

**Unit 2: Microeconomics:  $1 + 3 \times 5 + 8 = 24$  Marks**

**2.1 Market and Revenue Curves**

2.1.1 Concept of Market: Perfect Competition Market, Imperfect Competition Market and Its Types (Oligopoly, Monopoly, and Monopolistic Competition)

2.1.2 Concept of Total Revenue, Average Revenue and Marginal Revenue

2.1.3 Derivation of Average Revenue and Marginal Revenue Curves From Total Revenue Curve Under Perfect Competition and Monopoly Markets

2.1.4 Some Numerical Exercises

**2.2 Cost Curves**

2.2.1 Concept of Explicit, Implicit, Fixed, Variable, Total, Average and Marginal Costs

2.2.2 Short-run Costs and Derivation of Short-run Cost Curves

2.2.3 Some Numerical Exercises

**2.3 Theory of Price and Output Determination**

2.3.1 Definition and Characteristics of Perfect Competition Market, Equilibrium Price and Output Determination of Firm and Industry in the Short-run and Long-run

2.3.2 Definition and Characteristics of Monopoly Market and Equilibrium Price and Output Determination

2.3.3 Some Numerical Exercise

**2.4 Factor Pricing**

2.4.1 Concept of Factor Pricing

2.4.2 Rent: Concept of Economic Rent and Contract Rent, and Ricardian Theory of Rent

2.4.3 Wage: Money Wage and Real Wage, Subsistence Theory of Wage, Wage Fund Theory of Wage

2.4.4 Interest: Gross Interest and Net Interest, and Classical Theory of Interest

2.4.5 Profit: Gross Profit and Net Profit, Risk Bearing Theory of Profit and Uncertainty Bearing Theory of Profit

6. **Role of Government:** Governments often play a crucial role in addressing scarcity by implementing policies to regulate resource allocation, ensure fairness, and meet societal needs. Thus, scarcity drives the central economic problem by necessitating choices, introducing opportunity costs, and requiring efficient resource allocation to address the persistent challenge of meeting unlimited human wants with limited resources.

## **UNIT 2: MICROECONOMICS: (1 + 3 + 5 + 8 = 24 Marks)**

### **Market and Revenue Curves**

#### **1. Define market in economics. (1 Mark)**

Answer: Market is defined as a platform for exchanging goods and services in the mood of online and offline networks. There are generally perfect competition and imperfect competition market structures in the economy.

#### **2. What is perfect competition market? (1 Mark)**

Answer: Perfect competition market is a market structure of economy where more number of buyers and sellers are able to exchange homogeneous goods and services at the price determined by market forces demand and supply. *No transaction costs*

#### **3. What is monopoly market? (1 Mark)**

Answer: In monopoly, 'mono' means single and 'poly' means seller. So, monopoly market is a market structure of economy where single seller and more numbers of buyers exist and exchange no close substitute products at the prices set by monopolist.

#### **4. Define oligopoly market structure. (1 Mark)**

Answer: Oligopoly is the market structure in which only a few sellers have control over the price of product in the market and sell either close substitute or differentiated goods. There are pure oligopoly and differentiated oligopoly markets.

*Monopoly Market*  
Monopoly = A market structure that consists of a single seller or producer of no close substitutes

A Key Solution for Economics 12 by Puspa Ghimire

5. What is revenue? (1 Mark)

Answer: Revenue is the income earned by a seller from the sale of product at any particular time.

Total revenue ( $TR = P \times Q$ ), marginal revenue ( $MR = TR_n - TR_{n-1}$ ) and average revenue ( $AR = \frac{TR}{Q}$ ) are almost calculated in economics.

6. Define marginal revenue. (1 Mark)

Answer: Marginal revenue is the additional revenue in total revenue due to the sale of one more unit of the goods. It can be calculated as:

$$MR = TR_n - TR_{n-1}$$

Where,

MR = Marginal Revenue,

$TR_n$  = Total Revenue of  $n^{\text{th}}$  unit of goods sold,

$TR_{n-1}$  = Total Revenue of  $n-1^{\text{th}}$  unit of goods sold.

It can be alternatively calculated as:

$$MR = \frac{\Delta TR}{\Delta Q}$$

Where,  $\Delta TR = TR_1 - TR$   $\Delta Q = Q_1 - Q$

$TR_1$  = New TR

TR = Initial TR

$Q_1$  = New Quantity Sold

Q = Initial Quantity Sold

7. Explain the features of perfect competition market. (5 marks)

Answer: The features of perfect competition market can be explained as:

- Large number of buyers and sellers:** In perfect competition, there are large number of buyers and sellers in the market. The individual firm as buyer and seller is simply a price taker.
- Product homogeneity:** All products are perfectly same in terms of size, shape, taste, color, ingredients, quality, trademarks, etc. It ensures the existence of single price in the market.
- Free entry and exit of the firms:** Firms can freely enter or exit the market without facing significant barriers. This condition ensures that new firms can easily participate in the market. It ensures the existence of normal profit in perfect competition.
- No government restrictions:** In perfect competition, there is no government intervention in the form of taxes, subsidies, licensing policy, control over the supply of raw materials, price, supply etc.
- Perfect knowledge:** In the perfect competition market, both the buyers and the sellers have perfect knowledge about the products and the price in the markets determined by the market forces.

8. Explain the features of monopoly market. (5 marks)

Answer: The features of monopoly market can be explained as:

- Single Seller:** A monopoly exists when there is only one seller or producer in the market, controlling the entire supply of a particular product or service.
- Unique Product:** The monopolist typically offers a unique product or service with no close substitutes, giving it a significant degree of market power.
- No free entry or exit to other firms:** The entry and exit of the firm are restricted. Hence, monopolist has full control over the supply of the product. Legal restrictions, prevent other firms from entering the market and competing.

- d. **Price Maker:** The monopolist has the power to set the price for its product or service due to its control over the entire market. It adopts its independent price policy for the profit maximization.
- e. **Limited Consumer Choice:** Consumers have limited choices as there is only one provider for the particular product or service.
- f. **Maximization of Profit:** The monopolist aims to maximize profit by determining the output level where marginal cost equals marginal revenue.
- g. **Lack of Perfect Information:** Consumers may have limited information about alternatives since there is only one supplier, reducing the competitive pressure for transparency.

9. Answer the following questions based on the given table. (5 Marks)

| Units of sold goods (Q) | Amount in rupees |    |    |    |
|-------------------------|------------------|----|----|----|
|                         | Price (P)        | TR | AR | MR |
| 1                       | 10               |    |    |    |
| 2                       | 10               |    |    |    |
| 3                       | 10               |    |    |    |
| 4                       | 10               |    |    |    |
| 5                       | 10               |    |    |    |

- a. Complete the given table.
- b. Draw the total revenue (TR) curve, average revenue (AR) curve and marginal revenue (MR) curve.
- c. Explain the relationship among TR, AR and MR
- d. Identify the market and justify.

**Solution: a. Calculation of Revenues**

| Units of goods sold (Q) | Amount in rupees |                                    |                                |                                                       |
|-------------------------|------------------|------------------------------------|--------------------------------|-------------------------------------------------------|
|                         | Price (P)        | Total Revenue<br>$TR = P \times Q$ | Average Revenue<br>$AR = TR/Q$ | Marginal Revenue<br>$MR = \frac{\Delta TR}{\Delta Q}$ |
| 1                       | 10               | $10 \times 1 = 10$                 | $10/1 = 10$                    | $10 - 0 / 1 - 0 = 10$                                 |
| 2                       | 10               | $10 \times 2 = 20$                 | $20/2 = 10$                    | $20 - 10 / 2 - 1 = 10$                                |
| 3                       | 10               | $10 \times 3 = 30$                 | $30/3 = 10$                    | $30 - 20 / 3 - 2 = 10$                                |
| 4                       | 10               | $10 \times 4 = 40$                 | $40/4 = 10$                    | $40 - 30 / 4 - 3 = 10$                                |
| 5                       | 10               | $10 \times 5 = 50$                 | $50/5 = 10$                    | $50 - 40 / 5 - 4 = 10$                                |

- a. Derivation of the total revenue (TR) curve, average revenue (AR) curve and marginal revenue (MR) curve.



- The TR is the upward sloping total revenue curve. TR increases due to increase in units of goods sold. AR and MR are average revenue and marginal revenue curves. They are parallel to X-axis due to constant price at all units of goods sold.
- It is perfect competition market structure since the price remains constant at every level of output and Price is equal to MR and AR.

10. Answer the following questions based on the given table. (5 Marks)

| Units of goods sold (Q) | Price (P)<br>(In Rs.) | TR | AR | MR |
|-------------------------|-----------------------|----|----|----|
| 1                       | 10                    |    |    |    |
| 2                       | 9                     |    |    |    |
| 3                       | 8                     |    |    |    |
| 4                       | 7                     |    |    |    |
| 5                       | 6                     |    |    |    |
| 6                       | 5                     |    |    |    |
| 7                       | 4                     |    |    |    |

- Complete the given table and identify the market structure.
- Draw the total revenue (TR) curve, average revenue (AR) curve and marginal revenue (MR) curve.
- Explain the relationship among TR, AR and MR
- Why MR curve lies below AR Curve? Give the reason.

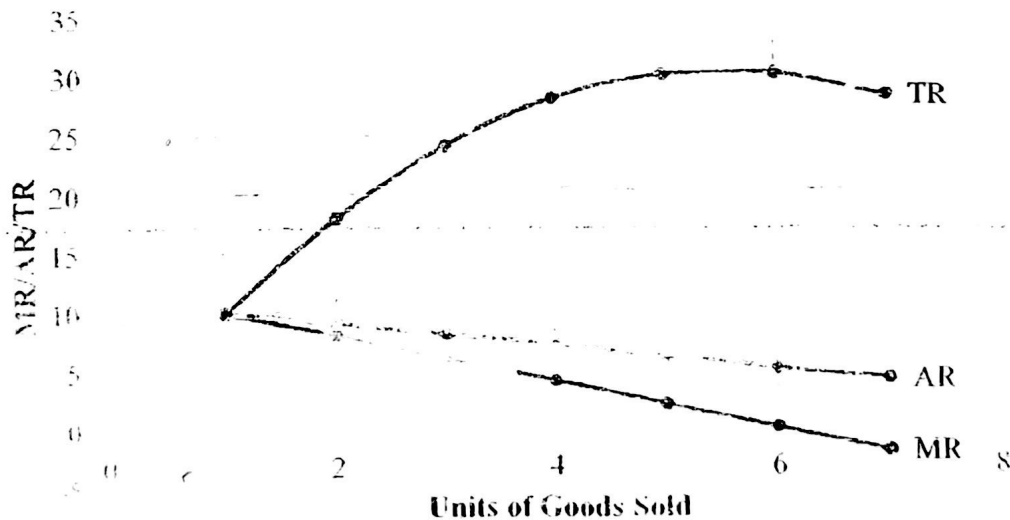
**Solutions:**

**a. Calculation of Revenues**

| Units of goods sold (Q) | Price (P) (In Rs.) | TR = P × Q<br>= ∑ MR | AR = TR/Q | MR = $\frac{\Delta TR}{\Delta N}$ |
|-------------------------|--------------------|----------------------|-----------|-----------------------------------|
| 1                       | 10                 | 10                   | 10        | 10                                |
| 2                       | 9                  | 18                   | 9         | 8                                 |
| 3                       | 8                  | 24                   | 8         | 6                                 |
| 4                       | 7                  | 28                   | 7         | 4                                 |
| 5                       | 6                  | 30                   | 6         | 2                                 |
| 6                       | 5                  | 30                   | 5         | 0                                 |
| 7                       | 4                  | 28                   | 4         | -2                                |

Based on the above schedule, it is monopoly structure of market. Since monopolist is price maker, price decreases due to sale of more units of goods to maximize the profit.

**b. Derivation of the total revenue (TR) curve, average revenue (AR) curve and marginal revenue (MR) curve.**



- TR is the upward sloping total revenue curve. TR increases due to increase in units of goods sold. When TR curve is rising, AR and MR curves are falling, when TR curve is maximum, AR curve is falling but above zero and MR is zero even negative. When TR curve is falling, AR is positive but the MR curve is negative.
- Since monopolist is price maker, it decreases prices at every more units of goods sold whereas MR is the revenue of additional units of goods sold. So, MR curves lies below AR curve in monopoly market.

**Numerical Questions:**

1. If total revenue from the sales of 20 units and 30 units of goods are Rs. 5000 and Rs. 6000 then find the marginal revenue. (1 Mark)

Solution: Here given,

Initial revenue (TR) = Rs. 5000,

New revenue (TR<sub>1</sub>) = Rs. 6000,

Initial quantity (Q) = 20 units,

New quantity (Q<sub>1</sub>) = 30 units,

Marginal revenue = ?

We have

$$\text{Marginal revenue (MR)} = \frac{\Delta TR}{\Delta Q} = \frac{TR_1 - TR}{Q_1 - Q} = \frac{6000 - 5000}{30 - 20} = \frac{1000}{10} = \text{Rs. } 100$$

∴ MR is Rs. 100.

2. If the total revenue (TR) of a firm from sale of 10 chairs is Rs. 10000 then find the average revenue (AR). (1 Mark)

Solution: Given:

Total revenue (TR) = Rs. 10000,

Quantity sold (Q) = 10 chairs,

AR = ?

We have,

$$\text{Average revenue (AR)} = \frac{TR}{Q} = \frac{10000}{10} = \text{Rs. } 1000$$

∴ AR is rupees 1000.

3. If a firm sells 5 units of goods at rupees 10 per unit then find the total revenue of the firm. (1 Mark)

Solution: Given

Price of per unit goods (P) = Rs. 10

Quantity of sold unit = 5 units

TR = ?

We have

$$TR = P \times Q = 10 \times 5 = \text{Rs. } 50$$

∴ TR = Rs. 50

4. If the revenue function is given by  $TR = 50 + 5Q - Q^2$  then find the average revenue and marginal revenue at  $Q = 5$ . (5 marks)

Solution:

We have,

$$AR = \frac{TR}{Q}$$

$$AR = \frac{50 + 5Q - Q^2}{Q}$$

$$\text{When } Q = 5, AR = \frac{50 + 5 \times 5 - 5 \times 5}{5} = 10$$

$$\therefore AR = 10,$$

Again

$$MR = \frac{dTR}{dQ} \quad (\because \text{w.r.t. } Q)$$

$$MR = \frac{d(50 + 5Q - Q^2)}{dQ} = 0 + 5 - 2Q$$

$$\text{When } Q = 5, MR = 5 - 2 \times 5 = -5$$

$$\therefore MR = -5$$

**1. Define cost. (1 mark)**

Answer: Cost refers to all sorts of monetary expenditures incurred by the production of goods or services or made by the factors involved in the production process in the economy. There are explicit cost, implicit cost, fixed cost, variable cost, etc.

**2. Define short-run or long-run cost.**

**Short-run cost:** It refers to the expenditures incurred on both fixed and variable factors of production in short-run. It includes the fixed cost of land, buildings, and machinery while variable cost of labor, raw-material, etc.

**Long-run Cost:** It refers to the expenses incurred for all variable factors of production. It includes the cost paid to land, labour, capital, and organization. In long, the cost for all the factors of production are variable.

**3. Define explicit cost. (1 mark)**

Answer: Explicit cost is defined as the direct monetary payment to the factors involved in production such as wages, rent, interest, profit, cost of raw-materials, utility bills which are recorded in book keeping system.

**4. What is implicit cost? (1 mark)**

Answer: Implicit cost represents the opportunity costs of using resources owned by the individual or firm, like the foregone income from self-employment or the interest income from using personal funds for business which are not recorded in book keeping system.

**5. Define fixed cost. (1 mark)**

The cost incurred on fixed factors like land, buildings, machineries, interest on capital, salaries of permanent staff, wear and tear of machines, insurance, taxes, etc. These costs do not change with the change in the volume of production in short-run.

**6. Define variable cost. (1 mark)**

The expenditures made on variable factors like raw materials, wages of laborers, fuel, etc. is the variable cost. This cost will increase with increase in production and decrease with a decrease in production. At zero production, there is no variable cost.

**7. Define marginal cost (MC). (1 mark)**

Answer: Marginal cost (MC) is the additional cost in total cost due to the production of one more unit of output. It can be calculated as:

$$MC = \frac{dTC}{dQ}$$

Where:

$$dTC = TC_1 - TC$$

$$dQ = Q_1 - Q$$

TC<sub>1</sub> = New Total Cost

TC = Initial Total Cost

Q<sub>1</sub> = New Quantity

Q = Initial Quantity

Alternatively, it can be calculated as:

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

Where,

TC<sub>n</sub> = Total cost of n<sup>th</sup> output and

TC<sub>n-1</sub> = Total cost of (n-1)<sup>th</sup> output.

*TC = Total cost  
Q = Quantity*

**8. Define total costs. (1 mark)**

**Answer:** Total cost (TC) is the sum of total fixed cost (TFC) and total variable cost (TVC) in short run. It can be calculated as:  $TC = TFC + TVC$ .

Where: TFC is total amount of expenditures made on fixed factors of production like land, building, machinery, equipment, etc. It can be calculated as:  $TFC = TC - TVC$

TVC = Total Variable Cost which is the total amount of expenditure made on variable factors of production like cost of intermediate goods, raw-materials, fuel, labour, etc.

**9. Define average costs. (1 mark)**

**Answer:** Average cost is per unit cost of output on an average. It is obtained by adding average fixed cost (AFC) and average variable cost (AVC) or by dividing the total cost (TC) by the number of outputs (Q). It can be calculated as:

$$AC = AFC + AVC \text{ or, } AC = \frac{TC}{Q}$$

$$\text{Where: } AFC = \frac{TFC}{Q} \text{ or, } AFC = AC - AVC$$

$$AVC = \frac{TVC}{Q} \text{ or, } AVC = AC - AFC$$

**10. Why does Average Fixed Cost (AFC) decrease continuously? (1 mark)**

**Answer:** Average fixed cost (AFC) decreases continuously in the short run because it is fixed costs and remains constant at every level of production. As output (Q) increases, these fixed costs are spread over a larger quantity of output which results decreasing AFC.

**11. Explain the nature of total variable cost (TVC), total fixed cost (TFC), and total cost (TC) with the help of schedule and diagram. (5 marks)**

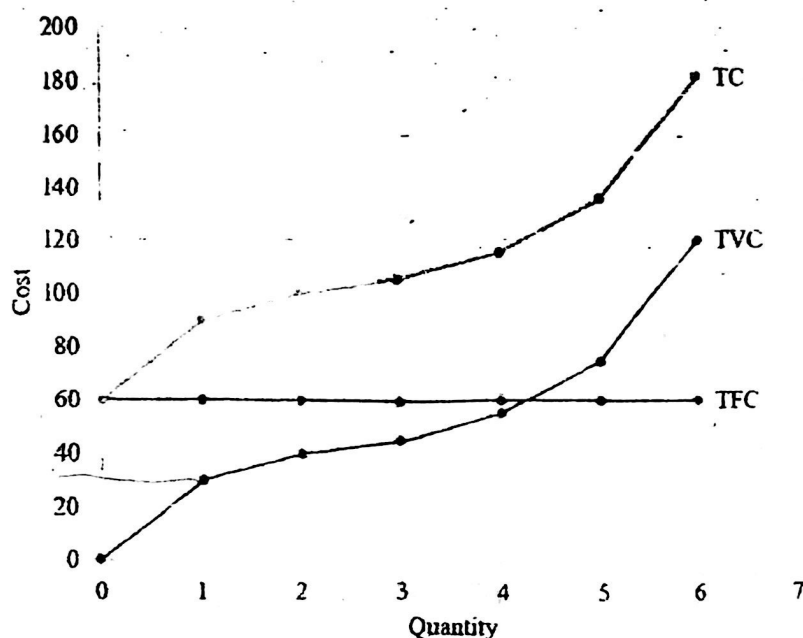
**Answer:** Total cost (TC) is the sum of total fixed cost (TFC) and total variable cost (TVC) in short run. TFC is total amount of expenditures made on fixed factors of production whereas Total Variable Cost (TVC) is the total amount of expenditure made on variable factors of production like cost of intermediate goods, raw-materials, fuel, labour, etc. The nature of TC, TFC and TVC can be further explained with the help of schedule and diagram as:

**Schedule for derivation of TC, TFC and TVC**

| Unit of output (Q) | Total Fixed Cost (TFC) | Total Variable Cost (TVC) | Total Cost (TC) (TFC+TVC) |
|--------------------|------------------------|---------------------------|---------------------------|
| 0                  | 60                     | 0                         | 60                        |
| 1                  | 60                     | 30                        | 90                        |
| 2                  | 60                     | 40                        | 100                       |
| 3                  | 60                     | 45                        | 105                       |
| 4                  | 60                     | 55                        | 115                       |
| 5                  | 60                     | 75                        | 135                       |
| 6                  | 60                     | 120                       | 180                       |

In the table, the Total Fixed Cost is constant at all levels of output. The Total Variable Cost increases with an increase in output. So, the Total Cost also increases with increase in output.

**Figure for TC, TFC and TVC curves**

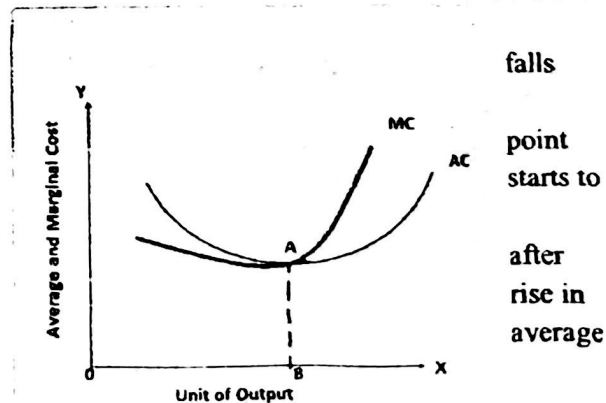


In the diagram, costs and output are measured along axes. The total fixed cost (TFC) remains constant at all levels of output, while the total variable cost (TVC) increases with output but is zero at zero output. The total cost (TC) curve is the sum of TFC and TVC, starting from the same point as the average fixed cost and increasing with output.

**12. Explain the relationship between average cost (AC) and marginal cost (MC). (5 marks)**

**Answer:** The relation between short-run average cost (AC) and marginal cost (MC) can be explained with the help of a diagram as:

1. In the beginning, both average and marginal costs fall, but the marginal cost falls faster than average cost.
2. Marginal cost reaches its minimum before average cost and marginal cost rise earlier than average cost.
3. Both average and marginal cost rise reaching their minimum points but the marginal cost is faster than the rise in cost.
4. When average cost is minimum, marginal cost is equal to average cost.
5. The marginal cost curve cuts the average cost curve at its minimum point from below.
6. Both average and marginal cost curves are U-shaped but marginal cost curve has a steeper slope but average cost has a flatter slope.



### 13. Why Short-run Average Cost (SAC) curve is U-shaped?

Answer: Short-run Average Cost (SAC) curve is U-shaped because of the following reasons:

1. **Basis of average fixed cost (AFC):** Initially, Average Cost (AC) falls due to decreasing Average Fixed Cost (AFC) and declining Average Variable Cost (AVC). However, as AVC starts rising and surpasses the declining AFC, AC begins to rise, forming a U-shaped curve.
2. **Basis of the law of variable proportions:** The law of variable proportions states that combining a variable factor with a fixed factor initially leads to increasing production with decreasing average costs. However, beyond the optimal combination, average costs rise due to overutilization of fixed factors, resulting in a U-shaped average cost curve.
3. **Invisiblity of the factors:** SAC curve is U-shaped due to initial internal economies from indivisible fixed factors, resulting in cost reduction. Beyond an optimal output level, diseconomies emerge, causing SAC to rise as production increases.
4. **Basis of reserve capacity:** The classical theory of cost ignores the reserve capacity which results in the U-shaped of AC curve. U-shaped curve of AC shows that there is no reserve capacity to meet the seasonal variation in demand in the modern cost theories.
5. **Economies and diseconomies of scale:** Low production levels benefit from economies of scale, reducing average costs, but higher production may see diminishing scale advantages, leading to inefficiencies and diseconomies, causing costs to rise.

### 14. Consider the following table and answer the given questions. (8 marks)

| Output (Q) | TC  | TVC | TFC | AFC | AVC | AC | MC |
|------------|-----|-----|-----|-----|-----|----|----|
| 0          | 60  |     |     |     |     |    |    |
| 1          | 90  |     |     |     |     |    |    |
| 2          | 100 |     |     |     |     |    |    |
| 3          | 105 |     |     |     |     |    |    |
| 4          | 115 |     |     |     |     |    |    |
| 5          | 135 |     |     |     |     |    |    |
| 6          | 180 |     |     |     |     |    |    |

- a. Calculate TVC, TFC, AFC, AVC, AC and MC
- b. Derive AFC, AVC, AC and MC curves
- c. Explain the relationship between AC and MC

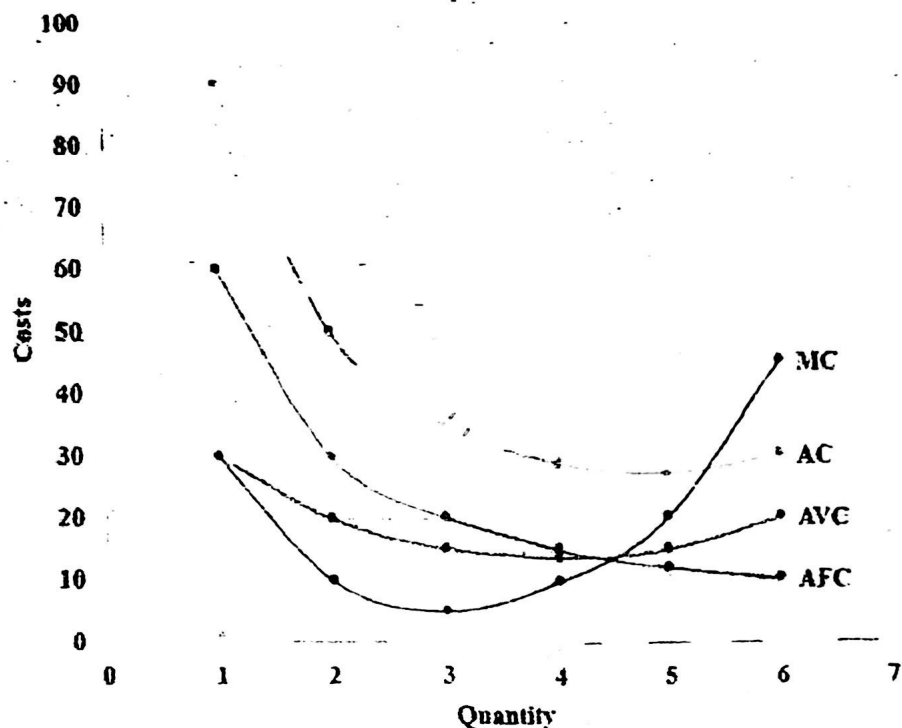
**Solution,**

#### a. Calculation of TVC, TFC, AFC, AVC, AC and MC

| Output (Q) | TFC | TVC = TC - TFC | TC  | $AFC = \frac{TFC}{Q}$ | $AVC = \frac{TVC}{Q}$ | $AC = \frac{TC}{Q}$ | $MC = \frac{\Delta TC}{\Delta Q}$ |
|------------|-----|----------------|-----|-----------------------|-----------------------|---------------------|-----------------------------------|
| 0          | 60  | 0              | 60  | -                     | -                     | -                   | -                                 |
| 1          | 60  | 30             | 90  | 60                    | 30                    | 90                  | 30                                |
| 2          | 60  | 40             | 100 | 30                    | 20                    | 50                  | 10                                |
| 3          | 60  | 45             | 105 | 20                    | 15                    | 35                  | 5                                 |
| 4          | 60  | 55             | 115 | 15                    | 13.75                 | 28.75               | 10                                |
| 5          | 60  | 75             | 135 | 12                    | 15                    | 27                  | 20                                |
| 6          | 60  | 120            | 180 | 10                    | 20                    | 30                  | 45                                |

∴ At zero level of output, TFC = TC and TFC = 60 and TFC remains constant at every level of output.

**b. Derivation of AFC, AVC, AC and MC curves**



**c. The relationship between AC and MC can be listed as:**

1. Initially, both AC and MC decrease, with MC decreasing faster than AC.
2. MC reaches its minimum before AC, and MC starts rising earlier than AC.
3. At the minimum point of AC, MC is equal to AC.
4. The MC curve intersects the AC curve from below at AC's minimum point.

**Numerical Questions:**

1. A firm produces 10 units of output where its total fixed cost is rupees 200, total variable cost is rupees 400 and its total cost is rupees 600 then find AFC, AVC and AC.

Solution,

$Q = 10$  units

$TFC = \text{Rs. } 200$

$TVC = \text{Rs. } 400$

$TC = \text{Rs. } 600$

$AFC = ?$

$AVC = ?$

$AC = ?$

We have,

$AFC = TFC / Q = 200 / 10 = \text{Rs. } 20$

$AVC = TVC / Q = 400 / 10 = \text{Rs. } 40$

$AC = TC / Q = 600 / 10 = \text{Rs. } 60$

2. If the cost of producing 5 units and 6 units of a commodity by a firm are Rs. 500 and Rs. 800 respectively then find marginal cost.

Solution:

Initial total cost ( $TC$ ) = Rs. 500

New total cost ( $TC_1$ ) = Rs. 800

Change in total cost ( $\Delta TC$ ) =  $TC_1 - TC = 800 - 500 = \text{Rs. } 300$

Initial output ( $Q$ ) = 5 unit

New output ( $Q_1$ ) = 6 unit

Change in output ( $\Delta Q$ ) =  $Q_1 - Q = 6 - 5 = 1$  unit

We have

$$MC = \Delta TC / \Delta Q = 300 / 1 = \text{Rs. } 300$$

3. Derive marginal cost function from the total cost function,  $TC = 20 + Q + 3Q^2$

Solution:

$$TC = 20 + Q + 3Q^2$$

Marginal cost function ( $MC$ ) = ?

We have

$$\begin{aligned} MC &= \frac{d(TC)}{dQ} \\ &= \frac{d(20 + Q + 3Q^2)}{dQ} \\ &= \frac{d(20)}{dQ} + \frac{d(Q)}{dQ} + \frac{d(3Q^2)}{dQ} = 6Q + 1 \end{aligned}$$

$\therefore$  Marginal cost function is  $MC = 6Q + 1$

4. Calculate the total fixed cost from the total cost function  $TC = 10 + 5Q - Q^2 + 3Q^3$

Solution

$$\text{Total cost function, } TC = 10 + 5Q - Q^2 + 3Q^3$$

$$TVC = ?$$

$$TFC = ?$$

We have

$$\text{At } Q = 0, TFC = TC$$

$$TFC = 10 + 5 \times 0 - 0^2 + 3 \times 0^3$$

$$TFC = 10$$

$\therefore TFC = 10$  units.

5. The total cost function is  $TC = 10 + 3Q - Q^2 + 2Q^3$ . If  $Q = 5$  then find  $TFC$ ,  $AVC$ ,  $AFC$  and  $MC$ . (8 marks)

Solution,

$$TC = 10 + 3Q - Q^2 + 2Q^3 \text{ and } TFC, AVC, AFC, MC = ?$$

We have

$$TC = TFC \text{ at } Q = 0$$

$$TFC = 10 + 3 \times 0 - 0^2 + 2 \times 0^3 = 10$$

$$TVC = TC - TFC = 10 + 3Q - Q^2 + 2Q^3 - 10 = 3Q - Q^2 + 2Q^3$$

$$AVC = \frac{TVC}{Q} = \frac{3Q - Q^2 + 2Q^3}{Q}$$

$AVC$  when  $Q = 5$ ,

$$AVC = \frac{3 \times 5 - 5^2 + 2 \times 5^3}{5} = \frac{15 - 25 + 250}{5} = 48$$

$AFC$  when  $Q = 5$ ,

$$\text{We have, } AFC = \frac{TFC}{Q} = \frac{10}{5} = 2$$

$MC$  at  $Q = 5$

$$\begin{aligned} MC &= \frac{d(TC)}{dQ} \\ &= \frac{d(10 + 3Q - Q^2 + 2Q^3)}{dQ} \end{aligned}$$

$$\begin{aligned}
&= \frac{d(10)}{dQ} + \frac{d(3Q)}{dQ} + \frac{d(Q^2)}{dQ} + \frac{d(2Q^3)}{dQ} \\
&= 0 + 3 - 2Q + 6Q^2 \\
&= 3 - 2 \times 5 + 6 \times 5^2 \\
&= 143
\end{aligned}$$

MC = Rs. 143

∴ TFC = Rs. 10, AVC = Rs. 48, AFC = Rs. 2 and MC = Rs. 143

### Price and Output Determination

#### 1. Define firm/ industry.

Answer: A firm is the single unit of an industry producing products with the objective of profit maximization whereas an industry is the group of the firms which produces similar or identical products.

#### 2. Why does a monopolist generally earn supernormal profit?

Answer: A monopolist earns supernormal profits in a monopoly market because it has monopoly power to control prices, no close substitute goods, barrier to entry other firms. As a result, monopolist sets prices above production costs to maximize profit.

#### 3. What are two conditions of equilibrium of a firm?

Answer: Firm gets equilibrium almost to maximize profit when it fulfills the following conditions:

- MR = MC: marginal cost should be equal to the marginal revenue
- Marginal cost curve should cut the marginal revenue curve from below.

#### 4. What is meant by equilibrium of a firm or industry?

The equilibrium of firm is the situation in which the firm attains maximum profit under marginal revenue is equal to marginal cost, i.e. MR = MC.

#### 5. Define short-run and long-run equilibrium of perfect competitive and monopoly firm.

Answer: In short-run, firm gets equilibrium either in normal profit, or abnormal profit or even in loss and in long-run perfect competitive firm is equilibrium in normal profit whereas monopoly firm gets equilibrium in abnormal profit due to the nature of each firms.

#### 6. Differentiate between perfect competitive firm and a monopoly firm.

Difference between a perfect competitive firm and a monopoly firm.

| Basis of difference         | Perfect competitive firm                                          | Monopoly firm                                                          |
|-----------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------|
| 1. Number of Firms:         | Many small firms exist in perfect competition.                    | Only one firm dominates the market in a monopoly.                      |
| 2. Product Differentiation: | Products are identical with no differentiation.                   | The monopolist is the sole provider with a unique product.             |
| 3. Market Power:            | Firms have no market power; they are price takers.                | The monopolist has significant market power and can set prices.        |
| 4. Barriers to Entry:       | No significant barriers to entry for new firms.                   | High barriers to entry, limiting the entry of new firms.               |
| 5. Price Setting:           | Firms cannot influence the market price; as they are price taker. | The monopolist can set its own price due to lack of competition.       |
| 6. Profit:                  | It can earn normal profit in the long run, no supernormal profit. | It can earn supernormal profits in the long run due to market control. |

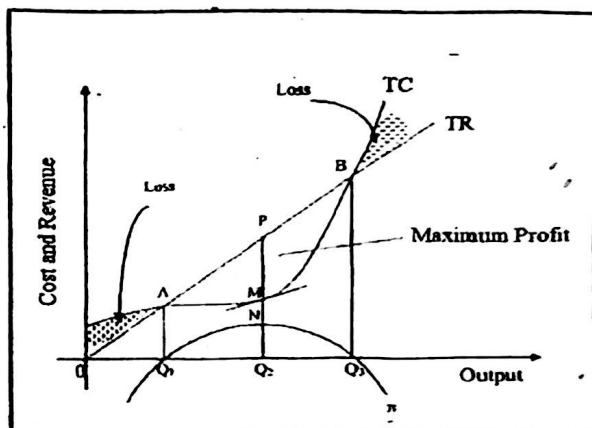
7. Explain the equilibrium of the firm by using TR-TC approach under perfect competitive/monopoly market.

Answer: Under TR - TC approach, firm gets equilibrium during the breakeven points where  $TR = TC$  and profit maximizes at  $TR > TC$  where Profit  $(\pi) = TR - TC$

It can be cleared with the help of diagram as:

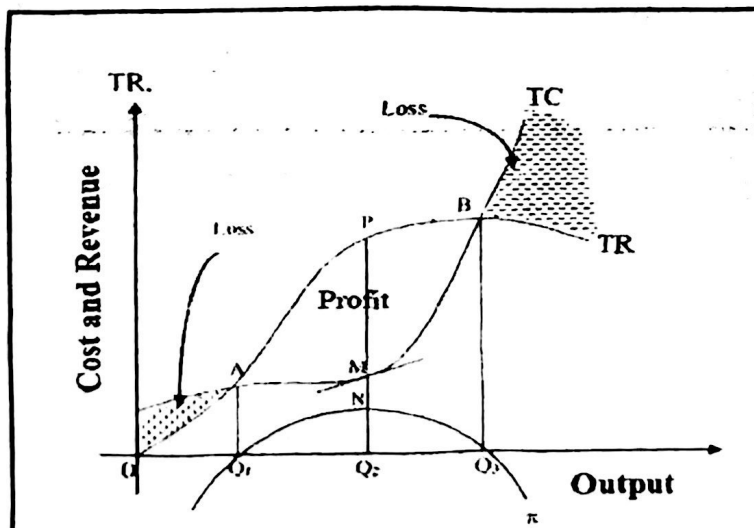
**Equilibrium of a firm under perfect competition firm:** Firm gets equilibrium when profit is maximum when total revenue is more than total cost, i.e.  $TR > TC$  as presented in diagram as:

As shown in the diagram, TR increases with the increase in output and slopes linearly upwards to the right. Similarly, Total cost also slopes non-linearly S-shaped. The firm maximizes its profit at  $OQ_2$  output where the distance between TR and TC is the greatest. At a lower or higher level of output than  $OQ_2$ , the total profit is not maximum. At levels of output lower than  $OQ_1$  and higher than  $OQ_3$ , the firm is in loss as TC is more than TR.



**Equilibrium of a firm under monopoly firm:**

Firm gets equilibrium when profit is maximum when total revenue is more than total cost, i.e.  $TR > TC$  as presented in diagram as:



As shown in the diagram, TR and TC increase with the increase in output and slopes non-linearly upwards to the right. The firm maximizes its profit at  $OQ_2$  output where the distance between TR and TC is the greatest. At a lower or higher level of output than  $OQ_2$ , the total profit is not maximum. At levels of output lower than  $OQ_1$  and higher than  $OQ_3$ , the firm is in loss as TC is more than TR.

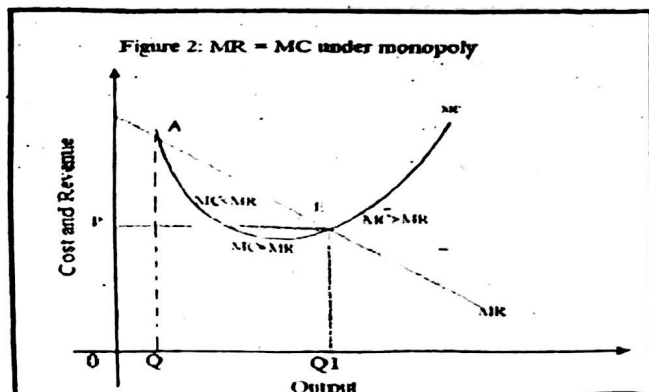
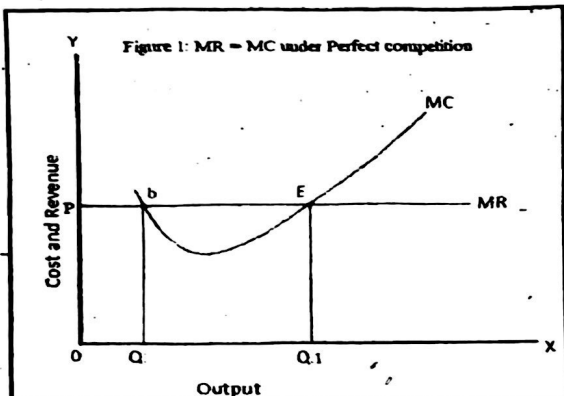
8. Explain the equilibrium of the firm by using MR-MC approach under perfect competitive/monopoly market.

Equilibrium of a firm under MR - MC Approach:

Perfect competitive and monopoly firm get equilibrium when the firms fulfill the following conditions.

- $MR = MC$ : marginal cost should be equal to the marginal revenue
- Marginal cost curve should cut the marginal revenue curve from below.

The equilibrium of a firm under MC=MR approach can be cleared with the help of following diagrams as:



The above diagram 1 and diagram 2 show the equilibrium of firm under perfect competition and monopoly firm respectively. Both firms fulfill the equilibrium conditions at point E. So, point E is the point of maximum profit and  $OQ_1$  is the equilibrium quantity and  $OP$  is the equilibrium price for the both firms.

At any other units less than  $OQ_1$  output, the MC is less than MR. So long as MC is less than MR, it will be profitable for the firm to produce more output till it reaches  $OQ_1$ . When the output reaches beyond  $OQ_1$ , the MC will be higher than MR and the firm will be in loss.

#### 9. How is price and output determined under perfect competition in short-run? (8 marks)

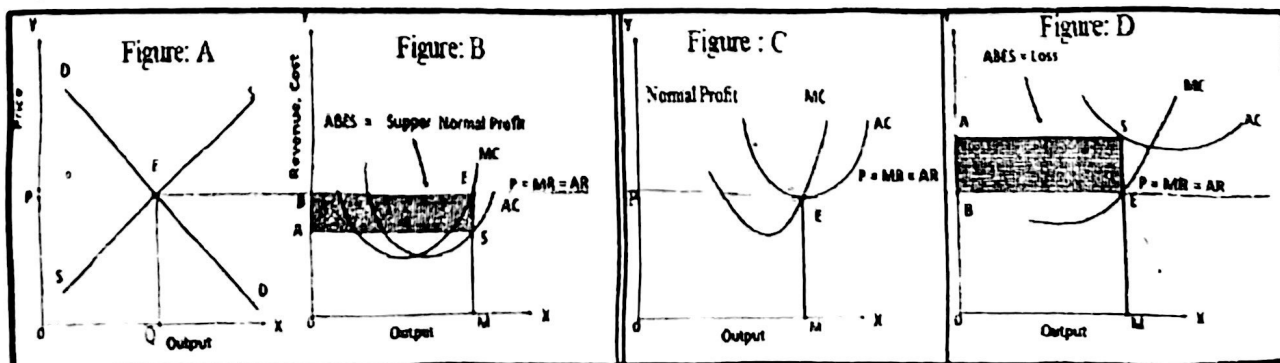
Answer: Perfect competition market is a market structure where more numbers of buyers and sellers are able to exchange of homogeneous products at the price determined by market forces. Under perfect competitive market structure, the price and output are determined when industry and firm fulfill the following equilibrium conditions as:

- MR is equal to MC, it is necessary condition.
- MC cuts MR and AC from below, it is sufficient condition.
- MC cuts AC from below at AC's minimum point, it is efficient condition.
- Market demand and supply are equal and firms have no control over the price.

In the short-run, firms get equilibrium on the basis of nature of AC and AR when:

- ✓ If  $AR > AC$ , the firm earns supernormal profits.
- ✓ If  $AR = AC$ , the firm earns normal profit.
- ✓ If  $AR < AC$ , the firm bears loss.

The determination of price and output for perfect competition firm can be explained with the help of diagram as:



**Equilibrium of industry:** Figure A represents the equilibrium of industry. When demand curve DD and supply curve SS are intersected at point E, OP level of price and OQ level of output are determined. Each firm follows OP level of price in perfect competitive market for their revenue and cost for output.

In the above diagram, output and price, cost and revenue are measured along axes. AR, MR represents average revenue and marginal revenue curves which are horizontal and parallel to x-axis due to constant price. E is the equilibrium point where both the conditions for equilibrium are fulfilled: i.  $MR = MC$ , ii. MR is cut by MC from below.

**Equilibrium of firms:**

1. **Condition of Abnormal profit:** In Figure B, firm fulfills the equilibrium conditions and earns abnormal profit when average revenue (AR) is greater than average cost (AC). Abnormal profit is calculated here as:

We have

$$\begin{aligned}\text{Profit} &= R - C \\ &= OBEM - OASM \\ &= ABES \text{ (TR} > \text{TC)}.\end{aligned}$$

$\therefore$  Abnormal profit earned by the firm is by ABES

2. **Condition of Normal profit:** In Figure C, firm fulfills the equilibrium conditions and earns only normal profit. In this condition, firm can only operate its business. The firm earns normal profit when average revenue (AR) is equal to average cost (AC). From the figure, normal profit is calculated as:

We have

$$\begin{aligned}\text{Profit} &= R - C \\ &= OPEM - OPEM = 0: \text{ (TR} = \text{TC)}.\end{aligned}$$

$\therefore$  The normal profit earned by the firm is 0.

3. **Condition of loss:** In Figure D, firm fulfills the equilibrium conditions and bears the loss. In this condition, firm can exist from industry. This condition may occur due to inefficiency of factors of production, adverse situation of economy, etc. The firm bears loss when average revenue (AR) is less than average cost (AC). From the figure, loss is calculated as:

We have

$$\begin{aligned}\text{Profit} &= R - C \\ &= OBEM - OASM = \\ &= -ABES \text{ (TC} > \text{TR)}.\end{aligned}$$

$\therefore$  Profit by -ABES means firm is bearing the loss by ABES.

#### 10. How is price and output determined under perfect competition in long-run? (5 Marks)

**Answer:** Long-run is the time period in which all the factors of production are variable. In the long run, a firm will earn only normal profit under perfect competition. When the existing firms are earning abnormal profit, new firms are attracted to enter the market (industry). This will increase the supply of goods (demand remaining same) and hence reduce the profit to normal only. On the other hand, when the existing firms are incurring loss, some firms will leave the market/ industry. This will reduce the supply of goods (demand remaining the same) and hence enable them to earn normal profit.

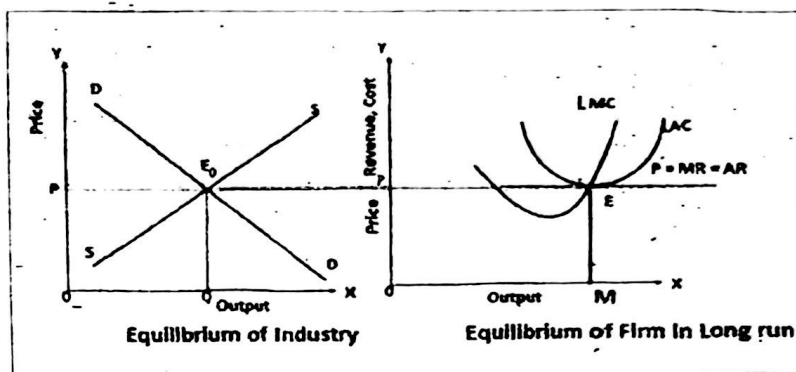
#### Conditions for equilibrium

The following conditions must be fulfilled in order to attain equilibrium in the long-run under perfectly competitive industry and firm.

1. The quantity supplied and the quantity demanded should be equal.
2. Long-run marginal cost (LMC) should be equal to the marginal revenue (MR).
3. MR is cut by LMC from below.

Long-run equilibrium of the firm and the industry can be explained with the help of the diagram as:

In the diagram, industry is in equilibrium at the point  $E_0$  where demand is equal to supply and OP level of price and OQ level of output are determined. The firm follows the OP level of price and gets equilibrium at point E where LMC is equal to MR and LMC curve cuts MR curve from below.



At point E, LAC is the tangent to AR that shows the firm is operating under normal profit. It can be calculated as:

Here given: Revenue = Cost

We have,

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

$$ME - ME = 0$$

So, it is normal profit.

### 11. What is a monopoly? How are price and output determined under it?

Answer: Monopoly market is a market structure of economy where single seller and more buyers exchange no close substitute products at the prices set by monopolist. A monopolist generally earns super-normal (abnormal) profit in both short-run and long-run.

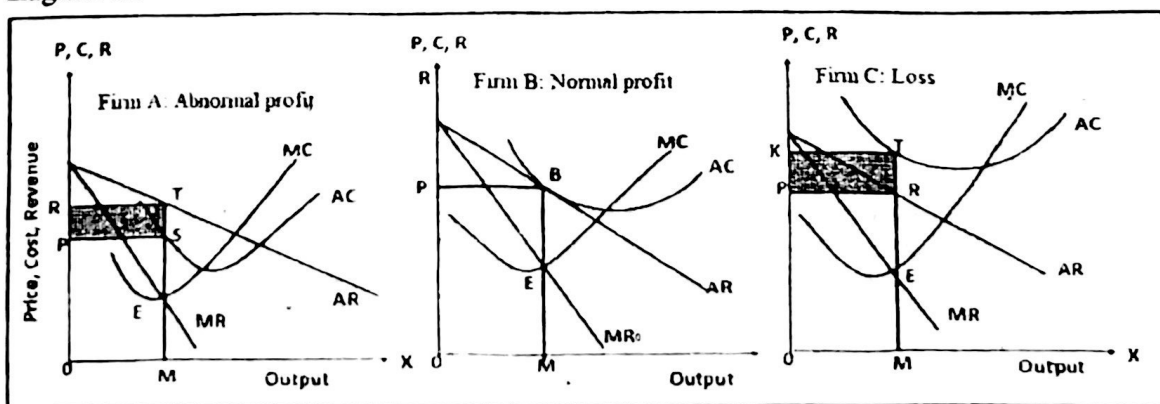
Under monopoly market structure, the price and output are determined when industry/firm fulfills the following equilibrium conditions as:

- MR is equal to MC, it is necessary condition.
- MC cuts MR and AC from below, it is sufficient condition.
- MC cuts AC from below at AC's minimum point, it is efficient condition.
- Firms have control over the price.

In the short-run, firms get equilibrium on the basis of nature of AC and AR when:

- ✓ If  $AR > AC$ , the firm earns supernormal profits.
- ✓ If  $AR = AC$ , the firm earns normal profit.
- ✓ If  $AR < AC$ , the firm bears loss.

The determination of price and output under monopoly market can be explained with the help of diagram as:



In the above diagram, output and price, cost and revenue are measured along axes. AR and MR downward sloped curves represents average revenue and marginal revenue curves. E is the equilibrium point where both the conditions for equilibrium are fulfilled: i.  $MR = MC$ , ii. MR is cut by MC from below. There are three possibilities in the short-run equilibrium under monopoly explained below as:

*Fallg. Falgun 29*

1. **Condition of Abnormal profit:** In Figure A, firm fulfills the equilibrium conditions and earns abnormal profit when average revenue (AR) is greater than average cost (AC). Monopolist almost tries to get equilibrium in abnormal profit calculated here as:

We have

$$\text{Profit} = R - C = \text{ORTM} - \text{OPSM} = \text{PRTS} \quad (\text{TR} > \text{TC})$$

So, the supernormal (abnormal) profit earned by the firm = PRTS

∴ Abnormal profit earned by the firm is by PRTS

2. **Condition of Normal profit:** In Figure B, firm fulfills the equilibrium conditions and earns only normal profit. In this condition, firm can only operates its business. The firm earns normal profit when average revenue (AR) is equal to average cost (AC). From the figure, normal profit is calculated as:

We have

$$\text{Profit} = R - C = \text{OPBM} - \text{OPBM} = 0 \quad (\because \text{TR} = \text{TC})$$

∴ The normal profit earned by the firm is 0.

3. **Condition of loss:** In Figure C, firm fulfills the equilibrium conditions and bears the loss. This condition may occurs due to inefficiency of resources, adverse situation of economy, etc. The firm bears loss when average revenue (AR) is less than average cost (AC). From the figure, loss is calculated as:

We have:  $\text{Profit} = R - C = \text{OPRM} - \text{OKTM} = -\text{PKTR} \quad (\text{TC} > \text{TR})$

∴ Profit by -PKTR means firm is bearing the loss by PKTR.

12. Does a monopolist always earn abnormal profit? Give the reason. (1 mark)

Answer: No, a monopolist normally earns supernormal profit. But sometimes a monopolist may earn only a normal profit or even incurs the losses in adverse situations of economy. Demand is very low during economic depression, wars, natural calamities, spread of pandemics, inflation, deflation, etc. and firm bears losses

13. How is price and output determined under perfect competition in long-run? (5 Marks)

Answer: In long-run monopolist has enough time to adjust the size of the plant and equipment. So it is possible to maximize its supernormal profit at the certain level of output.

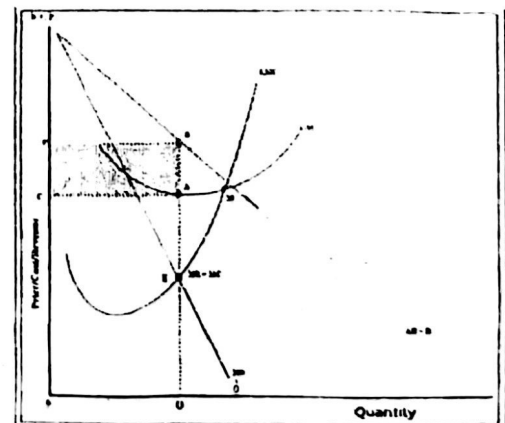
#### Conditions for Equilibrium

In the long-run, the price and output are determined and the equilibrium position is maintained at that point when the following conditions are fulfilled under monopoly:

- i. Long-run marginal cost is equal to marginal revenue ( $\text{LMC} = \text{MR}$ ), necessary condition
- ii. LMC curve cuts the marginal revenue curve from below, sufficient condition
- iii. LMC cuts LAC from below at LAC curve, efficient condition

The process of price and output determination (equilibrium position) under monopoly can be graphically presented in the diagram as below:

In the diagram, AR is the average revenue curve of a monopoly firm. LAC and LMC are long-run average cost and marginal cost curves. E is the equilibrium point where MR is equal to MC and MR is cut by MC from below and determined OP level of price and OQ level quantity with the OC cost as long-run average cost of production. As AR is greater than AC, the monopolist is operating under abnormal profit equal to the shaded area ABPC in the long-run



Monopolist gets equilibrium in abnormal profit only in long-run otherwise single owner may terminate the firm if it frequently bears losses. The abnormal profit can be calculated here as:

We have

$$\text{Profit} = R - C = \text{OPBQ} - \text{OCAQ} = \text{ABPC} \quad (\text{TR} > \text{TC})$$

∴ Supernormal (abnormal) profit earned by the firm = ABPC

**Numerical Questions:**

1. Find the equilibrium level of output of a firm, if MR is 42 and MC is  $60 - 2Q^2$ . (1 mark)

Solution,

$$MR = 42$$

$$MC = 60 - 2Q^2$$

$$Q = ?$$

We have,

For equilibrium:  $MR = MC$

$$42 = 60 - 2Q^2$$

$$2Q^2 = 18$$

$$Q = 3$$

Therefore, the equilibrium level of output is 3 units.

2. A firm's total revenue is Rs 20,000 its total cost is Rs. 25000 and its total fixed cost is Rs. 10,000. In this situation, does the firm exist in the business or not? (1 mark)

Solution,

$$TR = \text{Rs. } 20000$$

$$TC = \text{Rs. } 25000$$

$$TFC = \text{Rs. } 10000$$

We know

$$TVC = TC - TFC$$

$$25000 - 10000$$

$$= \text{Rs. } 15000$$

Since the total revenue is greater than total variable cost, so the firm exists in the business.

3. The demand curve function is  $P = 50 - 2Q$  while cost function is  $C = 50 + 2Q - Q^2$ . Find the profit maximizing price, output and maximum profit. (5 marks)

Solution,

Given,

$$\text{Demand function: } P = 50 - 2Q$$

$$\text{Cost function: } TC = 50 + 2Q - Q^2$$

$$\text{Price} = ?$$

$$Q = ?$$

$$\text{Profit} = ?$$

We have,

$$TR = P \times Q = (50 - 2Q) Q = 50Q - 2Q^2$$

$$MR = \frac{d(TR)}{dQ} = \frac{d(50Q - 2Q^2)}{dQ} = 50 - 4Q$$

$$MC = \frac{d(TC)}{dQ} = \frac{d(50 + 2Q - Q^2)}{dQ} = 2 - 2Q$$

For equilibrium of firm, we have

$$MR = MC$$

$$50 - 4Q = 2 - 2Q$$

$$6Q = 48$$

$$Q = 8 \text{ units}$$

For price

$$P = 50 - 2Q = 50 - 2 \times 8 = 34$$

For profit

Maximum Profit = TR - TC

$$\begin{aligned} &= 50Q - 2Q^2 - (50 + 2Q - Q^2) \\ &= 50Q - 2Q^2 - 50 - 2Q + Q^2 \\ &= 48Q - Q^2 - 50 \end{aligned}$$

When  $Q = 8$

$$\begin{aligned} &= 48 \times 8 - 8^2 - 50 \\ &= 384 - 64 - 50 \\ &= 384 - 114 \\ &= \text{Rs. } 270 \end{aligned}$$

Thus, profit maximizing price is Rs 34, output is 8 units and total profit is Rs. 270.

4. A firm's cost function and revenue function are  $TC = 20 + 2Q^2$  and  $TR = 42Q - Q^2$  then find the MC and MR function and equilibrium level of price and output. (5 marks)

Solution,

Cost function:  $TC = 20 + 2Q^2$

Revenue function:  $TR = 42Q - Q^2$

MC function = ?

MR function = ?

Price (P) = ?

Output (Q) = ?

We have

$$MC = \frac{d(TC)}{dQ} = \frac{d(20 + 2Q^2)}{dQ} = 4Q, \text{ which is MC function.}$$

$$MR = \frac{d(TR)}{dQ} = \frac{d(42Q - Q^2)}{dQ} = 42 - 2Q, \text{ which is MR function.}$$

For equilibrium of firm, we have

$$MR = MC$$

$$42 - 2Q = 4Q$$

$$6Q = 42$$

$$Q = 7 \text{ units}$$

When  $Q = 7$ ,

We have,

$$P = TR / Q = (42Q - Q^2) / Q = 42 - Q = 42 - 7 = \text{Rs. } 35$$

$\therefore$  MC function is  $4Q$ , MR function is  $42 - 2Q$ . Equilibrium price is Rs 35 and output is 7 units, answers

## Price determination of factors of production

### Very Short Answer Questions (1 mark)

**1. What is factor pricing?**

**Answer:** The factor pricing is the price paid to the factors of production like rent to the land, wages to labour, interest to capital and profit/loss to organization for their contribution in production.

**2. Define rent in economics.**

**Answer:** Rent refers to the payment received by owner for the use of factors of production. **Classical view of rent** states that rent is the price paid for the use of land to its owner whereas **modern view of rent** states that rent is the payment made for any factor of production which is perfectly inelastic in supply.

**3. What is contract rent?**

**Answer:** The rent paid by the tenant to the landlord for the use of land as determined by the contract between them is called contract rent. It may differ as per the quality of land.

**4. Define economic rent.**

**Answer:** **Economic rent** is defined as the excess amount paid by any factor of production of which the supply is perfectly inelastic. It may differ as per the productivity of factors of production.

**5. Define wage/ money wage.**

**Answer:** Wage is the reward paid to the labourers for both physical and mental work. In other words, it is the monetary payment made to the labourer for their physical or mental works. For example: if a worker is paid by rupees 500 a day for his work, it is his/her money wage.

**6. What is Real Wage?**

**Answer:** Real wage is defined as the purchasing power of money wage. There is inverse relationship between price level and real wage. It is determined by various extra facilities like bonus, medical, educational, transportation, residential, uniform, insurance, pension, etc.

**7. Define interest in economics.**

**Answer:** Interest is the price paid for the use of capital. In other words, it is the reward paid to capital for its contribution in production.

**8. What is gross interest? / How can it be calculated?**

**Answer:** It is the total amount of interest received by the lender from the borrower of capital. It can be calculated as:

**Gross Interest** = Net interest + insurance against the risk + cost of inconvenience for parting with liquidity by the lender + cost of loan management made by the lender.

**9. What is net interest? How can it be calculated?**

**Answer:** It is the amount of money paid by the borrower to the lender for the use of capital only. It is also known as pure interest. It can be calculated as:

**Net interest** = Gross interest - insurance against the risk - cost of inconvenience for parting with liquidity by the lender - cost of management made by the lender.

**10. Distinguish between contract rent and economic rent. (5 marks)**

**Differences between contract rent and economic rent**

| S<br>N | Basis of<br>difference       | Contract rent                                                                                                           | Economic rent                                                                         |
|--------|------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1.     | Definition                   | It is the total payment made to the factor owner by the renter according to their mutual agreement.                     | It is the part of contract rent which is paid to the owner for the use of factor.     |
| 2.     | Constituents                 | It consists of economic rent, interest on capital invested in a land like the building, fences, drainage, parking slot. | It does not consist of any other payments.                                            |
| 3.     | Source                       | It can be obtained from all grades of land.                                                                             | It cannot be obtained from the marginal land.                                         |
| 4.     | Change in price              | The change in the price of the product does not affect the contract rent.                                               | The change in the price of the product influences the economic rent.                  |
| 5.     | Inclusion of price and cost. | It is included in the price as it is included in the cost of production.                                                | It is not included in the price because it is not included in the cost of production. |
| 6.     | Determination                | It depends on the demand and supply of land.                                                                            | It depends on the total product of the land.                                          |

**11 Critically examine Ricardian Theory of Rent with diagram. (8 marks: if this question is asked for 5 marks then list the criticisms in points only)**

Or,

**'Rent is paid for the use of the original and indestructible power of the soil'. Explain critically.**

**Answer:** Ricardian Theory of Rent was propounded by classical economist David Ricardo. As per him, *"Rent is that portion of the produce of the earth which is paid to the landlord for the original and the indestructible power of the soil"*. Rent arises due to differences in the fertility of the soil.

The Ricardian theory of rent is based on the following assumptions:

1. Land is free gift of nature and its supply is fixed.
2. Land is graded by its fertility.
3. The land is cultivated and arises rent.
4. There is existence of marginal land.
5. Theory assumes long-run, perfect competition, closed economy, etc.

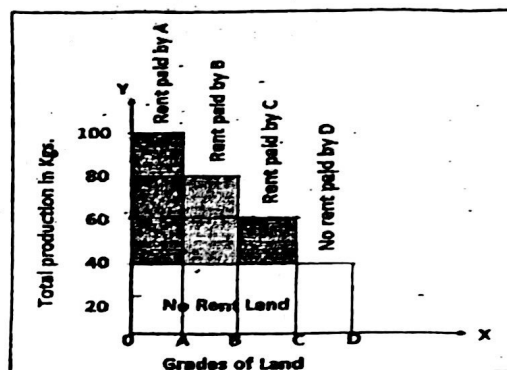
The Ricardian Theory of rent can be explained with the help of a schedule and example as below:

| Grades of land | Total production (Kg.) | Rent paid (Kg.)     |
|----------------|------------------------|---------------------|
| A              | 100                    | $100-40=60$         |
| B              | 80                     | $80-40=40$          |
| C              | 60                     | $60-40=20$          |
| D              | 40                     | $40-40=0$ (No Rent) |

In the schedule, four grades of land A, B, C and D are ranked as high fertile to low fertile. A, B, C, D land are cultivated as their supply is fixed, rent arises due to their fertility power of soil also differ i.e 60 kg, 40 kg, 20 kg and no rent respectively. Grade D land is Marginal Land or No Rent Land due to no rent arises

by it. The above table can be shown in a diagram as below:

In the diagram, grades of land and total production are measured along axes. Under extensive cultivation, when one unit of capital and labour is employed on A, B, C and D grades of land of different fertilities, they earn 60 kg, 40 kg, 20 kg and 0 kg of rent respectively. The vertical rectangles of shaded area is the amount of rent paid by each grade of land. Grade D land does not pay any rent and is called No rent Land or Marginal Land.



**Criticisms:** The Ricardian Theory of Rent is strongly criticized by modern economists as:

- 1. Indestructible power of the soil:** Critics argue that fertility of the soil will decrease over time due to continuous cultivation and increases by using fertilizer.
- 2. Wrong order of land cultivation:** Critics argue that land cultivation is done in the order of availability and accessibility of land but not in order of fertility of land.
- 3. The concept of rent has been narrowed and limited:** Critics argue that rent arises not only from land but from all factors which are limited and inelastic in supply.
- 4. Ignores the different uses of land:** Critics say that besides cultivation, land can also be used for other purposes like making houses, industries, growing forests, etc.
- 5. No existence of marginal land:** In reality, even if land is an inferior, it has to pay some rent, however less it may be.

Despite all, Ricardian theory of rent is one of the most accepted and important theories of rent in Economics.

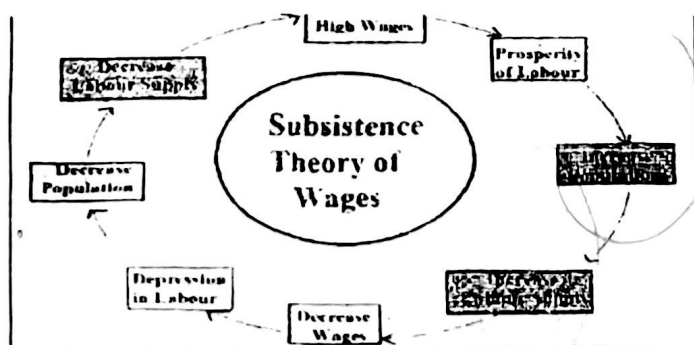
**12. Critically explain the subsistence Theory of Wages/ Iron law of wages. (8 marks: if this question is asked for 5 marks, then list the criticisms in points only)**

**Answer:** Subsistence theory of wage is first introduced by Quesnay and later developed by David Ricardo in 1817 AD. As per theory, the wages paid to labourers will be just able to maintain the basic necessities of life. This theory is based on the following assumptions:

**Assumptions:**

1. Subsistence level of wage is paid to labour.
2. Homogeneity of labour are in the perfect competitive market.
3. There is no government intervention.
4. It is classical theory based on Long-run, closed economy, full employment.

The subsistence theory is also called **Iron law of wages**. It can be more cleared with the help of the following cycle as:



**Explanation of theory:** The subsistence theory of wage states that the wages paid to the workers remain at the subsistence level of living of labour which maintains the basic necessities of their life. In the above cycle, wage rate increases to more than the subsistence level, it will lead to the increase in population as the increased prosperity of labourers will encourage

them to produce more children. This will increase the supply of labourers leading to competition among the workers for employment causing to a fall in the wage rate to the subsistence level.

On the other hand, if the wage rate falls below the subsistence level, workers will be unable to meet their basic needs resulting in malnutrition, starvation and deaths of workers. This will reduce the supply of labourers leading to increase in wage rate to the subsistence level. Thus, in the long run the wage rate will always remain at the subsistence level.

**Criticisms of the theory:** The subsistence theory of wages has been criticized on the following grounds:

1. **The Iron Law of Wages:** The theory is also known as the Iron Law of Wages because the wage rate paid to labourers is equal to the subsistence level only which is fixed and rigid, just like an iron.
2. **Based on the supply of labour only:** The theory is based only on the supply of labour and completely ignores the demand of labourers. Under a free market economy, both demand and supply of labourers are equally important to determine the wages of labourers.
3. **A wrong concept of population growth:** In reality, when the living conditions of people improve, they become more aware and produce a less number of children. Similarly, when the wage rate decreases, the population will rather increase due to poverty. So, it is wrong concept of population growth.
4. **Exploiting tendency of the theory:** The theory upholds exploitation of labourers as labourers are paid wages equal to the subsistence level only. It has ignored the improvement in the efficiency of labourers.
5. **Discouraging Theory:** The theory is discouraging to the laborers to improve their efficiency, work hard and earn more.

13. Critically explain the wage fund theory. (8 marks: if this question is asked for 5 marks then list the criticisms in points only)

**Answer:** Wage fund theory was first developed by J.S Mill. As per him, a fixed proportion of the capital of the country should be kept in reserve for the payment of laborers is called the **Wage fund**. The wage fund is divided by the total number of workers in the country and repay to the labourer, it is average wage rate. It can be calculated as:

$$AWR = \frac{WF}{NW}$$

Where,

AWR= Average Wage Rate,

WF= Wage Fund and

NW= Number of Workers.

**Assumptions:** The wage fund theory is based on the following assumptions as:

1. The wage fund is set before the employment of workers.
2. The units of labour employed in work are homogenous.
3. Workers are paid wage equally.
4. The wage is flexible to change the number of workers employed.
5. Money is regarded as the medium of exchange.
6. There inverse relationship between wage rate and number of workers where wage fund remains constant.

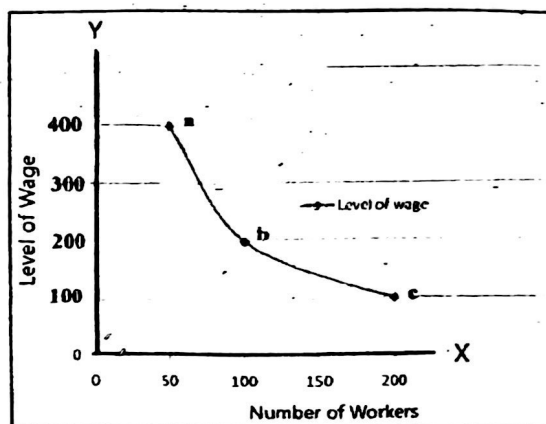
The wage fund theory can be explained with the help of schedule and diagram as:

| Wage Fund<br>(Rs.) | No. of Workers | Wage rate = $\frac{\text{Wage Fund}}{\text{No of Workers}}$ |
|--------------------|----------------|-------------------------------------------------------------|
| 20000              | 100            | 200                                                         |
| 20000              | 200            | 100                                                         |
| 20000              | 400            | 50                                                          |

In the above table, wage fund remains constant by Rs. 20000 and wage rate decreases from 200 to 100 to 50 rupees due to number of workers increases from 100 to 200 to 400 respectively.

It can be cleared with the help of diagram as:

In the diagram, level of wage and number of workers are measured along axes. a, b, c are the combination points of level of wage rate and number of workers which have inverse relationship between them. It means higher the number of worker, lower will be the level of wage and vice-versa. It is due to fixed of wage fund which is set before employment of workers. If the labour union forces to increase the wage rate of one sector (say industry), the wage rate of another sector (say agriculture) decreases in short run and fixed nature of wage fund.



The wage fund of the country remains constant and the wage rate is determined by dividing this fund by the number of labourers in the country.

**Criticisms of Wage-Fund Theory:** The Wage-Fund Theory has been criticized on the following grounds:

1. **Unscientific theory:** The critics say that wage fund cannot remain constant as said by the theory. Moreover, wages are paid from the national income and current production and not from wage fund.
2. **Ignores the efficiency and productivity of labourers:** Critics say that average wage cannot be possible in practice as it completely ignores the efficiency and productivity of labourers. Labourers are paid wages according to their efficiency and productivity.
3. **One sided and incomplete theory:** The theory considers only supply side of labourers to determine wage rate and ignores the demand of labourers. Thus it is a one-sided and incomplete theory.
4. **Ignores the influence of trade unions:** Today the trade unions play a major role in the determination of wages which the theory completely ignores.
5. **Traditional in nature:** Critics argue, in the modern productions, workers are employed first and they are paid wages afterwards according to their efficiency and productivity.

**14. Distinguish between Gross Interest and Net Interest. (5 marks)**

**Answer:** Differences between Gross Interest and Net-Interest are shown in the following table as:

| Basis of difference     | Gross Interest                                                                                                  | Net Interest                                                                  |
|-------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Definition              | It is the total amount paid by a borrower to the lender in return of the capital borrowed for a period of time. | It is the price paid by a borrower to the lender only for the use of capital. |
| Calculation             | It can be calculated by summing up net interest and other charges.                                              | It can be calculated by deducting other charges from gross interest.          |
| Dimension               | It is a broad concept.                                                                                          | It is a narrow concept.                                                       |
| Interest rate variation | The rate of gross interest differs in the market.                                                               | The rate of net interest remains almost the same in the market.               |
| Application             | It is a practical concept which is applicable in real life.                                                     | It is purely a theoretical concept which has no practical application.        |
| Determination           | It is determined by several factors besides demand for and supply of the capital.                               | It is determined by the demand for the capital and supply of the capital.     |

**15. Critically explain the Classical Theory of Interest. 8 marks: if this question is asked for 5 marks then list the criticisms in points only)**

**Answer:** The classical theory of interest was propounded by classical economists and later modified by Marshall, Pigou and Taussig. As per theory, demand for capital and the supply of capital determine the rate of interest. This theory is based on the following assumptions as:

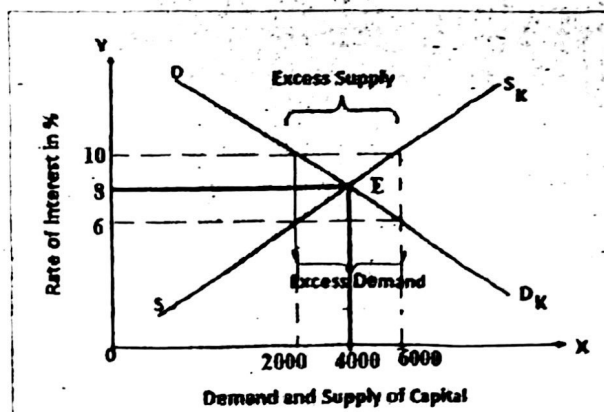
1. Full employment of resources
2. There is negative relationship between rate of interest and demand for capital.
3. There is positive relationship between rate of interest and supply of capital.
4. Saving depends upon capacity and willingness to save.
5. Money is the medium of exchange.
6. Level of income is given.
7. Marginal productivity of capital is diminishing.

Determination of the rate of interest can be explained with the help of schedule as:

| Rate of interest | Demand for capital | Supply of capital |
|------------------|--------------------|-------------------|
| 6 %              | 4000               | 2000              |
| 8 %              | 3000               | 3000              |
| 10 %             | 2000               | 4000              |

In the table, when rate of interest increases from 6% to 8% to 10% then the demand for capital decreases from rupees 4000 to 3000 to 2000 and supply of capital increases from rupees 2000 to 3000 to 4000 respectively. When demand for capital and the supply of capital are equal by rupees 3000, the equilibrium rate of interest is determined by 8%. The above table can be represented in the following diagram as:

In the diagram, the rate of interest and demand and supply of capital are measured along axes.  $S_K$  and  $D_K$  are supply of capital and demand for capital curve intersected each at point E and the equilibrium rate of interest is determined by 8%. Below the point E, there is excess demand for capital which will push up the rate of interest to the equilibrium rate. Similarly, above the point E, there is excess supply which will pull down the rate of interest to the equilibrium rate. So, the equilibrium rate of interest is determined where the demand for capital and the supply of capital are equal.



### Criticisms of the Classical Theory of Interest

The Classical Theory of Interest has been criticized especially by the modern economists as:

1. It is wrong to assume that factors of production are fully employed. In reality, there will be no full employment of factors of productions.
2. Unlike this theory, saving depends on the level of income also and not on interest rates only. If income is high, saving will also be high and if income is low saving will also be low.
3. Unlike the theory investment does not only depend on the interest rates. It depends also on the efficiency of entrepreneurs and capital formation in the country.
4. The theory completely ignores the role of credit money such as credit cards, promissory notes, visa card, etc. which play the major role to determine interest rate.

### 16. Critically explain the Risk Bearing Theory of Profit. (5 marks)

The Risk Bearing Theory of Profit was propounded by Professor Hawley, in 1907. According to him, 'Profit is the reward for taking risk in business'. The higher is the risk in any business, higher will be the profit and lower is the risk, the lower will be the profit. If there is no risk, there will be no profit.

#### Criticism to the Risk Bearing Theory of Profit

The major criticisms of the bearing theory are:

- i. Profit arises not because of bearing risk as said by the theory but because of efficient management and coordination of factors by the entrepreneurs.
- ii. Profit is not the reward for bearing risk as said by the theory but rather the reward for avoiding and reducing risk in business by efficient entrepreneurs.
- iii. There is no direct relation between risk and profit as said by the theory.
- iv. Profit does not arise from all kinds of risk as said by the theory. It arises only from unforeseeable risks which are not insured like changes in taste, fashion, habit of people, new discoveries, etc. It does not arise from foreseen risk like theft, fire, accidents which are insurable risks as they are not risks at all.

### 17. Critically explain the Uncertainty Bearing Theory of Profit. (5 marks)

This theory was developed by Professor Knight, an American economist in 1921. The Uncertainty bearing theory of profit is the outcome of the criticisms of the Risk Bearing Theory of Profit. According to Prof. Knight, profit is the reward for bearing uncertainties in business by entrepreneurs. In other words, there are uncertainties in business which the entrepreneurs bear. So for bearing the uncertainties, they earn a profit. Knight has divided the risks into two categories: