

Unit 2

I. Choose the correct answer (each question carries 1 mark)

1. Utility is
 - a) Objective
 - b) Subjective**
 - c) Both a & b
 - d) None of the above
2. The shape of an indifference curve is normally
 - a) Convex to the origin
 - b) Concave to the origin**
 - c) Horizontal
 - d) Vertical
3. The consumption bundles that are available to the consumer depend on
 - a) Colour & Shape
 - b) Price & Income**
 - c) Income & Quality
 - d) None of the 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) $Y = Mx + C$
5. The demand for these goods increases as income increases
 - a) Inferior goods
 - b) Giffens 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
 1. Numbers
 2. Returns
 - 3. Ranks**
 4. Awards

II. Fill in the blanks (each question carries 1 mark)

1. Want satisfying capacity of a commodity is **utility**
2. Two indifference curves never **touch** each other
3. As income increases the demand curve for normal goods shifts towards **the left.**
4. The demand for some good moves **inverse** in the direction of its price.
5. Method of adding two individual demand curves is called **aggregated demand.**
6. An equation $xy = C$ gives us **rectangular** hyperbola

III. Match the following (each question carries 1 mark)

1. Demand curve	a. $d(P) = a - bp$
2. Linear demand curve	b. Downward sloping
3. Unitary elasticity of demand	c. Pen and Ink
4. Complimentary goods	d. A family of indifference curves
5. Indifference map	e. $ ed = 1$

1. Demand curve	Downward sloping
2. Linear demand curve	$d(P) = a - bp$
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5. Indifference map	A family of indifference curves

IV. Answer the following questions in a sentence / word (each question carries 1 mark)

1. What is budget line?

$$p_1x_1 + p_2x_2 = M$$

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

2. What do you mean by cardinal Utility Analysis?

Cardinal utility means one util equals one unit of money, the utility of money remains constant.

3. Give the meaning of marginal utility?

The utility derived from the consumption of additional unit of commodity is known as marginal utility. In other words, the change in total utility due to the change in consumption of commodity is known as marginal utility.

4. What is utility?

Goods and services have the capacity to satisfy wants or serve a purpose. It is a common feature of all goods and services. Anything which can satisfy human wants possesses utility.

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 two commodities in which consumers get equal satisfaction.

7. What is demand?

Demand is an economic principle that describes a consumer's desire and willingness to pay a price for a specific good or service. Holding all other factors constant, the price of a good or service increases as its demand increases and vice versa.

V. Answer the following questions in 4 sentences. (each question carries 2 marks)

1. What is MRS?

MRS refers to the rate at which the commodities can be substituted with each other, so that total satisfaction of the consumer remains the same. For example, in the example of apples (A) and Oranges (O), MRS of 'A' for 'O', will be number of units of 'O', that the consumer is willing to sacrifice for an additional unit of 'A', to maintain the same level of satisfaction.

$MRS_{AO} = \text{Units of Oranges (O) willing to Sacrifice} / \text{Units of Apples (A) willing to Gain}$

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

The combination of two goods a consumer purchases depends on the prices of the goods. Consumer budget states that real income or purchasing power can allow a consumer to buy two goods at a given price. A consumer can purchase only that combination or bundles of goods which costs less than or equal to his income.

A budget set (opportunity set) is a collection of all the bundles available to a consumer in the prevailing market price at a given level of income.

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

In economics, an inferior good is a good that decreases in demand when consumer income rises (or rises in demand when consumer income decreases), unlike normal goods, for which the opposite is observed. Example: Low income consumers prefer public transport

4. What is monotonic preference?

Consumer's preferences are assumed to be such that between any two bundles (x_1, x_2) and (y_1, y_2) , if (x_1, x_2) has more of at least one of the goods and no less of the other good as compared to (y_1, y_2) , the consumer prefers (x_1, x_2) to (y_1, y_2) . Preferences of this kind are called monotonic preferences.

5. State the law of demand.

In economics, the law states that, all else being equal, as the price of a product increases, quantity demanded falls; likewise, as the price of a product decreases, quantity demanded increases.

In other words, the law of demand states that the quantity demanded, and the price of a commodity are inversely related, other things remaining constant. If the income of the consumer, prices of the related goods, and preferences of the consumer remain unchanged, then the change in quantity of good demanded by the consumer will be negatively correlated to the change in the price of the good. There are, however, some possible exceptions to this rule.

6. Mention two different approaches which explain consumer behaviour.

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

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7. What do you mean by price elasticity of demand?

Elasticity of demand is the responsiveness of demand to a change in one of its determinants, while the other determinants remain constant. It is the measure of responsiveness of demand for a good to changes in price. It can be expressed as:

$$\text{Price elasticity} = \frac{\% \text{ change in demand for the good}}{\% \text{ change in price for the good}}$$

VI. Answer the following questions in 12 sentences (each question carries 4 marks)

1. Write the differences between Total utility & Marginal utility.

This is the total utility derived from consuming a given amount of goods and services over a period. If a person consumes five units of a commodity and derives U₁, U₂, U₃, U₄, and U₅ utility from the units of a commodity then the total utility is

$$TU = U_1 + U_2 + U_3 + U_4 + U_5$$

It can also be expressed as

$$TU_X = \sum MU_X$$

Where TU = Total utility and MU = Marginal Utility and X = Commodity

The utility derived from the consumption of additional unit of commodity is known as marginal utility. In other words, the change in total utility due to the change in consumption of commodity is known as marginal utility. Mathematically it can be expressed as:

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

ΔTU = Change in total utility

ΔQ = Change in consuming additional unit of a good

It can also be represented as

$$MU_n = TU_n - TU_{n-1}$$

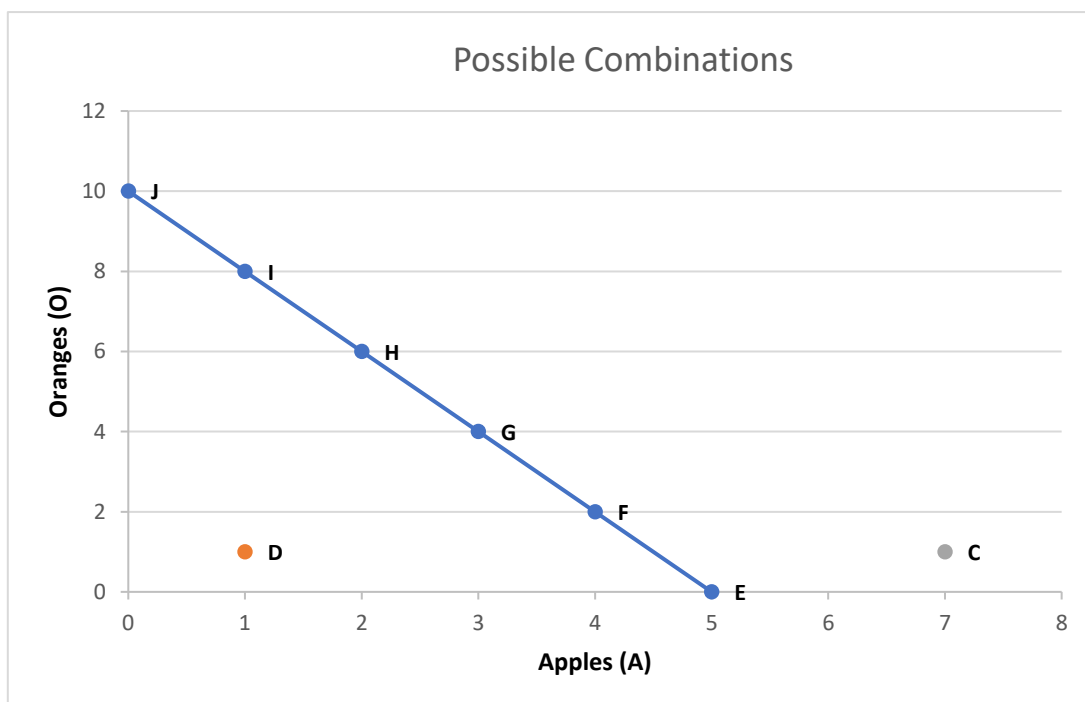
MU_n = Marginal utility of 'n' units

TU_n = Total utility of 'n' units

TU_{n-1} = Total utility of 'n-1' units

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

Combination of Apples and Oranges	Price of Apples (A) Rs. 4 each	Price of Oranges (O) Rs. 2 each)	Money Spent
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	$(0 \times 4) + (10 \times 2) = 20$



In the above diagram, Apples are plotted along the X axis and Oranges along the Y axis. At one point E, a consumer can spend his entire income of Rs. 20 by buying 5 apples and at point J he can spend his entire income by buying 10 Oranges. Between these two points there are several other combinations such as F, G, H, and I. By joining these points, we get the Budget Line AB. All the indicated points on AB show the bundles a consumer can buy using his entire income of Rs. 20.

1. Budget line AB slopes downward from left to right as more goods can be bought by decreasing some units of another good.
2. Bundles whose cost equal consumer income lie on the budget line.
3. Bundles which cost less than consumer income lie inside the budget line. (D)
4. Bundles costing more than consumer income lie outside the budget line. (C)

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

Suppose the income of the consumer is M and the prices of the two goods are p_1 and p_2 respectively. If the consumer wants to buy x_1 units of good 1, she will have to spend p_1x_1 amount of money. Similarly, if the consumer wants to buy x_2 units of good 2, she will have to spend p_2x_2 amount of money.

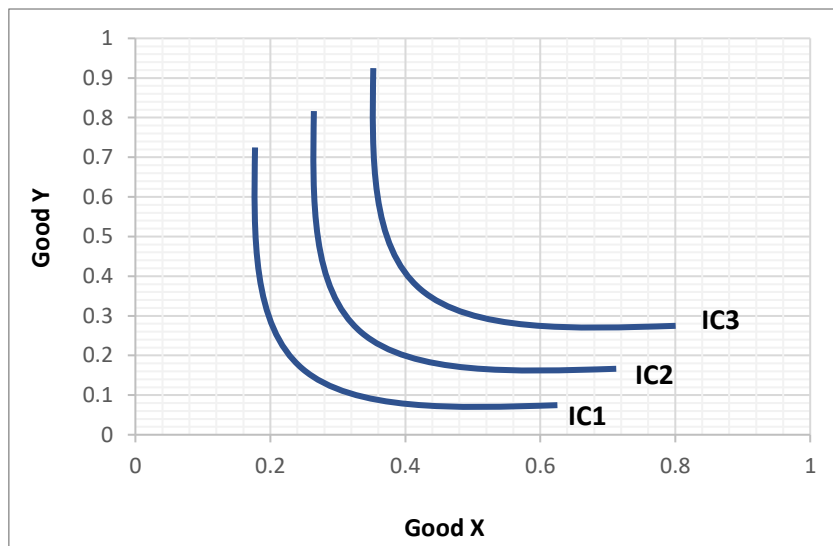
Therefore, if the consumer wants to buy the bundle consisting of x_1 units of good 1 and x_2 units of good 2, she will have to spend $p_1x_1 + p_2x_2$ amount of money. She can buy this bundle only if she has at least $p_1x_1 + p_2x_2$ amount of money. Given the prices of the goods and the income of a consumer, she can choose any bundle if it costs less than or equal to the income she has. In other words, the consumer can buy any bundle (x_1, x_2) such that

$$p_1x_1 + p_2x_2 \leq M$$

The inequality is called the consumer's budget constraint. The set of bundles available to the consumer is called the budget set. The budget set is thus the collection of all bundles that the consumer can buy with her income at the prevailing market prices.

4. Explain the indifference map with a diagram.

Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods. An indifference curve represents all the combinations, which provide same level of satisfaction. However, every higher or lower level of satisfaction can be shown on different indifference curves. It means, infinite number of indifference curves can be drawn.



In the above diagram, IC3 gives higher level satisfaction compared to IC2 and IC1. In the same way IC2 gives more satisfaction than IC1. The consumer is better off when he moves from a lower to a higher indifference curve.

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

5. Write the differences between substitutes and complements

Consider two bundles such that one bundle has more of the first good as compared to the other bundle. If the consumer's preferences are monotonic, these two bundles can be indifferent only if the bundle having more of the first good has less of good 2 as compared to the other bundle. Suppose a consumer is indifferent between two bundles (x_1, x_2) and $(x_1 + \Delta x_1, x_2 + \Delta x_2)$. Monotonicity of preferences implies that if $\Delta x_1 > 0$ then $\Delta x_2 < 0$, and if $\Delta x_1 < 0$ then $\Delta x_2 > 0$; the consumer can move from (x_1, x_2) to $(x_1 + \Delta x_1, x_2 + \Delta x_2)$ by substituting one good for the other.

The rate of substitution between good 2 and good 1 is given by the absolute value of $\Delta x_2 / \Delta x_1$. The rate of substitution is the amount of good 2 that the consumer is willing to give up for an extra unit of good 1. It measures the consumer's willingness to pay for good 1 in terms of good 2. Thus, the rate of substitution between the two goods captures a very important aspect of the consumer's preference.

A consumer is indifferent to the bundles (1, 2) and (2, 1). At (1, 2), the consumer is willing to give up 1 unit of good 2 if she gets 1 extra unit of good 1. Thus, the rate of substitution between good 2 and good 1 is 1.

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

The demand function is a relation between the consumer's demand for a good and its price when other things are given. Instead of studying the relation between the demand for a good and its price, we can also study the relation between the consumer's demand for the good and the income of the consumer.

The quantity of a good that the consumer demands can increase or decrease with the rise in income depending on the nature of the good. For most goods, the quantity that a consumer chooses, increases as the consumer's income increases and decreases as the consumer's income decreases. Such goods are called normal goods. Thus, a consumer's demand for a normal good move in the same direction as the income of the consumer. However, there are some goods the demands for which move in the opposite direction of the income of the consumer. Such goods are called inferior goods.

Answer the following questions in 20 sentences. (each question carries 6 marks)

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

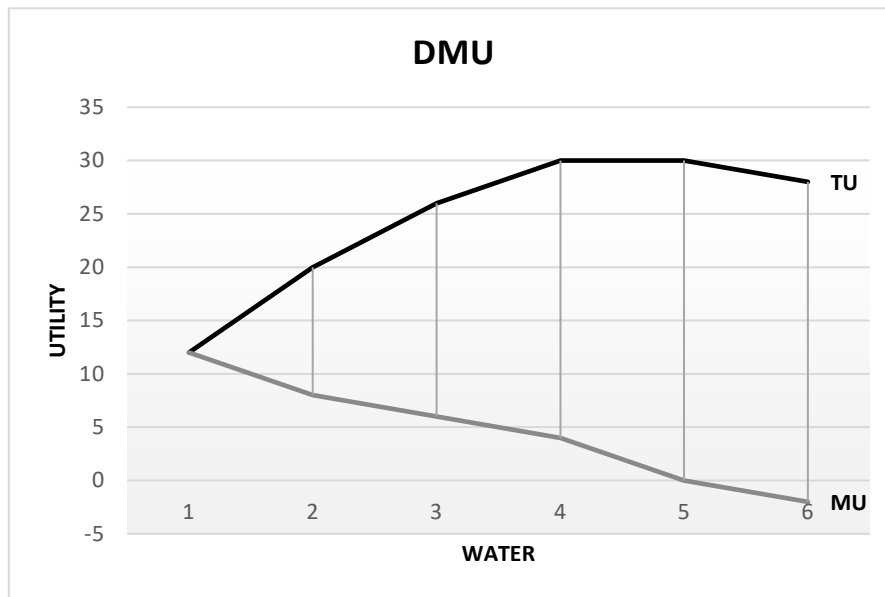
A German economist Gossen explained this law. Therefore, it is also known as Gossen's First Law. Alfred Marshall, the founder of the neo-classical school popularized it. The law of diminishing marginal utility is one of the important laws of utility analysis. It deals with consumer behaviour in an intensive manner.

Statement: As consumer increases the consumption of any one commodity keeping constant consumption of all the other commodities, the marginal utility of the variable commodity must eventually decline. In other words, as a consumer consumes more of any commodity, the total utility increases but the increase in total utility is not proportionate to the increase in units of consumption.

Assumptions of the Law

- a) All the units of the given commodity are homogenous i.e. identical in size shape, quality, quantity etc.
- b) The units of consumption are of reasonable size. The consumption is normal.
- c) The consumption is continuous. There is no unduly long-time interval between the consumption of the successive units.
- d) The law assumes that only one type of commodity is used for consumption at a time.
- e) Though it is psychological concept, the law assumes that the utility can be measured cardinally i.e. it can be expressed numerically.
- f) The consumer is rational human being and he aims at maximum of satisfaction.

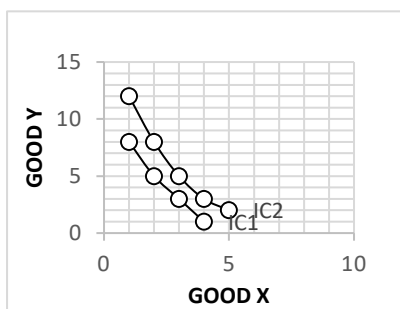
No of Glasses of Water Consumed	Total Utility (TU)	Marginal Utility (MU)
1	12	12
2	20	8
3	26	6
4	30	4
5	30	0
6	28	-2



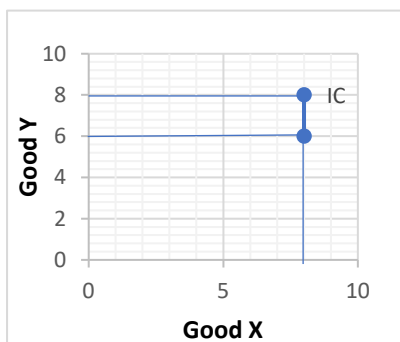
Exceptions

- a) The law is not applicable to rare collections such as a person collecting stamps, coins or antiques
- b) Law is not applicable to money although utility of money reduces with increase in wealth, the value is never zero.
- c) Does not apply to knowledge, innovation, or art.
- d) It does not apply to precious goods like diamonds, gold etc.
- e) It does not operate if consumer is irrational.
- f) Clothes in a current fashion trend have greater utility while those out of trend do not.
- g) Utility increases due to demonstration effect where a person tries to imitate a neighbour who is well off.

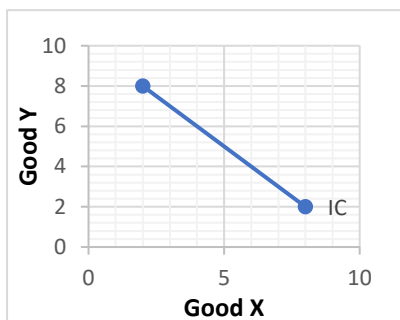
2. Explain the features of indifference curves with the help of diagrams.



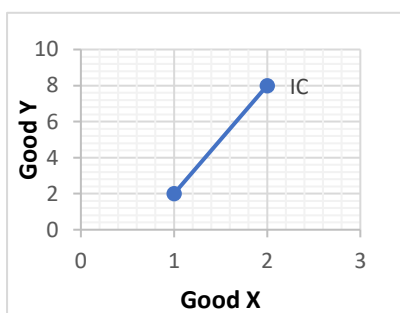
Higher indifference curve means greater consumer satisfaction than a lower indifference curve. Every consumer attempts to move to a higher indifference curve provided that his income permits him to do so.



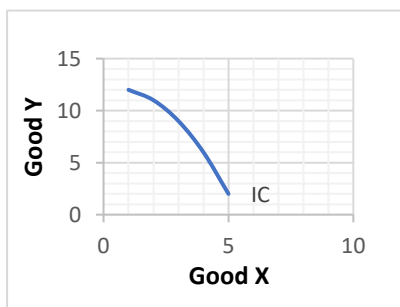
An indifference curve cannot be a vertical or horizontal line. If it were it is contrary to the principles of indifference curve analysis. The consumer can get more commodities without having to sacrifice any.



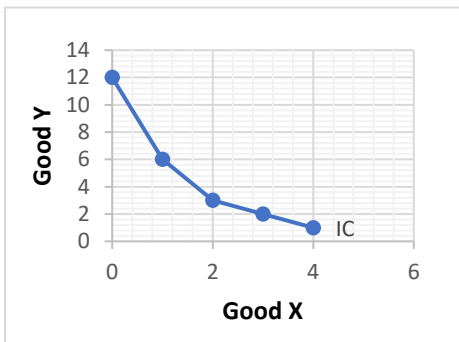
An indifference curve cannot be sloping downward as a straight line because MRS cannot remain constant. MRS remaining constant is unrealistic.



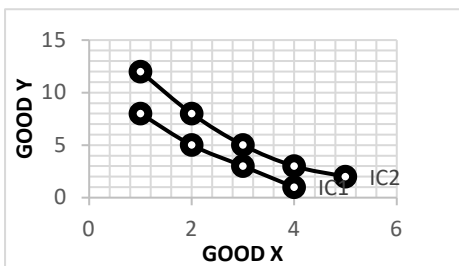
Indifference curve cannot be positively sloped. It indicates the consumer prefers more units of both commodities which is not feasible in indifference curve analysis.



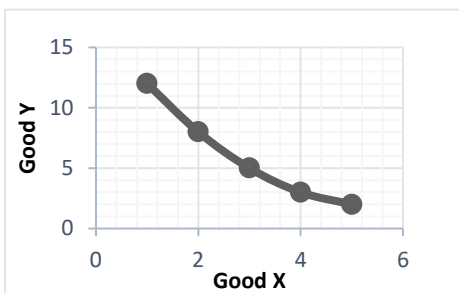
Indifference curves cannot be concave to the origin. It indicates substitution increasing which is unrealistic. As stock of one commodity falls, preference for the other must increase.



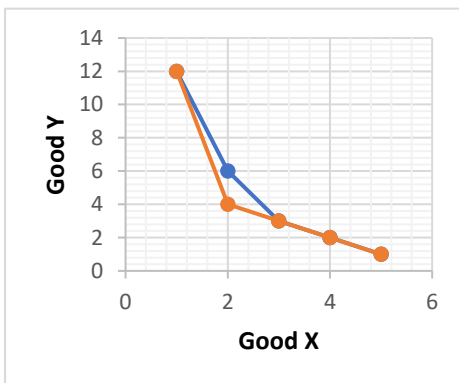
Indifference curves are downward sloping from left to right. An indifference curve has a negative slope. The reason is that consumer has to stay at same level of satisfaction the quantity of one commodity must decrease when quantity of the other commodity increases.



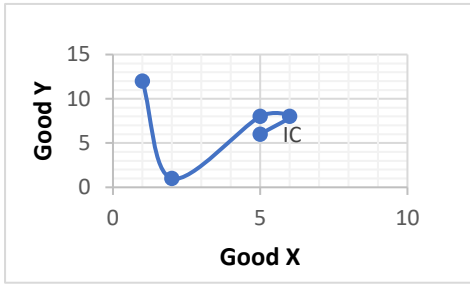
Indifference curves cannot be parallel. If they are parallel the MRS is same on all the indifference curves.



Indifference curve will not touch either X or Y axis. It means the consumer is having only commodity X or only commodity Y which is not feasible under indifference curve analysis.



Indifference curves cannot intersect each other. Two indifference curves never intersect because they represent two sets of combinations of two goods which provide unequal level of satisfaction.



Indifference curve cannot have bulge. MRS does not diminish consistently. It means consumer is behaving erratically.

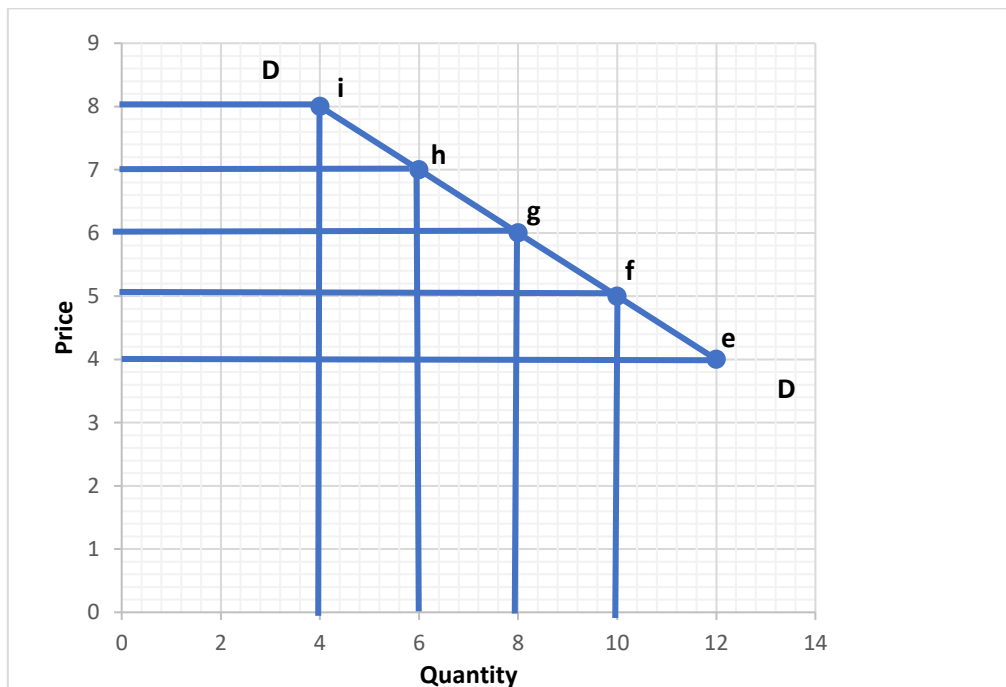
3. Explain the derivation of demand curve in the case of a single commodity.

Statement: In economics, the law states that, all else being equal, as the price of a product increases, quantity demanded falls; likewise, as the price of a product decreases, quantity demanded increases.

In other words, the law of demand states that the quantity demanded and the price of a commodity are inversely related, other things remaining constant. If the income of the consumer, prices of the related goods, and preferences of the consumer remain unchanged, then the change in quantity of good demanded by the consumer will be negatively correlated to the change in the price of the good. There are, however, some possible exceptions to this rule.

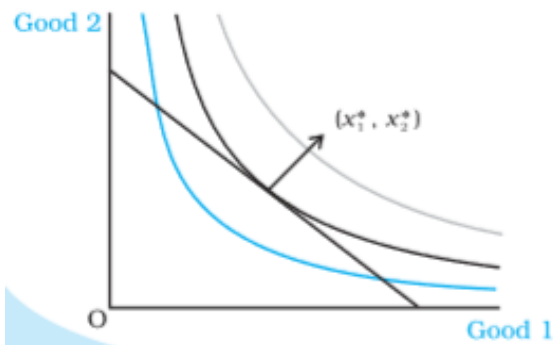
Individual Demand Schedule

Price of Potato per Kg (in Rs.)	Demand for Potato (in Kg)
8	4
7	6
6	8
5	10
4	12



The table shows the demand of all the consumers in a market. When the price decreases there is increase in demand for goods and vice versa. When price is Rs. 8 demand is 4 kilograms. When the price is Rs. 4 demand is 12 kilograms. Thus, the table shows the total amount demanded by all consumers various price levels.

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



Bundle	U_1	U_2
(2, 2)	5	40
(1, 3) (3, 1)	4	35
(1, 2) (2, 1)	3	28
(1, 1)	2	20
(0, 0) (0, 1) (0, 2) (0, 3) (0, 4) (1, 0) (2, 0) (3, 0) (4, 0)	1	10

From the bundles which are available to her, a rational consumer always chooses the one which she prefers the most.

Among the bundles that are available to her, (2, 2) is her most preferred bundle. Therefore, as a rational consumer, she would choose the bundle (2, 2).

Where on the budget line will the optimum bundle be located? The point at which the budget line just touches (is tangent to), one of the indifference curves would be the optimum.

To see why this is so, note that any point on the budget line other than the point at which it touches the indifference curve lies on a lower indifference curve and hence is inferior.

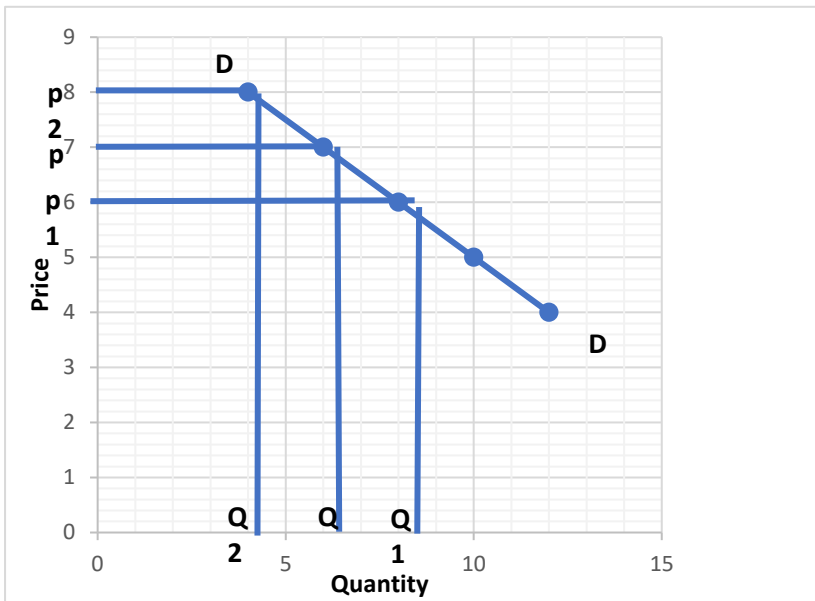
Therefore, such a point cannot be the consumer's optimum. The optimum bundle is located on the budget line at the point where the budget line is tangent to an indifference curve.

At (x^*_1, x^*_2) , the budget line is tangent to the black coloured indifference curve. The first thing to note is that the indifference curve just touching the budget line is the highest possible indifference curve given the consumer's budget set.

Bundles on the indifference curves above this, like the grey one, are not affordable. Points on the indifference curves below this, like the blue one, are certainly inferior to the points on the indifference curve, just touching the budget line.

Any other point on the budget line lies on a lower indifference curve and hence, is inferior to (x^*_1, x^*_2) . Therefore, (x^*_1, x^*_2) is the consumer's optimum bundle.

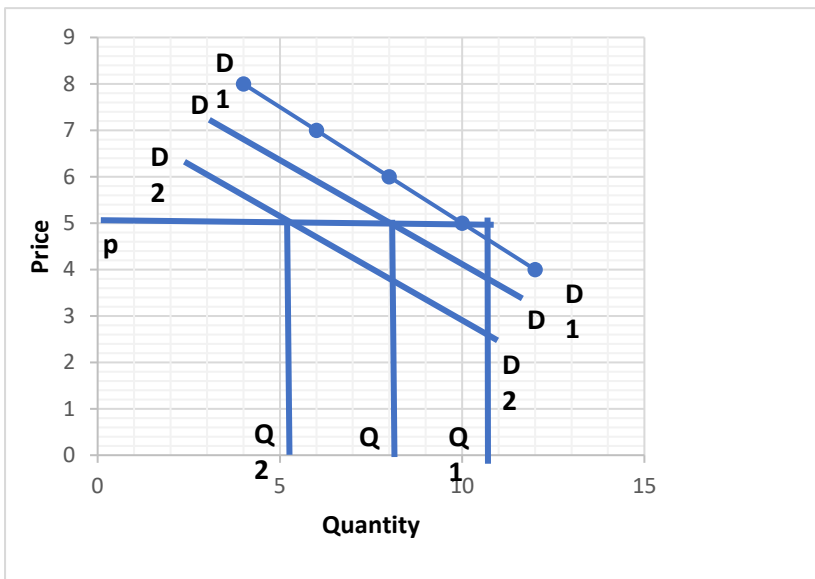
5. Explain the movement along the demand curve and shift in demand curve with the help of two diagrams.



When the price decreases from p to p_1 , the demand expands from Q to Q_1 .

So, the demand curve moves downward. This is called expansion of demand. Likewise, when price rises from p to p_2 , the demand contracts from Q to Q_2 .

So, the demand curve moves upward. This is called contraction of demand.



For normal goods, demand shifts to the right. It means when income increases, demand also increases. The demand curve shifts from DD to D_1D_1 .

For inferior goods, demand shifts to the left. It means when income increases, demand for inferior goods decreases. The demand curve shifts from DD to D_2D_2 .

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

It is the measure of responsiveness of demand for a good to changes in price. It can be expressed as:

$$\text{Price elasticity} = \frac{\% \text{ change in demand for the good}}{\% \text{ change in price for the good}}$$

$$Ped = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

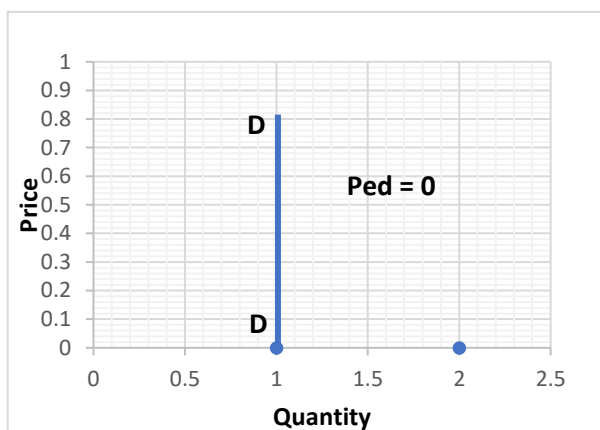
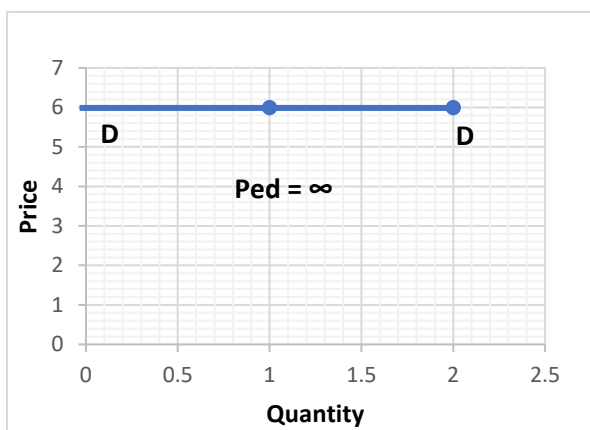
Δp = change in price

Δq = change in quantity

p = price

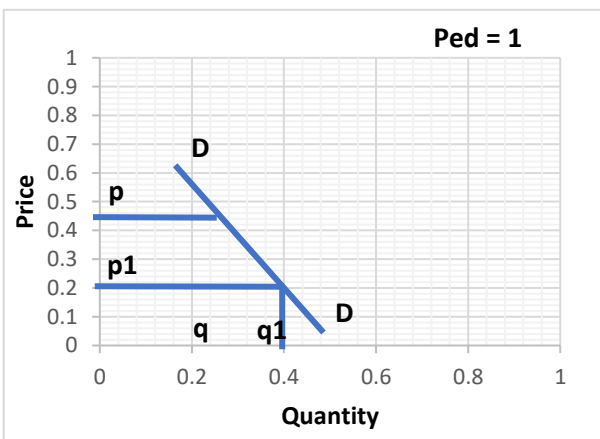
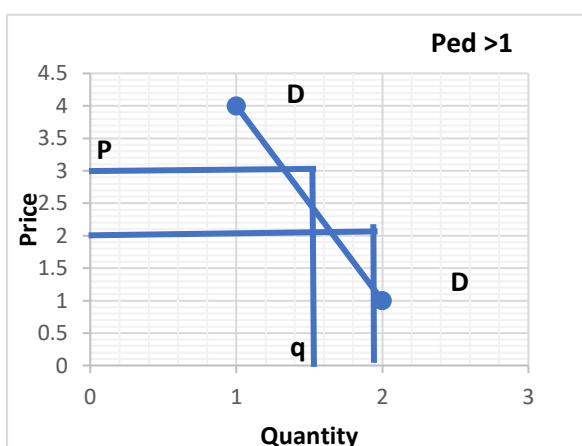
q = quantity

Ped = price elasticity of demand



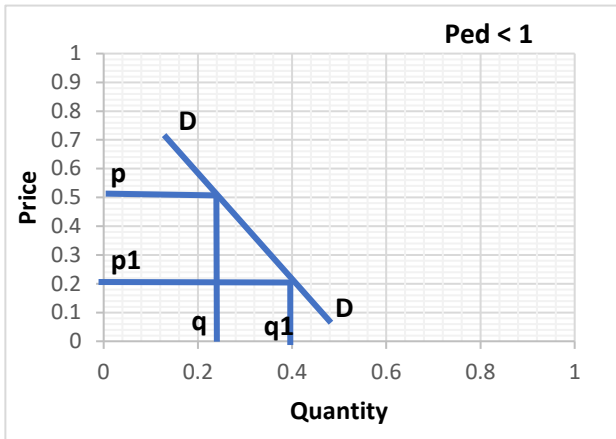
Perfectly Elastic: Here price elasticity is infinite. It means a small change in demand can lead to an infinite

Perfectly Inelastic demand: here price elasticity is zero. It means whatever change in price, the quantity demand



More Elastic: Here price elasticity is more than 1. It means percentage change in demand is greater than percentage change in price.

Unitary Elastic: Here price elasticity is equal to 1. The percentage change in demand is equal to the percentage change in price

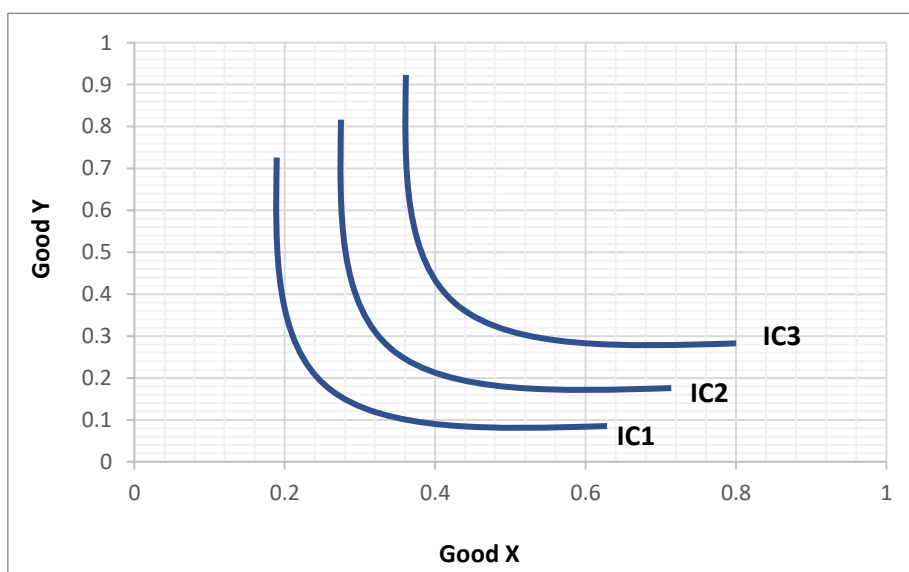
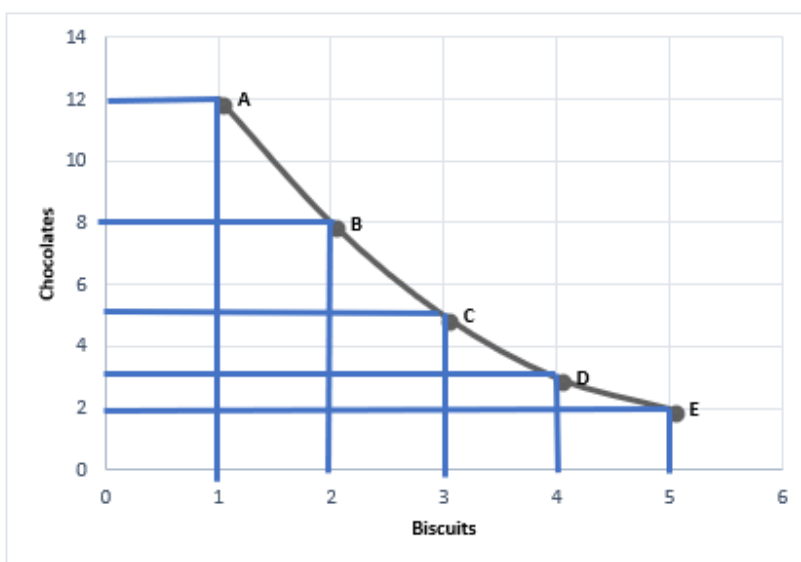


Less Elastic: Here price elasticity is less than 1. It means percentage change in demand is less than percentage change in price.

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

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

Indifference Schedule		
Combination of Goods	Unit of Biscuits (X)	Units of Chocolates (Y)
A	1	12
B	2	8
C	3	5
D	4	3
E	5	2



In the above diagram, IC3 gives higher level satisfaction compared to IC2 and IC1. In the same way IC2 gives more satisfaction than IC1. The consumer is better off when he moves from a lower to a higher indifference curve.

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