CHAPTER-2

-:- Consumer's Equilibrium -:-

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MEANING OF UTILITY:- "Utility may be defined as wants satisfying power of a commodity. It is a relative concept with respect to person, place and time".

According to Marshall- "The utility of a thing to a person at a time is measured by the extent to which it satisfies his wants"

TYPES OF UTILITY: - There are two types of utility as under:

A. Total utility (Tu)
B. Marginal utility (Mu)

A. Total utility (Tu):- "It is the sum total of utility derived from the consumption of all units of a commodity".

$$Tu = u_1+u_2 \_ \_ \_ \_ u_n$$

B. Marginal utility (Mu):- "It refers to additional utility on account of the consumption of an Additional unit of a commodity". Or MU is the additional (extra) utility derived from consumption of additional units of a commodity.

$$Mu = \frac{\Delta Tu}{\Delta N}$$

or

$$Mu_{nth} = Tu_n - Tu_{n-1}$$

Here. Mu_{nth} = Marginal utility of "n" units of a commodity.

Tu_n = Total utility of "n" units of a commodity.

Tu_{n-1} = Total utility of "$_{n-1}$" units of a commodity.

C. Relation between Tu&Mu

Tu and Mu Schedules

Quantity	Tu.	Mu.
1	6	6
2	10	4
3	12	2
4	12	0
5	10	-2
6	6	-4

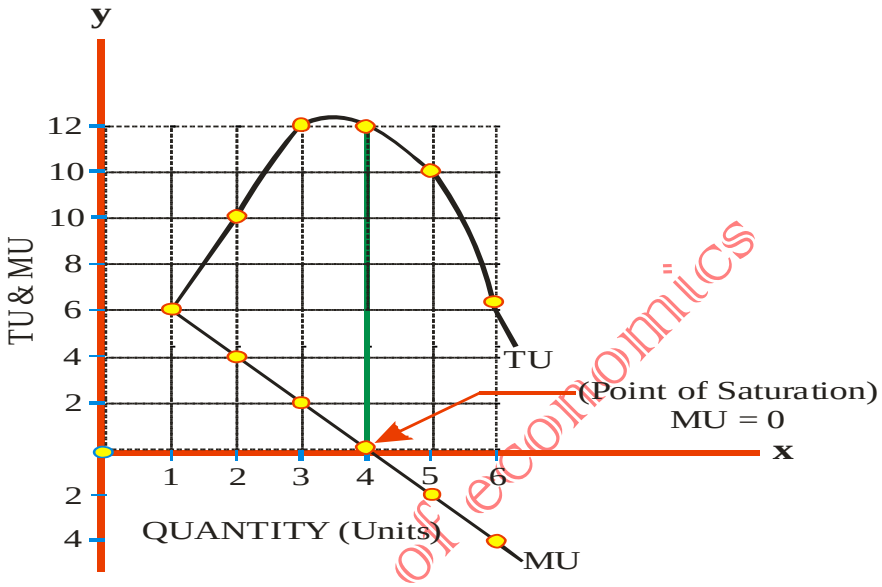


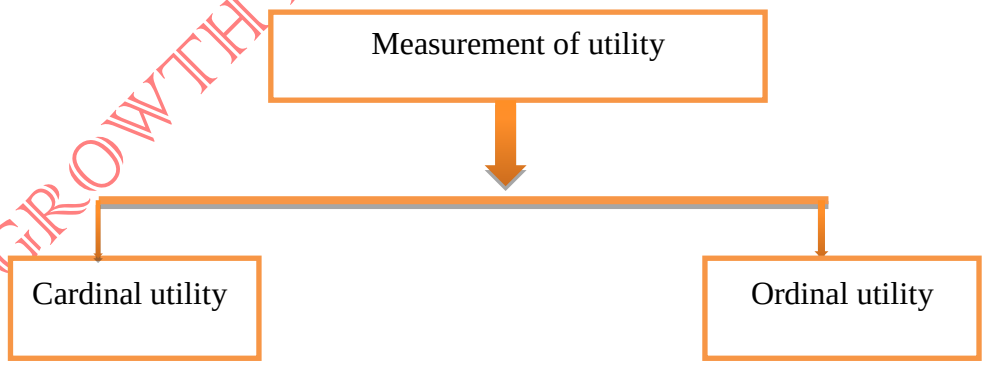
Fig-Relationship Between MU and TU

Explanation:- In fig ,Tu curve represents total utility and Mu represents marginal utility. Tu increases up to point "G" where it is maximum corresponding to it Mu =0. This occurs when 5th unit of the commodity is consumed .when 6th unit is consumed Mu is negative (= -2). Accordingly Tu starts declining from "G" onward. (Mu=0= point of saturation)

Relation between Tu and Mu:-

- So long as Mu is positive, Tu increases.
- Tu is maximum when Mu = 0
- Tu starts deceasing when Mu is negative.

MEASUREMENT OF UTILITY:- There are two approaches for measurement of utility.



(i)Cardinal utility Approach:- This approach was propounded by Alfred Marshall according to him utility each commodity is measurable in terms of coordinal numbers like – 1,2,3,4 and so on.

(ii)Ordinal utility Approach:- The ordinal economists like F. Y. edge worth, J.R. Hicks etc. suggested that utility is not measurement but, it can be measured in terms of ordinal number like. I, II, III and so on.

LAW OF DIMINISHING MARGINAL UTILITY:-

(a) Introduction:- Law of diminishing marginal utility is also known as the first law of Grossen as German economist H.M. Gossen propounded it. This law explains the fundamental and clear human nature therefore called "Fundamental law of satisfaction or "Fundamental Psychological law.

(b) Meaning-

According to K.E. Boulding "As consumer increases consumption of any one commodity keeping constant the consumptions of other commodity the marginal utility of the variable commodity will decline as known law Dmu"

In common-**"**the law states as more and more units of a commodity are consumed; marginal utility derived from each successive unit goes on falling"

(c) Assumptions of the law:-

- Consumer is rational
- All units of the commodity are homogeneous
- Consumption of commodity must be continues without any time interval
- Units of commodity consumed must be adequate and suitable.
- Price of the commodity should remain constant
- Habit, Taste, income and preference of the consumer should remain constant.

(d) The law of D.M.U schedules

Ox	DMu_x
1	8
2	6
3	4
4	2
5	0
6	-2

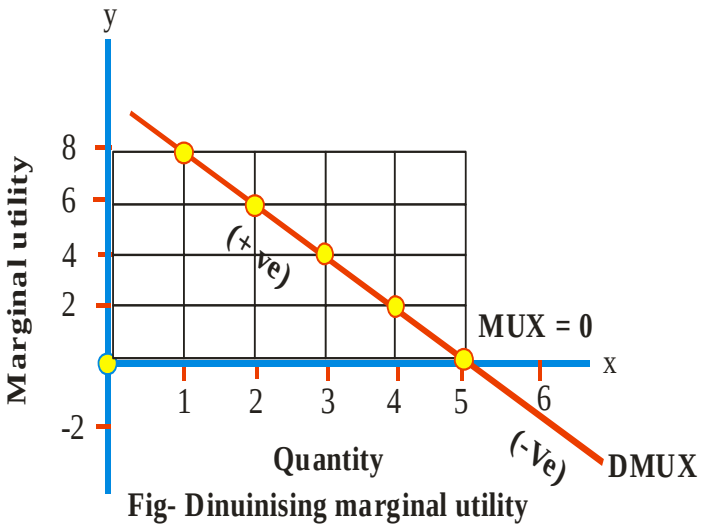


Fig- Dinuinising marginal utility

Explanation- As the consumer consumes commodity 'X' he gets the satisfaction in deceasing order at first unit his satisfaction is 8 but with every successive unit it falls. At 5th unit marginal utility becomes zero which shows minimum satisfaction and which is consumer's equilibrium.

UTILITY ANALYSIS CONSUMER'S EQUILIBRIUM:

A. **Meaning of consumer's equilibrium:-** " The consumer is in equilibrium when given his income and market prices, he plans his expenditure in such a manner that he maximizes his total satisfaction"

Purchase of a commodity a consumer depends on three factors:

(1)Price of the commodity

(2)Marginal (and total) utility of the commodity

(3) Marginal utility of money.

B. **Meaning of marginal utility of money: -** Marginal utility of money refers to "worth of a rupee" to a consumer.

In other word, the marginal utility of a rupee is the extra utility that a consumer gets from the expenditure of one additional rupee on other available goods.

$$Mu_x \text{ in terms of money} = \frac{Mux(utiles)}{PX}$$

Now, we shall explain consumer's equilibrium in two different situations:

(a)Single commodity model

(b)Two commodity model

C. **Single commodity model:-**

   a. **Meaning of consumer equilibrium-**

In this model "The consumer should purchase that much quantity of that commodity so that marginal utility of the commodity in terms of money becomes equal to the price of the commodity.

   b. **Condition for equilibrium**

Hence the condition for consumers' equilibrium in one commodity model will be as follows:

$$Mum = \frac{MUx}{Px}$$

$$P_x = \frac{MUx}{MUm}$$

(Note- in order to make our analysis of consumer, s equilibrium simple, we are assuming that the marginal utility of one rupee is equal to one utils. Hence, the mu of a commodity in terms of utils, as well as in terms of money become the same)

$$P_x = MUx$$

Here, mu_{xm} = Marginal utility of x commodity in terms money

P_x = Price of x commodity.

c. Assumptions of consumer equilibrium:-

The concept of consumer's equilibrium through utility approach is based on the following assumptions:-

- The consumer is rational
- Coordinal measurement of utility is possible
- Marginal utility of money remains constant.
- The law of diminishing marginal utility operates.
- Prices of commodities one given and remain constant.

Schedule and diagrammatic presentation

Unit of x	Mux (in Rs.)	Px (in Rs.)
1	40	25
2	35	25
3	30	25
4	**25**	**25**
5	20	25
	15	25

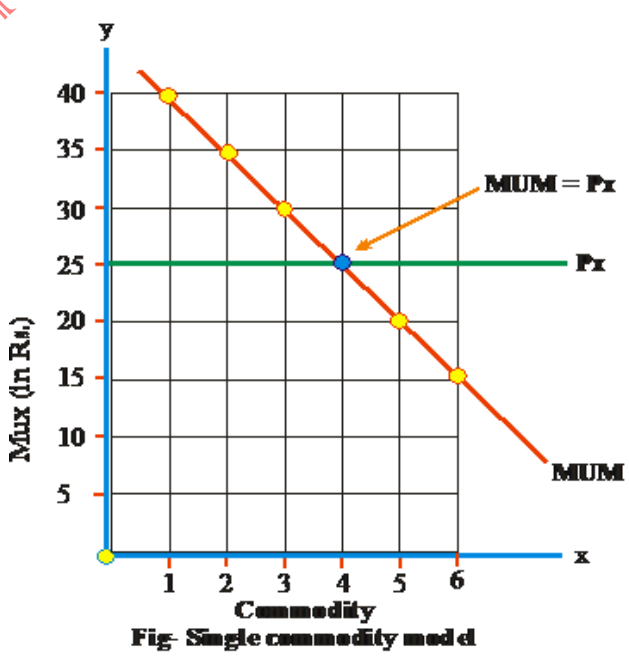


Fig- Single commodity model

d. **Explanation:-** If the marginal utility of x is greater than its price the consumer can increase his satisfaction by purchasing more units of x. similarly if the marginal utility of x is less than its price the consumer can increase its total

satisfaction by cutting down the quantity of x. therefore, he attains the maximum of his total utility when $Mu_x = p_x$

In the schedule and diagram this condition is fulfilled when he purchases 4 units of x and gets 130 as total utility which is the maximum.

D. Two commodity model:-

(a) Meaning of consumer equilibrium

In this model the fundamental condition of consumer's equilibrium is the principle of equi- marginal utility.

"The principle of marginal utility implies that the consumer should incur expenditure on different commodity in such a manner that marginal utility of last rupee spent on each one of them is equal.

(b) The conditions of consumers' equilibrium

As given below.

i. $\frac{Mux}{PX} = \frac{Muy}{Py}$

where:- Mu- marginal utility of x.

Muy- marginal utility of y

Px – price of x.

Py- price of y.

ii. Expenditure on X + expenditure on Y= consumers income.

Note:- [Both the condition must be fulfilled to attain consumers equilibrium]

(c) Assumptions of consumer equilibrium:-

The concept of consumer's equilibrium through utility approach is based on the following assumptions:-

- The consumer is rational
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- Marginal utility of money remains constant.
- The law of diminishing marginal utility operates.
- Prices of commodities one given and remain constant.

(d) **This can future is explained with the help of an example.**

For Example:-

- Suppose there are two commodity x and y.
- P_x = Rs. =2 per unit and P_y = Rs.=3
- Consumers money income = Rs. =24
- Marginal utility of x and y commodity are given in the table below.

Table = marginal utility of goods x and y.

Units	Mux (utility)	Muy (utility)
1	20	24
2	18	21
3	16	18
4	***14***	***15***
5	12	12
6	***10***	9

In order to maximize his satisfaction the consumer will not equate marginal utility of 'x' with the marginal utility of y because prices of these two goods are different. He will equate (per rupee Mux) with (per rupee Muy)

So, reconstructing the above table by dividing marginal utilities (Mux) of x by Rs-2 and marginal utilities (Muy) of y by Rs-3, we get the table below.

Table marginal utility of money expenditure

Units	Mux / Px	Muy / Py
1	10	8
2	9	7
3	8	6
4	7	***5***
5	6	4
6	***5***	3

In order to have maximum utility consumer will purchase 6 units of x any 4 units of y because it satisfies the following two conditions required for consumers equilibrium.

- At 6 units of x = $\frac{Mux}{PX} = \frac{10}{2} = 5$

At 7 units of y = $\frac{Muy}{Py}$ = $\frac{15}{3}$ = 5

- Expenditure on x + expenditure on y = total income ($Q_x \times Px + Q_y \times Py$)

Diagrammatic Presentation of two commodity model :-

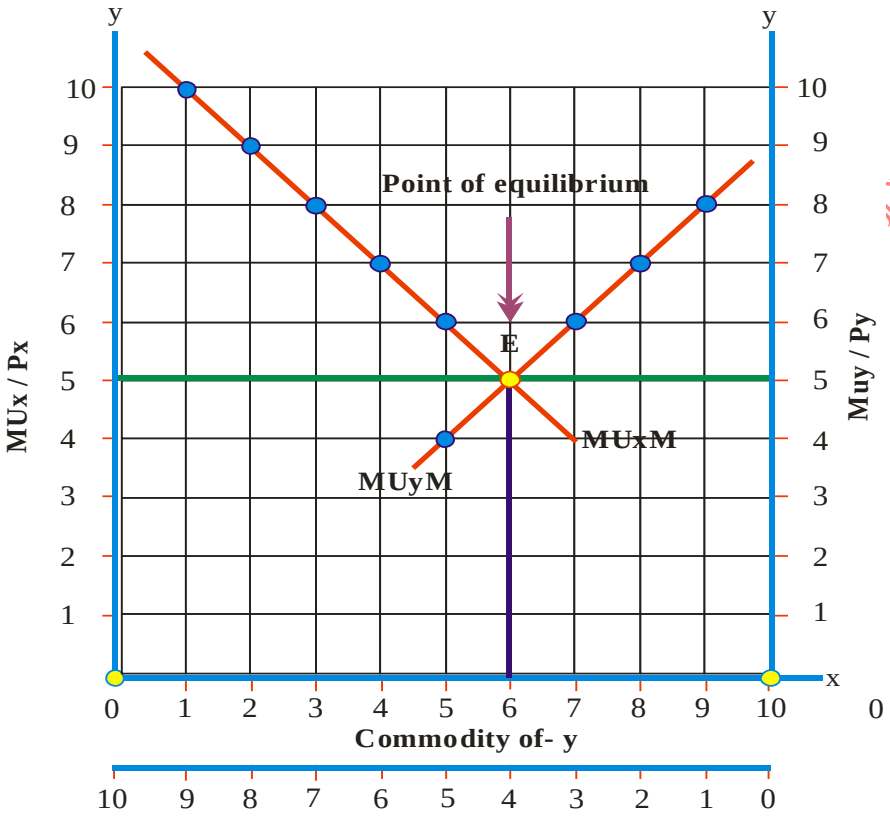


Fig- Equi- marginal utility and consumer's equilibrium

Explanation:- In this diagram the consumer is in equilibrium when is buying 6 units of x and 4 units of y . Hence, the equilibrium is struck at point E where $\frac{Mux}{Px} = \frac{Muy}{Py}$. no other allocation of money expenditure will yield him greater utility than he is buying 6 units of commodity x and 4 unit of commodity y.

INDIFFERENCE CURNE'S ANALYSIS AND CONSUMER'S EQUILIBRIUM:-

A. Indifference curve:-

i. **Meaning-** "It shows different combinations of two commodities between which a consumer is indifferent. Each combination offers him the same level of satisfaction" that is known indifference curve.

ii. **Assumption underlying indifference curve approach-**

- The consumer is rational
- Utility is expressed ordinally
- Consumption pattern behavior should be consistent.
- Price of the two commodities does not change.
- Money income of the consumer remains unchanged.

iii. **Indifference schedules and set**

"It is a set of combination of two commodities which offer a consumer the same level of satisfaction."

Table- Indifference schedules

Combination of apples	Apples	Oranges	DMRs.
A	1	10	-
B	2	7	3
C	3	5	2
D	4	4	1

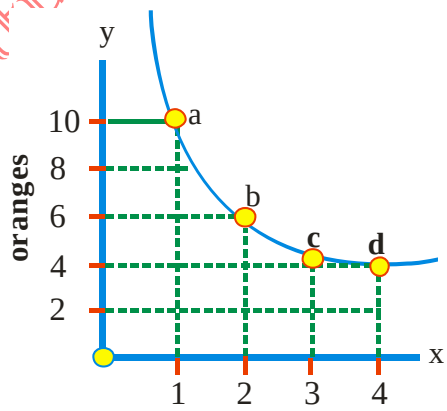


Fig- A consumers indefferenc curve

Explanation- Each point on the curve (like A,B,C) shows one combination of apples and Oranges. Since each combination offers the same level of satisfaction to a consumer this curve is called indifference curve.

Indifference Map- "Indifference map refers to a set of indifference curve". Higher IC shows higher level of satisfaction. It corresponds to higher level of income of the consumer.

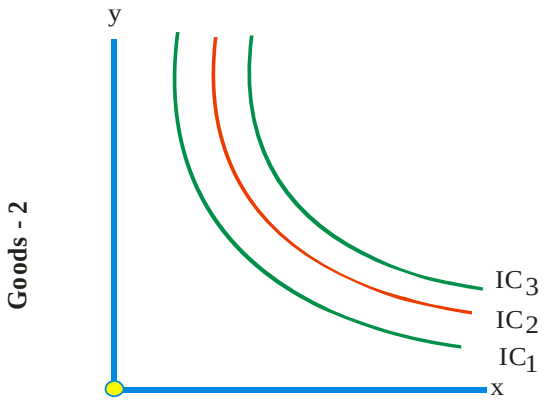


Fig- Indifference Map

iv. Some useful concepts relating to indifference curve analysis:-

a. Marginal Rate of substitution (MRSxy) - Moving along an IC we find that one good is substituted for the other. "The rate at which one more unit of Good-2 is substituted for Good-1 is called MRSxy".

$$MRSxy = \frac{\Delta GOOD-1}{\Delta GOOD-2} = \frac{ac}{cb}$$

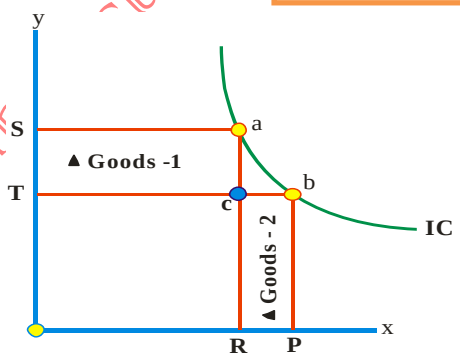


Fig- marginal rate of substitution

b. Diminishing marginal rate of substitution- "DMRSxy implying that for every additional unit of Good-1, a consumer is willing to give up less and less amount of Goods-2".This is because of the goods are imperfect substitutes of each other and IC is convex the origin

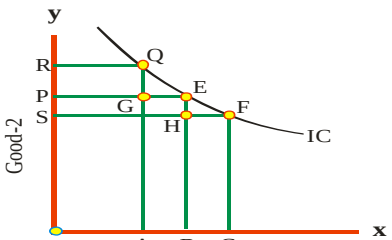
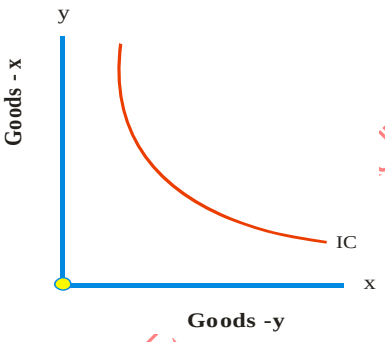


Fig- Diminishing Marginal Rate of Substitution

v. **Properties / Features of indifference curve-**

These are following features of indifference curve as under.

- Indifference curves slope downwards to the right- In order to maintain the same level of satisfaction along a curve it he increases consumption of commodity 'x' then consumption of commodity 'y' has to be decreases. Because, in the given limitation of money income consumption of both 'x' and 'y' cannot be increased, hence indifference curve is downwards sloping.



- Indifference curves are always convex the origin- Indifference curves are convex to the point of origin because marginal rate of substitution of 'x' for 'y' diminishing.

- Indifference curves can never intersect each other- Two indifference curves can never intersect each other as they represent different level of total satisfaction.

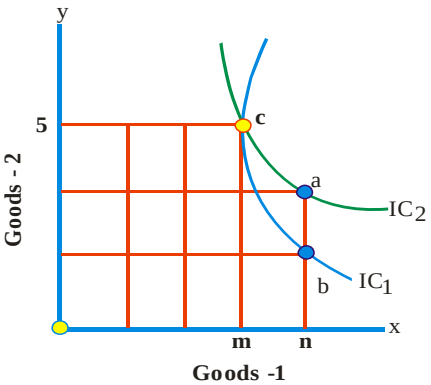


Fig- indifference curve cannot cut each other

- Higher the indifference curve, higher the level of satisfaction- A consumer will always refer to him the higher indifference curve on an indifference map. because of the fact that a higher indifference curve gives higher satisfaction.

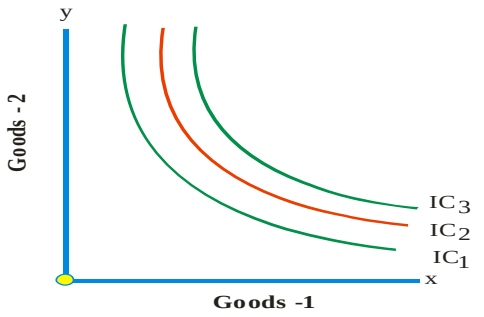


Fig- A higher indifference curve show a higher level of satisfaction

- Indifference curve does not touch either 'x' axis or 'y' axis- An indifference curve does not touch any of the axis. If it touches any of the axes, it would mean that zero unit of any of the two commodities. such curves are in contradiction to the assumptions that the consumer buys two goods in combinations.

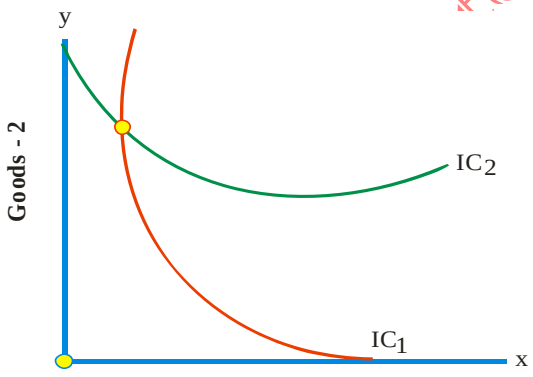


Fig- Indifference curve does not touch either 'x' anis or 'y' anis

B. Consumer's Budget- (Budget set and Budget line):-

Budget set- "It refers to attainable combinations of a set of two goods, given prices of goods and income of the consumer".

Explanation with an example-

- Let us assume that a consumer has a budget of Rs.= 60.
- Also let us assume that price of apples is Rs.= 2 per unit and price of oranges is Rs.= 1 per unit.
- Accordingly we find the following set of apples and oranges that a consumer can buy with his given income.

Table-consumption possibilities

Units of Apples	Units of Orange
0	60
10	40
20	20
30	0

Diagrammatic presentation of consumption possibilities-

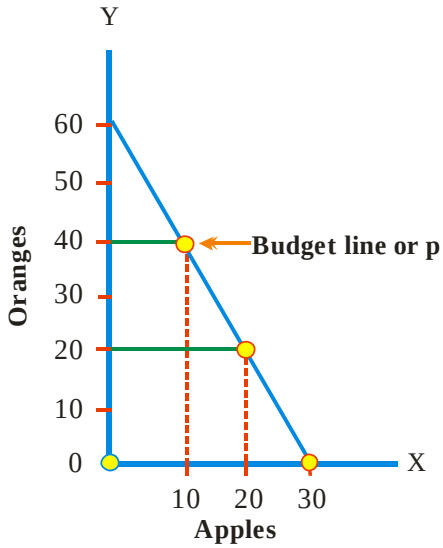


Fig- IC of consumption possibilities

$$\frac{\Delta X2}{\Delta X1} = \frac{-P1}{P2}$$

Explanation:- If a consumer spends his entire money on Apples, he can buy 30 units of it. On the other hand, if he spends his entire money on oranges, he gets 60 units of it. Likewise, he can think of various other combinations that he can buy given his income and prices of apples and oranges.

Budget line: - "It is a line showing different possible combinations of Good-1 and Good-2 which a consumer can buy, given his income and the prices of Good-1 and Good-2".

The line consists of all bundles which cost exactly equal to income. $P_xq_x+p_yq_y=M$.

Budget constraint- it refers to those bundles which cost more than money income of the consumer. $p_xq_x+p_yq_y<m$

C. Consumers Equilibrium:-

a. **Meaning:-** " It is struck when what customer is willing to buy coincides with what he can buy"

Willing to buy:- Means preference according to his indifference set.

Can buy- means budget set of consumers

b. Assumptions underlying indifference curve approach

- The consumer is rational.
- Utility is expressed ordinally
- Consumption pattern behavior should be consistent.
- Price of the two commodities does not change.
- Money income of the consumer remains unchanged.

c. Conditions of consumer's equilibrium

The conditions of consumer equilibrium where he would maximize his satisfaction is as follows:-

- At equilibrium point budget line or price line should be tangent to indifferent curve.
- At equilibrium point slope of the indifference curve must be equal to the slope of budget line.
- At equilibrium point = $(Q_x \times P_x) + (Q_y \times P_y)$ = money income or expedition or x and exp. on y commodity = consumers income.

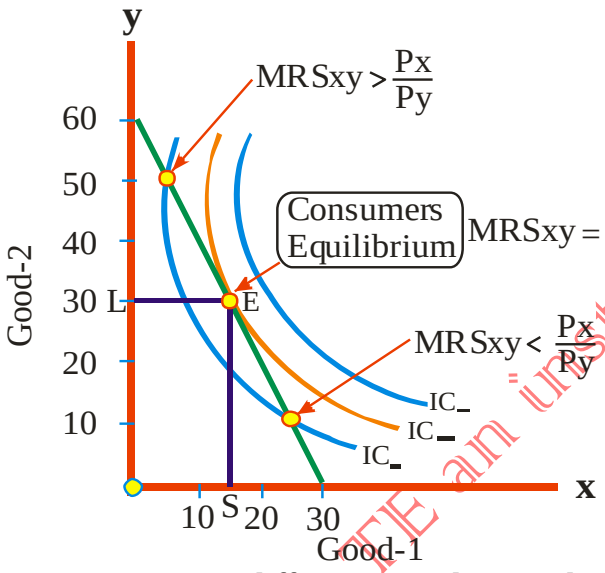


Fig-Indifference Analysis and Consumers equilibrium

d. **Explanation:-** The diagram shows that it is point E at which what a consumer wishes to have coincides with what the can have .therefore, D is point of consumer equilibrium where he maximizes his satisfaction. At this point consumer buys OY_1 amount of Good-Y and OX_1 amount of Good-X.D is also called optimum consumption point.

Monotonic Reference: - "It means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction.

-:- ----------The End---------- -:-