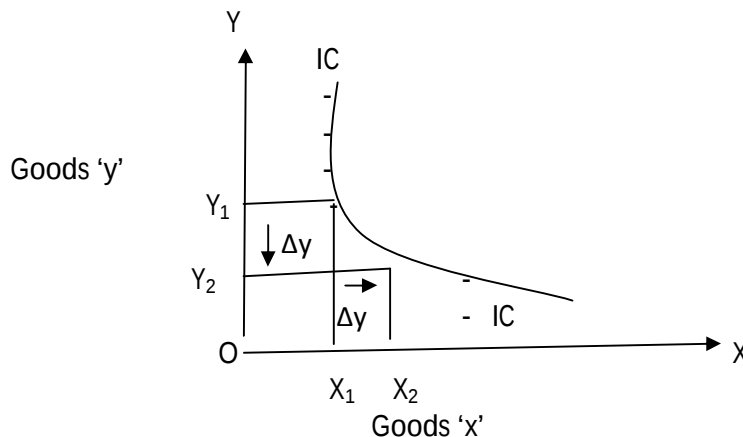
It is convex to the point of origin.

Indifference Map- It is a group or set of indifference curve and each of which represents a given level of satisfaction.

Marginal rate of substitution [MRS] or slope of IC-

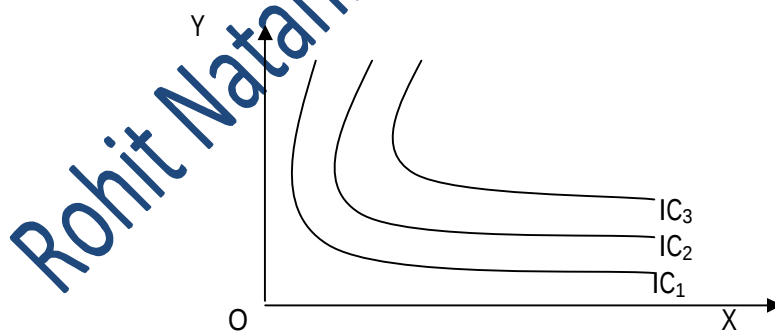
- MRS is the rate at which the consumer is willing to substitute one good for another, without changing the level of satisfaction.
- MRS_{XY} is the quantity of 'Y' commodity foregone for getting one additional unit of 'X' commodity.
- The slope of IC shows the MRS_{XY} because it indicates the rate at which the consumer is willing to substitute one good with the other.

Combination	X	Y	MRS_{XY}
A	1	14	-
B	2	8	6/1
C	3	4	4/1
D	4	2	2/1
E	5	1	1/1



Characteristics:-

1. IC slopes downward from left to right i.e. negatively sloped. Because in order to maintain the same level of satisfaction along a curve, if a consumer increases consumption of 'X', then the consumption of 'Y' has to be reduced i.e. MRS_{XY} keeps on diminishing.
2. IC is convex to the origin because of decreasing MRS.
3. IC can not intersect to each other since each IC carries a particular level of satisfaction.
4. Higher IC represents higher level of satisfaction. An IC which is to the right and above another IC shows a higher level of satisfaction to the consumer. Thus, IC_3 and IC_2 shows a higher level of satisfaction than IC_1 . Higher IC corresponds to a higher level of income of the consumer.



Budget line:- It shows various combinations of two commodities which can be purchased by a consumer within the given budget and at given prices of two commodities.

- Every consumer has limited income and with this limited income only a consumer can buy the various goods and services. It is called limitation of consumer's budget.

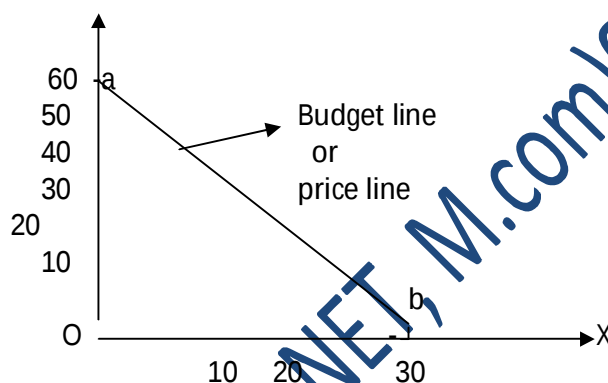
- Budget line is also known as price line.
- Any point on budget line shows the attainable combinations.
- Budget set refers to the set of all possible combinations of two goods, which a consumer can consume from his income and given prices.

Units of 'X' unit of 'Y' total exp.

0	60	$(0*2) + (60*1)$	= Rs. 60
10	40	$(10*2) + (40*1)$	= Rs. 60
20	20	$(20*2) + (20*1)$	= Rs. 60
30	0	$(30*2) + (0*1)$	= Rs. 60

$P_X = \text{Rs. } 2$
 $P_Y = \text{Rs. } 1$

Total income / budget = Rs. 60



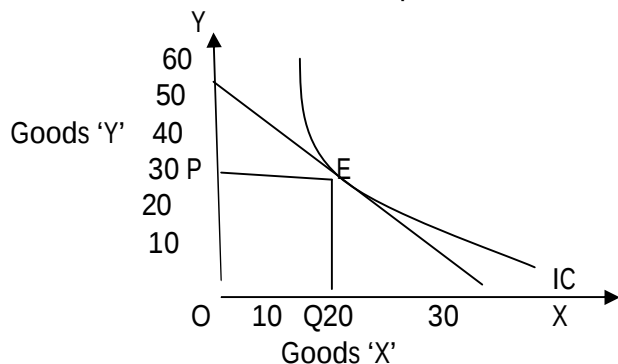
A consumer has Rs. 60 to spend. Max 30 units of 'X' commodity are purchased when entire income is spent on 'X' and max 60 units of 'Y' commodity can be purchased when entire budget is spent on 'Y'.

Moreover, each point on above line indicates one combination of 'X' and 'Y' which a consumer can buy with his given income and given prices of 'X' and 'Y' commodities.

Line 'ab' is called price line because it show that 30 units of 'X' commodity are equal to 60 units of 'Y' commodity so that price of 'X' commodity = price of 'Y' commodity.

Thus price line shows price ratio between 'X' and 'Y' commodity.

Determination of consumer's Equilibrium:-



Equilibrium is determined at point E, where a consumer is willing to buy (as reflected by IC) coincides with what he can buy (as reflected by his budget line/price line).

OR

We can say that consumer's equilibrium is determined at a point E, where budget line is tangent to IC i.e. when slope of price line is equal to slope of IC.

This point is called point of optimum consumption and it gives maximum level of satisfaction to the consumer.

At this point he buys OQ unit of 'X' commodity and OP unit of 'Y' commodity.

Monotonic preference :- The IC analysis is based on the assumption that consumer's preferences are monotonic, which means that a rational consumer always prefer consumption of more units of a commodity as it offers him a higher level of satisfaction.

IMPORTANT QUESTIONS

Q.1 How does change in price and change in income can affect consumer's equilibrium . by using cardinal approach?

Ans : When price is change

Units	MU_x	$\frac{M.U._x}{MU_M}$	P_{x1}	P_{x2}	P_{x3}
1	10	10	6	3	9
2	9	9	6	3	9
3	8	8	6	3	9
4	7	7	6	3	9
5	6	6	6	3	9
6	5	5	6	3	9
7	4	4	6	3	9
8	3	3	6	3	9

When price of a commodity is decreased from Rs. 6/unit to Rs. 3/unit then consumer Equilibrium is shifted from 5th unit to 8th unit.

In the same way, when price of a commodity is increased from Rs. 6/unit to Rs. 9/unit then the consumer had to cut-down the consumption from 5th unit to 2nd unit.

2. When income is changed

Units	MU_x	P_x	$\frac{M.U._x}{MU_M} = 1$	$\frac{M.U._x}{MU_M} = 0.5$	$\frac{M.U._x}{MU_M} = 1.5$
1	10	6	10	20	6.6
2	9	6	9	18	6.0
3	8	6	8	16	5.3
4	7	6	7	14	4.6
5	6	6	6	12	4
6	5	6	5	10	3.3
7	4	6	4	8	2.6
8	3	6	3	6	2.0

Consumer equilibrium is determined at point where $\frac{M.U._x}{MU_M} = P_x$.

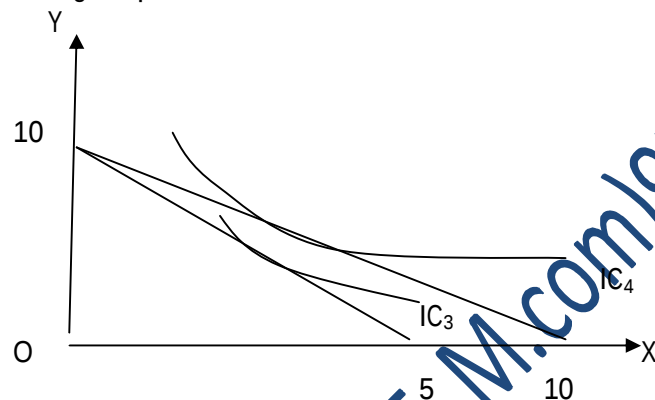
But, when income of the consumer is increased then MU_M to the consumer would decrease and due to this, consumer equilibrium is shifted from 5th unit to 8th unit.

In the same way, when the income of the consumer is decreased then MU_M would increase and it will force the consumer to cut down the consumption from 5th unit to 2nd unit.

Q.2 How does change in price and change in income can affect consumer's equilibrium by using ordinal approach?

Ans: consumer equilibrium is determined at a point where MRS_{XY} is equal to P_X/P_Y assuming that the price and income is constant.

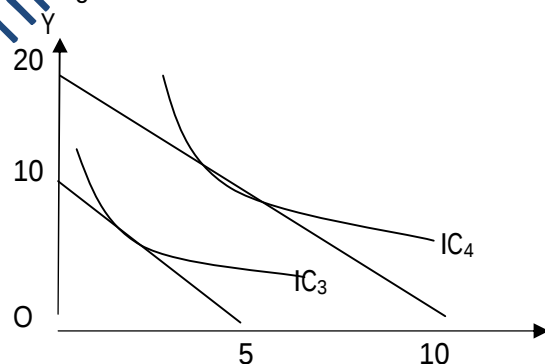
1 change in price:-



$M = \text{Rs. } 10$
 $P_{X1} = \text{Rs. } 2$
 $P_{Y1} = \text{Re. } 1$
 $P_{X2} = \text{Re. } 1$
 $P_{Y2} = \text{Re. } 1$

When price of 'X' commodity decreases from Rs. 2 to Re. 1 per unit then it will increase the purchasing power of the consumer and budget line will shift towards right in 'X' axis. As a result consumer equilibrium is shifted from IC_3 to IC_4 and vice-versa.

2 Change in income :



When income of the consumer is Rs 10, then equilibrium is determined on IC_3 . On the other hand, when income is increased from Rs. 10 to Rs. 20 then consumer can shift to IC_4 and vice-versa.

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