MICRO ECONOMICS

CHAPTER-1

INTRODUCTION

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

1. The scarce resources of an economy have

(a) Competing usages (b) Single usages
(c) Unlimited usages (d) none of the above

Ans: (a) Competing usages

2. Which of the following in an example of micro economic study?

(a) National income (b) Consumer Behaviour
(c) Unemployment (d) Foreign trade

Ans: (b) Consumer behaviour

3. Which of the following is a macroeconomic variable?

(a) Individual demand (b) Aggregate demand
(c) Firms output (d) Price of a good

Ans: (b) Aggregate demand

4. Central problems of an economy includes

(a) What to produce (b) How to produce
(c) For whom to produce (d) All of the above

Ans: (d) All of the above

5. Traditionally, the subject matter of economics has been studied under the following broad branches.

(a) Micro and macro Economics (b) Positive and Normative
(c) Deductive and Inductive (d) None of the above

Ans: (a) Micro and Macro Economics.

II. Fill in the blanks (each questions carries 1 marks)

1. Scarcity of resources gives raise to.....
   Ans: Problem of choice
2. In a centrally planned economy all important decisions are made by ……
   Ans: Government
3. In reality all economies are ……..
   Ans: Mixed Economies.

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

1. Market economy	a. Government
2. Service of a Teacher	b. Private
3. Centrally planned economy	c. Skill
4. Positive economics	d. Evaluate the Mechanism
5. Normative economics	e. Functioning of Mechanism

Ans: 1-b; 2-c; 3-a; 4-e; 5-d;

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

1. **Why does the problem of choice arise?**

   Ans: An economic problem arises because of limited resources and unlimited wants and alternative uses of resources. To allocate limited resources to satisfy unlimited wants the problem of choice arises.

2. **What is market economy?**

   Ans: A market economy also known as capitalistic economy is that economy in which the economic decisions are undertaken on the basis of market mechanism by the private entrepreneurs. It functions on demand and supply conditions. Example, USA

3. **What do you mean by centrally planned economy?**

   Ans: A planned economy also called as socialistic economy is that economy where the economic activities are controlled by the central Government. Here, the Government takes decisions about the allocation of resources in accordance with objectives to attain economic and social welfare. Example, Vietnam,Russia, China, North Korea etc.

4. **Give the meaning of micro economics.**

   Micro economics is the study of the economic actions of individuals and small groups of individuals.

5. **What do you mean by positive economics?**

   The positive economics is the study of 'what was' and 'what is' under the given set of circumstances. It deals with the scientific explanation of the working of the economy.

6. **What is normative economics?**

   Ans: The Normative economics studies 'what ought to be'. It explains about 'what should be and should not be done'.

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

1. Mention the central problems of an economy.

Ans: The central problems of an economy are as follows:

a) What goods are to be produced and in what quantities?
b) How the goods are to be produced?
c) For whom the goods are to be produced?

2. Distinguish between Micro and Macro economics.

The micro and macro economics are distinguished on the following grounds:

Scope: Micro Economics study in individual units so its scope is narrow.
Macro Economics study in aggregates, so its scope is wider.

Method of study: The Micro Economics follows slicing method as it studies individual unit.
The Macro Economics follows lumping method as it studies in aggregates.

4. **Distinguish between positive and normative economics.**

Positive Economics	Normative Economics
• The positive economics is the study of 'what was' and 'what is' under the given set of circumstances. • It deals with the scientific explanation of	• The Normative economics studies 'what ought to be'. • It explains about 'what should be and should not be done'.

the working of the economy. • Here we study how the different mechanisms function.	• Here we try to understand that whether the mechanisms are desirable or not.

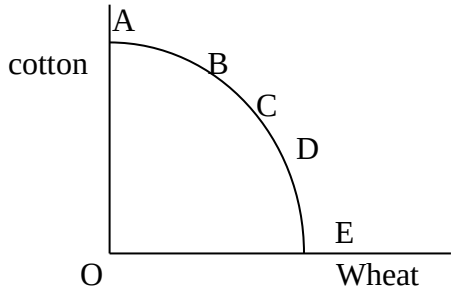
5. **What do you mean by production possibility set?**
   Ans: The collection of all possible combinations of the goods and services that can be produced from a given amount of resources and a given stock of technological knowledge is called the production possibility set of the economy.
6. **What is opportunity cost?**
   Ans: An opportunity cost is the cost of having a little more of one good in terms of the amount of the other good that has to be forgone. This is known as the opportunity cost of an additional unit of the goods.
7. **What is production possibility frontier?**
   Ans: The production possibility frontier is a graphical representation of the combinations of two commodities (cotton and wheat) that can be produced when the resources of the economy are fully utilized. It is also called as Production possibility curve (PPC) also known as transformation curve.

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

1. **Briefly explain the production possibility frontier.**
   Ans: The production possibility frontier is a graphical representation of the combinations of two commodities (cotton and wheat) that can be produced when the resources of the economy are fully utilized. It is also called as Production possibility curve (PPC) also known as transformation curve.

   It gives the combinations of cotton and wheat that can be produced when the resources of the economy are fully utilized.

   This can be graphically represented as follows:



   As per the above graph, the points lying strictly below the production possibility curve represents a combination of cotton and wheat that will be produced when all or some of the resources are either underemployed or are utilized in a wasteful fashion.

2. Briefly explain the central problems of an economy.

Ans: An economic system or economy is a mechanism where the scarce resources are channelized on priority to produce goods and services. These goods and services produced by all the sectors of the economy determine the national income.

Generally, human wants are unlimited and resources to satisfy them are limited. If there was a perfect match between human wants and availability of resources there would have been no scarcity, no problem of choice and no economic problems at all. So, one has to select the most essential want to be satisfied with limited resources. In economics, this problem is called 'Problem of Choice'.

The problem of choice arising out of limited resources and unlimited wants is called economic problem. Every economy whether developed or underdeveloped, Capitalistic or socialistic or mixed economy, there will be three basic economic problems viz., What to produce, How to produce and For whom to produce. Let us discuss in detail.

a) **What to Produce i.e., what is to be produced and in what quantities::** Every country has to decide which goods are to be produced and in what quantities. Whether more guns should be produced or more foodgrains should be grown or whether more capital goods like machines, tools, etc., should be produced or more consumer goods (electrical goods, daily usable products etc.) will be produced. What goods to be produced and in what quantity depends on the economic system of the country. In socialistic economy, the Government decides and in Capitalistic economy market forces decided and in mixed economy both the Government and market forces provide solutions to this problem.
b) **How to Produce i.e., how are goods produced?:** There are various alternative techniques of producing a product. For example, cotton cloth can be produced with either handloom or power looms. Production of cloth with handloom requires more labour and production with power loom use of more machines and capital. It involves selection of technology to produce goods and services.

There are two types of techniques of production viz., (a) Labour intensive technology and (b) capital intensive technology.

The society has to decide whether production be based on labour intensive or capital intensive techniques. Obviously, the choice of technology would depend on the availability of different factors of production (land, labour, capital) and their relative prices (rent, wages, interest).

c) **For whom to produce i.e., for whom are the goods to be produced:** Another important decision which an economy has to take is for whom to produce. The economy cannot satisfy all wants of all the people. Therefore, it has to decide who should get how much of the total output of goods and services. The society has to decide about the shares of different groups of people- poor, middle class and the rich, in the national output.

Thus, every economy faces the problem of allocating the scarce resources to the production of different possible goods and services and of distributing the produced goods and services among the individuals within the economy. The allocation of scarce resources and the distribution of the final goods and services are the central problems of any economy.

3. Write a short note on a centrally planned economy.

Ans: A planned economy also called as socialistic economy is that economy where the economic activities are controlled by the central Government. Here, the Government takes decisions about the allocation of resources in accordance with objectives to attain economic and social welfare. Example, Russia, China, North Korea etc.

In a centrally planned economy, the basic economic problems are solved as follows: In centrally planned economy, the Government takes decisions about the allocation of resources in accordance with the predetermined goals and objectives to attain maximum social welfare. Government decides what to produce, how to produce and what prices are to be fixed.

- Regarding what to produce, the Government may produce those goods and services which are most useful for its society.
- Regarding how to produce, the most suitable technique in production is adopted whether labour intensive or capital intensive in accordance with the situation in the economy.
- Regarding whom to produce, the goods and services are produced to those people who are suffering from hunger though there is a loss.
- It gives importance to the quality of life rather than quantity of production.
- It focuses the resources on rapid economic development.

4. Write a short on market economy.

Ans: A market economy also known as capitalistic economy is that economy in which the economic decisions are undertaken on the basis of market mechanism by the private entrepreneurs. It functions on demand and supply conditions. In USA, Japan, Autralia, UK and other countries we can see Market Economic systems.

In market economy, private individuals own the factors of production. Here, the profit is the main goal of business. There is least intervention of Government.

Price mechanism plays a major role in market economy. It is a balancing wheel of the market mechanism. Prices coordinate decisions of the producers and consumers. The price is determined by demand and supply in the market. No individual organization or Government is responsible for the production and distribution or pricing of goods. All depend on market mechanism.

Regarding basic problems of an economy, the problem of what to produce is solved on the basis of demand and profit. The producers produce those products which bring more income.

The problem - how the goods are to be produced is determined by the competition among different entrepreneurs. The select least cost combination of technology so that they can get more returns with less cost.

In market economy, the problem of whom to produce is decided on the basis of purchasing power of consumers. The producers produce commodities to the rich as they can afford to pay more but poorer sections of the society are neglected.

In Market economy, profits and losses play a predominant role in growth and development of every producer.

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CHAPTER-2

CONSUMER BEHAVIOUR

I Choose the correct answer

1. Utility is
   a) Objective c) Both a and b
   b) Subjective d) None of the above
   Ans: (b) Subjective
2. The shape of an Indifference curve is normally
   a) Convex to the origin c) Horizontal
   b) Concave to the origin d) Vertical
   Ans: (a) Convex to the origin
3. The consumption bundle that are available to the consumer depend on
   a) Colour and shape c) Income and quality
   b) Price and income d) None of the above
   Ans: (b) Price and income
4. The equation of Budget line is
   a) $Px+p_1x_1=M$ c) $P_1x_1+p_2x_2=M$
   b) $M=P_0X_0+Px$ d) $Y=Mx+C$
   Ans: c) $P_1x_1+p_2x_2=M$
5. The demand for these goods increases as income increases
   a) Inferior goods c) Normal goods
   b) Giffen goods d) None of the above
   Ans: (c) Normal goods
6. A vertical demand curve is
   a) Perfectly elastic c) Unitary elastic
   b) Perfectly inelastic d) None of the above
   Ans: (b) Perfectly inelastic
7. Ordinal utility analysis expresses utility in
   a) Numbers c) Ranks
   b) Returns d) awards
   Ans: (c) Ranks

II Fill in the blanks

1. Wants satisfying capacity of commodity is …….
   Ans: Utility
2. Two indifference curves never …….. each other.
   Ans: Intersect
3. As income increases, the demand curve for normal goods shifts towards…….

Ans: Rightward

4. The demand for a good moves in the ……direction of its price
   Ans: Opposite
5. Method of adding two individual demand curve is called as……
   Ans: Horizontal summation
6. An equation xy=c gives us ……hyperbola
   Ans: Rectangular

III Match the following

A	B
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. Complementary goods	d) A family of Indifference curve
5. Indifference map	e) |ed|=1

Ans: 1-b; 2-a; 3-e; 4-c; 5-d;

IV Answer the following questions in a sentence or a word

1. **What is budget line?**
   Ans: The line consists of all bundles of goods which cost exactly equal to the money income of consumer is called budget line. It represents all bundles which costs entire income of consumer. It slopes negatively.
2. **What do you mean cardinal utility analysis?**
   Ans: When the utility is measured in numbers like 1,2,3,4…., it is called as cardinal utility analysis. It was advocated by Prof.Alfred Marshall.
3. **Give the meaning of marginal utility.**
   Ans: It is the additional utility derived by the consumer by consuming additional unit of a commodity. It represents the utility of single unit. It may be written as $MU=TU_n-TU_{n-1}$.
4. **What is utility?**
   Ans: Utility refers to the want-satisfying power of a commodity or a service.
5. **Expand MRS**.
   Ans: Marginal Rate of Substitution.
6. **What do you mean by indifference curve?**
   Ans: Indifference curve shows the different combinations of two products in which the consumer gets equal satisfaction.
7. **What is demand?**

   Ans: The concept ‘demand’ refers to the quantity of a good or service that a consumer is willing and able to purchase at various prices, during a period of time. It includes desire for a commodity, ability to pay and willingness to pay.

V Answer the following in 4 sentences

1. **What is MRS?**

   Ans: MRS is the rate at which the consumer will substitute one product for another, so that her total utility remains constant. It can be represented as follows:
   MRS = $\Delta Y/\Delta X$

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

Budget Line	Budget Set
• It is locus of different combinations of the two goods which the consumer consumes and whose price exactly equals his income. • It is also known as Price line.	• It is a collection of all bundles available to a consumer at the existing price at his given level of income. • It is also known as opportunity set

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

   Ans: The inferior goods are those goods for which the demand increases with the fall in income of consumer and vice-versa. That is, there will be a negative relationship between income of consumer and demand for inferior goods. Here the income of consumer and demand move in opposite directions.
   Example: Low quality goods.

4. **What is monotonic preference?**

   Ans: A consumer's preferences are said to monotonic if and only if between any two bundles, the consumer prefers the bundle which has more of at least one of the goods and no less of the other good as compared to the other bundle.

   For instance, the consumer, between any bundles say (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 compared to (y_1, y_2) then the consumer prefers (x_1,x_2) to (y_1, y_2). This is called monotonic preferences.

   Here the consumer will not remain indifferent between two combinations of commodities when he has an opportunity to have more quantity in one combination than the other.

5. **State the law of demand?**

   Ans: Law of Demand states that other things being equal, there is a negative relation between demand for a commodity and its price.

   In other words, when price of the commodity increases, demand for it falls and when price of the commodity decreases, demand for it rises, other factors remaining the constant.

The law can be explained in the following manner: "Other things being equal, a fall in price leads to expansion in demand and a rise in price leads to contraction in demand".

6. Mention two different approaches which explain consumer behavior.

Ans: The two approaches which explain consumer behaviour are:

a) Cardinal Utility Analysis – Law of Diminishing Marginal Utility
b) Ordinal Utility Analysis – Indifference Curve analysis

7. What do you mean price elasticity of demand?

Ans: Price elasticity of demand is a measure of the responsiveness of the demand for a good to changes in its price.

In the words of Prof. Stonier & Hague, "Price elasticity of demand is a technical term used by economists to describe the degree of responsiveness of the demand for a good to a change in its price.

It is measured by using the following formula.

$$PED = \frac{\text{Percentage change in demand for the good}}{\text{Percentage change in price of the good}}$$

VI Answer the following questions in 12 sentences

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

Total Utility	Marginal Utility
• It is the aggregate utility derived by the consumer by consuming all the units. • It represents utility of all the units consumed. • It may be symbolically written as $TUn=U_1+U_2+U_3+U_4$……Un. • It increases in the beginning and later decreases as the consumer consumes more and more units.	• It is the additional utility derived by the consumer by consuming additional unit • It represents the utility of single unit. • It may be written as $MU_n=TU_n-TU_{n-1}$. • It decreases from the beginning and becomes negative later.

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

Ans: The budget set is the collection of products that the consumer can buy with his income at the prevailing market prices. The Budget set is also known as opportunity set. It includes all the bundles (all possible combination of two goods) which the consumer can purchase with his given level of income.

The budget equation can be written as follows:

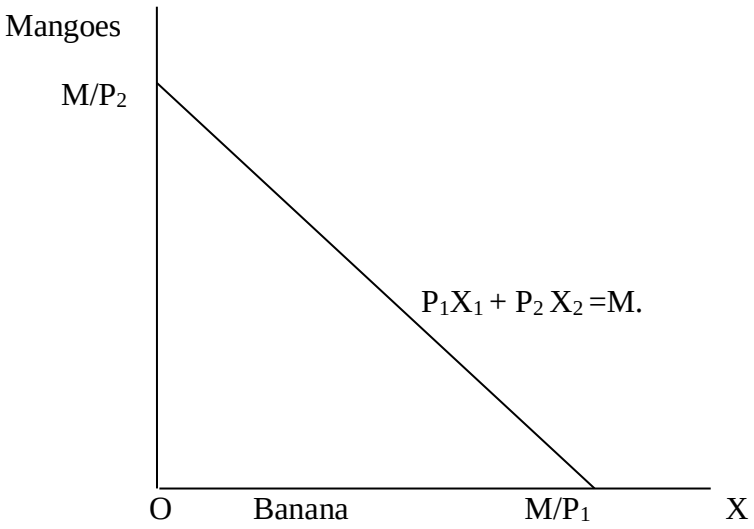
$$P_1X_1 + P_2X_2 \leq M.$$

Consider, for example, a consumer who has Rs.20 and suppose, both the goods are priced at Rs.5 and are available only in integral units. The bundles that this consumer can afford to buy are; (0,0), (0,1), (0,2), (0,3), (0,4), (1,0), (1,1), (1,2), (1,3), (2,0), (2,1), (2,2), (3,0), (3,1) and (4,0).

Among these bundles, (0,4), (1,3), (2,0), (2,2), (3,1) and (4,0) cost exactly Rs.20 and all the other bundles cost less than Rs.20.

If both the goods are perfectly divisible, the consumer's budget set would cosist of all bundles (x_1,x_2) such that x1 and x2 are any numbers greater than or equal to 0 and $P_1X_1 + P_2 X_2 \leq M$.

The budget set can be represented in a diagram as follows:

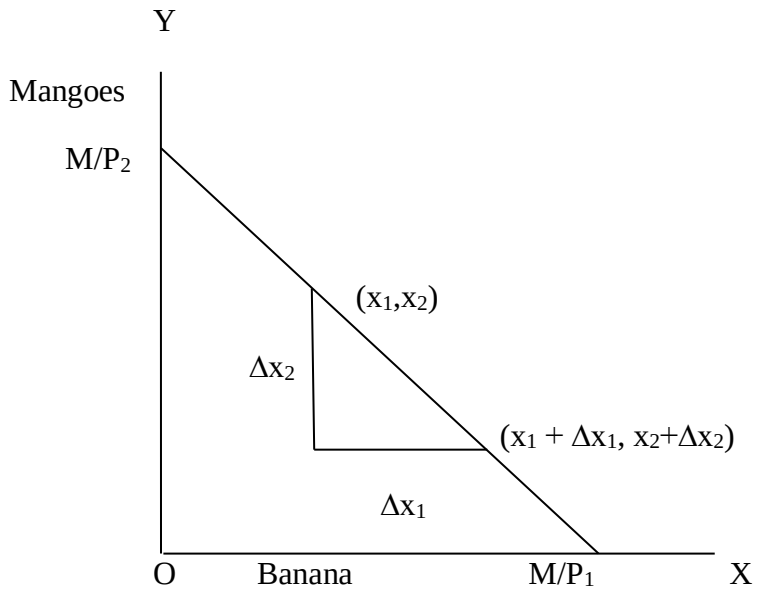


Quantity of bananas is measured along the horizontal axis and quantity of mangoes is measured along the vertical axis. Any point in the diagram represents a bundle of the two goods. The budget set consists of all points on or below the straight line having the equation $P_1X_1 + P_2 X_2 =M$.

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

Ans: The slope of the budget line measures the quantity of change in one product required per unit of change in another product along the budget line.

For example, the amount of change in mangoes required per unit of change in bananas along the budget line is the derivation of slope of the budget line. It can be represented in diagram as follows:



The absolute value of the slope of the budget line measures the rate at which the consumer is able to substitute bananas for mangoes when she spends her entire budget.

Let us consider two points (x_1,x_2) and $(x_1 + \Delta x_1, x_2+\Delta x_2)$ on the budget line. It will be as follows:

$$P_1X_1 + P_2 X_2 = M \text{……..(1)}$$

$$P_1 (x_1 + \Delta x_1) + P_2(x_2+\Delta x_2) = M \text{ ……(2)}$$

Now subtracting (1) from (2), we get

$$P_1\Delta x_1 + P_2\Delta x_2 = 0 \text{…….(3)}$$

By rearranging terms in (3) we get

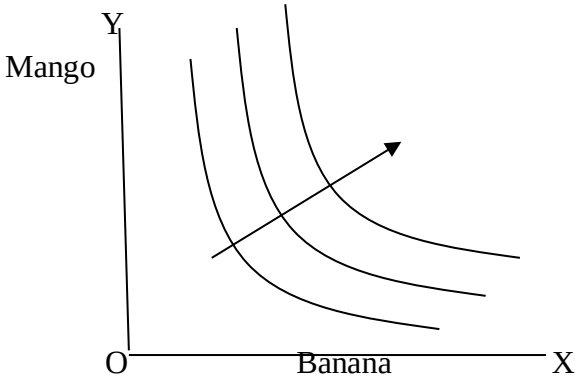
$$\Delta x_2/\Delta x_1 = -P_1/P_2 \text{ .....(4).}$$

Therefore, the slope of the budget line is $-P_1/P_2$. The means, the Indifference curve is negatively sloped i.e., it slope downwards. An increase in the amount of bananas along the indifference curve is associated with a decrease in the amount of mangoes.

4. **Explain the indifference map with the diagram.**

Ans: A family of indifference curves is called as indifference map. It refers to a set of indifference curves for two commodities showing different levels of satisfaction. The higher indifference curves show higher level of satisfaction and lower Indifference Curve represent lower satisfaction. A rational consumer always chooses more of that product that offers him a higher level of satisfaction which is represented in higher Indifference Curve. It is also called 'Monotonic preferences'.

The consumer's preferences over all the bundles can be represented by a family of indifference curves as shown in the following diagram.



In the above diagram, we see the group of three indifference curves showing different levels of satisfaction to the consumer. The arrow indicates that bundles on higher indifference curves are preferred by the consumer to the bundles on lower indifference curves.

5. Write the differences between substitutes and complements.

Substitute goods	Complementary goods
• These are alternative goods available to satisfy our wants. • If the price of a product increases, the demand for its substitute also increases. • Example for substitute goods are Tea and Coffee, Colgate and Pepsodant, etc. • Here the demand curve shifts to the right in case of price rise. • Price and demand move in same direction.	• These are the goods which are consumed together. • If the price of a product increases, the demand for its complementary good decreases. • Example for complementary goods are Pen and Ink, Shoes and socks etc • Here the demand curve shifts to left in case of price rise. • Price and demand move in opposite directions.

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

Normal goods	Inferior goods
• These are the goods for which the demand increases with the increase in the income of consumer. • Example for normal goods are food, cloths, electronic goods, luxury goods etc. • There is positive relationship between income and demand. • Here the demand curve shifts towards right if the income of consumer increases.	• These are the goods for which the demand decreases with the increase in the income of consumer. • Example for inferior goods are low quality of goods like unbranded products. • There is inverse relationship between income and demand. • Here the demand curve shifts towards left if the income of consumer increases.

VII Answer the following questions in 20 sentences

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

One of the most important propositions of the cardinal utility approach to demand was the Law of Diminishing Marginal Utility. German Economist Gossen was the first to explain it. Therefore, it is called Gossen's First Law.

Definition:

According to Alfred Marshall, "The additional benefit which a person derives from a given increase of a stock of a thing diminishes, other things being equal, with every increase in the stock that he already has".

This law simply tells us that, we obtain less and less utility from the successive units of a commodity as we consume more and more of it.

ASSUMPTIONS OF THE LAW OF DMU

- Uniform quality and size of the commodity: The Successive units of the commodity should not differ in any way either in quality or size.
- Suitable quantity of consumption: The commodity units should notk be very small; Eg. Milk should be in glasses and not in spoons.
- Consumption within the same time: Consumption must be continuous. There should not be so much difference in time between the consumption of successive units.
- No change in the price of the commodity or its substitutes: The law is based on the assumption that the commodity's price is not changes with successive units. The price of the substitutes is also kept at the same level.
- Utility can be measured in cardinal numbers i.e., 1, 2, 3, 4, …….
- Consumer must be rational, i.e., every consumer wants to maximize his satisfaction.

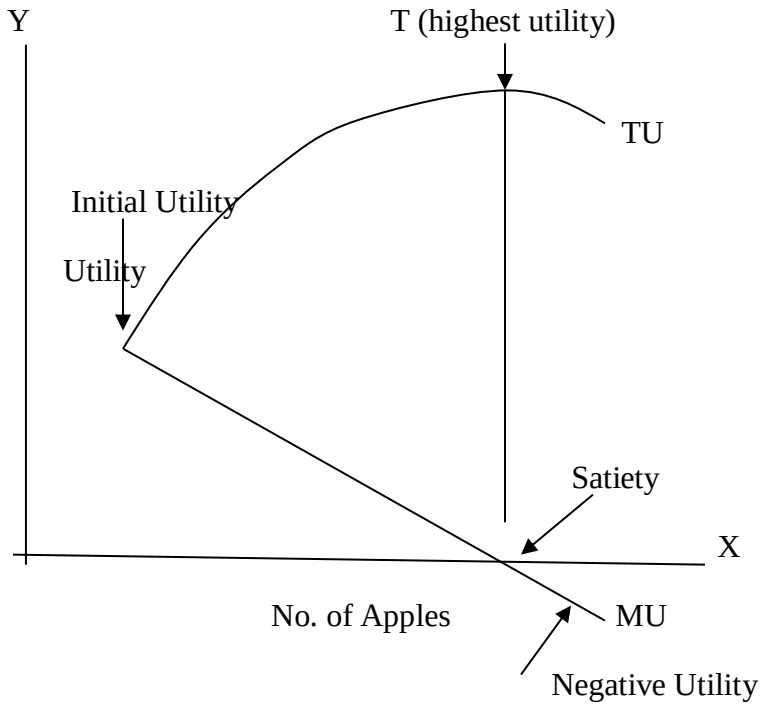
Explanation of Law of Diminishing Marginal Utility:

The basis of this law is that every want needs to be satisfied only upto a limit. After this limit is reached the intensity of our want becomes zero. It is called complete satisfaction of the want. Therefore, s we consume more and more units of a commodity to satisfy our need, the intensity of our want for it becomes less and less. Therefore, the utility obtained from the consumption of every unit of the commodity is less than that of the units consumed earlier. This can be explained with the help of the following table. TU- Total Utility, U- Marginal Utility.

Units of Apples	TU	MU
1	30	30
2	50	20
3	65	15
4	75	10
5	80	5
6	82	2
7	82	0
8	80	-2

Suppose a man wants to consume apples and is hungry. In this condition, if he gets one apple, he has very utility for it. Let us say that the measurement of this utility is equal to 30 utils. Having eaten the first he will not remain so hungry as before. Therefore, if he consumes the second apple he will have a lesser amount of utility from the second apple even if it was exactly like first one. The utility he got from the second apple equals 20 units, the third, fourth, fifth and sixth apples give him utility equal to 15, 10, 5 and 2 units respectively. Now, if he is given the seventh apple he has no use for it. That means the utility of the seventh apple to the consumer is zero. It is just possible that if he is given the eight apple for consumption, it may harm him. Here the utility will be negative ie., -2. Therefore, we are clear that the additional utility of the successive apples to the consumer goes on diminishing as he consumes more and more of it.

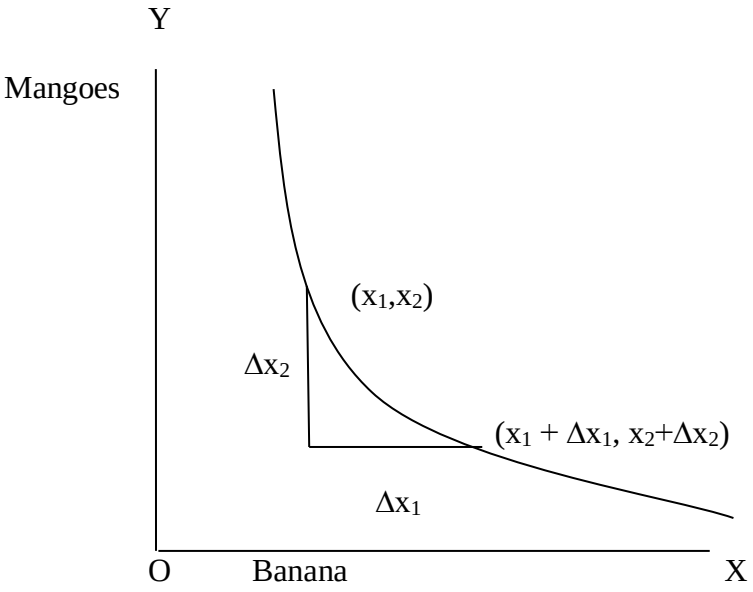
The Law of Diminishing Marginal Utility can be explained with the help of the following diagram.



In the diagram the horizontal axis shows the units of apples and the vertical axis measures the MU and TU obtained from the apple units. The total utility Curve will be increasing in the beginning and later falls. The Marginal Utility curve is falling from left down to the right clearly tells us that the satisfaction derived from the successive consumption of apples is falling.

The Marginal Utility of the first apple is known as initial utility. It is 30 utils. The Marginal utility of the seventh apple is Zero. Therefore, this point is called the satiety point. The Marginal Utility of the eighth apple is -2. So, it is called Negative utility and lies below the X axis.

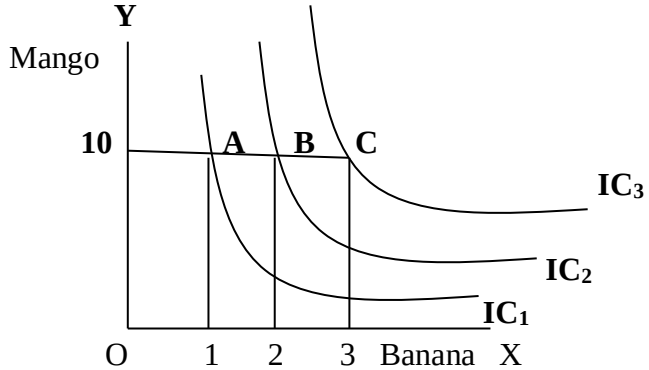
2. **Explain the features of Indifference curves with the help of diagrams.**
   Ans: The main features of Indifference curves are as follows:
   a) **Indifference curve slopes downwards from left to right:** An indifference curve slopes downwards from left to right because, the consumer in order to have more of one product, he has to forego some units of other product. This can be explained with the help of diagram.



Thus, according to above diagram, as long as the consumer is on the same indifference curve, an increase in bananas must be compensated by a fall in quantity of mangoes. That means, an increase in the amount of bananas along the indifference curve is associated with a decrease in the amount of mangoes.

b) **Higher indifference curve gives greater level of utility:** As long as marginal utility of a commodity is positive, a consumer always prefers more of that commodity to increase his level of satisfaction. This can be explained with the help of table and a diagram:

Combination	Banana	Mango
A	1	10
B	2	10
C	3	10

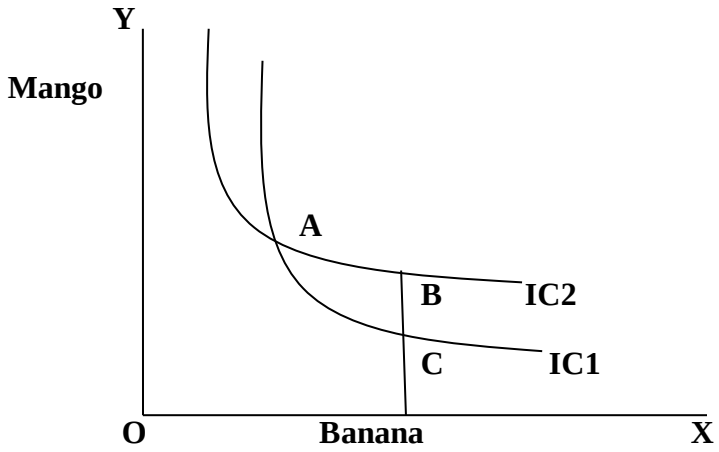


Let us consider the different combinations of two goods bananas and mangoes A, B and C in the above table and diagram. All the three combinations consist of same quantity of mangoes but different quantities of bananas. As combination B has more bananas than A, B will provide the consumer higher level

of satisfaction than A. Therefore, B will lie on higher indifference curve. Similarly, C has more bananas than B and therefore C will provide higher level of satisfaction than B and also lie on higher indifference curve than B.

Thus higher indifference curves give greater level of utility.

c) Two indifference curves never intersect each other: If the two indifference curves intersect each other, they will give conflicting results. This can be explained with the help of diagram.



In the above diagram the two indifference curves have intersected with each other. As points A and B lie on IC2, utilities derived from A and B are same. Similarly, as points A and C lie on the same indifference curve IC1, the utilities are same. From this, it follows that utility from point B and C are same. But this is clearly an absurd result as on B, the consumer gets a greater number of mangoes with the same quantity of bananas. So the consumer is better off at point B than at Point C. Thus, it is clear that intersecting indifference curves will lead to conflicting results. Thus, two indifference curves cannot intersect each other.

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

Ans: By keeping the prices of other goods, the consumer's income and her tastes and preferences remain constant, the amount of a good that the consumer optimally chooses becomes entirely dependent on its price. The relation between the consumer's optimal choice of the quantity of a good and its price is very important and this relation is called as demand function.

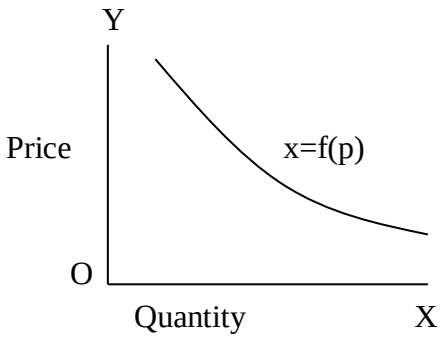
Thus, the consumer's demand function for a single commodity gives the amount of the commodity that the consumer chooses at different levels of its price when the other things remain unchanged.

The consumer's demand for a single commodity as a function of its price can be written as

$X = f(P)$

Where X denotes the quantity and P represents the price of the commodity.

The demand function can be represented graphically. The graphically representation of the demand function is called the demand curve. The relation between the consumer's demand for a good and the price of the good is likely to be negative. That means, the amount of a good that a consumer would optimally choose is likely to increase when the price of the good falls and it is likely to decrease with a rise in the price of the good.



The demand curve is a relation between the quantity of the good chosen by a consumer and the price of the good. The independent variable (price) is measured along the vertical axis and dependent variable (quantity) is measured along the horizontal axis. The demand curve gives the quantity demanded by the consumer at each price.

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

It is assumed that the consumer chooses her consumption bundle on the basis of her taste and preferences over the bundles in the budget set. It is generally assumed that the consumer has well defined preferences over the set of all possible bundles. She can compare any two bundles. In other words, between any two bundles, she either prefers one to the other or she is indifferent between the two goods.

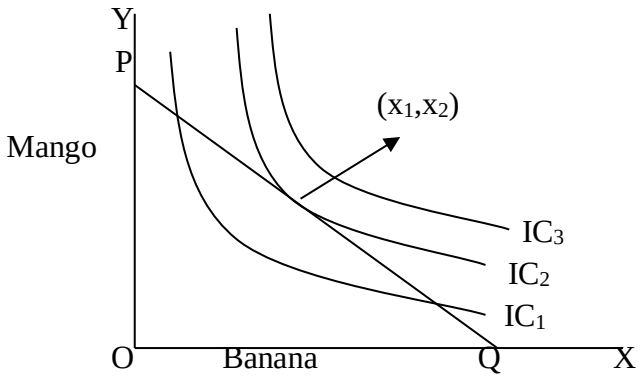
It is further assumed that the consumer is a rational individual. A rational individual clearly knows what is good or what is bad for her and in any given situation, she always tries to achieve the best for herself. From the bundles which are available to her, a rational consumer always chooses the one which gives her maximum satisfaction. The consumer always tries to move to a point on the highest possible indifference curve given her budget set.

Thus, the optimum point would be located on the budget line. A point below the budget line cannot be the optimum. Compared to a point below the budget line, there is always some point on the budget line which contains more of at least one of the goods and no less of the other. Thus, the consumer's preferences are monotonic.

The point at which the budget line is tangent to one of the indifference curves would be the optimum choice of consumer. This is because, the budget line other

than the point at which it touches the indifference curves lies on a lower indifference curve is considered as inferior. So 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.

This can be explained with the help of the following diagram.



In the above diagram, PQ is budget line, IC1, IC2 and IC3 are indifference curves showing different levels of satisfaction. Banana is measured in OX axis and Mango is measured in OY axis.

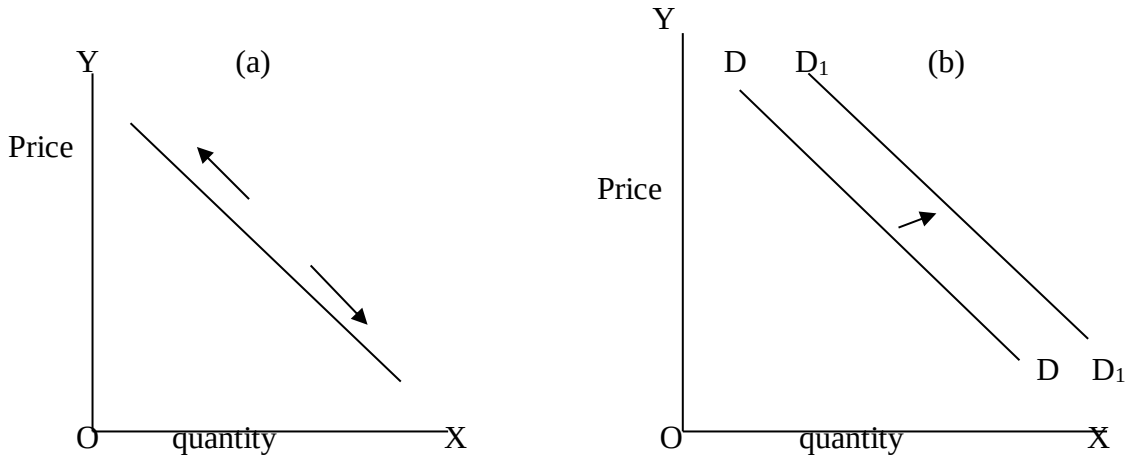
The above diagram illustrates the consumer's optimal choice also known as consumer's equilibrium. At (x_1,x_2), the budget line PQ is tangent to the indifference curve IC_2. The indifference curve just touching the budget line is the highest possible indifference curve given the consumer's budget set. Bundles on the indifference curve above IC_2 are not affordable. Points on the indifference curve IC_2 are certainly inferior to the points on the IC_2 as they lie on IC_1. 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.

It is important to note that the amount of a good that the consumer chooses depends on the price of the good, the prices of other goods, income of the consumer and her tastes and preferences. The demand function is a relation between the amount of the good and its price when other things remain constant.

The demand curve is a 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 movements along the demand curve.

On the other hand, changes in any of the other things like, income of consumer, price of related goods (substitutes and complementary goods) and tastes and preferences, lead to a shift in the demand curve. The following two diagrams depict the movement along the demand curve and a shift in the demand curve.



The above diagrams show movement along a demand curve and shift of a demand curve. Diagram (a) depicts a movement along the demand curve and diagram (b) depicts a shift in the demand curve.

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

Ans: Price elasticity of demand is a measure of the responsiveness of the demand for a good to changes in its price. Price elasticity of demand for a good is defined as the percentage change in demand for the good divided by the percentage change in its price. Price elasticity of demand for a good is measured with the help of following formula

$$PED = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}} = \frac{\Delta Q/Q \times 100}{\Delta P/P \times 100}$$

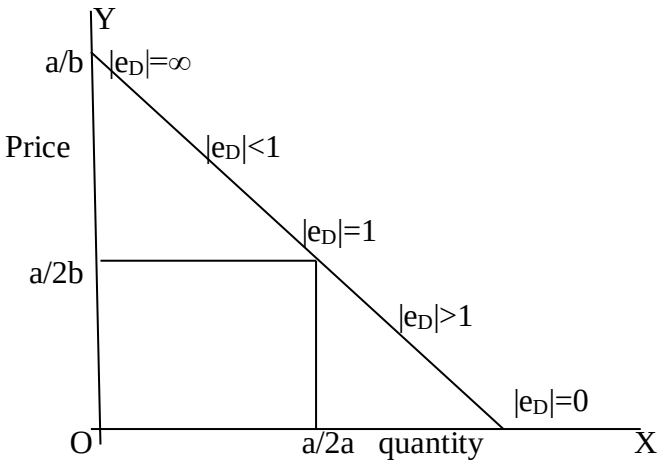
$$PED = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Here, ΔQ stands for change in quantity, ΔP is change in price, 'p' is initial price and 'Q' is initial quantity.

Elasticity along a Linear Demand curve:

The linear demand curve is $q = a - bp$. Note that at any point on the demand curve, the change in demand per unit change in the price $\frac{\Delta q}{\Delta P} = -b$

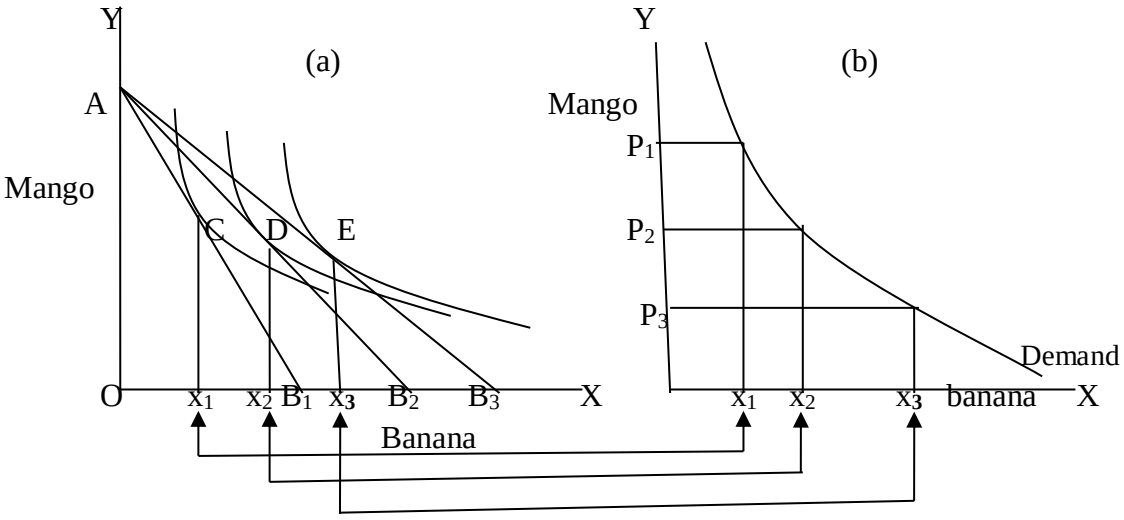
The price elasticity of demand is different at different points on the linear demand curve which is shown in the following diagram:



In the above diagram, $|e_D|=\infty$ depicts price elasticity is perfectly elastic, $|e_D| < 1$ depicts the demand is less responsive to a price change; $|e_D|=1$ depicts that the change in demand is equal to a change in price, $|e_D|>1$ shows that the demand is more responsive to a price change and $|e_D|=0$ depicts that there is no change in quantity demanded due to a change in price. So, price elasticity of demand is different at different points on the linear demand curve.

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

The derivation of demand curve from Indifference curve and budget constraints can be explained with the help of following diagram.



Suppose the price of X_1 falls from P_1 to P_2, keeping price of X_2 and income of consumer constant, the budget set in diagram (a) expands and new consumption equilibrium is on higher indifference curve at point D where she buys more of bananas. Thus, demand for bananas increases as its price decreases. We can plot P_2 against X_2 in diagram (b) to get the second point on the demand curve for X_2. Similarly, the price of bananas may fall further to P_3, resulting in further increase in

consumption of bananas to X_3 and the consumer moves from point D to E on an higher indifference curve in diagram (a). So, P_3 is plotted against X_3 which gives us third point on the demand curve.

Therefore, we observe that a decrease in price of bananas results in an increase in quantity of bananas purchased by a consumer who maximizes his utility. Thus, the demand curve is negatively sloped.

VIII Assignment and project oriented question

1. **A consumer wants to consume two goods. The Price of bananas is Rs.4 and price of mangoes is Rs.5. The consumer income is Rs.20.**
   - **a) How much bananas can she consume if she spend her entire income on that good**
   - **b) How much mangoes can she consume if she spend her entire income on that good**
   - **c) Is the slope of budget line is downward or upward**
   - **d) Are the bundles on the budget line equal to the consumers' income or not**
   - e) **If you want to have more of banana you have to give up mangoes. Is it true?**

Ans: (a) 5 Bananas (20/4)

(b) 4 Mangoes (20/5)

(c) Slope of budget line is downward.

(d) Yes, the bundles on the budget line are equal to the consumer's income.

(e) True. If we want to have more of banana we have to give up mangoes.

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CHAPTER 3

PRODUCTION AND COST

I Choose the correct answer

1. The formula of production function is
   a) q=f(L,K) c) Y=f(x)
   b) q=d(p) d) None of the above.
   Ans: (a) q=f(L,K)

2. In the short run, a firm
   a) Can change all the inputs c) can keep inputs fixed
   b) Cannot vary all the inputs d) None of the above
   Ans: (b) Cannot vary all the inputs

3. The change in output per unit of the change in the input is called
   a) Marginal product c) Total product
   b) Average Product d) Product
   Ans: (a) Marginal product

4. Cobb-Douglas production function is
   a) q=(x, x) c) $q= (x_1^{\alpha}, x_2^{\beta})$
   b) $q=(x_1, x_2)$ d) q=(0)
   Ans: c) $q= (x_1^{\alpha}, x_2^{\beta})$

5. TC=
   a) TVC c) TFC+TVC
   b) TFC d) AC + MC
   Ans: c) TFC+TVC

II Fill the blanks

1. In the long run, all inputs are ……
   Ans: Varied
2. ……..is defined as the output per unit of variable input.
   Ans: Average Product
3. Marginal product and average product curves are ……in shape.
   Ans: Inverse U
4. SMC curves cuts the AVC curve at the ……point of AVC curve from below.
   Ans: Minimum
5. …….is the set of all possible combinations of the two inputs that yield the same maximum possible level of output.

Ans: Isoquant

III Match the following

A	B
1. CRS	a) ΔTC/ΔC
2. SAC	b) Long run Average cost
3. LRAC	c) Short run Average cost
4. TFC+TVC=	d) Constant returns to scale
5. SMC	e) TC

Ans: 1 - (d); 2 - (c); 3 - (b); 4 – (e); 5 – (a)

IV Answer the following questions in a sentence or word

1. **What do you meant by total product?**
   Ans: Total product is the relationship between a variable input and output when all other inputs are held constant.

   Suppose we vary a single input and keep all other inputs constant. Then for different levels of that input, we get different levels of output. This relationship between the variable input and output, keeping all other inputs constant, is often referred to as Total Product of the variable input.
2. **What is Average product?**
   Ans: Average Product is defined as the output per unit of variable input. We calculate it as $AP_L=TP_L/L$.
3. **Give the meaning of marginal product.**
   Ans: Marginal Product of an input is defined as the change in output per unit of change in the input when all other inputs are held constant. It is the additional unit of output per additional unit of variable input. It is calculated by dividing the change in output by change in input labour.
   $MP_L = \Delta TP_L/\Delta L$.
4. **Write the meaning of cost function of the firm.**
   Ans: The cost function of the firm describes the least cost of producing each level of output, given prices of factors of production and technology. It deals with the output and prices of factors of production.
5. **What is total fixed cost?**
   Ans: The cost that a firm incurs to employ fixed factors of production (inputs) is called as Total Fixed Cost.
6. **What is average fixed cost?**
   Ans: Average fixed cost is the cost per unit of fixed input. It is obtained by dividing the values of the Total Fixed cost by output. The formula to calculate Average Fixed cost is AFC = TFC/q.

V Answer the following questions in four sentences.

1. **What is Isoquant?**
   Ans: An isoquant is the set of all possible combinations of the two inputs that yield the same maximum possible level of output. Each isoquant represents a particular level of output and is labelled with that amount of output. It is just an alternative way of representing the production function.
2. **Give the meaning of the concepts of short run and long run.**
   Ans: The concepts of short run and long run are defined as a period simply by looking at whether all the inputs can be varied or not. It is not advisable to define short run and long run in terms of days, months or years.

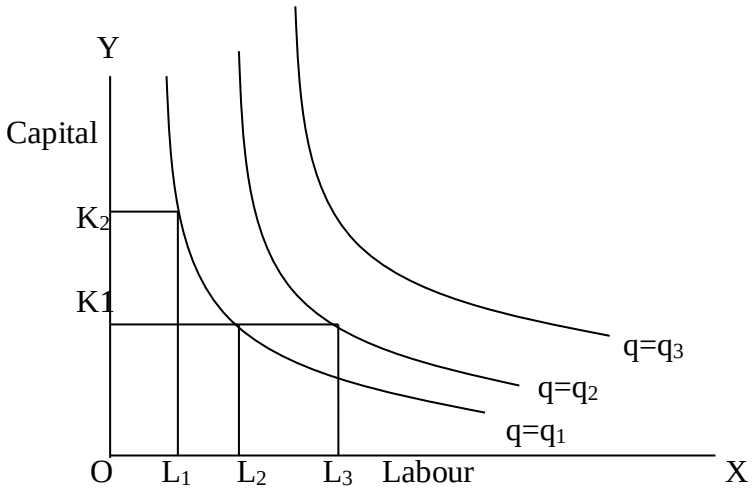
   In the short run, at least one of the factor – labour or capital cannot be varied and therefore, remains fixed. In order to vary the output level, the firm can vary only the other factor. The factor that remains fixed is called the fixed factor and the other factor which the firm can vary is called the variable factor.

   In the long run, all factors of production can be varied. A firm in order to produce different levels of output in the long run may vary both the inputs simultaneously. So, in the long there is no fixed factor.
3. **Mention the types of returns to scale.**
   Ans: The types of returns to scale are
   (a) Constant Returns to Scale
   (b) Increasing Returns to Scale
   (c) Decreasing Returns to Scale
4. **Name the short run costs.**
   Ans: The short run costs are: Total Fixed cost, Total Variable cost, Total Cost, Average Fixed Cost, Average Variable Cost, Average Cost and Marginal Cost.
5. **What are long costs?**
   Ans: There are two long run costs namely, (a) Long run Average Cost (b) Long run Marginal Cost.

VI Answer the following questions in 12 sentences.

1. **Explain isoquant with the help of a diagram.**
   Ans: An isoquant is the set of all possible combinations of the two inputs that yield the same maximum possible level of output. Each isoquant represents a particular level of output and is labelled with that amount of output. It is just an alternative way of representing the production function.

   The concept of isoquant can be explained with the help of following diagram:



The above diagram generalizes the concept of isoquant. In the above diagram, labour is measured in OX axis and Capital is measured in OY axis. There are 3 isoquants for the three output levels viz., $q=q_1$, $q=q_2$ and $q=q_3$. Two input combinations (L_1, K_2) and (L_2, K_1) give us the same level of output q_1. If we fix capital at K1 and increase labour to L3, output increases and we reach a higher isoquant $q=q_2$. When Marginal products are positive, with greater amount of one input, the same level of output can be produced only using lesser amount of the other. Therefore, isoquants curves slope downwards from left to right (negatively sloped).

2. Explain TP, MP and AP with the example.

Ans: The TP – total product, MP- marginal product and AP – Average Product

Total Product:

Total product is the relationship between a variable input and output when all other inputs are held constant. Suppose we vary a single input and keep all other inputs constant. Then for different levels of that input, we get different levels of output. This relationship between the variable input and output, keeping all other inputs constant, is often referred to as Total Product of the variable input.

Average product

Average Product is defined as the output per unit of variable input. We calculate it as $AP_L=TP_L/L$, where AP_L is the Average Product of Labour, TP_L is the Total product of labour and L is the amount of labour input used.

Marginal Product

Marginal Product of an input is defined as the change in output per unit of change in the input when all other inputs are held constant. It is the additional unit of output per additional unit of variable input. It is calculated by dividing the change in output by change in input labour.

$MP_L = \Delta TP_L/\Delta L$.

The concepts of TP, AP and MP can be explained with the help of following table:

Labour	TP	MP_L	AP_L
0	0	-	-
1	10	10	10
2	24	14	12
3	40	16	13.33
4	50	10	12.5
5	56	6	11.2
6	57	1	9.5

The above table shows the total product of labour, Marginal product of labour and Average product of labour. The total product is also sometimes called as total return to or total physical product of the variable input labour. The third column gives us a numerical example of Marginal product of labour. The values in this column are obtained by dividing change in TP by change in Labour. The last column gives us a numerical example of average product of labour. The values in their column are obtained by dividing TP by Labour.

3. Write a brief note on returns to scale.

Ans: The returns to scale can happen only in the long run as both the factors (Labour and Capital) can be changed. One special case in the long run occurs when both factors are increased by the same proportion or factors are scaled up.

- **Constant returns to scale:** When a proportional increase in all inputs results in an increase in output by the same proportion, the production function is said display constant returns to scale.
- **Increasing returns to scale:** When proportional increase in all inputs results in an increase in output by a larger proportion, the production function is said to display increasing returns to scale.
- **Decreasing returns to scale:** When a proportional increase in all inputs results in an increase in output by a smaller proportion, the production function is said to display decreasing returns to scale.

  For example, if in a production process, all inputs get doubled. As a result, if the output gets doubled, the production function exhibits constant returns to scale, if output is less than doubled, exhibits decreasing returns to scale and if is more than doubled, exhibits increasing returns to scale.

4. Explain the long run costs.

Ans: In the long run, all inputs are variable. There are no fixed costs, The total cost and the total variable cost coincide in the long run. There are two types of long run costs. They are as follows:

a) **Long Run Average Cost (LRAC)**: The long run average cost is the cost per unit of output produced. It is obtained by dividing the Total Cost by the output produced. It can be calculated as follows:

LRAC = TC/q

Where TC is Total cost and ‘q’ is quantity of output produced.

b) Long Run Marginal Cost: The long run marginal cost is the change in total cost per unit of change in output. When output changes in discrete units, then, if we increase production from q_1-1 to q_1 units of output, the marginal cost of producing q_1^{th} unit will be measured as follows:

LRMC = (TC at q1 units) – (TC at q_1-1 units) or LRMC = $TC_n – TC_{n-1}$

5. The following table gives the TP schedule of labour. Find the corresponding Average product and marginal product schedules.

TP_L	**0**	**1**	**35**	**50**	**40**	**48**
L	**0**	**1**	**2**	**3**	**4**	**5**

Ans: Calculation of Average Product (AP) and Marginal Product (MP). AP is obtained by dividing TPL by Labour (L) and MP is obtained from TPL with the help of formula

$TC_n – TC_{n-1}$

TP_L	L	AP	MP
0	0	0	-
1	1	1	1
35	2	17.5	34
50	3	16.66	15
40	4	10	-10
48	5	9.6	8

VII Answer the following questions in 20 sentences.

1. **Explain the various short run costs with the help of a table.**
   The various short run costs are Total Cost, Total Fixed Cost, Total Variable Cost, Average Cost, Average Fixed Cost, Average Variable Cost, and Marginal Cost. The following table shows the various types of short run costs:

The TFC, TVC, TC, AFC, AVC, AC and MC is shown in table as follows:

Output	TFC	TVC	TC	AFC	AVC	AC	MC
0	100	0	100	100	0	0	-
1	100	150	250	100	150	250	150
2	100	200	300	50	100	150	50
3	100	250	350	33.33	83.3	116.6	50
4	100	300	400	25	75	100	50
5	100	420	520	20	84	104	120
6	100	530	630	16.66	88.3	105	110

a) Total Fixed Cost (TFC):

It refers to the total money expenses incurred on all the fixed factors in the short run. TFC remains constant at all levels of output. Therefore the total fixed cost curve is horizontal straight line to OX axis above the origin which indicates that it is never zero.

TFC = TC-TVC

b) Total Variable Cost (TVC):

It refers to the total money expenses incurred on the variable factor inputs in the short-run. Total variable cost is the direct cost of the output because it increases along with the output & remains zero when the output is zero. So, the TVC curves starts from the origin & rises sharply in the beginning, gradually in the middle & stretch again sharply in the end the nature of this slope is in accordance with the law of variable proportion.

TVC = TC-TFC

c) Total Cost (TC):

It is the aggregate money expenditure incurred by the firm on all the factors to produce a given quantity of output. TC varies in the same proportion as total variable cost because the total fixed cost is constant. The TC curve slope upwards from left to right, above the origin, indicating that, it includes total fixed cost and total variable cost.

d) **Average Fixed Cost (AFC):**

It is the fixed cost per unit of output. In other words, it is average expenses incurred on a single unit of output produced. AFC and output are inverse relation i.e. AFC will be higher when the output level is less and as the output goes on increasing AFC starts reducing, when it is represented in the diagram AFC curve will have a negative slope which falls very stiffly in the beginning and later on becomes parallel to the X axis. .

The Average Fixed Cost is obtained by dividing Total Fixed Cost by Output.

AFC=TFC/Output.

e) Average Variable Cost (AVC):

It is a variable cost for per unit of output. It can be calculated by dividing total variable cost by the total units of output. When this cost is graphically represented, we get a 'U' shaped AVC, which shows that the cost will be less as the number of units produced increase, this is because as the number of variable inputs are added in a fixed plant the efficiency will increase and vice versa.

AVC=TVC/Output or AVC=AC-AFC

f) **Average Cost (AC):** It is the cost per unit of output produced. It is obtained by dividing total cost by the total output produced i.e. AC = TC/Q or it is also obtained by adding AFC & AVC. If the AC is graphical represented we get U shaped curve because of the operation of law of

variable proportions. The short run AC curve is also called as 'Plant Curves' because it indicates the optimum utilization of a given plant (Industry) capacity.

g) **Marginal Cost (MC):** It is an additional cost incurred to produce an additional output. In other words it is the net additions to the total cost when one more unit of output is produced.

$$MC = TC_n - TC_{n-1}$$

(Where TCn = Total Cost of 'n' selected unit of output and TCn-1 is Total cost of previous output)

2. Explain the shapes of long run cost curves.

Ans: In the long run, all inputs are variable. There are no fixed costs, The total cost and the total variable cost coincide in the long run. There are two types of long run costs. They are as follows:

c) **Long Run Average Cost (LRAC)**: The long run average cost is the cost per unit of output produced. It is obtained by dividing the Total Cost by the output produced. It can be calculated as follows:

$$LRAC = TC/q$$

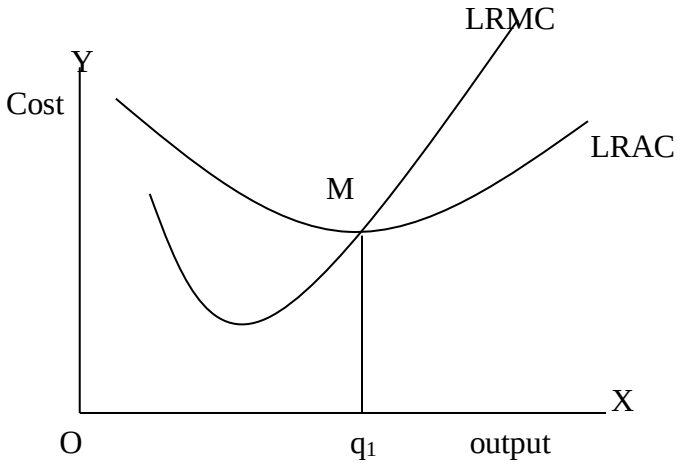
Where TC is Total cost and 'q' is quantity of output produced.

In a typical firm the Increasing Returns to scale is observed at the initial level of production. This is then followed by the Constant Returns to Scale and then by the Diminishing Returns to Scale. Accordingly, the LRAC curve is 'U' shaped curve. Its downward sloping part corresponds to Increasing Returns to Scale and upward rising part corresponds to Decreasing Returns to scale. At the minimum point of the LRAC curve, Constant returns to scale is observed.

d) Long Run Marginal Cost: The long run marginal cost is the change in total cost per unit of change in output. When output changes in discrete units, then, if we increase production from q_1-1 to q_1 units of output, the marginal cost of producing q_1^{th} unit will be measured as follows:

LRMC = (TC at q1 units) – (TC at q_1-1 units) or $LRMC = TC_n - TC_{n-1}$

For the first unit of output, both LRMC and LRAC are the same. Then, as output increases, LRAC initially falls, and then, after a certain point, it rises. As long as average cost is falling, marginal cost must be less than the average cost. When the average cost is rising, marginal cost must be greater than the average cost. LRMC curve is there a 'U' shaped curve. It cuts the LRAC curve from below at the minimum point of LRAC. The following diagram shows the shapes of the long run marginal and the long run average cost curves for a typical firm.



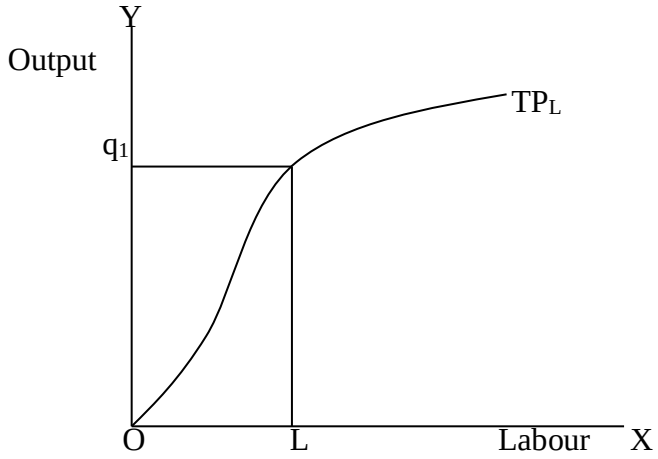
In the above diagram, LRAC reaches its minimum at q_1. To the left of q_1, LRAC is falling and LRMC is less than the LRAC curve. To the right of q_1, LRAC is rising and LRMC is higher than LRAC.

3. Explain the shapes of TP, MP and AP curves.

Ans: Total Product(TP):

Total product is the relationship between a variable input and output when all other inputs are held constant. Suppose we vary a single input and keep all other inputs constant. Then for different levels of that input, we get different levels of output. This relationship between the variable input and output, keeping all other inputs constant, is often referred to as Total Product of the variable input.

The total product curve in the input-output plane is a positively sloped curve as follows:



The above diagram shows the total product curve for labour. When all other inputs are held constant, it shows the different output levels obtainable from different units of labour.

Labour is measured in OX axis and output is measured in OY axis. With L units of labour, the firm can at most produce q_1 units of output.

Average product (AP) and Marginal Product (MP):

Average Product is defined as the output per unit of variable input. We calculate it as $AP_L=TP_L/L$, where AP_L is the Average Product of Labour, TP_L is the Total product of labour and L is the amount of labour input used.

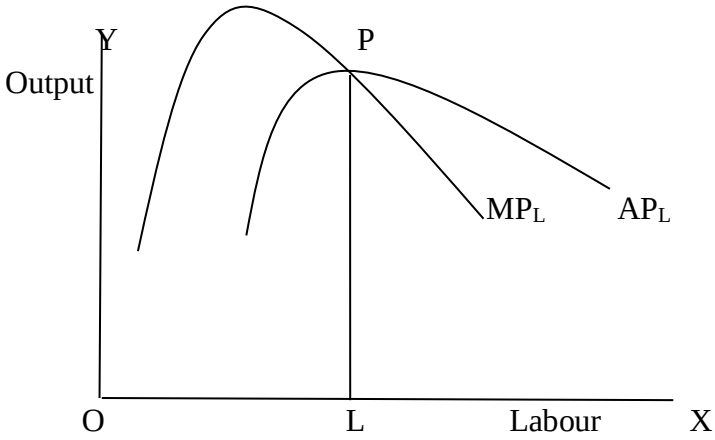
Marginal Product of an input is defined as the change in output per unit of change in the input when all other inputs are held constant. It is the additional unit of output per additional unit of variable input. It is calculated by dividing the change in output by change in input labour.

$MP_L = \Delta TP_L/\Delta L$.

According to the law of variable proportions, the marginal product of an input initially rises and then after a certain level of employment, it starts falling. The MP curve therefore, looks like an inverse 'U' shaped curve.

For the first unit of the variable input, one can easily check that the MP and the AP are same. As the amount of input is increased, the MP rises. AP being the average of marginal products also rises, but rises less than MP. Then after a point, the MP starts falling. However, as long as the value of MP remains higher than the value of the AP, the AP continues to rise. Once MP has fallen sufficiently, its value becomes less than the AP and the AP also starts falling. So AP curve is also inverse 'U' shaped.

This can be diagrammatically represented as follows:



In the above diagram, MPL is marginal product of labour, APL is the average product labour. As long as the AP increases, it must be the case that MP is greater than AP. Otherwise, AP cannot rise. Similarly, when AP falls, MP has to be less than AP. It follows that MP curve cuts AP curve from above at its maximum. In the diagram, AP is maximum at L. To the left of L, AP is rising and MP is greater than AP. To the right of L, AP is falling and MP is less than AP.

4. **A firm's SMC schedule is shown in the following table. TFC is Rs.100. find TVC, TC, AVC and SAC schedules of the firm**

Q	**0**	**1**	**2**	**3**	**4**	**5**	**6**
SMC	**-**	**500**	**300**	**200**	**300**	**500**	**800**

Ans:

Q	SMC	TFC	TVC	TC	AVC	SAC
0	-	100	0	100	0	0
1	500	100	500	600	500	600
2	300	100	800	900	400	450
3	200	100	1000	1100	333.33	366.66
4	300	100	1300	1400	325	350
5	500	100	1800	1900	360	380
6	800	100	2600	2700	433.33	450

Note: TFC is given. TVC is obtained by adding SMC for each unit of output like 500 as it is taken, then 500+300=800; 800+200(SMC)=1000 and so on. TC is TFC+TVC, AVC is TVC divided by Q; and SAC is TC divided by Q.

5. **Explain the law of variable proportions with the help of a diagram.**

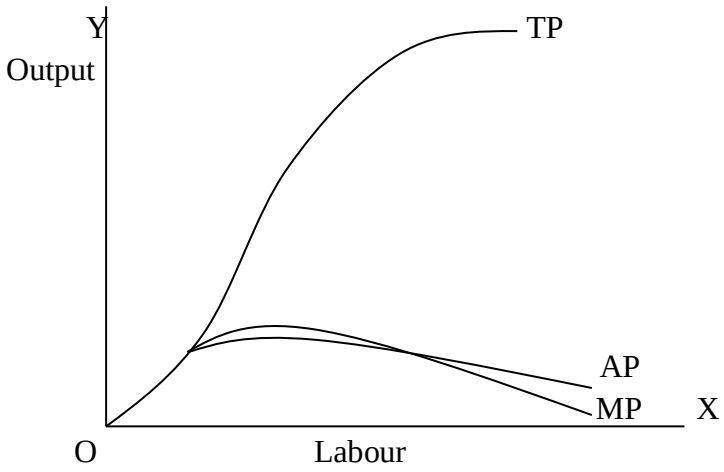
Ans: The law of variable proportions say that the Marginal product of a factor input initially rises with the employment level. But after reaching a certain level of employment, it starts falling.

The law of variable proportions can be explained with the help of the following table and diagram.

Labour	TP	MP_L	AP_L
0	0	-	-
1	10	10	10
2	24	14	12
3	40	16	13.33
4	50	10	12.5
5	56	6	11.2
6	57	1	9.5

The above table shows the total product of labour, Marginal product of labour and Average product of labour. The total product is also sometimes called as total return to or total physical product of the variable input labour. The third column gives us a numerical example of Marginal product of labour. The values in this column are obtained by dividing change in TP by change in Labour. The last column gives us a numerical example of average product of labour. The values in their column are obtained by dividing TP by Labour.

If we plot the above table in graph, placing labor on X axis and output on Y axis, we get the curves shown in the diagram below:



The TP increases as labour input increases. But the rate at which it increases is not constant. An increase in labour from 1 to 2 increases TP by 10 units. An increase in labour from 2 to 3 increases TP by 12 units. The rate at which TP increases is shown by the MP. The MP first increases (till 3 units of labour) and then begins to fall. This tendency of the MP to first increase and then fall is called the law of variable proportions.

The law of variable proportions is also known as law of diminishing marginal product. It occurs because of change in factor proportions. Factor proportions represent the ratio in which the two inputs are combined to produce output. As we hold one factor fixed and keep the other increasing, the factor proportions change. Initially, as we increase the amount of the variable input, the factor proportions become more and more suitable for the production and marginal product increases. But after a certain level of employment, the production process becomes too crowded with the variable input.

In the above diagram, TP is Total Product curve which is increasing in different proportions due the change in labour input. The AP and MP curves are increasing in the beginning and decreasing later. But the change in MP is greater than AP.

VIII Assignment and project oriented questions.

1. **Find the missing products of the following table.**

Factor 1	TP	MP_1	AP_1
0	**0**	**0**	**0**
1	**10**	**-**	**10**
2	**24**	**-**	**12**
3	**40**	**16**	**13.33**
4	**-**	**10**	**-**
5	**-**	**6**	**11.2**
6	**57**	**1**	**9.5**

Ans:

Factor 1	**TP**	**MP_1**	**AP_1**
0	0	0	0
1	10	**10**	10
2	24	**14**	12
3	40	16	13.33
4	**50**	10	**12.5**
5	**56**	6	11.2
6	57	1	9.5

CHAPTER-4

THE THEORY OF FIRM UNDER PERFECT COMPETITION

I Choose the correct answer

1. In a perfect competition each firm produces and sells
   a) Heterogeneous products c) Luxury goods
   b) Homogeneous products d) Necessary goods

Ans: (b) Homogeneous products

2. The increase in total revenue for a unit increase in the output is
   a) Marginal Revenue c) Total Revenue
   b) Average Revenue d) Fixed Revenue

Ans: (a) Marginal Revenue

3. The firm's profit is denoted by
   a) $\sum$ b)Δ c) Φ d)π

Ans: d)π

4. When the supply curve is vertical, the elasticity of supply is
   a) es=1 b) es=1 c) es=0 d) ex=∞

Ans: c) es=0

5. The revenue per unit of output of a firm is called as
   a) TR b) MR c) AR d) None of these.

Ans: c) AR

II Fill in the blanks.

1. Price taking behavior is the single most distinguishing characteristic of ……market
   Ans: Perfect competitive market.
2. …….is a tax that the Government imposes per unit sale of output.
   Ans: Unit Tax
3. For a price taking firm Marginal Revenue is equal to……
   Ans: Market price
4. The point of minimum AVC where the SMC curve cuts the AVC curves is called as ……
   Ans: Shut down point
5. ……cost of some activity is the gain forgone from the second best activity.
   Ans: Opportunity cost

III Match the following

A	B
1. TR=	a) Perfect information
2. π =	b) Zero profit
3. AR=	c) P x Q
4. Normal profit	d) TR-TC
5. Perfect competition	e) TR/Q

Ans: 1 – (c); 2 – (d); 3 – (e); 4 – (b); 5 – (a)

IV Answer the following questions in a sentence or a word

1. **Define Marginal Revenue.**
   Ans: Marginal Revenue of a firm is defined as the increase in total revenue for a unit increase in the firm's output.
   It is obtained by dividing the Change in Total Revenue by Change in quantity.
2. **To which side does a supply curve shift due to the technological progress?**
   Ans: The supply curve shifts to the right due to the technological progress.
3. **Write the formula to calculate Average Revenue.**
   Ans: We calculate Average Revenue, by dividing Total revenue by the quantity sold. The following formula used:
   AR = TR/q
4. **What is normal profit?**
   Ans: The minimum level of profit that is needed to keep a firm in the existing business is called as normal profit.
5. **Give the meaning of super normal profit.**
   Ans: Profit that a firm earns over and above the normal profit is called as super normal profit.
6. **What does market supply curve show?**
   Ans: The market supply curve shows the output levels that firms in the market produce in aggregate corresponding to different values of the market price.

V Answer the following questions in four sentences

1. **Mention the conditions needed for profit by a firm under perfect competition.**
   Ans: The following conditions needed for profit by a firm under perfect competition:
   - The Price P must be equal to MC
   - Marginal cost must be non-decreasing at q_0
   - The firm to continue to produce, in the short run, price must be greater than the average variable cost and in the long run, price must be greater than the average cost.
2. **Give the meaning of shut down point.**

Ans: In the short run, the shut down point is that point of minimum Average Variable Cost where Short run Marginal Cost curve cuts the Average Variable Cost curve. In the long run, the shut down point is the minimum of Long Run Average Cost Curve.

3. **Write the meaning of opportunity cost with an example.**
   Ans: Opportunity cost of some activity is the gain foregone from the second best alternative activity.

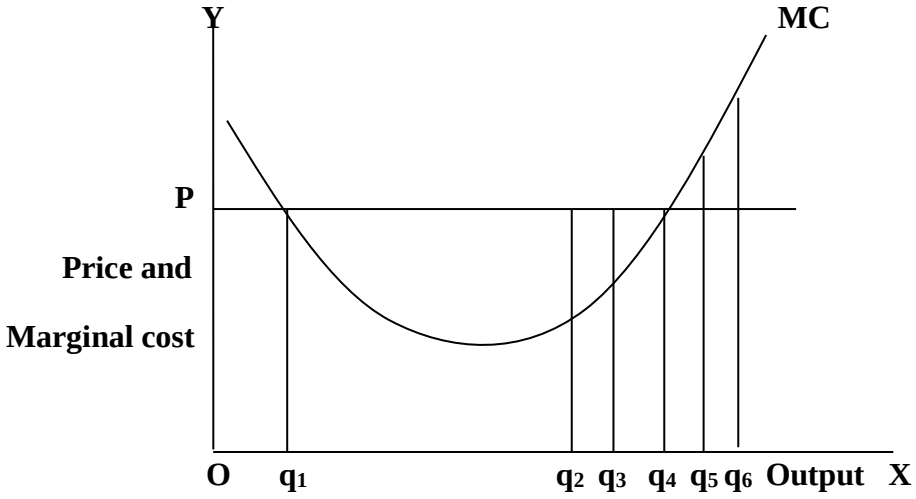
   For example, you have Rs.10000 which you decide to invest in your family business. What is the opportunity cost of your action? If you do not invest this money, you can either keep it in the house safe which will give you zero return or you can deposit it in either bank A or bank B in which case you get an interest at the rate of 20 percent or 10 percent respectively. So the maximum benefit that you may get from other alternative activities is the interest from the bank A. But this opportunity will no longer be there once you invest the money in your family business. The opportunity cost of investing the money in your family business is therefore the amount of forgone interest from the bank A.
4. **Mention the two determinants of a firm's supply curve.**
   Ans: The two determinants of a firm's supply curve are as follows:
   (a) Technological progress
   (b) Input prices.
5. **Give the meaning of price elasticity of supply and write its formula.**

VI Answer the following questions in 12 sentences

1. **Write a short note on profit maximization of a firm under the following conditions**
   a) P=MC
   b) MC must be none decreasing at q_0
   Ans:
   A firm always wishes to maximize its profit. The firm would like to identify the quantity q_0, the firm's profits are less than at q_0. For profits to be maximum, the following conditions must hold at q_0.
   a) **The price P must equal MC (P = MC):** Profit is the difference between Total Revenue and Total Cost. Both total revenue and total cost increase as output increases. As long as the change in total revenue is greater than the change in total cost, profits will continue to increase.

      The change in total revenue per unit increase in output is the marginal revenue and the change in total cost per unit increase in output is the marginal cost.
      Therefore, we can conclude that as long as marginal revenue is greater than marginal cost, profits are increasing and as long as marginal revenue is less than marginal cost, profits will fall. It follows that for profits to be maximum, marginal revenue should be equal to marginal cost.
      For the perfectly competitive firm, we have established that the MR=P. So the firm's profit maximizing output becomes the level of output at which P=MC.

b) Marginal cost must be non-decreasing at q_0: It means that the marginal cost curve cannot slope downwards at the profit maximizing output level. This can be explained with the help of diagram:



In the above diagram, at output levels q_1 and q_4 the market price is equal to the marginal cost. However, at the output level q_1 the marginal cost curve is downward sloping. The q_1 is not profit maximizing output level.

If we observe all output levels left to the q_1 the market price is lower than the marginal cost. But the firm's profit at an output level slightly smaller than q_1 exceeds that corresponding to the output level q_1. Therefore, q_1 cannot be a profit maximizing output level.

2. Explain the determinants of a firm's supply curve.

Ans: A firm's marginal cost curve is a part of its marginal cost curve. Any factor that affects a firm's marginal cost curve is a determinant of its supply curve. Following are the two factors determining a firm's supply curve:

a) Technological Progress: The organizational innovation by the firm leads to more production of output. That means, to produce a given level of output, the organizational innovation allows the firm to use fewer units of inputs. It is expected that this will lower the firm's marginal cost at any level of output, i.e., there is a rightward shift of the MC curve. As the firm's supply curve is essentially a segment of the MC curve, technological progress shifts the supply curve of the firm to the right. At any given market price, the firm now supplies more quantity of output.

b) Input prices: A change in the prices of factors of production (inputs) also influences a firm's supply curve. If the price of input (eg. wage) increases, the cost of production also increases. The consequent increase in the firm's average cost at any level of output is usually accompanied by an increase in the firm's marginal cost at any level of output which

leads to upward shift of the MC curve. That means, the firm's supply curve shifts to the left and the firm produces less quantity of output.

3. Explain the features of perfect competition.

Ans: Perfect competition is a market where there will be existence of large number of buyers and sellers dealing with homogenous products. It is a market with highest level competition.

i) **Large number of sellers and sellers:** The first condition which a perfectly competitive market must satisfy is concerned with the sellers' side of the market. The market must have such a large number of sellers that no one seller is able to dominate in the market. No single firm can influence the price of the commodity. The sellers will be the firms producing the product for sale in the market. These firms must be all relatively small as compared to the market as a whole. Their individual outputs should be just a fraction of the total output in the market.

There must be such a large number of buyers that no one buyer is able to influence the market price in any way. Each buyer should purchase just a fraction of the market supplies. Further the buyers should have any kind of union or association so that they compete for the market demand on an individual basis.

ii) Homogeneous products: Another prerequisite of perfect competition is that all the firms or sellers must sell completely identical or homogeneous goods. Their products must be considered to be identical by all the buyers in the market. There should not be any differentiation of products by sellers by way of quality, colour, design, packing or other selling conditions of the product.

iii) Free Entry and Free exit for firms: Under perfect competition, there is absolutely no restriction on entry of new firms in the industry or the exit of the firms from the industry which want to leave. This condition must be satisfied especially for long period equilibrium of the industry.

If these four conditions are satisfied, the market is said to be purely competitive. In other words, a market characterized by the presence of these four features is called purely competitive. For a market to be perfect, some conditions of perfection of the market must also be fulfilled.

iv) Price Taker: The single distinguishing character of perfect competition is the price taking behaviour of the firms. A price taking firm believes that if it sets a price above the market price, it will be unable to sell any quantity of the good that it produces. On the other hand, if the firm set the price less than or equal to the market price, the firm can sell as many units of the good as it wants sell. The firms in the perfect competitive market are price takers. That means, the producers will continue to sell their goods and services in the price existing in the market. Firms have no control over the price of the product.

v) Information is perfect: Price taking is often thought to be a reasonable assumption when the market has many firms and buyers have perfect information about the price prevailing in the

market. Since all firms produce the same good and all buyes are aware of the market price, the firm in question loses all its buyers if it rises price.

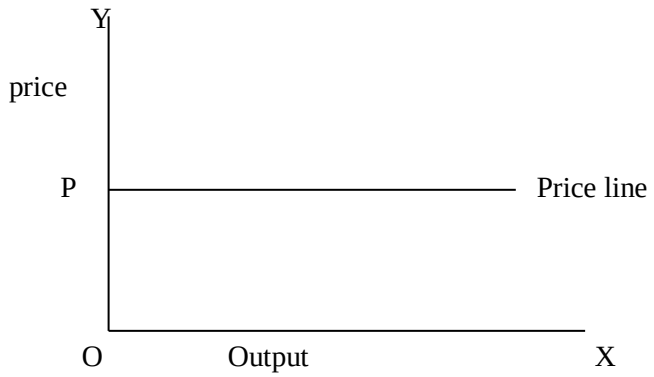
4. **Explain the Average Revenue or price line of a firm under perfect competition with the help of a diagram.**

Ans: Average Revenue: It refers to the revenue per unit of output sold. It is obtained by dividing the total revenue by the number of units of output sold. The average revenue is defined as total revenue per unit of output.

So, $AR = TR/Q = \frac{p \times q}{q} = p$

where, AR is Average Revenue, TR is Total Revenue and Q is quantities sold. That means, for a price taking firm, average revenue equals the market price.

Under perfect competition, the AR will be equal to the market price. This is because, in perfect competitive market, the seller sells his product at the same price which is prevailing in the market. If the seller sells at low price, he incurs losses or if he increases the price, he loses customers. This can be represented in diagram:



In the above diagram, the average revenue for different values of firm's output is shown in Y and X axis respectively. Since the market price is fixed at P, we obtain a horizontal straight line that cuts the Y axis at a height equal to P. This horizontal straight line is called the price line. It is also firm's AR curve under Perfect competition. The AR curve of a firm is also the demand curve of the customers, because the price paid by the consumer for each unit is the average revenue from the seller's point of view.

VII Answer the following questions in 20 sentences.

1. **Explain the short run supply curve of a firm with the help of a diagram.**

Ans: Supply of a firm refers to the quantity that it chooses to sell at a given price, given technology and given prices of factors of production. Supply curve of a firm shows the levels of output that the firm chooses to produce corresponding to different values of the market price by keeping technology and prices of factors of production constant.

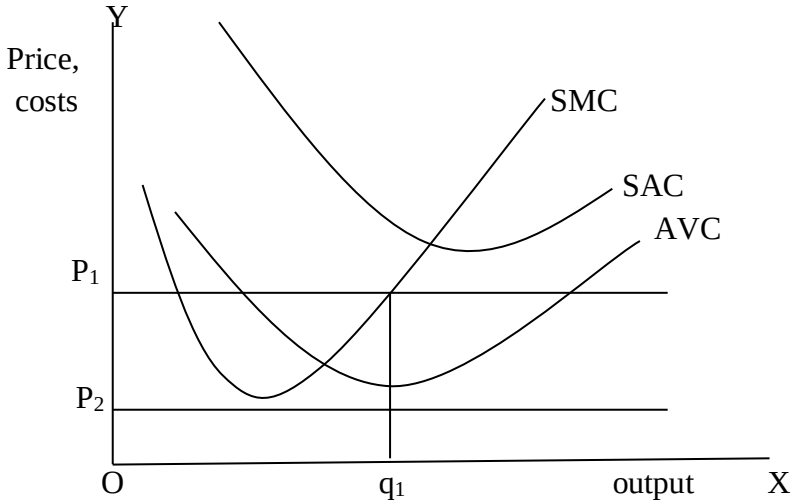
Short Run Supply Curve of a Firm:

Let us derive a firm's short run supply curve. The derivation of supply curve can be split into two parts viz., firm's profit maximizing output level when the market price is greater than or

equal to minimum Average Variable Cost and the firm's profit maximizing output level when the market price is less than the minimum Average Variable Cost.

Case 1: Price or Average Revenue greater than or equal to the minimum AVC:

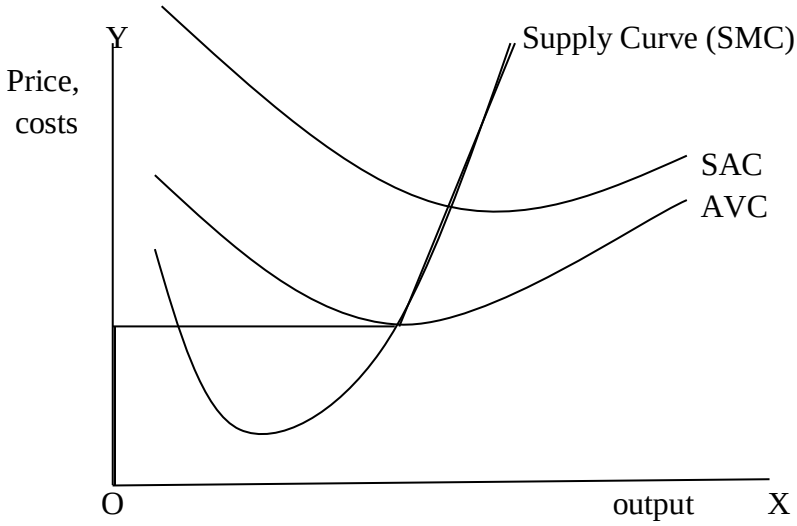
This can be explained with the help of the following diagram



If the market price is P_1, which exceeds the minimum of AVC, the firm starts out by equating P_1 with SMC on the rising part of the SMC curve which leads to the output level q_1. But the AVC at q_1 does not exceed the market price P_1. Thus, when the market price is P_1, the firm's output level in the short run is equal to q_1.

Case -2: Price is less than minimum AVC: If the market price is P_2 which is less than the minimum AVC, at all positive output levels, AVC exceeds P_2. In other words, it cannot be the case that the firm supplies a positive output. So, if the market price is P_2, the firm produces zero output.

Combining both the cases, we can conclude that a firm's short run supply curve is the rising part of the Short Run Marginal curve from and above the minimum Average Variable Cost together with zero output for all prices strictly less than the minimum AVC. This can be represented in the following diagram:



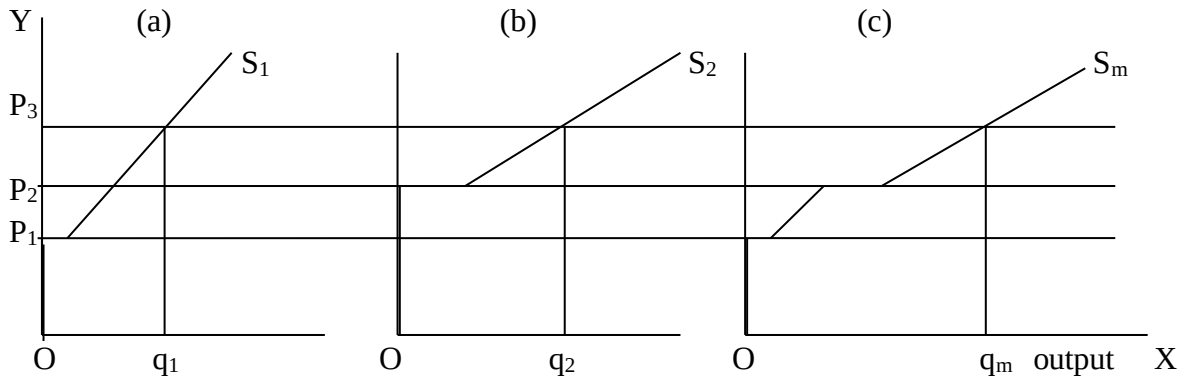
In the above diagram, the short run supply curve of a firm, which is based on its short run marginal cost curve and average variable cost is represented by the curve which rises from the minimum point of AVC curve. The bold line represents the short run supply curve.

2. Explain market supply curve with the help of a diagram.

Ans: The market supply curve shows the output levels that firms in the market produce in aggregate corresponding to different values of the market price.

For example, there are firm 1, firm 2, firm3 in the market. Suppose the price is fixed at p. Then the output produced by these firms in aggregate will be supply of firm 1 + supply of firm 2 + supply of firm 3. So, the market supply at price p is the summation of the supplies of individual firms at that price.

The supply curve geometrically with two firms in the market i.e., firm 1 and firm 2 is given below. The two firms have different cost structures. Firm 1 will not produce anything if the market price is less than P_1 while firm 2 will not produce anything if the market price is less than P_2. This can be represented in the diagram:

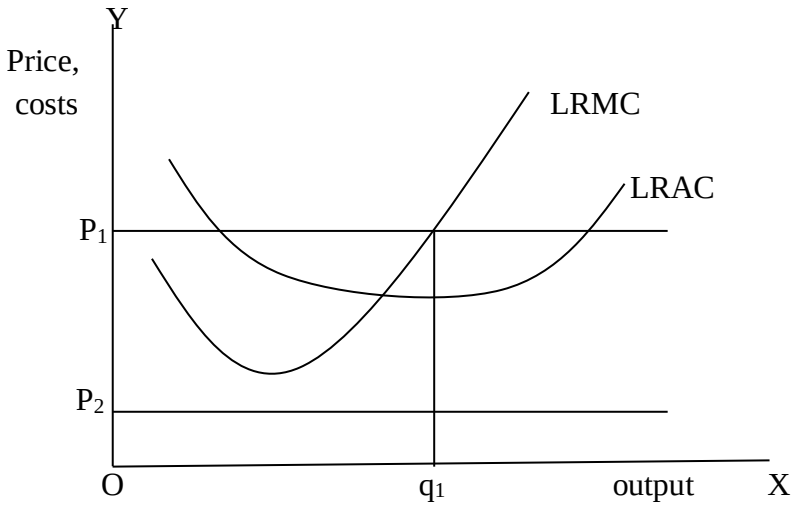


In the above diagram, output is measured in X axis and Price is measured in Y axis. The diagram (a) is the supply curve of firm 1 (S_1), diagram (b) is the supply curve of firm 2 (S_2) and the diagram (c) is the market supply curve (S_m). When the market price is below P_1, both the firms do not produce the goods. Hence the market supply will be zero. If the market price is greater than or equal to P_1, but less than P_2, only firm 1 will produce the goods. In this range, the market supply curve coincides with the supply curve of firm 1. If the market price is greater than or equal P_2, both firms will have positive output levels. If the price is P_3, the firm 1 will supply q_1 units of output and firm 2 supplies q_2 units of output. So, the market supply at price P_3 is q_m, where $q_m = q_1 + q_2$. The market supply curve S_m is obtained by taking a horizontal summation of the supply curves of the two firms in the market S_1 and S_2.

3. Explain the long run supply curve of a firm with the help of a diagram

Ans: To derive the long supply curve of a firm we split the derivation into two parts. First we determine the firm's profit-maximising output level when the market price is greater than or equal to the minimum Long run Average Cost.

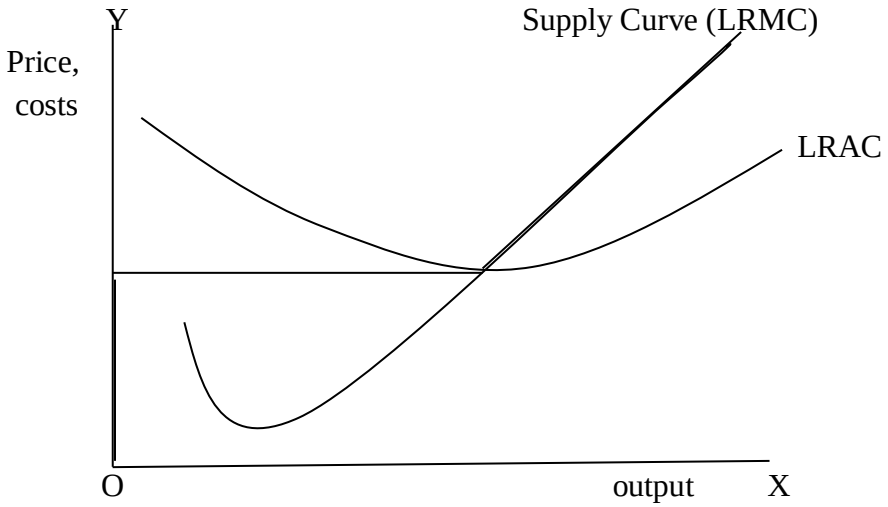
Case 1: Price greater than or equal to minimum of LRAC:



In the above diagram, if the market price is p_1, which exceeds the minimum LRAC, with LRMC rising, q_1 output is produced. LRAC at q_1 does not exceed the market price p_1. Hence, when the market price is p_1, the firm's supply, in the long run become an output equal to q_1.

Case 2: Price less than the minimum LRAC: If the market price is P2, which is less than the minimum LRAC the firm will not produce. Here the firm will not produce positive output. The market price P2 must be greater than or equal to the LRAC at the level of output. So, in the above diagram, LRAC exceeds P2.

By combining both the cases, we conclude that a firm's long run supply curve is the rising part of the LRMC curve from and above the minimum LRAC together with zero output for all the prices less than the minimum of LRAC. The following diagram shows the long run supply curve of the firm.



In the above diagram, the long run supply curve of a firm, which is based on its long run marginal cost curve and long run average cost curve is represented by the bold line.

VIII Assignment and project oriented questions.

1. **Compute the total revenue, marginal revenue and average revenue schedules from the following table when market price of each unit of goods is Rs.10.**

Quantity sold	TR	MR	AR
0			
1			
2			
3			
4			
5			
6			

Ans: Hint: For TR Multiply Price and Quantity (PxQ);
MR = TR_n-TR_{n-1} and AR = TR/Q

Quantity sold	TR	MR	AR
0	0	-	-
1	10	10	10
2	20	10	10
3	30	10	10
4	40	10	10
5	50	10	10
6	60	10	10

****

CHAPTER 5

MARKET EQUILIBRIUM

I Choose the correct answer

1. In perfect competition buyers and sellers are
   a) Price makers c) Price analysts
   b) Price takers d) None of the above
   Ans: (b) Price takers.
2. A situation where the plans of all consumers and firm in the market match.
   a) Inequilibrium situation c) Maximisation situation
   b) Equilibrium situation d) Partial Equilibrium situation
   (b) Equilibrium situation
3. As a result of increase in the number of firms there is an increase in supply, then supply curve
   a) Shifts towards left c) Shifts towards both sides
   b) Shifts towards right d) None of the above
   Ans: (b) Shifts towards right
4. The firms earn super normal profit as long as the price is greater than the minimum of
   a) Marginal cost c) Average cost
   b) Total cost d) Fixed cost
   Ans: c) Average cost
5. The government imposing upper limit on the price of goods and services is called
   a) Price ceiling c) Price floor
   b) Selling price d) None of the above
   Ans: **(a) Price ceiling**
6. The government imposed lower limit on the price of goods and service is called
   a) Goods floor c) Price floor
   b) Service floor d) None of the above
   Ans: c) Price floor

II Fill in the blanks

1. In a perfectly competitive market, equilibrium occurs when market demand ……market supply
   Ans: Equals
2. If the supply curve shifts rightward and demand curve shifts leftward equilibrium price will be……..
   Ans: Decreasing
3. ……is determined at the point where the demand for labour and supply of labour curves intersect.
   Ans: Wage

4. In labour market…….are the suppliers of labour.
   Ans: Households
5. Due to rightward shifts in both demand and supply curves the equilibrium price remains……..
   Ans: Unchanged (constant or same).
6. It is assumed that, in a perfectly competitive market an ……is at play.
   Ans: Invisible hand

III Match the following

A	B
1. Adam smith	a) Attraction of new firms
2. Price ceiling	b) Operation of invisible hand
3. Market equilibrium	c) Lower limit on price
4. Possibility of supernormal profit	d) Upper limit on price
5. Price floor	e) QD=QS

Ans: 1 – (b); 2 – (d); 3 – (e); 4 – (a); 5 – (c);

IV Answer the following questions

1. **Define market equilibrium.**
   Ans: A market equilibrium is a situation where the plans of all consumers and firms in the market match and the market clears. Here Quantity demanded is equal to Quantity supplied. It is a zero excess demand and zero excess supply situation.
2. **What is equilibrium price?**
   Ans: The price at which equilibrium is reached is called equilibrium price.
3. **When do we say that there is an excess demand in the market?**
   Ans: The excess demand exists in the market when the market demand exceeds the market supply.
4. **What is price ceiling?**
   Ans: The Government imposed upper limit on the price of a good or service is called price ceiling. Example, price ceiling on necessary items like selected medicines, kerosene, wheat etc.
5. **What is price floor?**
   Ans: The Government imposed lower limit on the price that may be charged for a particular good or service is called price floor. Example agricultural price support programmes and minimum wage legislation.
6. **Through which legislation, the government ensures that the wage rate of the labourers does not fall below a particular level?**
   Ans: Minimum Wage Legislation (Minimum Wages Act)

V Answer the following questions in 4 sentences

1. **Define equilibrium price and quantity.**

   Ans: Equilibrium price is the price at which equilibrium is reached in the market.
   The equilibrium quantity is defined as the quantity which is bought and sold at equilibrium price.

   Therefore price and quantity will be at equilibrium when

   $$Q^d(p^*) = q^s(p^*)$$

   p^* denotes the equilibrium price and $Q^d(p^*)$ and $q^s(p^*)$ denote the market dmenad and market supply respectively.

2. **Write any two possible ways in which simultaneous shift of both demand and supply curve.**

   Ans: The simultaneous shifts can happen in four possible ways:
   a) Both supply and demand curves shift rightwards.
   b) Both supply and demand curves shift leftwards.
   c) Supply curve shifts leftward and demand curve shifts rightward
   d) Supply curve shifts rightward and demand curve shifts leftward.

3. **What is marginal revenue product labour (MRP_L)?**

   Ans: The extra output produced by one more unit of labour is its marginal product and by selling each extra unit of output, the additional learning of the firm is the marginal revenue she gets from that unit.

   Therefore, for each extra unit of labour, she gets an additional benefit equal to marginal revenue times marginal product is called as Marginal Revenue Product of Labour (MRP_L).

   $$MRP_L = MR \times MP_L$$

   MR - Marginal Revenue; MP_L- Marginal productivity of Labour.

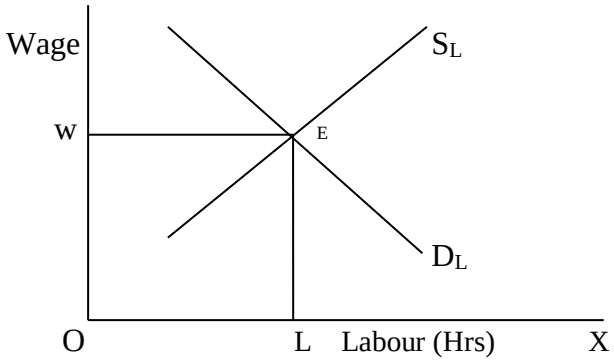
4. **Distinguish between excess demand and excess supply.**

Excess Demand	Excess Supply
• It is situation where market demand exceeds the market supply. • Here the price of the product increases. • Qd > Qs	• It is a situation where the market supply exceeds the market demand. • Here the price of the product decreases. • Qs > Qd.

5. **How wage is determined in the labour market?**

   Ans: The wage rate is determined at the point where the labour demand and supply curves intersect. This is shown in the following diagram:

Y



In the above diagram, hours of labour is measured in X axis and Wage is measured in Y axis. S_L is labour supply curve and D_L Labour demand curve. With an upward sloping supply curve and downward sloping demand curve, the equilibrium wage rate is determined at the point where these two curves intersect (point E). That means, the wage rate is determined at that point where the labour that the households wish to supply is equal to the labour that the firms wish to hire.

VI Answer the following questions in 12 sentences.

1. **What is the implication of free entry and exit of firm on market equilibrium? Briefly explain.**

   Ans: In perfect competitive market, it is assumed that there will be free entry and exit of firms. This assumption implies that in equilibrium, no firm earns super normal profit or incurs loss by remaining in production. Here, the equilibrium price will be equal to the minimum average cost of the firms.

   Let us discuss in detail why there will be no super normal profit or no loss to the firms.

   Suppose, at the prevailing market price, each firm is earning super normal profit. The possibility of earning supernormal profit will attract some new firms. As new firms enter the market supply curve shifts rightward. However, demand remains same. This causes market price to fall. As prices decrease, super normal profits will eventually extinct. At this point, with all firms in the market earning normal profit.

   Similarly, if the firms are incurring loss (less than normal profit) at the prevailing price, some firms will exit. This will lead to an increase in price. Then the profits of each firm will increase to the level of normal profit. At this point, no firm will want to leave since they will be earning normal profit.

   Therefore, with free entry and exit, each firm will always earn normal profit at the prevailing market price.

2. **Write a table to show the impact of simultaneous shifts on equilibrium.**

   Ans: The following table shows the impact of simultaneous shifts on equilibrium

Shift in Demand	Shift in Supply	Quantity	Price
Leftward	Leftward	Decreases	May increase, decrease or remain constant
Rightward	Rightward	Increases	May increase, decrease or remain constant
Leftward	Rightward	May increase, decrease or remain constant	Decreases
Rightward	Leftward	May increase, decrease or remain constant	Increases

3. Write a note on price ceiling and price floor.

Ans: **Price Ceiling:** The Government imposed upper limit on the price of a good or service is called price ceiling. Price ceiling is generally imposed on necessary items like wheat, rice, kerosene, sugar and it is fixed below the market determined price. It is fixed below the market price because, at market determined price some sections of the population will not be able to afford these goods.

Here, though the intention of the Government is to help the consumers, it could end up creating shortage of products. In order to solve the scarcity of products, the Government may issue ration coupons to the consumers so that no individual can buy more than a certain amount of a product. This stipulated amount of a product sold through ration shops are called Fair Price Shops.

Price Floor: The Government imposed lower limit on the price that may be charged for a particular good or service is called price floor. For certain goods and services, fall in price below a particular level is not desirable and hence the Government sets minimum prices for these goods and services.

Example, agricultural price support programmes and the minimum wage legislation. The Government may impose a lower limit on the purchase price for some of the agricultural goods and the floor is normally set at a level higher than the market determined price for these goods.

Similarly, through the minimum wage legislation, the Government ensures that the wage rate of the labourers does not fall below a particular level and here again the minimum wage rate is set above the equilibrium wage rate.

VII Answer the following questions in 20 sentences

1. Explain the simultaneous shifts of demand and supply curve in perfect competition with the help of diagrams.

Ans: The simultaneous shifts can happen in four possible ways:

e) Both supply and demand curves shift rightwards.
f) Both supply and demand curves shift leftwards.
g) Supply curve shifts leftward and demand curve shifts rightward
h) Supply curve shifts rightward and demand curve shifts leftward.

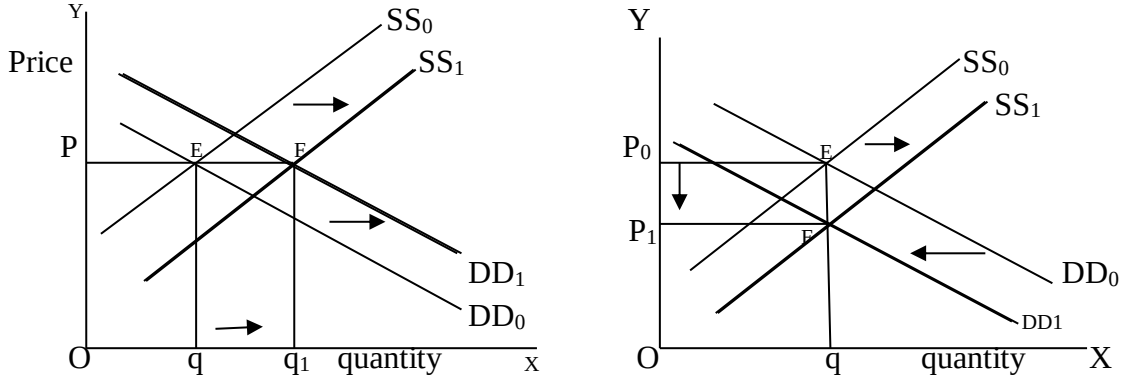
The simultaneous shifts of demand and supply curve in perfect competition can be represented in the following table:

Shift in Demand	Shift in Supply	Quantity	Price
Leftward	Leftward	Decreases	May increase, decrease or remain constant
Rightward	Rightward	Increases	May increase, decrease or remain constant
Leftward	Rightward	May increase, decrease or remain constant	Decreases
Rightward	Leftward	May increase, decrease or remain constant	Increases

In the above table, each row of the table describes the direction in which the equilibrium price and quantity will change for each possible combination of the simultaneous shifts in demand and supply curves. For instance, from the second row of the table, we can notice that due to a rightward shift in both demand and supply curves, the equilibrium quantity increases invariably but the equilibrium price may increase or decrease or remain constant.

The following diagrams depict the second and third cases of the above table:

(a) (b)



In the above diagram (a) initially, the equilibrium is at E where the demand curve DD_0 and supply curve SS_0 intersect. Here, both supply and demand curves shift rightward where the price remains constant at P but the equilibrium quantity moves from q to q_1.

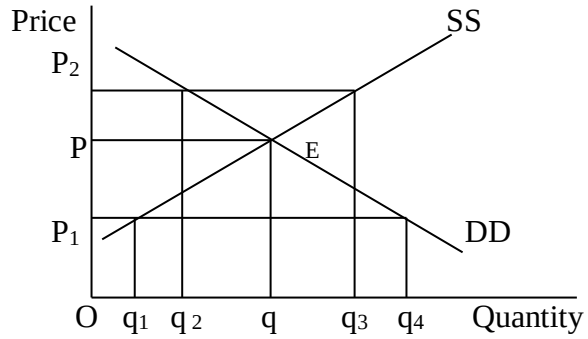
Similarly, in diagram (b), the supply curve shifts rightward and demand curve shifts leftward where the equilibrium quantity remains same but the equilibrium price decreases from P to P_1.

Therefore, the rightward shifts in both demand and supply curves leads to increase in the equilibrium quantity and equilibrium price remaining constant. The equilibrium quantity remains same and the price decreases if there is leftward shift in demand curve and a rightward shift in supply curve.

2. Explain the market equilibrium with the fixed number of firms with the help of diagram.

Ans: Under perfect competition, market is said to be in equilibrium when quantity demanded is equal to the quantity supplied. Here, with the help of market demand curve and market supply curve we will determine where the market will be in equilibrium when the number of firms is fixed.

This can be illustrated with the help of the following diagram:



The above diagram illustrates equilibrium for a perfectly competitive market with a fixed number of firms. SS is market supply curve and DD is market demand curve. The market supply curve SS shows how much of the commodity firms would wish to supply at different prices and the demand curve DD tells us how much of the commodity, the consumer would be willing to purchase at different prices.

At point E, the market supply curve intersects the market demand curve which denotes that quantity demanded is equal to quantity supplied. At any other point, either there is excess supply or there is excess demand.

OP is the equilibrium price and Oq is the equilibrium quantity. If the price is P_1, the market supply is q_1 and market demand is q_4. Therefore, there is excess demand in the market equal to q_1q_4. Some consumers who are either unable to obtain the commodity at all or obtain it in insufficient quantity will be willing to pay more than P_1. The market price would tend to increase. All other things remaining constant, when the price increases the demand falls and quantity supplied rises. The market moves towards equilibrium where quantity demanded is equal to quantity supplied. It happens at P where supply decisions match demand decisions.

If the price is P_2, the market supply- q_3 will exceed the market demand q_2 which leads to excess supply equal to q_2q_3. Some firms will not be able to sell quantity they want to sell. Therefore, they will lower their price. All other things remaining constant, when the price falls, quantity demanded rises and quantity supplied falls to equilibrium price P where the firms are able to sell their desired output as market demand equals market supply at P.

So, the P is the equilibrium price and the corresponding quantity q is the equilibrium quantity.

3. **Suppose the demand and supply curves of wheat are given by $q^D=200-P$ and $q^S=120+P$**
   a) **Find the equilibrium price**
   b) **Find the equilibrium quantity of demand and supply**
   c) **Find the quantity of demand and supply when P is greater than equilibrium price**
   d) **Find the quantity of demand and supply when P is lesser than equilibrium price.**

Solution……

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CHAPTER-6

NON COMPETITIVE MARKETS

I Choose the correct answer

1. A market structure which produces heterogeneous products is called
   a) Monopoly c) Perfect competition
   b) Monopolistic competition d) None of the above
   Ans: (b) Monopolistic competition
2. The change in TR due to the sale of an additional unit is called
   a) Total Revenue c) Marginal revenue
   b) Average Revenue d) Revenue
   Ans: c) Marginal revenue
3. When the price elasticity of demand is more than one, MR has a
   a) Negative value c) Constant value
   b) Decreasing value d) Positive value
   Ans: d) Positive value
4. Profit =
   a) P x Q c) TFC + TVC
   b) TR-TC d) TR/Q
   Ans: (b) TR-TC

II Fill in the blanks

1. The monopoly firm's decision to sell a larger quantity is possible only at……..
   Ans: Lower prices.
2. Competitive behavior and competitive market structure are in general……..related
   Ans: Inversely
3. In monopoly market the goods which are sold have no……..
   Ans: Substitutes
4. TR=…….
   Ans: P x q (price x quantity)
5. The revenue received by the firm per unit of commodity sold is called…….
   Ans: Average Revenue
6. With the zero production cost, when the total revenue of monopoly firm is maximum, the profit is ……..
   Ans: Maximum

III Answer the following questions in a sentence or a word.

1. What is monopoly?

Ans: It is a market with one seller or firm with many buyers.

2. **Write the equation of the demand function.**
   Ans: q = 20 – 2p, where 'q' is quantity sold and 'p' is the price.
3. **Give the meaning of monopolistic competition.**
   Ans: When the market structure has large number of firms, free entry and exit of firms and differentiated goods, then it is called monopolistic competition.
4. **Give the meaning of oligopoly market.**
   Ans: If the market consists of more than one seller but the number of sellers is few, then it is called oligopoly market. Oligopoly in a commodity market occurs when there are a small number of firms producing a homogenous commodity.
5. **What is duopoly?**
   Ans: It is a special case of oligopoly where there are exactly two sellers or firms.

IV Answer the following questions in 4 sentences

1. **Mention the requirements of a monopoly market structure.**
   Ans: The requirements of a monopoly market structure are as follows:
   a) Existence of a single producer of a particular commodity.
   b) No other commodity works as a substitute for this commodity.
   c) The monopoly situation has to persist over a time.
   d) Restrictions to prevent other firms entering the market and selling the commodity.
2. **State the meaning of average revenue and marginal revenue.**
   Ans: Marginal Revenue of a firm is defined as the increase in total revenue for a unit increase in the firm's output. It is obtained by dividing the Change in Total Revenue (ΔTR) by Change in quantity (Δq). Thus,
   $MR = \Delta TR/\Delta q$.
   Average Revenue: We calculate Average Revenue, by dividing Total revenue by the quantity sold. The following formula used:
   $AR = TR/q$
3. **State the relationship between Marginal revenue and price elasticity of demand.**
   Ans: The values of Marginal Revenue have a relation with the price elasticity of demand. Price elasticity of demand is more than 1 when the Marginal Revenue has a positive value and becomes less than the unity when Marginal Revenue has a negative value.
4. **Write the meaning of monopolistic competition and give an example.**
5. Ans: When the market structure has large number of firms, free entry and exit of firms and differentiated goods, then it is called monopolistic competition.
   For example, there is large number of soaps producing firms. But many of the soaps being produced are associated with some brand name and are distinguishable from the other companies. The consumer develops a preference for a particular brand of soap over time or becomes loyal to a particular brand like some people always prefer Mysore Sandal Soap.

6. Write the features of monopoly.

Ans:

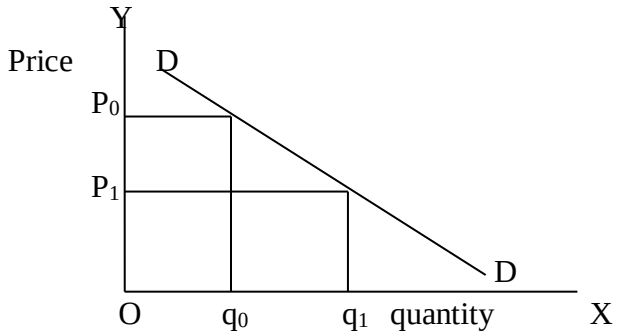
- Existence of single seller or firm.
- No close substitutes.
- Barriers on entry of new firms.
- Firm is a Price maker and buyers are price takers.
- Uniform price or price discrimination.
- No difference between firm and industry.
- Perfect knowledge.

V Answer the following questions in 12 sentences.

1. What is market demand curve? Draw a market demand curve for a monopoly firm.

Ans: The market demand curve shows the quantities that consumers as a whole are willing to purchase at difference prices.

The market demand curve for a monopoly firm can be explained with the help of diagrams follows:



In the above diagram, price is measured in Y axis and quantity is measured X axis. If the market price is at P_0 consumers are willing to purchase the q_0 quantity. If the market price is less i.e., P_1, consumers are willing to buy more quantity i.e., q_1. That means, price in the market affects the quantity demanded by the consumers.

Therefore, monopoly firm's decision to sell a larger quantity is possible only at a lower price. If the monopoly firm brings a smaller quantity of the commodity into the market for sale it will be able to sell at a higher price. Thus, for the monopoly firm, the price depends on the quantity of the commodity sold.

For a monopoly firm, price is decreasing function of the quantity sold. So, the market demand curve for a monopolist expresses the price that consumers are willing to pay for different quantities supplied. This idea is reflected in the statement that the monopoly firm faces the downward sloping market demand curve.

2. Calculate TR and MR from the following table.

Q	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
P	**100**	**90**	**80**	**70**	**60**	**50**	**40**	**30**	**20**	**10**

Ans: Hint: TR = P x Q; MR = $TR_n - TR_{n-1}$

Q	1	2	3	4	5	6	7	8	9	10
P	100	90	80	70	60	50	40	30	20	10
TR	100	180	240	280	300	300	280	240	180	100
MR	-	80	60	40	20	0	-20	-40	-60	-80

3. Briefly explain the monopolistic competitive market.

7. Ans: Ans: When the market structure has large number of firms, free entry and exit of firms and differentiated goods, then it is called monopolistic competition.

For example, there is large number of biscuits producing firms. But many of the biscuits being produced are associated with some brand name and are distinguishable from the other companies. The consumer develops a taste for a particular brand of biscuits over time or becomes loyal to a particular brand and he may not immediately be willing to substitute it for another biscuit. However, if the price difference becomes large, the consumer would be willing to choose a biscuit of another brand which is of lower price.

Therefore, the demand curve faced by the firm in monopolistic competitive market is not perfectly elastic. The demand curve faced by the firm is also not market demand curve. In monopolistic competition, the firm expects increase in demand if it reduces the price. So, the demand curve (AR curve) is downward sloping. The Marginal Revenue curve will be less than Average revenue and is downward sloping.

The monopolistic competitive firm is also a profit maximiser. So it will increase production as long as the addition to its total revenue is greater than the addition to its total costs. In other words, the firm under monopolistic competition will produce the quantity that equates its marginal revenue to its marginal cost. But, here, the firm produces less than the perfectly competitive firm. This is because, given the lower output, the price of the commodity becomes higher than the price under perfect competition.

The above situation exists in the short run. But in the long run, new firms may enter the market. If the firms in the industry are receiving supernormal profit in the short run, this will attract new firms. As new firms enter, some customers shift from existing firms to these new firms. So, existing firms find that their demand curve has shifted leftward. This reduces firm's profits. This continues till supernormal profits are wiped out and firms are making only normal profits.

On the other hand, if firms in the industry are facing losses in the short run, some firms would stop producing (exit). The demand curve for existing firms would shift leftward. This would lead to a higher price and higher profit. Entry or exit would stop once supernormal profits become zero and this will be long run equilibrium under monopolistic competition.

4. **Show the relationship between average revenue and marginal revenue of a monopoly market with the help of diagrams.**

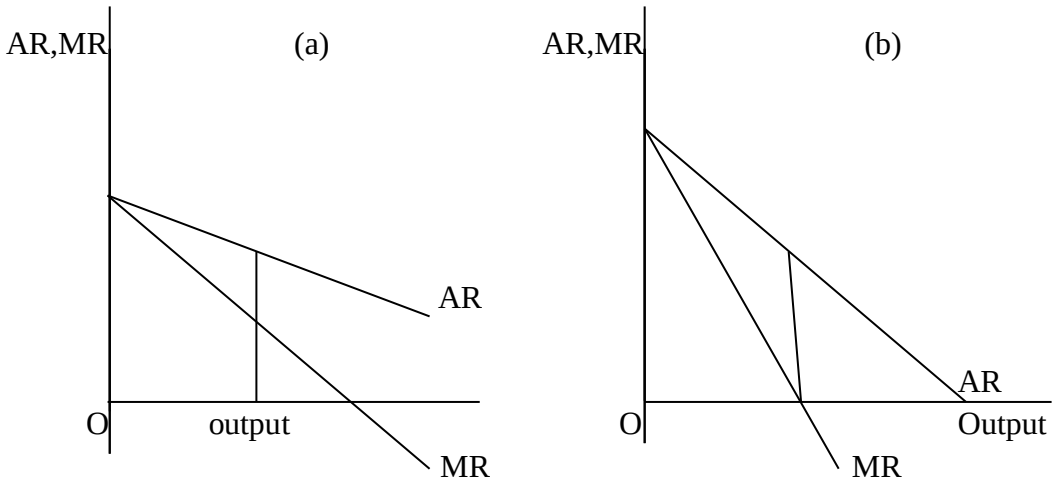
Ans: Marginal Revenue of a firm is defined as the increase in total revenue for a unit increase in the firm's output. It is obtained by dividing the Change in Total Revenue (ΔTR) by Change in quantity (Δq). Thus,

MR = ΔTR/Δq.

Average Revenue: We calculate Average Revenue, by dividing Total revenue by the quantity sold. The following formula used:

AR = TR/q

The relationship between AR and MR of a monopoly market can be shown with the help of following diagrams:



The above diagram shows that the MR curve lies below the AR curve. That means, if the AR curve is falling steeply, the MR curve is far below the AR curve. If the AR curve is less steep, the vertical distance between the AR and MR curves is smaller. The diagram (a) shows a flatter AR curve while diagram (b) shows a steeper AR curve. Therefore, for the same units of the commodity, the difference between AR and MR in diagram (a) is less than the difference in diagram (b).

VI Answer the following questions in 20 sentences.

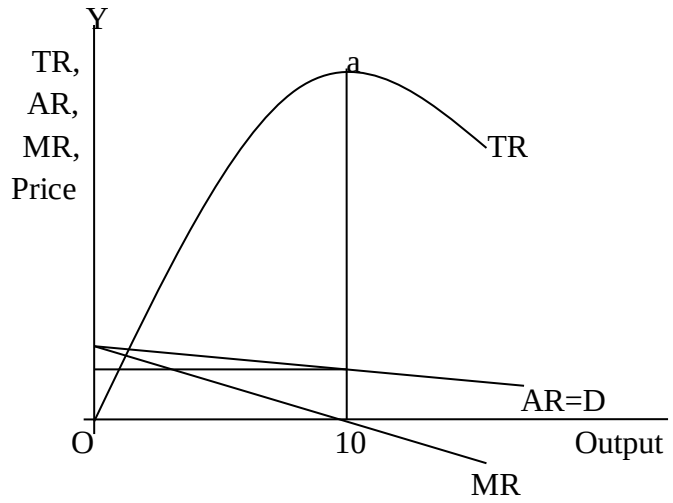
1. **Explain the short run equilibrium of a monopoly firm with the help of the simple case of zero cost.**

Ans: Every monopolist aims at maximizing profit. Here, we try to analyze the profit maximizing behaviour to determine the quantity produced by a monopoly firm and price at which it is sold.

Let us imagine that there exists a village situated far way from other villages. In this village, there is exactly one well from which water is available. All residents are completely dependent for their water requirements on this well. The well is owned by one person who is able to prevent others from drawing water from it except through purchase of water. The

person who purchases the water has to draw the water out of the well. The well owner is thus a monopolist firm which bears zero cost in producing the good. We shall analyse this simple case of a monopolist bearing zero costs to determine the amount of water sold and the price at which it is sold.

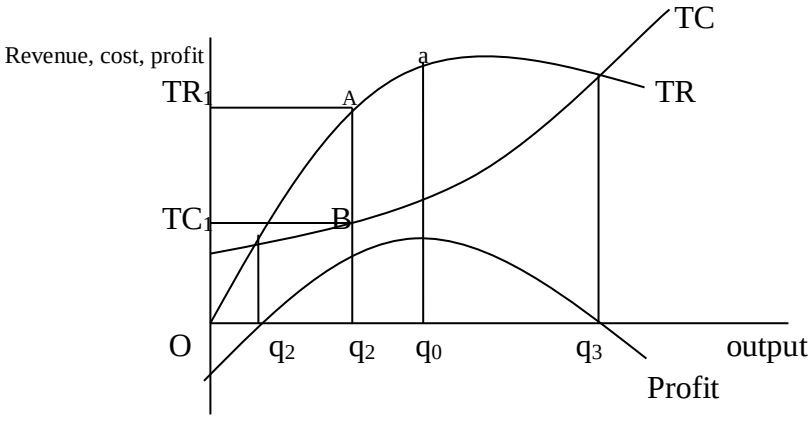
The short run equilibrium of the monopolist with zero cost can be explained with the help of the following diagram:



In the above diagram, TR, AR and MR curves are revenue curves. The profit received by the firm equal the revenue received by the firm minus the cost incurred. Since TC is zero, profit is maximum when TR is maximum. This occurs when output is of 10 units. This is the level when MR equals zero. The amount of profit is given the length of the vertical line segment from 'a' to the horizontal axis.

2. Explain the short run equilibrium of a monopolist firm, when the cost of production is positive by using TR and TC curves with the help of diagram.

Ans: The short run equilibrium of a monopolist firm, when the cost of production is positive by using TR and TC curves can be explained with the help of diagram as follows:



In the above diagram Total Cost, Total Revenue and Profit curves are drawn. The profit received by the firm equals the total revenue minus the total cost. In the diagram, if quantity

q1 is produced, the Total Revenue is TR1 and Total cost is TC1. The difference TR1 – TC1 is the profit received. The same is depicted by the length of the line segment AB ie., the vertical distance between the TR and TC curves at q1 level of output.

If the output level is less than q_2, the TC curve lies above the TR curve, i.e., TC is greater than TR and therefore profit is negative and the firm makes losses. The same situation exists for output levels greater than q_3. Hence, the firm can make positive profits only at output levels between q_2 and q_3 where TR curve lies above the TC curve. The monopoly firm will chose that level of output which maximizes its profit. This would be level of output for which the vertical distance between TR and TC is maximum and TR is above the TC ie., TR – TC is maximum This occurs at the output level q_0.

3. Explain how the firms behave in oligopoly.

Ans: If the market of a particular commodity consists of a few number of sellers, the market structure is termed oligopoly.

Given there are a few firms, each firm is relatively large when compared to the size of the market. As a result each firm is in a position to affect the total supply in the market and thus influence the market price.

For example, if a firm decides to double its output, the total supply in the market will increase, causing the price to fall. This fall in price affects the profits of all firms in the industry. Other firms will respond to such a move in order to protect their own profits, by taking fresh decisions regarding how much to produce. Therefore the level of output in the industry, the level of prices, and the profits are outcomes of how firms are interacting with each other.

Case- 1: Firms could decide to collude with each other to maximize profits. Here the firms form a cartel (an association) that acts as a monopoly. The quantity supplied collectively by the industry and the price charged are the same as a single monopoly firm.

Case-2: The firms could decide to compete with each other. For example, a firm may lower its price a little below the other firms, in order to attract away their customers. Certainly, the other firms would retaliate by doing the same. So the market price keep falling.

In reality, cooperation of the kind that is needed to ensure a monopoly outcome is often difficult to achieve in the real world. The firms may realize that competing fiercely by continuous price cuts is harmful to their own profits.

4. The market demand curve for a commodity and the total cost for a monopoly firm producing the commodity is given by the schedule below. Use the information to calculate the following.

Quantity	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Price	**52**	**44**	**37**	**31**	**26**	**22**	**19**	**16**	**13**

Quantity	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Total cost	**10**	**60**	**90**	**100**	**102**	**105**	**109**	**115**	**125**

a) The MR and MC schedules

b) The quantity for which the MR and MC are equal

c) The equilibrium quantity of output and equilibrium price of the commodity

d) The total revenue, Total Cost, and Total profit in equilibrium

Ans:

Quantity	Price	TR	MR	TC	MC
0	52	0	-	10	-
1	44	44	44	60	50
2	37	74	30	90	30
3	31	93	19	100	10
4	26	104	11	102	2
5	22	110	6	105	3
6	19	114	4	109	4
7	16	112	-2	115	6
8	13	104	-8	125	10

a) Quantity where MR and MC are equal is 6

b) Equilibrium quantity is 6 and Equilibrium price is 19

c) Total Revenue is 114 and Total cost is 109

d) Profit = TR-TC i.e., 114-109 = 5; therefore Profit=5.

****