

CHAPTER – 2 CONSUMER EQUILIBRIUM

- ❖ A consumer is one who buy goods and services for satisfaction of his / her wants.
- ❖ **UTILITY:-** The wants satisfying power of a commodity called utility. It can be presented with the help of cardinal number such as 1,2,3-----. It is psychological feeling of the consumer.
- ❖ It depends upon need and importance of the products by the consumer the measuring unit of utility is utils.
- ❖ Total utility it refer to the sum of all the utilities which can be derived by consuming all the units of a commodity. It is also called as the addition of all the utility of a commodity by consuming the units

For example – If goods x is consumed by consumer and he gets 20 utils of satisfaction after consuming one unit. As he goes on his consumption satisfaction derived would be 17, 15 -----n of utils. When all the utility are summed up it gives total utility.

$$TU = U_1 + U_2 + U_3 + \dots + U_n$$

Where U = Utility from units 1,2,3.....n

- ❖ **MARGINAL UTILITY:-** It refers to an additional utility which can be derived by consuming one more unit of commodity. In other words, MU refers to change in per unit of consumption. It is an extra utility which can be obtained consuming one more unit of two commodity.

$$MU = TUn - TUn-1$$

Where TUn = Total utility of current unit of consumption

TUn-1 = Total utility of previous unit of consumption.

Or

$$MU = \frac{\Delta TU}{\Delta Q}$$

Where ΔTU = change in total utility

ΔQ = change in per unit of consumption

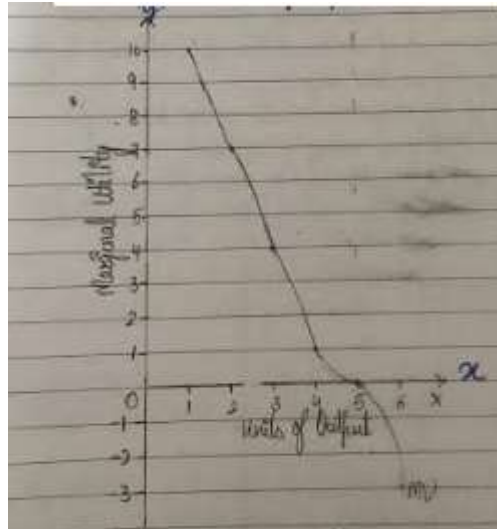
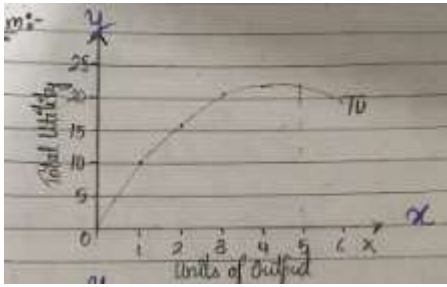
Units of Mangoes	Total utility	Marginal utility
0	0	0
1	10	10
2	17	7
3	21	4
4	22	1
5	22	0
6	10	-3

- ❖ **RELATIONSHIP BETWEEN TOTAL UTILITY AND MARGINAL UTILITY**

Total utility	Marginal utility
1. It is sum of all the utilities which can be derived by consuming all the units of commodity.	It is an additional utility which can be derived by consuming one more unit of commodity.
2. $TU = \sum MU$	$MU = TUn - TUn-1$
3. When TU increases	MU continuously decreases.
4. TU maximum.	MU is zero.
5. TU decline.	MU -ve.

Diagram:

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❖ **LAW OF DIMINISHING MARGINAL UTILITY:-**

- **STATEMENT OF LAW:-** The law states that when a consumer consumes particular commodity continuously, then the utility derived from each successive unit goes on diminishing. In other words, if a consumer consumes on particular commodity continuously, than marginal utility goes on diminishing.
- **DEFINITION:-** The additional benefit that the person derives from the given increase in stock of a commodity diminishes. Other things remaining constant. **By Marshall**

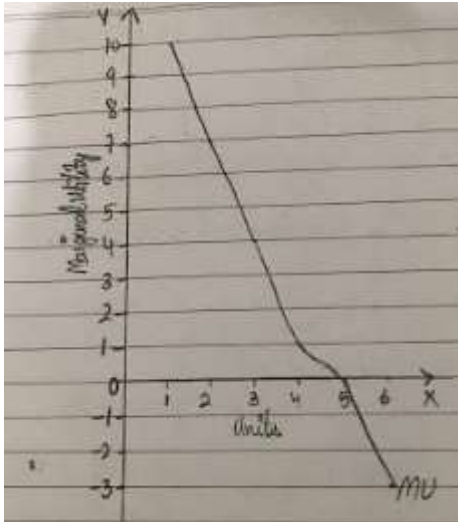
❖ **ASSUMPTIONS OF LAW:-**

1. The utility must be measured in cardinal numbers like 1,2,3,.....etc.
2. All the units of commodity, must be identical i.e. same in all aspect like size, colour, design, quality etc.
3. The unit of commodity, must be standard.
EXAMPLE:- Cup of water, bottle of cold drink. It should not be too small or too large.
4. Income of the consumer must remain unchanged.
5. Marginal utility of money is constant.
6. There must be continuity in consumption.
7. No change in taste during process of consumption.

Units	Mux
0	0
1	10
2	7
3	4
4	1
5	0
6	-3

Diagram:

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- ❖ **EXPLANATION OF DIAGRAM:-** The theory of law of diminishing marginal utility is presented in schedule and diagram. In schedule at first unit the MU of good X is 10 units and as we goes on increasing the units of consumption, the marginal utility continuously 7,4,1 to 0, 03.
In given diagram '0' x –axis represent units of good X consumed where as y-axis represents MU of good x. The MU curve slopes downwards from left to right because of decrease in MU.

Q. What is point of satisfy or saturation point?

Ans. Marginal utility becomes zero it is a point where consumer secures total possible satisfaction it is a stage of maximum satisfaction.

Q. Dis utility.

Ans. Opposite of utility it refers to loss of satisfaction due to consumption of too much of a commodity.

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- ❖ **MEANING:-** It is a situation where a consumer secures maximum satisfaction which with minimum budget. It is called as points of balance as the consumer does not want to change the level of satisfaction. Hence, it can be derived as the quantity of output at which the consumer maximises its satisfaction with his or her given level of income.

❖ **THERE ARE THREE TYPES:-**

1. In case of one commodity
2. In case of two or more commodity
3. In case of only two commodities.

1. **IN CASE OF ONE COMMODITY:-** In case of single commodity, the consumer is in equilibrium at the quantity of units at which marginal utility of good x is equal to price of good x. In other words the marginal utility of money expenditure must be equal to marginal utility of money.

❖ **ASSUMPTIONS:-**

1. Consumer must be rational one.
2. The marginal utility of money must be constant.
3. Consumer must be continuous in consumption.
4. Budget or income of consumer remain unchanged.
5. The law of diminishing marginal utility operated prices are assumed to be constant.

❖ **CONDITIONS:-**

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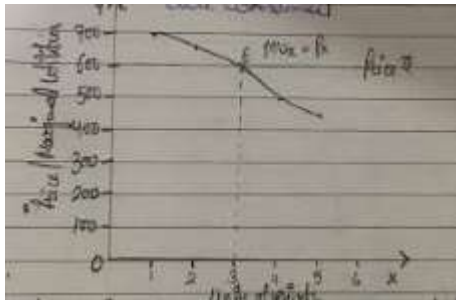
$$Mux = Px \text{ or } Mux/Px = Mum$$

Where Mux/Px = Marginal utility of money expenditure on good x.

Mum = marginal utility of money.

Units	MU of X(Mux)	Price of X (Px)
1	700	600
2	650	600
3	600	600
4	500	600
5	350	600

Diagram:



- ❖ **EXPLANATION:-** In the given schedule, the consumer refer to consume more and more units of commodity if MU of good x is more than the price of good x. the process of consumption will go on until the MU of good x or MU of money expenditure is equal to price.

2. Consumer equilibrium in case of two commodities / gossen's second law / law of substitution / law of equi marginal utility / law of maximum satisfaction: -

- A consumer will be at equilibrium when he / she allocates.

The consumer will be equilibrium. By purchasing x and y when $Mux/Px = MUy/Py = Mum$.

Where Mux/Px is marginal utility of money expenditure or commodity x.

MUy/Py is marginal utility of money expenditure on a commodity y.

Mum is marginal utility of money.

$$Px = 5, Py = 10$$

Unit	MU _x	MU _y	MU _x /Px	MU _y /Py
1	50	80	10	8
2	45	70	9	7
3	40	60	8	6
4	35	50	7	5
5	30	40	6	4
6	25	30	5	3

$$\frac{MU_x}{Px} = \frac{MU_y}{Py} = Mum$$

3 units of x + 1 unit of y = 25

$$3 \times 5 + 10 \times 1 = 15 + 10$$

4 units of x + 2 units of y = 40

$$4 \times 5 + 2 \times 10 = 20 + 20$$

5 units of x + 3 units of y = 55

$$5 \times 5 + 3 \times 10 = 25 + 30$$

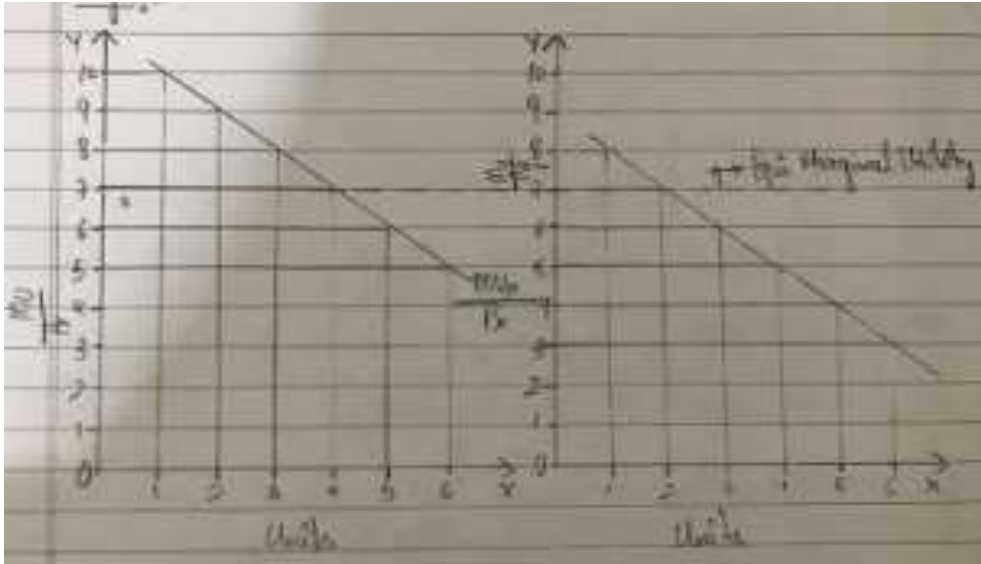
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6 units of x + 4 units of y = 70

$$6 \times 5 + 4 \times 10 = 30 + 40$$

Total expenditure	Income
25	40
40	40
55	40
70	40

Diagram:



- ❖ **INDIFFERENCE CURVE ANALYSIS / ORDINAL CURVE UTILITY:-** Indifference curve refers to various combination of 2 commodities which give equal amount of satisfaction to the consumer. In other words, it is locus (place) of points that shows combination of 2 commodities which gives the consumer same satisfaction.

INDIFFERENCE CURVE SCHEDULE:-

Combination	Food (units)	Clothing (units)
A	1	10
B	2	7
C	3	5
D	4	4

Diagram:-

Thus, different points A, B, C and D on indifference curve (IC) shows those combinations of good and clothing which give equal amount of satisfaction to the consumer. An indifference curve is also known as ISO utility curve.

Points on graph same satisfaction curve.

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❖ PROPERTIES OF IC:-

1. **IC SLOPES DOWNWARD FROM LEFT TO RIGHT OR IC SLOPES NEGATIVITY:-** It implies that if a consumer consumes more of one commodity (food), he or she must consume less quantity of others (clothing), then only he or she will have same level of satisfaction from its products.
2. **IC IS CONVENXED TO ITS ORIGIN:-** It implies that it shows inward to the origin because of assumption of diminishing marginal rate of substitution.
3. **HIGHER IC, HIGHER SATISFACTION:-** It implies more utility because of monotonic preference. Higher IC curve represents more satisfaction then the combination of lower IC.

DIAGRAM:

4. **IC DOES NOT TOUCH X-AXIS OR Y-AXIS:-** This is because IC analysis considers the consumption of 2 goods. IC touches y-axis. It would mean the consumption of X is zero. Similarly, if IC touches x-axis, it would mean consumption of y is zero.

Diagram:-

5. **IN DIFFERENCE CURVE CAN NEVER INTERSECT:-** As two indifference curves cannot represents the same level of satisfaction. They cannot intersect each other. It mean, only one indifference curve will pass through a given point and indifference map. In the diagram, satisfaction from point A and from point B on IC1, will be same. Similarly points A and C on IC2 also gives the same level of satisfaction. But, this is not possible as B and C lie on two different in difference curve that is IC1 and IC2 and represent level of satisfaction and two indifference curve can not intersect and match each other.

Diagram:

❖ ASSUMPTIONS OF IC:-

1. **TWO COMMODITIES:-** It is assumed that the consumer has a fixed amount of money whole of which is to be spend on the two of goods, given constant prices of both the goods.
2. **NON-SATIETY:-** It is assume that the consumer has not reached the saturation. He always prefer more of both the commodity. He always tries to more to higher indifference curve to get higher and higher satisfaction.
3. **ORDINAL UTILITY:-** Consumer can rank his preference on the basis of satisfaction from each combination of goods.
4. **DIMINISHING MARGINAL RATE OF SUBSTITUTION:-** It means as the consumer substitute more and more of one commodity (X) for another commodity (Y), he or she will be prepared to give a lesser units of Y for each additional unit of X.
5. **RATIONAL CONSUMER:-** Consumer is assume to behave in a rationed manners i.e. he aims to maximise his total satisfaction.

- ❖ **MARGINAL RATE OF SUBSTITUTION:-** It refers to the rate of which the commodities can be substituted with each other, so that total satisfaction of the consumer remains the same.

Combinations	Food	Clothing	MRS
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A	7	10	-
B	2	7	3:1 3C:IF
C	3	5	2:1 2C:IF
D	4	4	1:1 1C:IF

MRS = units of clothing (B) willing to sacrifice

units of good (A) willing to gain.

Diagram:

Q1. Budget Line.

Ans. Consumer Budget states the real income or purchasing power of the consumer from which he can purchase certain quantitative bundles of two goods at given price. It means, a consumer can purchase only those combinations (bundles) of goods, which cost less than or equal to his income.

Budget line is a graphical representation of all combinations of two goods which can be purchased with given income and prices, such that the cost of each of these combinations is equal to the money income of the consumer.

Suppose, a consumer has an income of Rs. 20. He wants to spend it on two commodities: X and Y and both are priced at Rs. 10 each. Now, the consumer has three options to spend his entire income:

1. Buy 2 units of X
2. Buy 2 units Y
3. Buy 3 units of X and 1 unit of Y, it means possible bundles can be:(2,0); (0,2) or (1,1).

When all these three bundles are represented graphically, we get a downward sloping straight line, known as budget line. It is also known as price line.

Q2. Budget set.

Ans. Budget set is the of all possible combinations of the two good which a consumer can afford, given his income and prices in the market.

Q3. Budget line Vs Budget Set.

Ans. Budget set and budget line are two distinct concepts.

1. Budget set include all the possible bundles which cost less than or equal to consumer's money income at the given prices. On the other hand, budget line represents all those bundles that the consumer can purchase by spending his entire income at the given prices.
2. The bundles of budget set lie either on or below the budget line. The bundles of budget line lie only on the budget line.

Q4. Schedule of budget line.

Ans.

Combinations of apples	Apples (A) (Rs. 4 each)	Bananas (B) (Rs. 2)	Money spent income
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and bananas		each)	(Rs.)
E	5	0	$(5 \times 4) + (0 \times 2) = 20$
F	4	2	$(4 \times 4) + (2 \times 2) = 20$
G	3	4	$(3 \times 4) + (4 \times 2) = 20$
H	2	6	$(2 \times 4) + (6 \times 2) = 20$
I	1	8	$(1 \times 4) + (8 \times 2) = 20$
J	0	10	$(0 \times 4) + (10 \times 2) = 20$

Budget line diagram:

Every point on this budget line indicates those bundles of apples and bananas, which the consumer can purchase by spending his entire income of Rs. 20 at the given prices of goods.

❖ **IMPORTANT POINTS ABOUT BUDGET LINE:-**

1. Budget line AB slopes downwards as more of one go/I can be bought by decreasing some units of the other good.
2. Bundles which cost exactly equal to consumer's money income (like combinations (E to J) lie on the budget line.
3. Bundles which cost less than consumer's money income (like combination D) shows under spending. They lie inside the budget line.
4. Bundles which cost more than consumer's money income (like combination C) are not available to the consumer. They lie outside the budget line.

Q5. Algebraic expression of budget line.

Ans. The budget line can be expressed as an equation:

$$M = (PA \times QA) + (PB \times QB)$$

Where:

M = money income;

QA = quantity of Apples (A);

QB = quantity of Bananas (B) ;

PA = Price of each apple;

PB = price of each bananas.

Q6. Slope of budget line.

Ans. Slope of the budget line will be number of units of bananas, that the consumer is willing to sacrifice for an additional unit of people.

$$\text{Slope of budget line} = \frac{\text{Units of bananas (B) willing to sacrifice}}{\text{Units of apples (A) willing to gain}} = \frac{\Delta B}{\Delta A}$$

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2 bananas need to be sacrificed each time to gain 1 apple. So slope of budget line = $-2/1 = 2$

** Numerator will always have negative value as it shows number of units to be sacrificed. This slope of budget line is equal to price ratio of two goods.

Q7. Price ratio or marginal rate of exchange (MRE).

Ans. Price ratio is the price of the good on the horizontal or X-axis divided by the price of the good on the vertical or Y-axis. For instance, if good X is plotted on the horizontal axis and good Y on the vertical axis then:

Price ratio = $\frac{\text{Price of X}}{\text{Price of Y}} = \frac{P_X}{P_Y}$

Q8. Why slope of budget line is represented by price ratio?

Ans. A point on the budget line indicates a bundle which the consumer can purchase by spending his entire income. So, if the consumer wants to have one more unit of good 1 (say, apples or A), then he will have to give up some amount of good 2 (Say, Bananas or B). the number of bananas needed to be given up to gain 1 apple depends on the prices of apples and bananas.

As per, apples (A) is priced at Rs. 4 (P_A) and bananas (B) at Rs. 2 (P_B). It means, to gain 1 apple, consumer will have to reduce his expenditure on bananas by Rs. 4, i.e. consumer will have to sacrifice 2 bananas to gain 1 apple. It means, consumer will have to give P_A/P_B units of bananas to gain one apple. P_A/P_B is nothing but the price ratio between apples and bananas. So, it is rightly said that price ratio indicates the slope of budget line.

Q9. Properties of budget line.

Ans. The two main properties of budget line are:

1. **BUDGET LINE IS DOWNWARD SLOPING:-** Budget line has a negative slope, it slopes downwards as more of one good can be bought by decreasing some units of the other good.
2. **BUDGET LINE IS STRAIGHT LINE:-** The slope of budget line is represented by the price ratio. As price is constant throughout, the budget line is straight line.

Let us understand this with the example:

1. **EFFECT OF A CHANGE IN THE INCOME OF CONSUMER:-** If there is any change in the income assuming no change in prices of apples and bananas, then the budget line will shift. When income increases the consumer will be able to buy more bundles of goods, which were previously not possible. It will shift the budget line to the right from AB to A1 B1, as seen in fig. the new budget line A1B1 will be parallel to the original budget line AB. Similarly, a decrease in income will lead to a leftward shift in the budget line to A2 B2.

Diagram:

2. **EFFECT OF CHANGE IN THE RELATIVE PRICES (APPLES AND BANANAS):-** If there is any change in price of two commodities, assuming no change in the money income of consumer, then

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budget line will change. It will change the slope of budget line as price ratio will change, with change in prices.

- a. **CHANGE IN THE PRICE OF COMMODITY ON X-AXIS (APPLES)**:- When the price of apples falls, then new budget line is represented by a shift in budget line to the right line AB to A1 B1. The new budget line meets the Y-axis at the same point B, because the price of bananas has not changed. But it will touch the x-axis to the right of A at point A1, because the consumer can now purchase more apples, with the same income level. Similarly, a rise in the price of apples will shift the budget line towards left from AB to A2B.

Diagram:

- b. **CHANGE IN THE PRICE OF COMMODITY ON Y-AXIS (BANANAS)**:- With a fall in the price of bananas, the new budget line will shift to the right from AB to AB1. The new budget line meets the x-axis at the same point A due to no change in the price of apples. But it will touch the y-axis to the right of B at point B1 because the consumer can now purchase more bananas, with the same income level. Similarly, a rise in the price of bananas will shift the budget line towards left from AB to AB2.

Diagram:

Q11. What do you mean by marginal utility of money?

Ans. Marginal utility of money refers to worth of a rupee to a consumer. A consumer defines in terms of utility he derives from a standard basket of goods that he can buy with a rupee.

Q12. Ice-cream sells for Rs.20. Priya who likes ice-cream has already consumed four (4). Her marginal utility of rupee is 4. Should she consume more ice-cream or stop the consumption?

Ans. $MU_x = MU_m$

$$MU_x/20 = 4$$

$$MU_x = 4 \times 20$$

$$MU_x = 80$$

Q13. What happens when $(MU_x/P_x > MU_y/P_y)$.

Ans. The situation implies that by spending a rupee on good X, the consumer gets greater marginal utility than in case of good Y. Accordingly he will spend more on X than Y as consumption of X MU_x will fall. The consumer will stop, buying more of X in place of Y only when, $(MU_x/P_x = MU_y/P_y)$.

Q14. Explain the conditions of consumer's equilibrium through indifference curve analysis?

Or

Explain the conditions of consumer equilibrium analysed by Hicks and Allen or Hicksian approach?

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Ans. For consumer equilibrium under IC approach two conditions must be fulfilled:-

1. **SLOPE OF IC = SLOPE OF BUDGET LINE**,-

$$MRS_{xy} = P_x/P_y$$

Here, MRS_{xy} is the number of units of y goods that consumer is willing to sacrifice to obtain extra unit of good X. P_x/P_y is the number of units Y good to required to be sacrificed to obtain one extra unit of good X.

2. **IC IS CONVEX TO ORIGIN**;- But sometime equilibrium cannot be met when these two conditions are not fulfilled due to which following two situation arise.

CASE I. $MRS_{xy} > P_x/P_y$

It means that consumer is willing to pay more for good X than, the price prevailing in the market as a result consumer buys more of X. consequently (As a result), MRS falls till it becomes equal to the ratio of prices and equilibrium is establish.

CASE II. $MRS_{xy} < P_x/P_y$

It means consumer is willing to pay loss for good X than price prevailing in the market. It indicates the consumer to buy less of god X and more of Y. As a result, MRS rises till it becomes equal to the ratio of prices and equilibrium is established.

It can be explained with the help of diagram:

Diagram:

Consumer is in equilibrium at point E where, both conditions of consumer equilibrium are fulfilled. At this point consumer purchases OX units of good X and OY units of good Y. consumer will not like to purchase any other bundle on budget line AB.

EXAMPLE:- Point C and D because they lie on lower IC and give lower level of satisfaction. Consumer cannot get satisfaction level higher than IC2 because his/her income does not permit to move the budget line AB. Therefore, equilibrium exist only at bangent point E where $MRS_{xy} = P_x/P_y$.