

Chapter 2: Theory of Consumer Behavior

Part 1: Choose the correct answer

1. Utility is _____
 - a. Objective
 - b. **Subjective**
 - c. Both a & b
 - d. None of these.
2. The shape of an indifference curve is normally _____
 - a. Convex to origin
 - b. **Concave to origin**
 - c. horizontal
 - d. vertical.
3. The consumption bundles that are available to the consumer depend on _____
 - a. Color & Shape
 - b. **Price & income**
 - c. Income & quality
 - d. None of above
4. The equation of budget line is _____
 - (a) $P_x + P_1x_1 = M$
 - (b) $M = P_0x_0 + P_x$
 - (c) $P_1x_1 + P_2x_2 = M$
 - (d) $Y = Mx + C$

Answer:

 - (c) $P_1x_1 + P_2x_2 = M$
5. The demand for these goods increases as income increases _____
 - a. Inferior goods
 - b. Giffen goods
 - c. **Normal goods**
 - d. None of the above
6. A vertical demand curve is _____
 - a. Perfectly elastic
 - b. **Perfectly inelastic**
 - c. Unitary Elastic
 - d. None of the above.
7. Ordinal Utility analysis expresses utility in _____
 - a. Numbers
 - b. Returns
 - c. **Ranks**
 - d. Awards
8. Any statement about demand for goods is considered complete only when the following is/are mentioned in it
 - a. Price of good
 - b. Quantity of good
 - c. Period of time
 - d. **All the above**
9. A situation of excess demand prevails at a _____
 - a. **Price lower than equilibrium price**
 - b. Price higher than equilibrium price
 - c. price equal than the equilibrium price
 - d. none of the above.
10. When there is a rise in the price of substitute good, the demand for the given good:
 - a. **Increases**
 - b. decreases
 - c. remains constant
 - d. none of the above.
11. If marginal rate of substitution is constant throughout, the indifference curve will be:
 - a. Parallel to the X-axis
 - b. Downward sloping concave
 - c. downward sloping convex
 - d. **downward sloping straight line**
12. The slope of indifference curve is measured by:
 - a. Marginal rate of transformation
 - b. **Marginal rate of substitution**
 - c. Marginal opportunity cost
 - d. none of the above
13. When demand for one commodity does not change even if its price changes then its demand curve is _____
 - a. Flatter
 - b. steeper
 - c. **parallel to Y-axis**
 - d. parallel to X-axis

14. Utility approach is _____
- Cardinal
 - Ordinal
 - Both a & b**
 - None of the above
15. If price of sugar increases, the demand for tea will _____
- Decreases**
 - Increase
 - Not affected
 - None of these.
16. Expansion and contraction in demand are caused by
- Change in the income of buyer
 - Change in the taste and preference of buyer
 - Change in the price of commodity**
 - Change in the prices of related goods
17. The consumer is in equilibrium at a point where the budget line
- Is above an IC
 - Is below an IC
 - Is tangent to an IC**
 - Cuts an IC
18. The second apple gives lesser satisfaction to a hungry boy. This is a clear case of
- Law of Demand
 - Law of supply
 - Law of diminishing Marginal utility**
 - Law of variable proportions
19. Which of the following pairs of goods is an example of substitutes.
- Tea & sugar
 - Tea & Coffee**
 - Pen & Ink
 - Shirt and Trousers
20. All of the following items are determinants of demand except:
- Tastes and preference
 - quantity supplied**
 - Income
 - price of related goods
21. Demand for a commodity refers to
- Desire for the commodity
 - Need for the commodity
 - quantity demanded of that commodity
 - quantity of commodity demanded at a certain price during any particular period of time.**
22. The law of demand, assuming other things to remain constant establishes relationship between
- Income of the consumer and the quantity of a good demanded by him.
 - Price of a good and the quantity demanded**
 - Price of a good and the demand for its substitute.
 - Quantity demanded of a good and the relative prices of its complementary goods.
23. Suppose the price of pepsu increases we will expect the demand curve of coca cola to
- Shift towards left
 - Shift towards right**
 - initially shift towards left and then to right
 - remain at the same level
24. The second glass of water gives lesser satisfaction to a thirsty boy. This is a clear case of
- Law of demand
 - Law of diminishing returns.
 - law of diminishing marginal utility**
 - law of supply
25. If as people's income increases, the quantity demanded of a good decreases, the good is called
- Substitute
 - normal good
 - an inferior good**
 - a complement
26. Potato chips and popcorn are substitutes. A rise in the price of potato chips will _____ the demand for popcorn and the quantity of popcorn will _____
- Increase, increase**
 - increase, decrease
 - decrease, decrease
 - decrease, increase

27. Total utility derived from consumption of commodity will begin to fall _____
- With every additional unit consumed
 - When total utility curve becomes flat
 - when marginal utility starts falling
 - when marginal utility becomes negative**
28. _____ curve is a downward sloping curve cutting the x-axis
- Marginal utility**
 - total utility
 - average utility
 - both a & c
29. The ratio of exchange between two goods on an indifference curve analysis is shown by the
- Constant marginal rate of substitution**
 - Indifference curve
 - increasing return to scale
 - income consumption curve
30. Indifference curves can be a straight line at
- Constant marginal rate of substitution
 - Increasing marginal rate of substitution
 - increasing return to scale
 - none of the above
31. If the price of any complementary good rise, then demand curve
- Shifts to left**
 - shifts to right
 - moves downward
 - moves upward
32. The demand function of a product x is given as $D_x = 30 - 4P$, where P is the price of the product, the demand at price of 4 will be
- 20
 - 12
 - 14**
 - 10
33. If demand is parallel to X-axis, what will be the nature of elasticity
- Perfectly elastic**
 - inelastic
 - elastic
 - highly elastic

Part 2: Fill in the blanks

- Want satisfying capacity of a commodity is **Utility**.
- Two indifference curves never **intersects** each other
- As income increases, the demand curve for normal goods shift towards **Rightward**.
- The demand for a good moves in the **opposite** direction of its price.
- Method of adding two individual demand curve is called **Horizontal summation**.
- An equation $xy = C$ gives us a **Rectangular** hyperbola.
- When demand for one commodity falls due to fall in price of other good, the two goods are called as **Substitute** goods.
- The vertical demand curve will show the good is **Perfectly Inelastic**.
- The relationship between price of commodity and demand of its substitute good is **Direct**.
- Marginal Utility** curve is a downward sloping curve cutting the X-axis.
- Higher** indifference curve indicates higher level of satisfaction.
- Total utility is maximum when marginal utility is **Zero**.
- If due to fall in the price of good X, demand for good Y rises, the two goods are **Complements**.
- A **budget** set is a collection of all bundles available to a consumer at the prevailing market price at given level of income.

15. **Budget line** is a locus of different combinations of two commodities which the consumer consumes and whose cost is exactly equals to his income.
16. A rational consumer prefers more to the commodity that offers him a higher level of satisfaction hence it is called **Monotonic preferences**.
17. As the consumers income increases, the quantity demanded for good increases and as the consumers income decreases, the quantity demanded decreases for a good, these goods are called as **Normal goods**.
18. **Demand** refers to the quantity of a good that a consumer purchases in a market at a particular price, at a particular time.
19. **Market demand** is the aggregate of quantities demanded by all individuals consumers in the market at different prices during a given period of time.
20. **Utility** means the want satisfying power of a good or a service.
21. A group of indifference curves for two commodities showing different levels of satisfaction is called **Indifference map**.
22. The law of diminishing marginal utility was introduced by the **German Economist Gossen**.
23. **Demand** refers to the quantity of a good that a consumer purchases in a market at a particular price, at a particular time.
24. **Market demand** is the method of adding two individual demand curves horizontally.
25. The responsiveness of demand to a change in one of its determinants while other determinants remain constant is called **Elasticity of demand**.
26. When the price of a good decreases and the quantity demanded increases then its called **Expansion of demand**.
27. When the price of a good increases and the quantity demanded decreases then it is called as **Contraction of demand**.

Part 3: Match the following

Question 1.

A	B
1. Demand curve	a. $d(P) = a - bp$
2. Linear demand curve	b. Down ward sloping
3. Unitary elasticity of demand	c. Pen & ink
4. Complementaty goods	d. A family of indifference curve
5. Indifference Map	e. $ ed = 1$

Answer:

1. (b) Down ward sloping
2. (a) $d(P) = a - bp$
3. (e) $|ed| = 1$
4. (c) Pen & ink
5. (d) A family of indifference curve

Question 2.

A	B
1. MRS	a. If Consumers income increases, Demand for goods decrease
2. Utility	b. Tea and Sugar
3. Law of Demand	c. Marginal Rate of Substitution
4. Normal goods	d. Tea and Coffee
5. Inferior goods	e. Ceteris Paribus
6. Substitutes	f. If consumers income increases, demand for good also decreases
7. Complementary	g. Want satisfying power

Answer:

1. (c) Marginal Rate of Substitution
2. (g) Want satisfying power
3. (e) Ceteris Paribus
4. (f) If consumers income increases, demand for good also decreases
5. (a) If Consumers income increases, Demand for goods decrease
6. (d) Tea and Coffee
7. (b) Tea and Sugar

Part 4: Answer the following in a sentence or in a word.

1. What is budget line?

Budget line is a locus of different combinations of two commodities which the consumer consumes and whose cost is exactly equals to his income.

2. What do you mean by cardinal utility analysis?

It refers to the method where the utility can be measured with the help of cardinal numbers such as 1,2,3, etc. cardinal numbers refer to those numbers that can be added, subtracted or multiplied.

3. Give the meaning of marginal utility.

Marginal utility is the change in total utility due to consumption of one additional unit of commodity.

4. What is utility?

Utility means the want satisfying power of a good or a service.

5. Expand MRS.

Marginal Rate of Substitution.

6. What do you mean by Indifference curve?

Indifference curve shows the different combinations of two commodities in which consumers get equal level of satisfaction.

7. What is demand?

Demand refers to the quantity of a good that a consumer purchases in a market at a particular price at a particular time.

Part 5: Answer the following questions in 4 sentences

1. What is MRS?

Marginal Rate of Substitution is the rate at which the consumer will substitute bananas for mangoes, so that his total utility remains constant. So, $MRS = | \Delta Y / \Delta X |$

2. What are the differences between budget line and budget set?

The budget set is a collection of all bundles that the consumer can buy with her income at the prevailing market prices.

The line consists of all bundles which cost exactly equal to money. This line is called budget line.

3. What do you mean by inferior goods? Give example.

These are the goods for which the demand is inversely related to consumer's income. The demand for inferior goods decreases in response to increase in income and vice-versa. Eg: Cereals, toned milk etc.

4. What is monotonic preference?

A rational consumer prefers more to the commodity that offers him a higher level of satisfaction, hence it is called Monotonic preferences.

5. State the law of demand.

The law of demand states that, “ other things remaining constant, when the price of a good decreases, the quantity demanded increases for the good, and when the price of a good increases, the quantity demanded decreases for the good”.

6. Mention the two different approaches which explain consumer behavior.

The two approaches which explains about consumer behavior are

- a. Cardinal utility analysis.
- b. Ordinal utility analysis.

7. What do you mean by elasticity of demand?

It is a measure of the responsiveness of the demand for a good to change in its price, that is changes in the quantity demanded with respect to changes in the price.

$$P_{ed} = \frac{\% \text{ change in quantity demanded for a good}}{\% \text{ change in price of a good}}$$

or

$$P_{ed} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

Where, p = actual price, q = actual quantity, Δp = change in price, Δq = change in quantity

Part 6: Answer the following questions in 12 sentences

1. Write the differences between total utility and marginal utility.

Total utility:

- a. Total utility of a fixed quantity of a commodity is the total satisfaction derived from consuming the given amount of some commodity x.
- b. TU depends on the quantity of the commodity consumed.
- c. $TU_x = \sum MU_x$ [where TU = total Utility, MU = marginal Utility, x = commodity]

Marginal Utility:

- a. Marginal utility is the change in total due to consumption of one additional unit of a commodity
- b. MU depends on the additional units of the commodity consumed.
- c. $MU_n = TU_n - TU_{n-1}$ [where n refers to the nth unit of commodity]

2. Briefly explain the budget set with the help of a diagram.

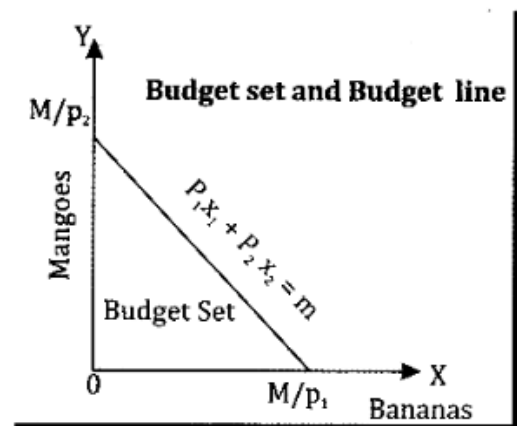
Suppose the income of the consumer is M and the prices of bananas and mangoes are P_1 and P_2 respectively. If the consumer wants to buy x_1 quantities of bananas then he/she will have to spend p_1x_1 amount of money.

Similarly if the consumer wants to buy x_2 quantities of mangoes, he/she have to spend p_2x_2 amount of money.

Therefore if the consumer wants to buy the bundle consisting x_1 quantities of bananas and x_2 quantities of mangoes, he/she will have to spend $p_1x_1 + p_2x_2$ amount of money.

The set of bundles available to the consumer is called budget set. Budget set is thus the collection of all bundles that the consumer can buy with his/her income at the prevailing market prices. Example: suppose a consumer who has Rs.20 and suppose both the goods are at rs.5 and are available only in integral units. The bundles that this consumer can afford to buy are:

Bundles	Bananas (₹ 5)	Mangoes (₹ 5)
A	0	4
B	1	3
C	2	2
D	3	1
E	4	0



In the above diagram, an OX axis we measure bananas and on OY axis we measure mangoes. Any point in the diagram represents a bundle of the two goods. The budget set consists of all points on or below the straight line having the equation

$$P_1x_1 + p_2x_2 = M$$

3. Explain the derivation of slope of the budget line.

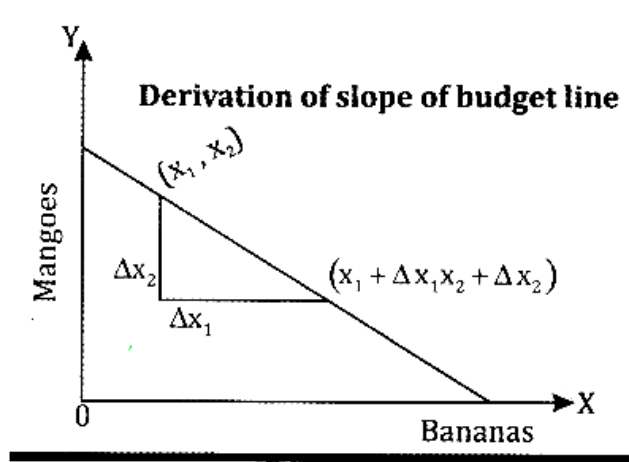
The slope of the budget line measures the amount of change in mangoes required per unit of change in bananas along the budget line.

Consider any two points (x_1, x_2) and $(x_1 + \Delta x_1, x_2 + \Delta x_2)$ on the budget line

It must be the case that $p_1x_1 + p_2x_2 = M$ and $p_1(x_1 + \Delta x_1) + p_2(x_2 + \Delta x_2) = M$ by subtracting both the equation we get $p_1\Delta x_1 + p_2\Delta x_2 = 0$

By rearranging terms in the above equation we get

$$\Delta x_2 / \Delta x_1 = -p_1/p_2$$



4. Explain the indifference map with a diagram.

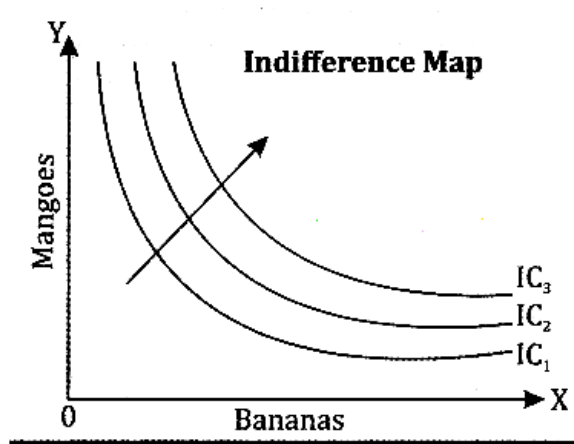
the consumers preferences over all the bundles can be represented by a family of indifference curves as showing the diagram. This is called an indifference map of the consumer .

All the points on an indifference curve represent bundles which are considered indifferent by the consumer.

A rational consumer always prefers more of the commodity that offers him a higher level of satisfaction. It is called 'Monotonic Preferences'.

In the above diagram, on OX axis we measure bananas and on OY axis we measure mangoes. IC1, IC2 IC3 are indifference curves of a consumer where it shows different levels of satisfaction.

The arrow indicates that bundles on the higher indifference curves are preferred by the consumer to the bundles on lower indifference curves.



5. Write the difference between substitutes and complements

Substitutes:

- a. Goods which are used as alternatives to satisfy a particular need are called substitute goods.
- b. Examples: goods like tea and coffee are not consumed together. But they are substitutes for each other.
- c. The demand for a good moves in the opposite direction of the price of its complementary goods.
- d. When the price of a good increases, the demand for its complementary good decreases.

Complements:

- a. Goods which are consumed together are called complementary goods.
- b. Examples: tea and sugar, shoes and socks, pen and ink, bike and petrol
- c. The demand for a good usually moves in the direction of the price of its substitute.
- d. When the price of a good increases, the demand for its substitute also increases.

6. Explain the differences between normal and inferior goods with examples.

Normal goods:

- a. Goods for which the consumers demand increases, as his/her income increases and demand decreases as the income decreases. Such goods are called normal goods.
- b. Examples: most of the daily-use goods, vegetables, fruits cloth etc.
- c. A consumers demand for a normal good moves in the same direction as the income of the consumer.

Inferior goods:

- a. Goods for which the consumers demand decreases, as his/her income increases, and demand increases as the income decreases. Such goods are called as Inferior goods.
 - b. Example: pearl millet, finger millet, fox tail millet etc.
 - c. A consumers demand for a inferior good moves in the opposite direction as the income of the consumer.
7. Consider a market where there are just two consumers and suppose their demands for the good are given as follows.

P	d1	d2
1	9	24
2	8	20
3	7	18
4	6	16
5	5	14
6	4	12

Answer:

P	d1	d2	Market demand (d1+d2)
1	9	24	33
2	8	20	28
3	7	18	25
4	6	16	22
5	5	14	19
6	4	12	16

8. Explain with the help of a numerical example, the meaning of diminishing marginal rate of substitution(MRS)

the law of diminishing marginal rate of substitution states that as good 1 is substituted for good 2, the marginal rate of substitution of good 1 for good 2 goes on diminishing, for e.g.

Bundles	Good 1 (units)	Good 2 (units)	$MRS = \frac{\Delta \text{ goods lost}}{\Delta \text{ goods gained}}$
A	1	12	-
B	2	8	4:1
C	3	5	3:1
D	4	3	2:1
E	5	2	1:1

The example shows the different combination of good 1 and good 2 that gives equal satisfaction to the consumer. Now in order to produce an additional unit of good 1 he is prepared to give up 4 units of good2, hence MRS will be 4:1

Part 7: Answer the following questions in 20 sentences

1. Explain the law of diminishing marginal utility with the help of a table and diagram.

According to this law, “ as consumer increases the consumption of any one commodity keeping constant consumption of all other commodities, the marginal utility of the variable commodity must eventually decrease”.

Explanation of the law:

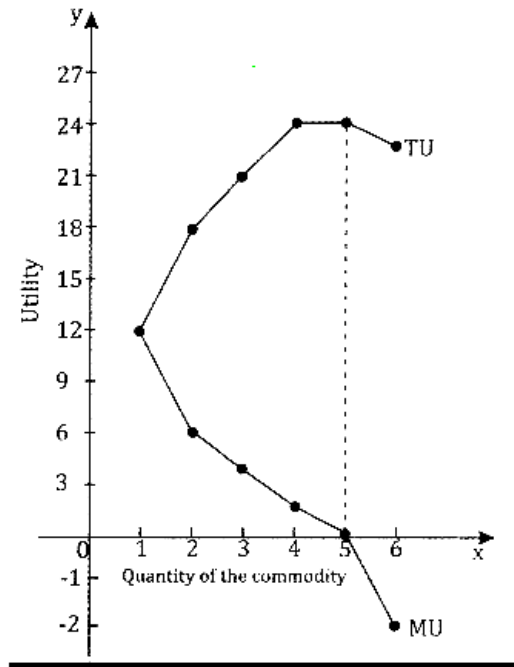
The law can be explained with the help of an example. A college girl comes home and she started drinking water to quench her thirst. First glass of water gives her a great utility. When she drinks second glass of water, the extent of her thirst should have reduced. Therefore she will derive less utility from the second glass of water. If she takes the third glass the utility will be less than the second glass. In this way, the additional utility from the extra glass of water will go on decreasing.

If she continues to take more glass of water, the marginal utility falls to zero and then becomes negative.

The above example can be illustrated with help of schedule and diagram

Table of total utility and marginal utility

No of glasses of water consumed	Total Utility (TU)	Marginal Utility (MU)
1	12	12
2	20	8
3	26	6
4	30	4
5	30	0
6	28	-2



The above table represents the consumer derives 12 units of utility from the first glass of water, when the water is consumed continuously, the marginal utility falls to 4 units for the fourth glass of water and becomes zero for the fifth glass of water. The marginal utility becomes negative for the sixth glass.

The total utility goes on increasing at a decreasing rate and after a stage, begins to decline. When the marginal utility is zero, the total utility is constant and reaches the maximum. When the marginal utility becomes negative the total utility declines from 30 units to 28 units.

The above diagram depicts that, on OX axis we measure quantity of water, and on OY axis we measure utility. TU is totally utility curve and MU is marginal utility curve. The TU curve rises upwards from left to right and later slopes downwards. The MU curve slopes downwards and goes to negative.

Conclusion:

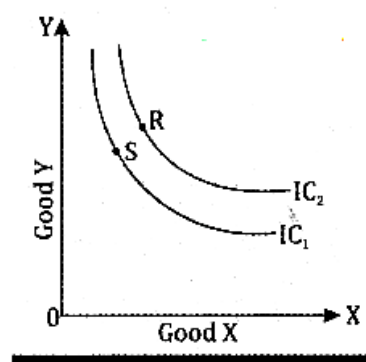
The above explanation of this law clearly depicts that as the consumer goes on consuming the units of a commodity, the total utility increases and reaches saturation

point and decreases. The marginal utility decreases and becomes zero and becomes negative.

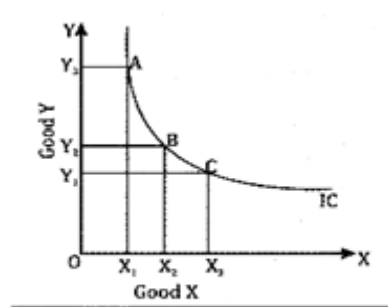
2. Explain the features of indifference curve with help of diagram.

a. A higher indifference curve represents a higher level of satisfaction than a lower indifference curve.

As the consumer's income increases and the prices of the good permit him to buy more commodities, he moves to a higher indifference curve. In the diagram, the point R is preferable to the point S as it gives more satisfaction than point S.

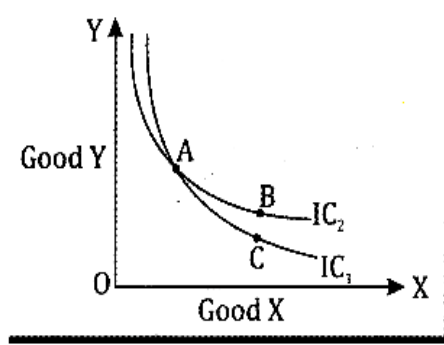


b. The indifference curves are downward sloping from left to right. The IC has a negative slope. The reason is, if the consumer has to stay at same level of satisfaction, the quantity of one commodity must decrease when the quantity of the other commodity increases.

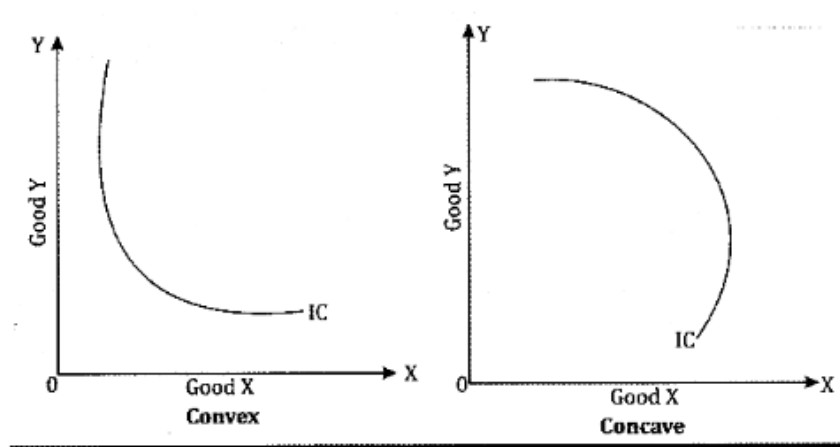


c. Indifference curve cannot intersect each other.

Two IC never intersects each other because they represent two different sets of combinations of two goods providing unequal level of satisfaction.



- d. An indifference curve must always be convex to the origin not concave.



If the IC is concave, the MRS will be increasing, which is unrealistic. As a stock of commodity falls, our preferences for the remaining units must increase. The MRS must always diminish. Then the IC will be convex to the origin.

3. Explain the derivation of demand curve in the case of single commodity.

The law of demand shows the relationship between the price of a good and the quantity demanded for the same good. The law can be explained with the help of statement and schedule diagram.

Statement: The law of demand states that, “other things remaining constant(Ceteris Paribus), when the price of a good decreases, the quantity demanded increases for the good, and when the price of a good increases, the quantity demanded decreases for the good.”

In the above statement, other things refers to the prices of related goods, the consumers income, tastes and preferences etc. when all these factors are constant, the demand for a good depends on price of a good. Therefore according to the law of demand, the price and the quantity demanded move in opposite direction.

Individual Demand Schedule

The law of demand can be explained with an example. Suppose a consumer wants to purchase apple in market. The demand of an individual consumer depends on its price. As the price varies, the quantity demanded also varies. The individuals demand for apple is shown in the demand schedule.

The individual demand schedule

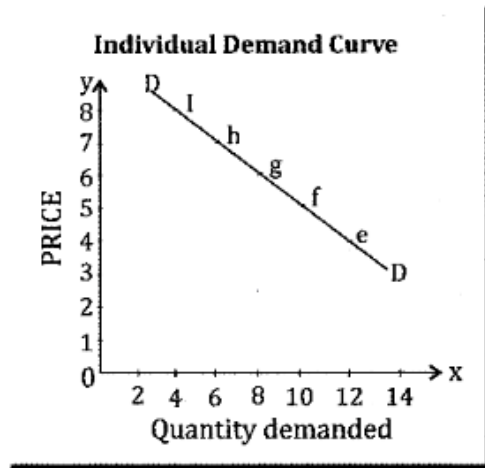
Price of apple per kg	Demand for apple (in kgs)
4	12
5	10
6	8
7	6
8	4

The above demand schedule shows that, as the price varies the individuals quantity demanded also varies. When the price of apple is Rs 4per kg, the quantity demanded is 12kgs. If the price increases to Rs 5per kg, the quantity demanded is 10kgs and finally when the price increases to Rs 8per kg, the quantity demanded decreases to 4kgs.

As per the law of demand, as when the price increases on apple the quantity demanded decreases for apple and vice-versa. With the help of individual demand schedule, an individual demand curve can be drawn to show how the quantity demanded varies as the increase/decrease in the price of apple.

The individual demand curve:

With the help of demand schedule, the law of demand can be obtained with the help of graph. The graphical representation of the demand schedule helps us to draw the demand curve.



In the above diagram, on OX axis we measure quantity demanded on OY axis we measure the price. DD is the demand curve. Various points on the curve (e,f,g,h,i) show different price levels and respective quantities demanded.

At the point 'e' the price is Rs 4 and the quantity demanded is 12kgs and at point 'f' price is Rs 5 and the quantity demanded is 10kgs and so on.

Thus, as the price of a good decrease the quantity demanded increases, and as the price increases the quantity demanded decreases, hence the demand curve slopes downwards from left to right as shown in the diagram.

Conclusion: with the help of the demand schedule and demand curve it has been made clear that the demand and price are inversely related. And when the price of good increases, the quantity demanded decreases and when the price of the good decreases the quantity demanded increases, helping other things remaining constant.

4. Explain the optimal choice of consumer with the help of a diagram.

The indifference curve depicts the choice and priority of a consumer.

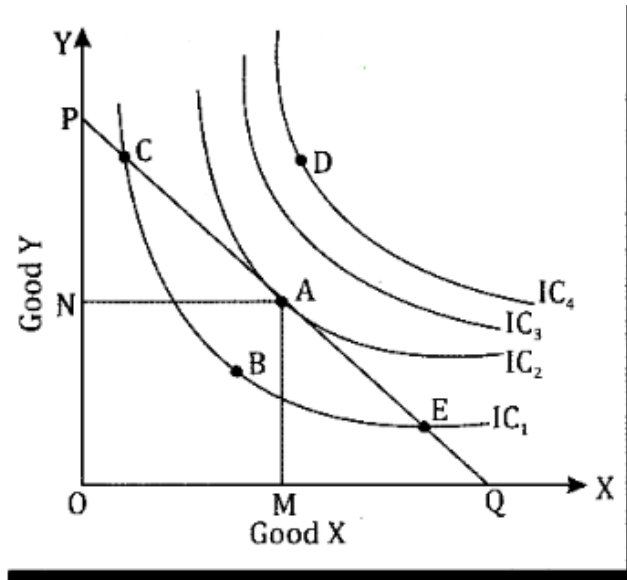
The budget line shows the ability to pay. Choice and priority can be achieved only when there is affordability. Therefore in order to achieve consumers equilibrium that maximizes utility, the indifference curves have to be combined with the budget line to determine the combination of goods that can be purchases within a certain amount of budget.

Assumptions: the following are the assumptions of consumer equilibrium under indifference curve analysis:

- a. Income of the consumer is given.
- b. Consumer is rational and wants to maximize his/her satisfaction from his/her limited income.
- c. Prices of goods and services are constant.
- d. Consumer is aware of the indifference map.
- e. All goods are homogeneous and divisible.

- f. The condition of transitivity is satisfied. If combination $A > B$ and $B > C$, then $A > C$.
- g. The condition of non-satiety holds. The consumer prefers more of one commodity or of the other or of both equally.

The consumer's equilibrium is shown in the diagram below.



In the diagram, there are four indifference curves IC1, IC2, IC3 and IC4 and a budget line PQ. Which of the points from A to D is an optimal, utility maximizing, optimum choice?

Point B is not optimal. A is better than B since A is on a higher indifference curve. The consumer has to choose A, since A is on the budget line.

Similarly point C is also not optimal, because both B and C are on the same indifference curve. Therefore B is as good as C. however, A is better than B and consequently, A must be better than C.

Point D can also not be the optimal. D is on a higher indifference curve than any of the other baskets, A to C, it therefore produces the highest level of utility. However, the consum it lies outside the budget line. Therefore, D is not an optimal choice.

Point A can be optimal. A is the only combinations that gives the maximum utility. All other points that lie on or below the budget line give higher or lower levels of utility. At point A, the indifference curve just touches the budget line and equilibrium is achieved at that point. Point A has an interesting property. At that point m the budget line and the indifference curve has exactly same slope.

This can be expressed as

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

This rule states that the willingness to substitute $\left(\frac{MU_x}{MU_y}\right)$ equivalent to the ability to pay $\frac{P_x}{P_y}$.

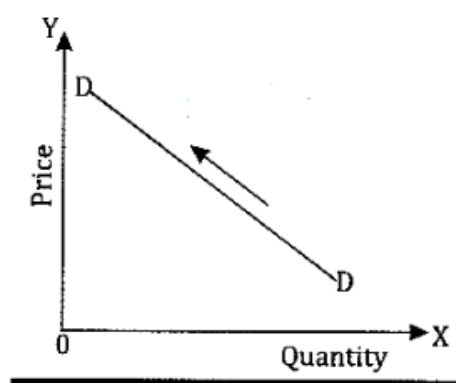
Thus we can say that the consumer is in equilibrium position when the price line is tangent to the indifference curve or when the marginal rate of substitution of goods X and Y is equal to the price ratio between the prices of the two goods.

The indifference curve theory is an ordinal theory which explains the consumers preference between alternative bundles of goods by means of indifference curves. A single curve joins all those combinations of goods which give the consumer equal satisfaction of utility and between which the consumer is thus indifferent. The consumer reaches equilibrium for a given money income and gives market price when he reaches the highest attainable level of satisfaction. At such point the budget line is tangent to the indifference.

5. Explain the movement along the demand curve and shift in demand curve with the help of two diagrams.

Movement along the demand curve:

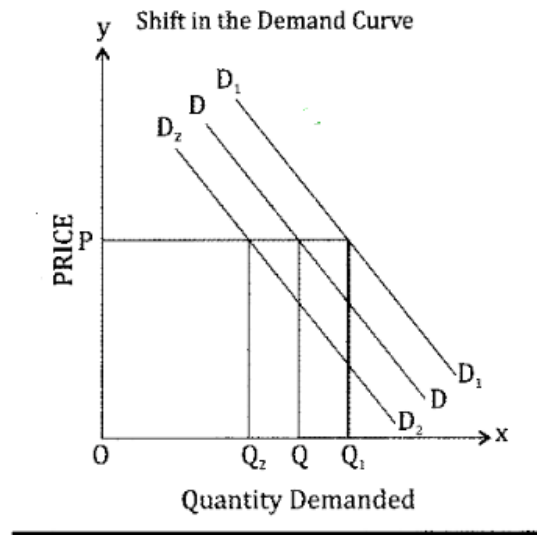
We know that the amount of a good that the consumer chooses depends on the price of the good, the prices of related goods, income of the consumer and tastes and preferences. The demand function is the relation between the amount of the good and its price when other things remain constant. The demand curve is graphical representation of the demand function. At higher prices, the demand is less, and at lower prices, the demand is more. Thus any change in the price leads to the movements along the demand curve.



Shifts in the demand curve:

Meaning: shift in the demand curve occurs because, except price, change in any of the other things leads to shift in the demand curve. The shift in the demand curve can be explained clearly with the help of diagram and with the changes in the determinants of demand.

- a. Let us see what happens to the demand curve if there is change in consumer's income keeping no change in price, with the help of diagram.



In the above diagram, on OX axis we measure quantity demanded and on OY axis we measure price.

Other things remaining constant, if the income of consumer increases, the demand for the good increases and hence there is shift in the demand curve to right and these goods are normal goods, because when income increases demand also increases. It is shown in above diagram, when income increases, keeping price as constant, the quantity demanded also increases from DD to D^1D^1 and Q to Q_1 .

And for inferior goods, the demand curve shifts to left from DD to D^2D^2 and Q to Q_2 , because as the income increases the demand for inferior goods decreases. Hence the demand curve shifts to left.

2. let us see what happens to the demand curve if there is no change in price of related goods. If the price of a related good changes, the demand for the goods which the consumer wants to buy, changes at each level of its price and hence there is a shift in the demand curve.

If there is an increase in the price of a substitute good, the demand curve shifts to the right. For example, if the price of coffee increases, consumer can shift to tea, and therefore demand for tea increases. Hence the demand curve of tea shifts to the right.

On the other hand, if there is an increase in the price complementary good, the demand curve shifts to left. For example, the demand for the petrol may increase if there is increase in price of bikes. Therefore the demand curve of petrol shifts to left.

Conclusion: with the help of above examples we can conclude that expect price, if other determinants of demand change the demand curve shifts to right and left.

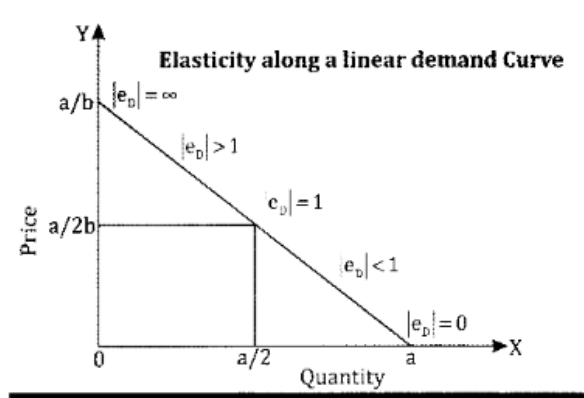
6. Give the meaning and formula of price elasticity of demand and explain the elasticity along a linear demand curve.

Price elasticity of demand: it is a measure of the responsiveness of the demand for a good to change in its price, that is, changes in the quantity demanded with respect to changes in price.

$e_D = \text{percentage change in demand for the good} / \text{percentage change in price of good}$

$$e_D = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

Elasticity along a linear demand curve



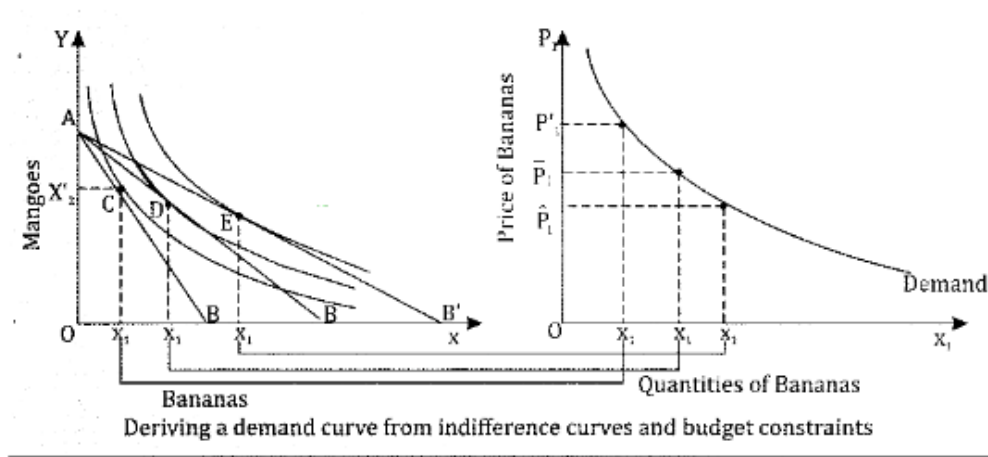
Let us consider a linear demand curve $q = a - bp$. Note that any point on the demand curve, the change in demand per unit change in the price $\Delta q / \Delta p = -b$. It is clear that the elasticity of demand is different at different points on a linear demand curve, which is shown in the diagram.

In the above diagram at $p=0$, the elasticity is 0, at $q=0$ elasticity is ∞ . At $p = a/2b$ the elasticity is 1, at any higher price greater than 0 and less than $a/2b$ elasticity is less than 1 and at any price greater than $a/2b$ elasticity is greater than 1.

7. Explain the derivation of demand curve from indifference curve and budget constraints.

Consider individual consuming bananas (X_1) and mangoes (X_2), whose income is M and market price of X_1 and X_2 are P_1 and P_2 respectively.

Figure (a) depicts her consumption equilibrium at point C , where she buys X_1 and X_2 quantities of bananas and mangoes. In panel (b) of the figure we plot P_1 against X_1 which is the first point on demand curve of X_1 .



Suppose the price of X_1 drops to P_1 , with P_2 and M remaining constant. The budget set in panel (a), expands and new consumption equilibrium is on a higher indifference curve at point D , where she buys more bananas ($X_1 > X_1$). Thus demand for bananas increases as its price drops. We plot X_1 against X_1 in panel(b) of the figure to get the second point on the demand curve for X_1 . Likewise the price of bananas can be dropped further to P_1 , resulting in further increase in consumption of bananas to X_1 . P_1 plotted against $X_1 >$ gives us the third point on the demand curve.

Therefore we observe that a drop in price of bananas results in increase in quantity of bananas purchased by individual who maximizes his utility. The demand curve for bananas is thus negatively sloped.

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