Module I

1

PRODUCTION FUNCTION: CONCEPTS AND TYPES

Unit Structure:

1.0 OBJECTIVES

- To know the concept of production function.
- To study the types of production function.
- To study the concepts of total, average and marginal product.

1.1 INTRODUCTION

The term 'production' is very important and broader concept in economics. To meet the daily demand of a consumer production is essential part. Production is a process by which various inputs are combined and transformed into output of goods and services, for which there is a demand in the market. In other words, Production is a process of combining various material inputs and immaterial inputs in order to make something for consumption. The essences of production are the creation of utilities and the transformation of inputs or resources into output. Inputs are the resources used in the production of goods and services the important resources or input in production are land, labour, capital, and entrepreneur. Production process creates economic well-being into the nation. Thus, production is a process which creates utility and value in exchange.

The theory of production function is concern with the problem in the production process in a certain level of output. It analyses the relation between cost and output and help the firm to determine its profit. All firms

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that aim at maximizing their profit must make their decision regarding production on the bases of the following three decision:

A. How much output to produce and supply in the market?

B. How to produce the product, i.e. which technique of production or combination of production to used have to be decided?

C. How much quantity of input is demanded to produce the output of the product?

Thus, the above three decisions are interrelated and have to be taken by the firm during the production process.

1.2 MEANING OF PRODUCTION FUNCTION

In economics, a production function is the functional relationship between physical output of a production process to physical inputs or factors of production. In other words, production function denotes an efficient combination of input and output. The factors which are used in the production of goods and services are also called as agents of production. Production function of a business firm is determined by the state of technology. More specifically, production function shows the maximum volume of physical output available from a given set of inputs, or the minimum set of inputs necessary to produce any given level of output.

Definition: With the above statements we can define the production function as: "A production function refers to the functional relationship, under the given technology, between physical rates of input and output of firm, per unit of time".

Mathematically, production function can be express as: Q = f (N, L, K, E, T, etc.)

1.3 TYPES OF PRODUCTION FUNCTION

I. **The production function can be broadly categorized into two based on the time period** i.e.

a) short run production function and

b) long run production function.

A) Short run production function: The short run is defined as the period during which at least one of the inputs is fixed. According to the following short-run production function, labour is the only variable factor input while the rest of the inputs are regarded as fixed. In other words, the short run is a period in which the firm can adjust production by changing variable factors such as materials and labour but cannot change fixed factors such as land, capital, etc. Thus, in short-run some factors are fixed and some are variable.

B) Long run production function: The long run production function is defined as the period of time in which all factors of production are variable. In the long run there is no distinction between the fixed or variable factor as all factors in the long run are variable.

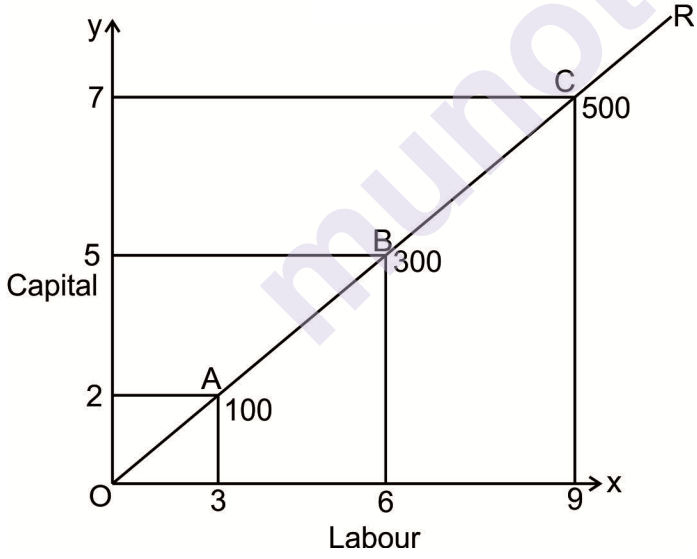
II. The production function can also be classified on the basis of factor proportion i.e.

a) Fixed proportion production function and

b) Variable proportion production function.

A. **Fixed proportion production function**: The fixed proportion production function, also known as a Leontief Production Function which implies the fixed factors of production function such as land, labour, raw materials are used to produce a fixed quantity of an output and these factors of production function cannot be substituted for the other factors. In other words, in such factors of production function fixed quantity of inputs is used to produce the fixed quantity of output. All factors of production are fixed and cannot be substituted for one another. The concept of fixed proportion production function can be further expained with the help of a **figure 1.1** as shown below:

Figure 1.1



B. **Variable proportion production function**: The variable proportion production function supposes that the ratio in which the factors of production such as labour and capital are used in a variable proportion. Also, the different combinations of factors can be used to produce the given quantity, thus, one factor can be substituted for the other factor. In the case of variable proportion production function, the technical Coefficient of production function is variable, i.e. the important quantity of output can be achieved through the combination of

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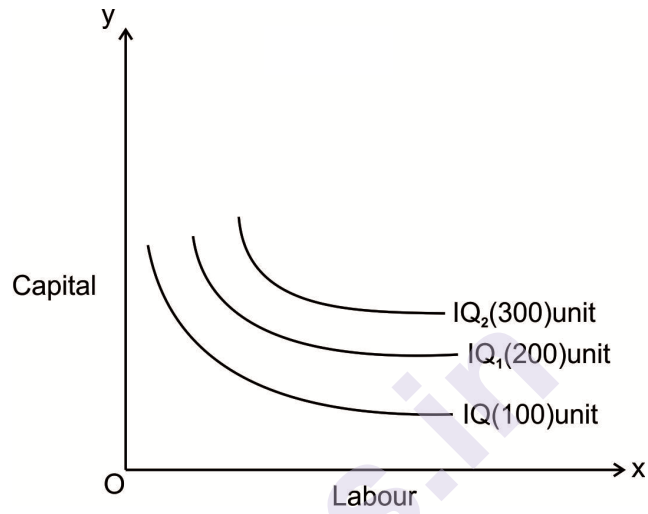
different quantities of factors of production, such as these factors can be varied by substituting one factors to the other/ factors in its place.

The concept of variable proportion production function can be further explained from an isoquant curve, as shown in the **Figure 1.2** below:

Figure 1.2



In the above diagram, the isoquant curves show that the different combinations of factors of technical substitution shows that it can be employed to get the required amount of output in the production process. Thus, for the production of a given level of product, the input factors can be substituted from another factor input.

1.4 CONCEPT OF TOTAL, AVERAGE AND MARGINAL PRODUCT

In the table the labour is consider as a variable factor and all other factors are assumed to be constant according to the law. With the increase in the variable factor i.e. labour there is a change in the level of TP, AP, and MP.

Total product: The total product is the total amount of output produced by using all the variable input in a fixed proportion in production. The total product increases with the increase in the unit of labour and reaches to the maximum and they're after decline with further more increase in the variable factor.

Average product: The average product is the per unit of product produced by the firm with the per unit of variable factor inputs. It is obtained by dividing the total product by the unit of total variable factor. The average product increases initially and then decline.

Marginal product: Marginal product is the additional output produced by an additional unit of variable factor. Marginal product increases and thereafter falls when TU becomes maximum MU becomes zero and further becomes negative

Table No. 1.1
Relationship between Total Product, Average Product & Marginal Product

Units of Variable factor (LABOUR)	Total Product (TP)	Average Product (AP)	Marginal Product (MP)
0	0	0	-
1	5	5	5
2	12	6	7
3	27	9	15
4	48	12	21
5	75	15	27
6	80	13.33	15
7	91	13	11
8	98	12.5	7
9	98	10.8	0
10	92	9.2	-6

1.5 SUMMARY

In economics, a production function is the functional relationship between physical output of a production process to physical inputs or factors of production.

Short-run production function is a production function in which labour is the only variable factor input while the rest of the inputs are regarded as fixed.

The long run production function is defined as the period of time in which all factors of production are variable.

The total product is the total amount of output produced by using all the variable input in a fixed proportion in production.

The average product is the per unit of product produced by the firm with the per unit of variable factor inputs.

Marginal product is the additional output produced by an additional unit of variable factor.

1.6 QUESTIONS

Q1. What are the types of production function?

Q2. Explain the concepts of Total, Average and Marginal Product by giving tabular example.

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THEORY OF PRODUCTION & PRODUCER'S EQUILIBRIUM

Unit Structure:

2.0 OBJECTIVES

- To study the meaning and features of isoquants.
- To study the short-run and long-run production functions.
- Understand the concept of producer's equilibrium.

2.1 INTRODUCTION

Production in economics refers to the process of transforming inputs into output or creation of value. Thus by production we mean not only goods put also services. Economics deals with the efficient use of inputs or factors of production to produce goods and services. The concept of production function is central to the theory of production. Production function is defined as "the technological relation which connects factor inputs and outputs". It helps us to understand the relationship between the use of inputs and the resulting output. 'The production function is related to a particular period of time. It expresses a flow of inputs resulting in a flow of output in a specified time'. The production function is written as under:

$$Q = f(L, K, R, S, \lambda, \nu) \qquad (1)$$

Q = physical output, L = units of labour, K = units of capital, R = raw materials, S = land input,

ν = returns to scale, λ = efficiency parameter. We shall now examine the short-run and long-run production functions.

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2.2 SHORT-RUN PRODUCTION FUNCTION OR THE LAW OF VARIABLE PROPORTIONS

In the short-run certain factors of production like the capital stock, plant and equipment, land are held constant and the variable factor land is changed to bring about changes in the output. We write such a production functions as under:

$$Q = f(L, \bar{K}, \bar{S}) \qquad (2)$$

This is the short-run production function. Here capital and land inputs are held constant, while units of labour are variable. Thus, it is also described as the law of variable proportions. Marshall defined the 'law of variable proportions as "if, given the state of arts, successive units of a variable input are combined with a fixed input (or fixed inputs), the returns, after a point, will be less than proportionate". G. J. Stigler defined this law as "as equal increments of one input are added, the inputs of other productive services being held constant, beyond a certain point the resulting increments of product will decrease, i.e., the products will diminish". P. A. Samuelson defined "increases in some inputs relative to other fixed inputs will, in a given state of technology, cause output to increase; but after a point the extra output resulting from the same additions of extra inputs will become less and less". J. M. Cassels stated the law as "if, with the same methods of production, successive physical units of an input are added to a constant physical quantity of another input (or fixed combinations of other inputs), the total physical output obtained would vary in magnitude through three distinct phases". The law of variable proportions is based on the following assumptions:

2. The state of technology is given.

2. Factors of production are clearly classified as fixed and variable. Labor is the variable factor, and capital and land are fixed inputs (as given in (2) above).

3. It is possible to combine the factors of production is variable proportions. The production function is not of fixed proportions type.

4. Both inputs are required to produce the given output.

5. There are constant returns to scale.

Following Cassels definition we can delineate the three phases of change in the output due to changes in variable input(s) as under:

Phase I: During this phase the total product would be increasing. There would be two stages in this increase. In the first stage there would be an absolute increase in the output, i.e., the marginal product of the variable input would be increasing. In the second, the marginal product would be increasing at a decreasing rate. The marginal product would be greater than the average product of the variable input. During this phase, the relative rate of increase in the output would be greater than the relative

rate of increase in the variable input. At the end of this phase, the two rates would be the same. At this point the marginal product equals the average product of the variable input. This point represents the *extensive margin* of production. Elasticity of output is used to explain the choice of a rational producer. It is defined as:

$$e_v = \frac{dQ}{Q} \div \frac{dv}{v} = \frac{dQ}{dv} \times \frac{v}{Q} = \frac{Marginal\ Product\ of\ v}{Average\ Product\ of\ v}$$

e_v = elasticity of output of variable input, v. dQ = the change in output, Q = output, dv = the change in variable input, v = units of variable input. In this phase the elasticity of output is greater than 2.

Phase II: In the phase, though the total product is still increasing, it would be at a decreasing absolute rate that is the marginal product of the variable input would be decreasing. The relative increase in output would be less than the relative increase in the quantity of the input. The marginal product would be less than the average product of the variable input. At the end of this phase, the total product reaches its maximum, i.e., the marginal product is zero. This point is known as the *intensive margin* of production. In this phase the elasticity of output is less than one.

Phase III: in this phase the total product starts decreasing as the marginal product of the variable input is negative. This is the 'uneconomic' or 'irrational' zone of production. The elasticity of output would be less than one or negative in this phase. Table 4.1 shows the law with the help of a numerical example.

Table 2.1: Law of Variable Proportions

Units of Variable Input (Labour)	Total Product (TP)	Average Product (AP)	Marginal Product (MP)	Output Elasticity of Labour
1	10	10	-	-
2	25	12.5	15	2.2
3	45	15	20	2.33
4	63	15.75	18	2.14
5	73	14.6	10	0.68
6	79	13.17	6	0.45
7	79	12.29	0	0
8	74	9.25	-5	-0.54

Following Figure shows the law of variable proportions.

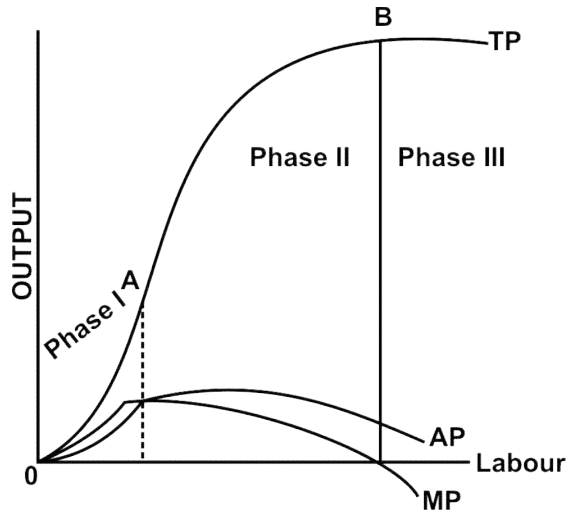

Figure 2.1 Law of Variable Proportion

In the above figure TP is the total product curve. This curve increases at increasing rate in the OA portion indicating the increasing returns. In this phase both the MP and AP rare rising with MP reaching its maximum and then declining. At the end of this phase MP equals AP at its maximum and continues to decline. This is at point A. Phase II is shown in the AB portion of the total product curve. In the AB portion of the TP curve, the output would be increasing at a decreasing rate since the MP is falling while the AP also continues to decline. At point B, the TP curve reaches its maximum and the MP cuts through the x-axis at point E. The marks the end of phase II. After point B the total product is falling and the marginal product turns negative. This is the uneconomic zone.

2.3 LONG-RUN PRODUCTION FUNCTION OR THE LAWS OF RETURNS TO SCALE

Long-run refers to a period where the firm can alter all its inputs. In other words, there are no fixed inputs in the long-run. Therefore, the returns to scale studies the impact of proportionate change in all inputs on the resulting changes in the output. It is important to note that the returns to scale occur not only in case of different production functions, but they do occur even when the production function is the same. We write the returns to scale as: $r = \frac{\text{Pr}\,oportionate\ change\ in\ output}{\text{Pr}\,oportionate\ change\ in\ all\ inputs}$.

We can write the returns to scale as:

$$hQ = f(\lambda K, \lambda L) \qquad (3)$$

The different possibilities are:

1)if $h = \lambda$ the production function exhibits constant returns to scale.

2)If $h > \lambda$ the production function exhibits increasing returns.

3)If $h < \lambda$ the production function exhibits decreasing returns.

Like the variable proportions, there are three distinct returns to scale. They are as under:

A) Increasing Returns to Scale:

In the initial stages of production, as a firm increases all its inputs in equal proportions, the resulting output will be increasing at an increasing rate. This is the phase of increasing returns to scale. Following are some of the causes of the increasing returns to scale:

i) According to Joan Robinson, Lerner and Kinght, some of the inputs like machinery are indivisible. Therefore, when output increases from a small scale to a large scale, these factors are utilized better resulting in increasing returns.

ii) Chamberlin did not agree with the views on indivisibilities. He argued that as the level of output increases, it becomes increasingly possible to introduce specialization and this allows increasing returns even if the factors are perfectly divisible. This is the case with some sophisticated machinery which can be effectively used only when the production is large.

iii) At times, inputs can be more efficiently used when the output is large enough. For example, some of the latest locomotives can pull up to 45 wagons and are less efficient when the number of wagons is less than this.

B) Constant Returns to Scale:

In this case a proportionate increase in inputs will result in an equally proportionate increase in the output. For example if all the inputs are doubled, the output will also be double. This type of production function is called 'production function of first degree'. According to E. A. G. Robinson, a firm might be able to utilize its resources better. He argues that the technical, financial, marketing, and 'forces of risk and fluctuations' are responsible for firms experiencing constant returns to scale.

C) Decreasing Returns to Scale:

When a firm expands beyond a particular scale it starts experiencing that the increase in output is less than the proportionate change in its inputs- this is the decreasing returns to scale. These occur because the firm will find it difficult to co-ordinate the production activities when the size is too large.

The concept of returns to scale is explained with the help of the 'expansion path'. In Figure 4.2 x-axis shows labour input and y-axis shows capital input. OR is the expansion path. This line shows us the returns to scale when the firm uses the same production process and still experiences the returns to scale.

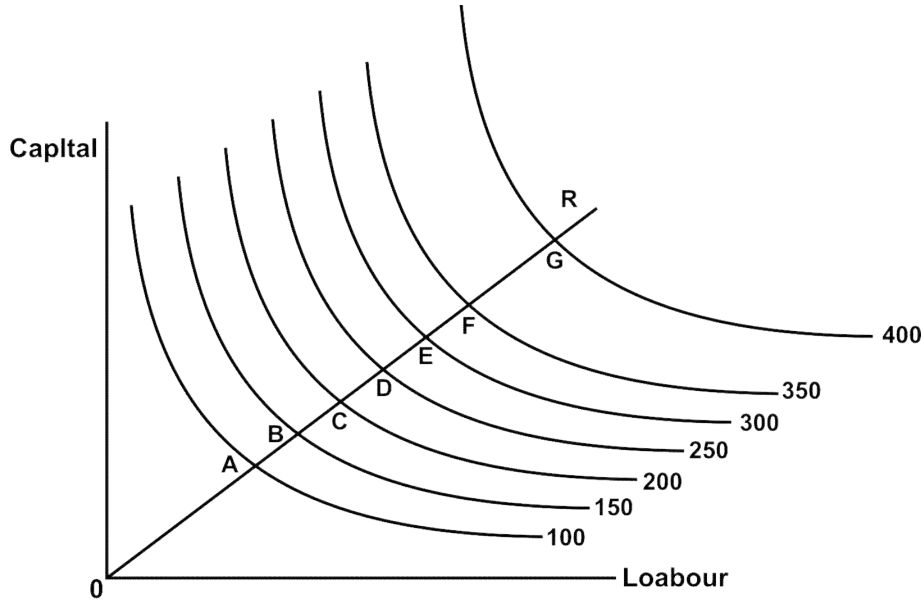

Figure 2.2

In the above figure A, B and C indicate increasing returns to scale (output increasing more than the increase in inputs). As inputs are increased, output increases more than proportionately. Points D, and E, indicate constant returns (output increasing in the same proportion as inputs). Points F and G indicate decreasing returns since a given proportionate change in output requires more than proportionate change in the inputs.

Check your Progress:

2. What do you understand by production function?

2. Distinguish between short run and long run production function.

2.4 PRODUCER'S EQUILIBRIUM

The concept of producer's equilibrium is analogous to the consumer's equilibrium. Producer's equilibrium refers to the situation where the producer maximizes his/her output for a given set of inputs or produces a given output with the minimum possible inputs. Thus, it is also known as the 'least cost combination'. It is based on the concepts of a) isoquant and b) factor price line. We shall now examine each of them.

2.4.1 The concept of an isoquant:

The concept of an isoquant was introduced by Edgeworth. This concept shows the various combinations of two inputs that give the same level of output. Each isoquant shows a particular level of output measured in physical terms. An isoquant measures the physical output that can be obtained by combining the two inputs in various proportions. For example, Q = (5K, 3L) and Q = (3K, 6L) indicates that to produce a given level of output, Q, we can use 5 units of capital and 3 units of capital or alternatively 3 units of capital and 6 units of labour. In other words, the two factors are considered to be perfect substitutes and each unit of factor

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is homogeneous. Figure 2.3 a) shows such a production function. The production function can be of fixed proportions or of variable proportions. In case of fixed proportions, it is not possible to combine the factor inputs in any other way except one. This production function will be L-shaped. Figure 2.3 b) shows this function. The Marginal Rate of Technical Substitution (MRTS) shows the factor combinations. In case of variable proportions production function, it is less than one and in case of fixed proportions production function it is zero.

An isoquant never touches either of the two axes. This is because, when the isoquant touches one of the axes, it indicates that at that point it is possible to produce the given output with only one factor. Since this contrary to the assumption that both the factors are required to produce a given level of output, an isoquant cannot touch either of the axes. Figure 3.4 a) and b) shows this. In case of the former, the isoquant touches y-axis indicating that at point E, no labour units are required to produce the given level of output. In the later case it indicates that output can be produced without any units of capital at point R. Both cases are ruled out.

Further, two isoquants do not intersect. This is shown in Figure in 4.5. At the point A, both the isoquants intersect. At this stage the two different levels of output (100 and 120 units) can be produced using the same combination of inputs. This is inconsistent with the property of each isoquant measuring a particular level of output.

2.4.2 Iso-cost Line or Budget Line :

This is analogous to the price line of the indifference curve. In this case, we measure the different units of the two inputs that can be obtained by the producer for a given outlay. The slope of the iso-cost line is the ratio of the prices of the two factors. Given the factor prices, outlay and a family of isoquants, we can determine the equilibrium of the producer or the optimum output that can be produced. Figure 2.3 shows the producer's equilibrium.

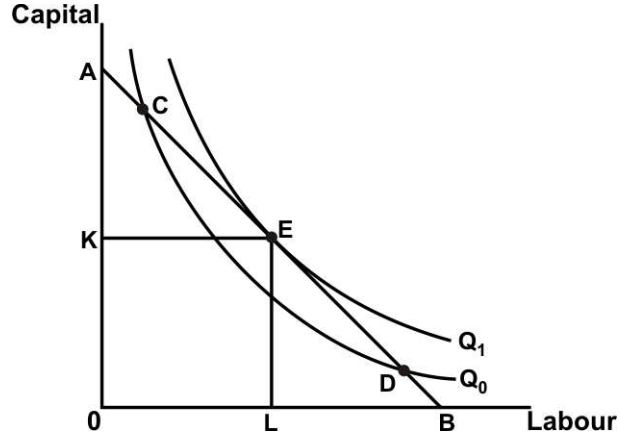

Figure 2.3 : Producer's Equilibrium

At point E the slope of the isoquant equals the slope of the iso-cost line (AB) at this point the $MRTS_{K,L}$ equals the ratio of factor prices:

$$\frac{MP_L}{w} = \frac{MP_K}{r} = \frac{MP_L}{MP_K} = \frac{w}{r} \qquad (1)$$

Therefore at E the firm produces maximum output with minimum cost (using ol units of labour and ok units of capital). At any other point, the ratios of marginal products and factors will not be the same (as at points C and D). The following example explains the producer's equilibrium.

Let the production function be $Q = 50L^{0.75}K^{0.25}$; Capital employed is 150 units; price of output is Rs. 150; wage rate is Rs. 50, and cost of capital is Rs. 60. $MP_L = 25L^{-0.75}\ K0^{.25}$; and

$MP_K = 25L^{0.75}K^{-0.25}$;

Therefore, $$\frac{MP_L}{MP_K} = \frac{25L^{-0.75}K^{0.25}}{25L^{0.75}K^{-0.25}} = \frac{K}{L} = \frac{w}{r} \qquad (2)$$

Or $$L = K.\frac{r}{w} \qquad (3)$$

$$L = 150\frac{60}{50} \qquad (4)$$

$$L = 180 \qquad (5)$$

$Q = 50 \times (150^{0.75}) \times (180^{0.25}) = 7849.47$

$TR = 7849.47 \times 150 = 1,177,420.40$

$TC = 9000 + 9000 = 18,000$

Total Profit = 1177420.47 – 18000 = 1,168,420.47

Given the data, by producing 7849.47 units of output by employing 150 units of capital and 180 units of labour the firm makes a total profit of 1,168,420.47. This combination of factors is 'the least cost' or 'profit maximising' output.

Check your Progress:

2. Explain the following concepts :

   a) Iso quant curve b) Iso cost line

2.5 SUMMARY

- Production refers to the creation of utility.
- In short-run certain factors of production remain constant.
- In long-run all factors of production are variable.

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- Variable proportions are changes in output due to changes in the variable factor.
- Returns to scale are due to proportionate change in all the factors of production.
- Increasing returns to scale are due to factor indivisibilities and improvements in efficiency.
- Cobb-Douglas production function allows for estimation of output given the factor inputs and technology.
- Cobb-Douglas production function shows that industrial sector experiences constant returns.
- Isoquant shows the level of output that can be produced using a given set of inputs.
- Isoquant can be convex to the origin or L-shaped.
- Iso-cost line shows the ratio of factor prices.
- Minimum cost of production ensures profit maximisation.
- Economies to scale arise due to better use of inputs.
- Diseconomies are due to managerial inefficiencies.
- Economies of scope involve changes in production processes.

2.6 QUESTIONS

1. Explain the concept of production function.
2. How do you distinguish between short-run and long-run production functions?
3. What do you understand by 'returns to factor'? Explain the law of variable proportions.
4. Write a note on returns to scale.
5. Explain the main features of Cobb-Douglas production function.
6. What is least cost combination? Discuss the conditions for producer's equilibrium.
7. Explain the various economies of scale.
8. Write a note on economies of scope.

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Module II

3

COST ANALYSIS

Unit Structure:

3.0 OBJECTIVES

1. To understand the concepts of costs of production.
2. To understand the nature of short-run and long-run costs of production.
3. To understand the concept of learning curve.

3.1 CONCEPTS OF COSTS OF PRODUCTION

Cost of production refers to the resources- financial or real required to produce a given quantity of output. This concept is central to economics since resources are scarce, and they have alternative uses, a firm has to ensure a proper use of its available resources. The idea of cost is different in economics from the daily use of the term. We shall now examine the different concepts of costs used in economics.

1. Money Costs: They refer to the money spent on procuring the various factors of production that are required to obtain a given output. For example, the wages paid to labour, the cost of raw materials, rent on premises, and so on. This cost is considered for pricing decisions.

2. Real Costs: This refers to the sacrifices, physical and mental privations that the entrepreneur and labour undergo in the process of production. Marshall considered them to be important. However, given the nature of these costs, they are subjective and hence not easy to measure.

3. Implicit Costs: They refer to the imputed value of factors of production that are owned by the entrepreneur and are used in production.

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There is no money payment for them. A popular example for this is the capital invested by the producer. If the lends his funds instead of using them for production, he would earn interest. The interest sacrificed is the implicit cost of the capital. An important component of implicit cost is the 'normal profit'. This refers to the minimum profit that the entrepreneur must obtain to continue in production. This is the salary he will earn as a manager instead of being an entrepreneur. Similarly the time spent by the family members in the production process is also an implicit cost. It is to be noted that they are only imputed.

4. Explicit Costs: These are the payments made in cash to the various factors of production. These are also known as 'accounting costs' since they are the once considered in the balance sheets of the firms.

5. Economic Costs: These refer to the total cost of production measured as in terms of the resources expended. Thus, economic costs are inclusive of explicit and implicit costs. Thus the economic cost of production is higher than the accounting cost of production. We write: Economic Cost = Implicit Cost + Explicit Cost.

6. Opportunity Cost: As noted above, the resources being scarce it is important to note that if they are employed for one use, they are not available for another. Economics focuses on this aspect of cost of production. Heberler defined opportunity cost as 'the next best use sacrificed'. We can see it both at the micro and macro level. If a household spends more income on food, it will have lesser income for other purposes. At the macro level, if the government decides to spend more on defence, it will have lesser money for education or family welfare. It is this opportunity cost that must be minimised by employing the resources in a thoughtful way.

7. Private Costs: These refer to the cost of a product to an individual producer. The money spent on inputs is one example for this. The private cost is paid by the user of the particular factor and thus is inclusive.

8. Social Costs: These are the costs that the society or economy as a whole has to bear for the particular use of resources. For example, using a private car may be convenient for an individual but the pollution caused by this is a social cost- the consequences of a particular resource use will have to be borne by the entire society. Industrial pollution is an important social cost. In recent years, the cost-benefit analysis techniques are developed to assess the social cost of production and consumption as well.

Check your Progress :

1. What is money cost of production?

3. Distinguish between Implicit cost and Explicit cost.

3.2 SHORT-RUN COSTS

In the short-run certain inputs remain the same and certain inputs can be changed according to the needs of the firm. The firm holds its fixed inputs as constant and uses the changes in the variable costs to bring about changes in the output. Following are the different concepts of short-run costs of production.

1. Fixed Costs or Sunk Costs: These are the costs incurred on fixed factors of production. They remain the same irrespective of the level of production. Plant and equipment, permanent staff, interest liabilities are some of the fixed costs. According to Marshall, firms do not pay much attention to these costs while considering production decisions in the short-run.

3. Variable Costs or Prime Costs: These are the costs incurred on the variable factors of production. Thus, they change with the level of production. Expenditure on labour, fuel and electricity, raw materials and transport costs are some of the important variable costs.

3. Total Cost of Production: This refers to the total of fixed and variable costs. We write: TC = TFC + TVC. Where TC is the total cost of production; TFC is the total fixed cost and TVC is the total variable cost.

4. Average Cost: This is the cost of production per unit of output.

Thus AC = TC/Q = (TFC+TVC)/Q

5. Average Fixed Cost: This is the fixed cost per unit of output. AFC = TFC/Q.

6. Average Variable Cost: This is the variable cost per unit of output: AVC = TVC/Q

7. Marginal Cost: This is the additional cost per unit of output. MC = ∂TC/∂Q or alternatively,

MC = $TC_n - TC_{n-1}$. In other words, marginal cost is change in the cost when the firm increases its output by one extra unit. The following table shows the relationship between different concepts of short-run costs.

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Table No. 3.1 Short-run Costs

Output	Fixed Cost (TFC)	Variable Cost (TVC)	Total Cost (TC)	Average Fixed Cost (AFC)	Average Variable Cost (AVC)	Average Cost (AC)	Marginal Cost (MC)
10	100	75	175	10.0	7.5	17.5	--
20	100	100	200	5.0	5.0	10.0	25
30	100	145	245	3.3	3.1	8.2	45
40	100	205	305	3.5	5.25	7.6	60
50	100	275	375	3.0	5.5	7.5	70
60	100	380	480	1.7	6.3	8	105
70	100	490	590	1.4	7	8.4	110
80	100	600	700	1.3	7.5	8.8	110
90	100	735	835	1.1	8.2	9.2	135
100	100	890	990	1.0	8.9	9.9	155

From the above table we can infer the relationship between the various short-run cost curves. The total fixed cost remains the same at all levels of output. The total variable cost increases with the increase in the level of output. Since the total cost is the total of these two, it also keeps increasing as the level of output increases. Figure III.1 shows the relationship between these three costs.

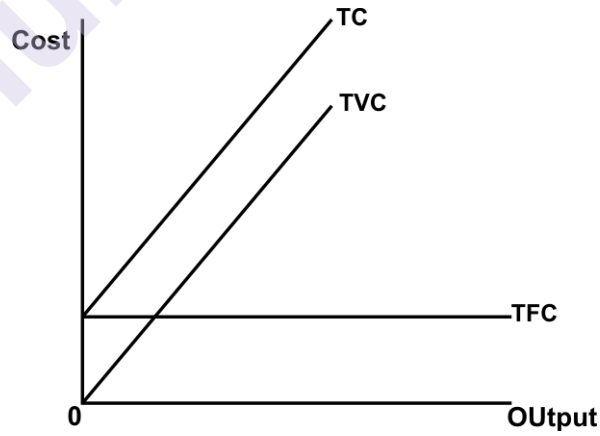

Figure 3.1

In the above figure x-axis shows the level of output and y-axis shows the cost. TFC is the total fixed cost. TVC is the total variable cost. TC is the total cost. The vertical distance between TVC and TC measures the fixed cost.

We can show the behaviour of the average and marginal costs of production also. Figure 3.2 shows this relationship.

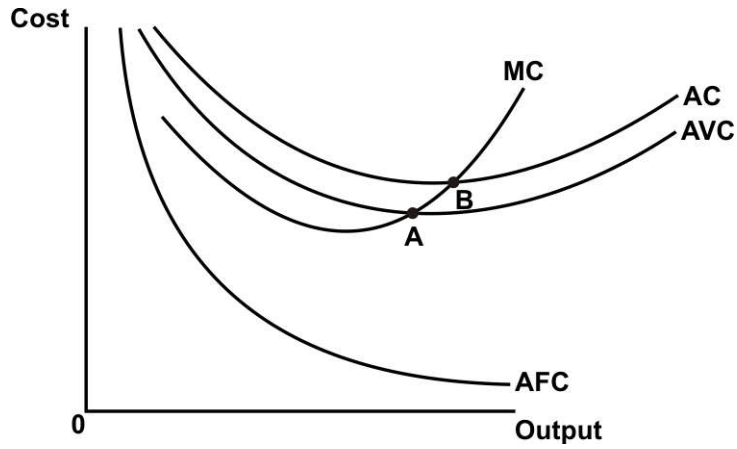

Figure 3.2

In the above figure x-axis shows the level of output and y-axis shows the different costs. AFC is the average fixed cost. As the level of output increases, this keeps falling but never reaches zero since there is fixed cost at all levels of output. AVC is the average variable cost. It decreases initially as production increases and starts increasing after a certain level of production. It moves asymptotically towards AC, but never touches it (since AFC>0 at all levels of production). AC the average cost of production. AC starts increasing after the AVC. This is because; part of the increase in AVC is offset by the falling AFC. The MC curve falls faster than the AVC and AC and intersects both the curves from below at their minimum point. MC increases faster than the AVC and AC after their minimum points.

3.3 LONG RUN COSTS

The long-run is a series of short-run. In the long-run the firm can change all its factors of production in any given way. Hence in the long-run all factors are variable and there are no fixed factors of production. The firm can alter the way in which its combines its inputs. It can also decide on the size of the plant. We can explain this with the help of an illustration. In Figure III.3 we show the cost and size of a firm.

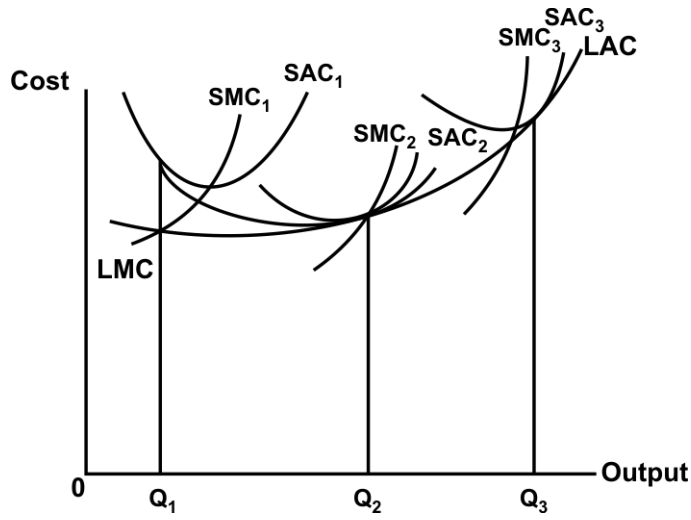

Figure 3.3

If the firm expects to produce say, Q_1 of output, it should operate on its SAC_1 which corresponds to this output. It is planning to sell Q_2 of output it should have a plant size corresponding to SAC_3. If on the other hand it is planning to sell Q_3 of output, its plant size should be corresponding to SAC_3. The different sizes of the plants that correspond to different levels of production give us the long-run average cost curve (LAC). Thus, LAC is the envelope of the short-run average cost curves. Due to the economies and diseconomies of scale, the minimum points on the SACs will not lie on the LAC. The minimum point of only one SAC will be the same as of the minimum point of the LAC and this particular size was termed as "the optimum firm" by E. A. G. Robinson. As noted above the long-run average cost curve reflects the economies and diseconomies of scale. When the firm is experiencing the economies of scale, its costs will be decreasing and hence the average cost will be declining. As the firm reaches the most efficient size, the average cost reaches its minimum. Beyond this level of output the cost of production increases due to diseconomies of scale. If the firm selects a size that is too small it will find it difficult to keep the cost low. Therefore, the firm would prefer to have a larger size.

The long-run marginal cost curve (LMC) is not the envelope of the short-run marginal cost curves (SMC). This is because the SMC applies to a particular plant while the LMC applies to all possible plant sizes. Each point on the LMC is the SMC associated with the most cost-efficient pant. SMC_1 therefore, intersects LMC at the output level Q_1 at which the SAC_1 is tangent to the LAC.

Check your Progress:

1. Distinguish between Fixed Cost and Variable Cost

3.4 LEARNING CURVE

The concept of learning curve was based on the experience in aircraft maintenance. It is also known as improvement/progress curve or learning-

by-doing. It is based on the experience that each time the task is repeated; decreasing amounts of labour input is required. It was developed by W. Z. Hirsch to explain the process through which firms enjoy falling long-run average cost, though there may not be increasing returns to scale. This is possible when workers and managers with experience, are able to absorb new technological information. This happens due to the following reasons: 1) workers often taken longer to accomplish a given task the first few times they do it. As they become more adept, their speed increases. 2) Managers learn to schedule the production process more effectively, from the flow of materials to the organisation of the manufacturing itself. 3) Engineers, with experience, will be able to produce designs that save costs without increasing defects. 4) Over the time, the suppliers will be able to provide materials at lower costs and pass on this advantage to the firm. The learning curve shows the reduction in labour units required to produce the cumulative output. The learning curve is based on the following relationship:

$$L = A + BN^{-\beta} \qquad (1).$$

where, N = cumulative units of output produced,

L = labour input per unit of output,

A, B are constants, with A showing the minimum labour input per unit of output after all learning has taken place. In the equation, when β is positive, as output gets larger and larger, L becomes arbitrarily close to A, so that A represents the minimum labour per unit of output after all learning has taken place.

Alternatively, the learning curve can be shown as a liner function, i.e., as output increases, the labour input requirement decreases at a uniform rate. In such a case, the learning curve will be:

$$Y = a\,X^{b} \qquad (2).$$

where, Y = man hour per unit of output,

X = units of output,

a = intercept, theoretical labour requirement for the first unit of output,

b = slope of the curve/ the rate of reduction in labour requirement.

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Following Figure shows the learning curve:

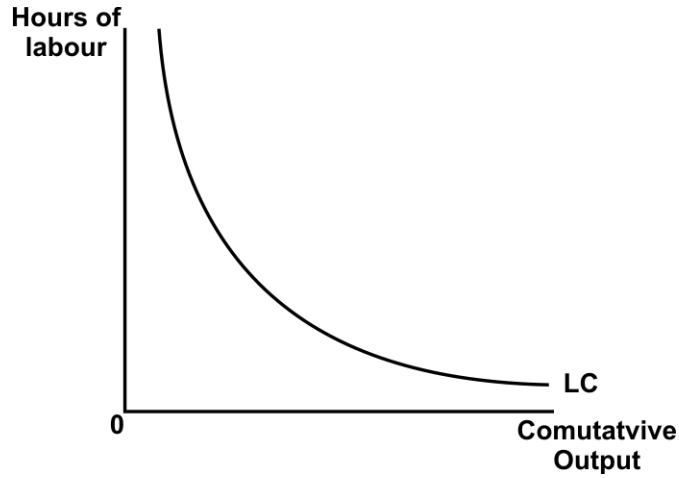

Figure 3.4 Learning Curve

In the above figure LC is the learning curve. It shows that as the production increases the cost falls as lesser labour hours are required to produce equivalent increases in output. This is because as managers and workers become more experienced and more effective at using the available plant and machinery, they will be able to turn out larger output. The learning curve shows the extent to which hours of labour needed per unit of output fall as the cumulative output increases. Learning curve helps to predict the labour requirement when output is doubled. The following table explains the concept of learning.

Table No. 3.2

Cumulative Output (N)	Per-Unit Labour Requirement for each 10 units of Output (L)	Total Labour Requirement	Learning Percentage
10	1.00	10.0	--
20	0.80	18.0 (10.0+8.0)	80
30	0.70	25.0 (18.0+7.0)	38.9
40	0.64	31.4 (25.0+6.4)	25.6
50	0.60	37.4 (31.4+6.0)	19.1
60	0.56	43.0 (37.4+5.6)	14.9

It can be seen from the above table that the percentage of learning, or the additional labour input required to double the output goes on increasing, i.e., learning curve is downward sloping.

Learning curve is used in forecasting the future labour requirements. It is also used in measuring the improved proficiency of the operator as output

is increased in estimating reductions in manufacturing losses. It is also used in stabilizing the designs and increasing the lots sizes. It is used in improving the special tooling needed for production and shifting from manual to automation as additional production is required.

It is important to distinguish learning effects from the returns to scale. Returns to scale implies, producing larger quantities for a given increase in inputs. Whereas, learning curve results in lowering of the average cost curve itself. Figure 3.5 helps to understand the two.

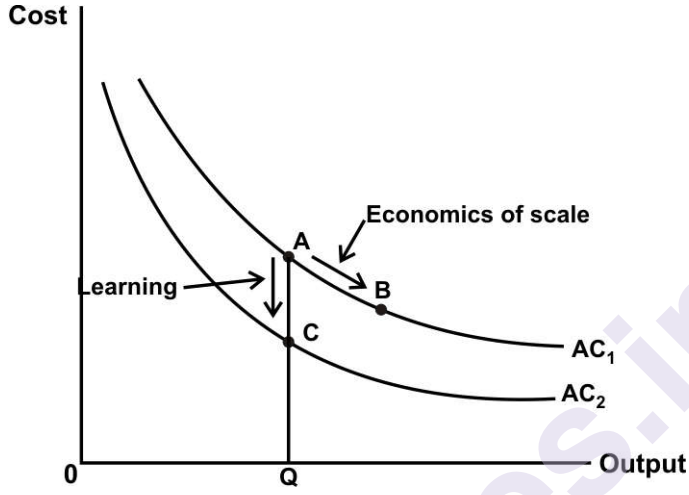

Figure 3.5

In the above diagram, x-axis shows the output and y-axis shows the cost (per unit of output). The movement from A to B on AC_1 (initial average cost) indicates economies to scale and movement from A to C depicts the learning effects which result in the average cost curve from AC_1 to AC_3. The learning curve concept is useful when the firm has to calculate the cost of producing a new product. If a firm is enjoying learning effects, the total labour requirement for producing larger quantities of output increases in smaller increments. Therefore, this concept is useful for a firm deciding whether it would be profitable to enter an industry or not.

3.5 SUMMARY

- Real cost refers to the sacrifices made in the process of production.
- Implicit costs measure the imputed value of inputs owned by the entrepreneur and used in production.
- Economic costs are broader than the accounting costs.
- Total Fixed Cost remains the same at all levels of output.
- AFC never becomes zero.
- MC is 'U'-shaped.
- MC intersects AC and AVC at their minimum points.

- In long-run all factors of production are variable.
- LAC is a locus of all the short-run average cost curves.
- LMC shows the most efficient output of each size of the firm

3.6 QUESTIONS

1. Explain the concepts of money costs and real costs of production.
2. Distinguish between social costs and private costs.
3. The economic concept of costs is broader than the accounting costs.
4. The short-run cost curves are 'U'-shaped.
5. Explain the derivation of the long-run average cost curve.

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4

REVENUE ANALYSIS

Unit Structure:

4.0 OBJECTIVES

- To study various concepts of revenue
- To study the relationship between TR, AR and MR under perfect competition
- To study the relationship between TR, AR and MR under monopoly

4.1 CONCEPTS OF REVENUE

The term revenue refers to the sales receipts obtained by a seller or a firm by selling certain amount of a commodity. There are three concepts of revenue used in economics.

A firm's revenue is classified as under-

1. Total Revenue: - "Total revenue refers to the total amount of sales receipts received by a seller or a firm by selling certain amount of a commodity over a period of time." The total revenue is obtained by multiplying the total quantity of a commodity sold by the price. Therefore, symbolically expressed as **TR = Q × P.**

Where, TR= total revenue, Q = total quantity of a commodity sold and P = price per unit of a commodity.

Total revenue depends upon two important factors i.e. total quantity of a commodity sold and price per unit of a commodity. For example, a firm sells 10 units of a commodity at a price of ₹ 10 per unit. Thus 10 × 10 = 100 is the total revenue. TR of a firm initially goes on increasing up to a certain limit then after it starts falling.

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2. Average Revenue: - "It refers to the price or revenue per unit of a commodity sold." It can be obtained by dividing the TR by the total number of units of a commodity sold (Q). It can be symbolically expressed as **AR = TR / Q**.

Where, AR stands for Average Revenue. With the example, 100 / 10 = 10 is the average revenue.

4. Marginal Revenue – It may be defined as, "Net addition made to the total revenue by selling one more additional unit of a commodity is called as marginal revenue." In other words net increase in total revenue is called as marginal revenue. It can be symbolically expressed as **MR = ΔTR / ΔQ**. Where MR stands for Marginal Revenue, ΔTR = change in total revenue and ΔQ = change in total quantity of a commodity sold.

For e.g. a seller obtains the total revenue of ₹ 90 from the sell of 9 units at price of ₹ 10 per unit. If he increases his sales by one more additional unit (9 to10) his total revenue increases from ₹ 90 to ₹ 100 the net change in TR or MR = ₹ 10.

The relationship between TR, AR and MR are different under different market condition.

4.2 THE RELATIONSHIP BETWEEN TR, AR AND MR UNDER PERFECT COMPETITION

Under perfect competition an individual firm can not influence a given market price. So a firm is a price- taker. Hence, the price remains constant as more and more units are sold. Therefore, an addition made to the total revenue by selling every additional unit of a commodity will always be equal to the given market price. Hence the marginal revenue of a firm is always equal to its average revenue.

Firms Demand Curve:

Under the condition of perfect competition, a firm's demand curve is perfectly elastic i.e. horizontal to 'X' axis at the height of the given market price. So the average revenue of a firm is the same as the price, whatever be the quantity sold. Hence a perfectly elastic demand curve i.e. average revenue curve is also called as marginal revenue curve. This is shown in the following figure.

An Industry's Demand Curve:

Under perfect competition an industry can sell more and more units of a commodity only at a lower price. Hence, the demand curve slopes downward from left to right towards 'X' axis. This is shown in the following figure.

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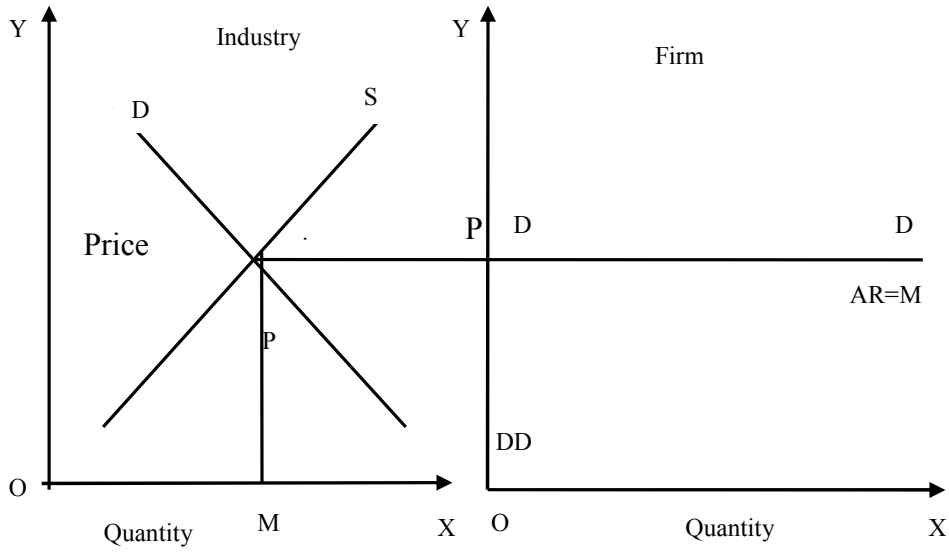

Figure **Figure**

Figure 4.1

The downward sloping demand curve DD is the demand curve of an industry as shown in the above fig. 1 and the horizontal DD curve is a firm's demand curve shows that demand for a commodity is perfectly elastic at the given market price OP as shown in the figure No. 2.

The market price is determined by the total demand for and total supply of the commodity in the market as a whole. This is shown in figure 1. The demand curve slopes downward it shows that the market demand for a commodity increases when its price is reduced and vice-versa.

The relationship between TR, AR and MR under perfect competition:

Let us assume that the price per unit of a commodity is ₹ 10. Hence the AR is constant. The relationship between TR, AR and MR is shown in the following table.

Revenue Schedule of a firm

Table No. 4.1

No. of units ofa commodity	Price ₹	TR Q × P	AR TR / Q	MR ΔTR / ΔQ
1	10	10	10	10
2	10	20	10	10
3	10	30	10	10
4	10	40	10	10
5	10	50	10	10
6	10	60	10	10
7	10	70	10	10

The above table shows that TR increases at a constant rate as more and more units are sold. It also shows that the MR of a firm is always equal to AR or price under perfect competition. We can show graphically the TR, AR and MR in the following figure.

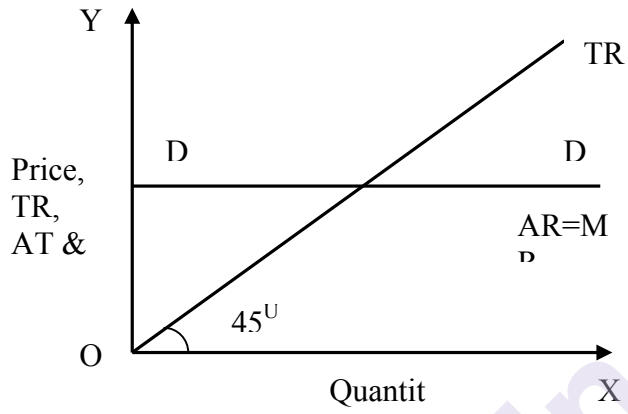

Figure 4.2

In this figure TR is the total revenue slopes upward to the right. The horizontal DD curve is the AR as well as MR curve. This is because the MR curve coincides with the AR curve. It is parallel to the 'X' axis.

4.3 THE RELATIONSHIP BETWEEN TR, AR AND MR UNDER MONOPOLY

Under monopoly the demand curve of a firm for its product slopes downward from left to right. It shows that, such a monopoly firm can sell more only at a lower price. Hence, its total revenue increases at diminishing rate.

A monopoly firm can influence the price. It is a price-maker. A monopolist can charge a high price only by reducing his market supply. A monopolist can fix a high price of his product and sell whatever amount of his product i.e. demanded by consumers.

A monopolist can sell more only by reducing the price of his product. The price is also called AR. So as price is reduced to sell more the AR falls.

When the AR or price declines the MR also falls. So the net addition made to the TR will be less than the price of AR. Hence, TR of a monopoly firm increases at a diminishing rate. For example, suppose a monopoly firm sells 3 units of a commodity at ₹ 8 per unit. Its total revenue will be ₹ 24. If now it wants to sell 4^{th} unit it will have to reduce the price to say ₹ 7 with this price its total revenue will be ₹ 28. Hence, the MR will be only ₹ 4 which is less than the price ₹ 7. This is shown in the following table.

Table No. 4.2

No. of units of a commodity	Price ₹	TR Q × P	AR TR / Q	MR ΔTR / ΔQ
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

It can be seen in the above table that as more and more units of a commodity are sold the TR increases at a diminishing rate. It also shows that as price is reduced the MR is less than AR. With the fall in MR the gape between AR and MR goes on widening. This is because in order to sell one more unit of a commodity the price per unit will have to be reduced.

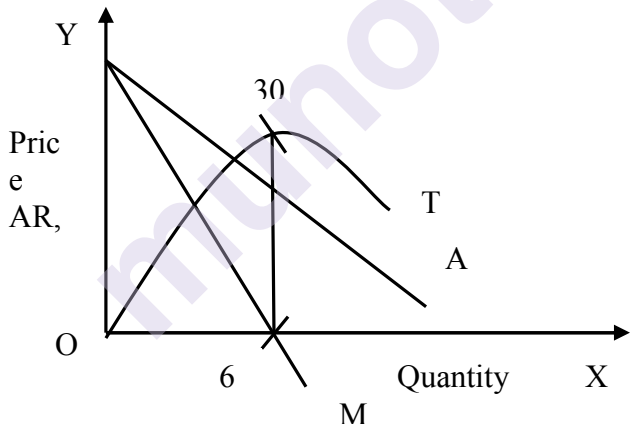

Figure 4.3

When the demand curve AR is sloping downward towards 'X' axis the MR curve also slopes downward and is always below the AR curve. The gap between AR and MR curve goes on widening as the price is reduced. This is shown in the figure.

4.4 RELATIONSHIP BETWEEN AR AND MR CURVES

There is some geometrical relationship between AR and MR curves. The important ones are as follows.

- **Under Perfect Competition:** - MR is always equal to AR from an individual firm's point of view. In this case the AR curve is horizontal to the 'X' axis and the MR curve coincides with AR curve.

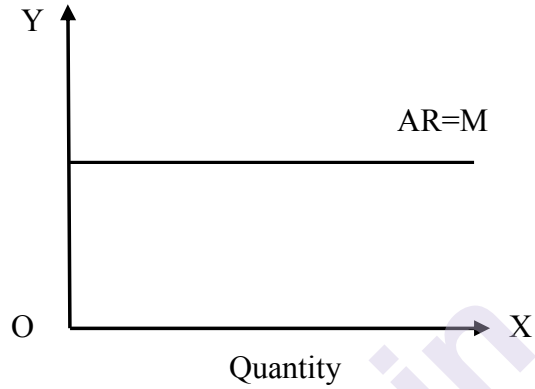

Figure 4.4

- **Under Monopoly:** - The AR curve has a negative slope. Hence, MR curve lies below it. MR curve can cut the 'X' axis and enter the negative quadrant. So MR can be zero or negative, but the AR curve can not intersect the 'X' axis and enter the negative quadrant. This is because price or AR can never be zero or negative. See figure No. 6

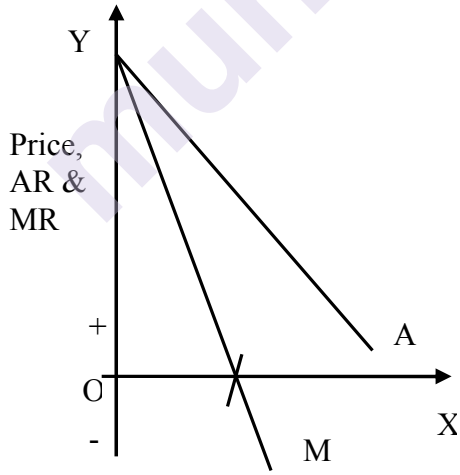

Figure 4.5

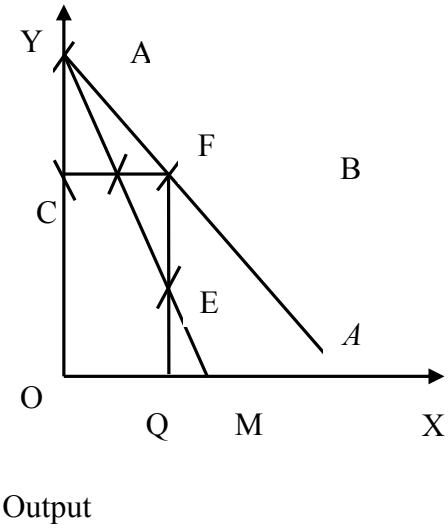

Figure 4.6

- **AR is a straight line or liner demand curve sloping downward under monopoly:** - MR curve is also a straight line sloping downward from left to right. See figure No. 7. The MR curve is below the AR curve it shows that under monopoly MR is less than price or AR. In such a situation MR curve is exactly half a way between AR curve and

'Y' axis. This is because the MR falls twice than the fall in price at each level of output.

At OC price OQ amount is demanded thus we get F point on AR curve. The line CF is drawn. The MR curve cuts the line CF at point B. CF is the distance between 'Y' axis and AR curve. To prove this we have to prove that CB = BF. It can be prove that triangle ACB and EFB are equal in area and are also similar. So CB = BF. This indicates that point B is exactly in the middle of the line CF since MR curve passes through the point B which lies exactly half a way between AR curve and Y axis.

- **If the AR curve is convex:** - The MR curve which is below the AR curve is close to the Y axis i.e. the MR curve is less than half way between the Y axis and AR curve. This is shown in the figure No.8.

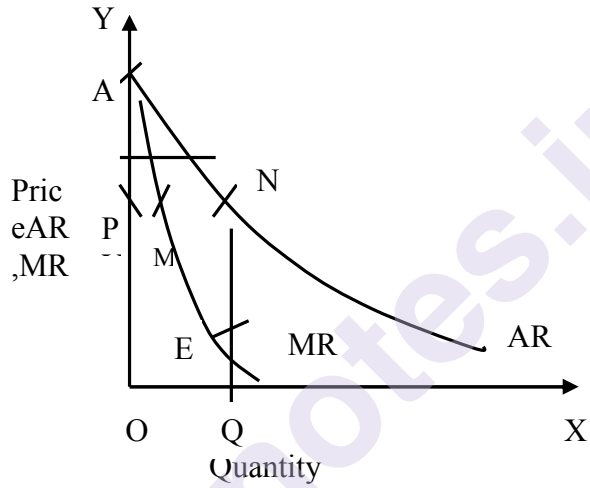

Figure 4.7

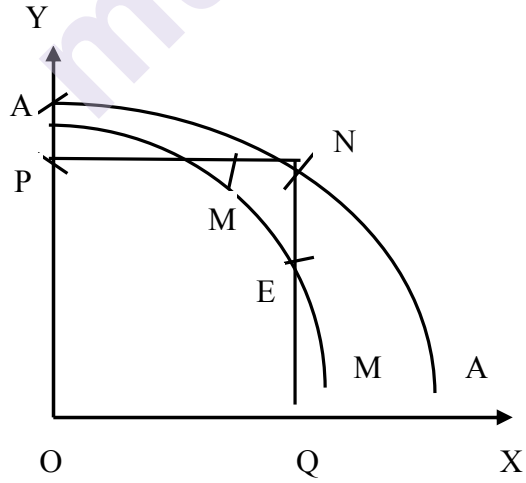

Figure 4.8

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In the above diagram the distance between Y axis and MR curve is less than half way between the Y axis and AR curve i.e. PM is less than MN or the triangle APM is smaller than the triangle EMN.

- **If AR curve is concave: -** The MR curve which is below the AR curve is closer to AR curve i.e. MR curve is more than half way between the Y axis and AR curve. This is shown in the above figure No. 9.

In the diagram the distance between Y axis and MR curve is more than the distance between MR curve and AR curve i.e. PM is more than MN or the triangle APM is larger than EMN.

4.5 QUESTIONS

1. Explain the different concepts of Revenue.
2. Discuss the relationship between TR, AR & MR under perfect competition.
3. Discuss the relationship between TR, AR & MR under monopoly.

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Module III

5

FACTOR PRICING: RENT AND WAGE

Unit Structure:

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5.0 OBJECTIVES

- Explain the marginal productivity theory of distribution.
- To understand Ricardian Theory of Rent.
- To study Modern Theory of Rent and Quasi Rent.
- To understand the concept of wages.
- To study modern theory of wages.
- To understand the concept of collective bargaining.
- To study the supply curve of labour.

5.1 INTRODUCTION

This unit will deliver you the detail knowledge of Marginal Productivity Theory of Distribution, Meaning and Definitions of Rent, Ricardian Theory of Rent, Modern Theory of Rent, the Concepts of Quasi Rent,

Meaning and Definitions of Wages, Modern Theory of Wages, Concept of Collective Bargaining, the Supply Curve of Labour etc.

5.2 MARGINAL PRODUCTIVITY THEORY OF DISTRIBUTION

The marginal productivity theory of distribution is developed by J. B. Clark, at the end of the 19th century which provides a general explanation of how the price (of the earnings) of a factor of production is determined.

In other words, it suggests some broad principles regarding the distribution of the national income among the four factors of production.

According to this theory, the price (or the earnings) of a factor tends to equal the value of its marginal product. Thus, rent is equal to the value of the marginal product (VMP) of land; wages are equal to the VMP of labour and so on. The neo-classical economists have applied the same principle of profit maximisation (MC = MR) to determine the factor price. Just as an entrepreneur maximises his total profits by equating MC and MR, he also maximises profits by equating the marginal product of each factor with its marginal cost.

Assumptions of the Theory:

The marginal productivity theory of distribution is based on the following seven assumptions:

1. Perfect competition in both product and factor markets:

Firstly, the theory assumes the perfect competition in both product and factor markets. It means that both the price of the product and the price of the factor (say, labour) remains unchanged.

2. Operation of the law of diminishing returns:

Secondly, the theory assumes that the marginal product of a factor would diminish as additional units of the factor are employed while keeping other factors constant.

3. Homogeneity and divisibility of the factor:

Thirdly, all the units of a factor are assumed to be divisible and homogeneous. It means that a factor can be divided into small units and each unit of it will be of the same kind and of the same quality.

4. Operation of the law of substitution:

Fourthly, the theory assumes the possibility of the substitution of different factors. It means that the factors like labour, capital and others can be freely and easily substituted for one another. For example, land can be substituted by labour and labour by capital.

5. Profit maximisation:

Fifthly, the employer is assumed to employ the different factors in such a way and in such a proportion that he gets the maximum profits. This can be achieved by employing each factor up to that level at which the price of each is equal to the value of its marginal product.

6. Full employment of factors:

Sixthly, the theory assumes full employment for factors. Otherwise, each factor cannot be paid in accordance with its marginal product. If some units of a particular factor remain unemployed, they would be then willing to accept the employment at a price less than the value of their marginal product.

7. Exhaustion of the total product:

Finally, the theory assumes that the payment to each factor according to its marginal productivity completely exhausts the total product, leaving neither a surplus nor a deficit at the end.

Some Key Concepts:

The theory is also based on key certain concepts.These are the following:

1. MPP:

The first is marginal physical product of a factor. The marginal physical product (MPP) of a factor, say, of labour, is the increase in the total product of the firm as additional workers are employed by it.

2. VMP:

The second concept is value of marginal product. If we multiply the MPP of a factor by the price of the product, we would get the value of the marginal product (VMP) of that factor.

3. MRP:

The third concept is marginal revenue product (MRP). Under perfect competition, the VMP of the factor is equal to its marginal revenue product (MRP), which is the addition to the total revenue when more and more units of a factor are added to the fixed amount of other factors, or MRP = MPP x MR under perfect competition. It is simply MPP multiplied by constant price, as P = MR. [VMP of a factor = MPP of the factor x price of the product per unit, and MRP of a factor=MPP of the factor x MR under perfect competition. So under perfect competition VMP of a factor = MRP of that factor.]

The Essence of the Theory:

The theory states that the firm employs each factor up to that number where its price is equal to its VMP. Thus, wages tend to be equal to the VMP of labour; interest is equal to VMP of capital and so on. By equating

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VMP of each factor with its cost a profit- seeking firm maximises its total profits. Let us illustrate the theory with reference to the determination of the price of labour, i.e., wages.

Let us suppose that the price of the product is Rs. 5 (constant) and the wages per unit of labour are Rs. 200 (constant). As the number of factors other than labour remain unchanged, wages represent the marginal cost (MC).

Table 5.1: Calculation of MPP, VMP and MRP of a Variable Factor (Labour)

Land	Capital	Labour	Total Product	MPP of Labour	VMP or MRP of Labour	The Wage Rate AW = MW
1 unit	1 unit	1 unit	10 unit	-	-	Rs. 20
1 unit	1 unit	2 unit	16 unit	6 unit	Rs. 30	Rs. 20
1 unit	1 unit	3 unit	21 unit	5 unit	Rs. 25	Rs. 20
1 unit	1 unit	4 unit	25 unit	4 unit	Rs. 20	Rs. 20
1 unit	1 unit	5 unit	28 unit	3 unit	Rs. 15	Rs. 20
1 unit	1 unit	6 unit	30 unit	2 unit	Rs. 10	Rs. 20

Table 5.1 shows that at 2 or 3 labourers, the VMP or MRP of labour is greater than wages; so the firm can earn more profits by employing an additional labour. But at 5 or 6 labourers, the VMP or MRP of labour is less than wages, so it would reduce the number of labourers. But when it employs 4 labourers, the wage rate (Rs. 20) becomes equal to the VMP or MRP of labour (also Rs. 20). Here the firm gets the maximum profits because its marginal cost of labour (or marginal wage Rs. 12) is equal to its marginal revenue (VMP or MRP, Rs. 20).

Thus, under the assumption of perfect competition a firm employs a factor up to that number at which the price of the factor is just equal to the value of the marginal product (=MRP of the factor). In the same way it can be shown that rent is equal to the VMP of land, interest is equal to the VMP of capital, and so forth.

The theory may now be illustrated diagrammatically. See Fig. 12.2. Here WW is the wage line indicating the constant rate of wages at each level of employment (AW = MW. Here AW is average wage and MW is marginal wage). The VMP line shows the value of marginal product curve of labour, and it goes downwards from left to right indicating diminishing MPP of labour. Fig. 12.2 shows that the firm employs OL number of labourers, because by doing so it equates the MRP of labour with the wage ratio, and makes optimum purchase of labour.

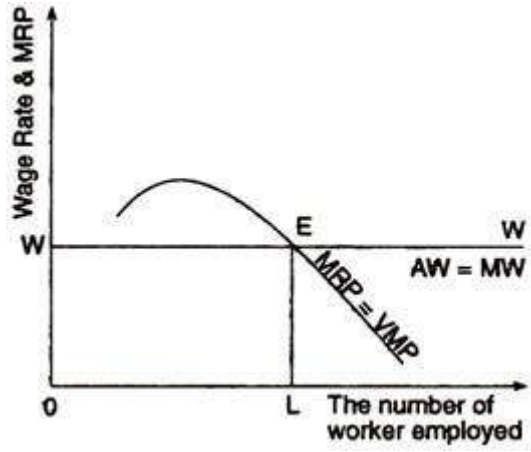

Fig. 5.1 Wage Determination

Criticisms of the Theory:

The marginal productivity theory of distribution has been subjected to a number of criticisms:

1. In determination of marginal product:

Firstly, main product is a joint product— produced by all the factors jointly. Hence the marginal product of any particular factor (say, land or labour) cannot be separately determined. As William Petty pointed out as early in 1662: Labour is the father and active principle of wealth, as lands are the mother.

2. Unrealistic:

It is also shown that the employment of one additional unit of a factor may cause an improvement in the whole of organisation in which case the MPP of the variable factors may increase. In such circumstances, if the factor is paid in accordance with the VMP, the total product will get exhausted before the distribution is completed. This is absurd. We cannot think of such a situation in reality.

3. Market imperfection:

The theory assumes the existence of perfect competition, which is rarely found in the real world. But E. Chamberlin has shown that the theory can also be applied in the case of monopoly and imperfect competition, where the marginal price of a factor would be equal to its MRP (not to its VMP).

4. Full employment:

Again, the assumption of full employment is also unrealistic. Full employment is also a myth, not a reflection of reality.

5. Difficulties of factor substitution:

W. W. Leontief, the Nobel economist, denies the possibility of free substitution of the factors always owing to the technical conditions of

production. In some products process, one factor cannot be substituted by another. Moreover organisation or entrepreneurship is a specific factor which cannot be substituted by any other factor.

6. Emphasis on the demand side only:

The theory is one-sided as it ignores the supply side of a factor; it has emphasised only the demand side i.e., the employer's side, hi the opinion of Samuelson, the marginal productivity theory is simply a theory of one aspect of the demand for productive services by the firm.

7. Inhuman theory:

Finally, the theory is often described as 'inhuman' as it treats human and non-human factors in the same way for the determination of factor prices.

5.3 RENT

Rent has one meaning in popular usage and another related, but not identical, in economic theory. To a layman, rent is a periodic payment made regularly for the hire of a good or a service. But when interpreted in economic terms, it is applied to payments made for factors of production which are in imperfectly elastic supply with land as main example (stories & Hague). The rent of a house, for instance, includes, beside the payments made for the use of land, elements of interest and depreciation on the sums invested in the past. All these elements cannot form the part of 'pure of economic rent'. Such a term, used colloquially, can be described as 'contractual rent'. But economic rent is a payment made for the use of 'Scarce' factor. Land being a fixed, is a leading example of 'rent-earning' factor. As P.W. Bell and M.P.Todaro put it, "We many pay a homage to the theory by calling this payment to a completely inelastic factor, as pure economic rent."

a) Scarcity rent

Land earns rent is two forms. (1) Scarcity rent (2) differential rent. If the plots of land are assumed as homogeneous, both in their fertility, as well as, their site then the limited supply of land in relation to their demand gives rise to a surplus, which is called as **Scarcity rent**.

b) Differential rent

If the land is taken as heterogeneous factor i. e. if plots of land are gradable, according to their fertility or site, then the limited supply relatively to their demand, result in different rent.

5.4 RICARDIAN THEORY OF RENT

David Ricardo, an English classical economist, first developed a theory in 1817 to explain the origin and nature of economic rent.

Ricardo used the economic and rent to analyse a particular question. In the Napoleonic wars (18.05-1815) there were large rise in corn and land prices.

Did the rise in land prices force up the price of corn, or did the high price of corn increase the demand for land and so push up land prices. Ricardo defined rent as, "that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil." In his theory, rent is nothing but the producer's surplus or differential gain, and it is found in land only.

Assumptions of the Theory:

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

1. Rent of land arises due to the differences in the fertility or situation of the different plots of land. It arises owing to the original and indestructible powers of the soil.

2. Ricardo assumes the operation of the law of diminishing marginal returns in the case of cultivation of land. As the different plots of land differ in fertility, the produce from the inferior plots of land diminishes though the total cost of production in each plot of land is the same.

3. Ricardo looks at the supply of land from the standpoint of the society as a whole.

4. In the Ricardian theory it is assumed that land, being a gift of nature, has no supply price and no cost of production. So rent is not a part of cost, and being so it does not and cannot enter into cost and price. This means that from society's point of view the entire return from land is a surplus earning.

REASONS FOR EXISTENCE OF RENT

According to Ricardo rent arises for two main reasons:

(1) Scarcity of land as a factor and

(2) Differences in the fertility of the soil.

Scarcity Rent:

Ricardo assumed that land had only one use—to grow corn. This meant that its supply was fixed, as shown in Figure 13.1. Hence the price of land was totally determined by the demand for land. In other words, all the price of a factor of production in perfectly inelastic supply is economic rent—it has no transfer earnings.

Thus, it was the high price of corn which caused an increase in the demand for land and a rise in its price, rather than the price of land pushing up the price of corn. However, this analysis depends on the assumption that land has only one use. In the real world a particular piece of land can be put to many different uses. This means its supply for any one use is elastic, so that it has transfer earnings.

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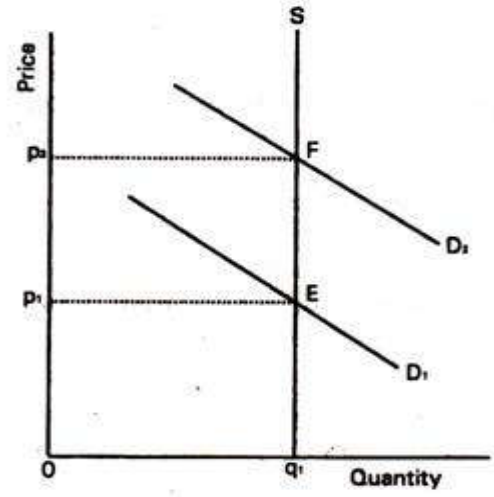

Figure No. 5.2: Earnings of a Factor in Fixed Supply

Differential Rent:

According to Ricardo, rent of land arises because the different plots of land have different degree of productive power; some lands are more fertile than others. So there are different grades of land. The difference between the produce of the superior lands and that of the inferior lands is rent—what is called differential rent. Let us illustrate the Ricardian concept of differential rent.

Differential Rent on account of differences in the fertility of soil:

Ricardo assumes that the different grades of lands are cultivated gradually in descending order—the first-grade land being cultivated at first, then the second grade, after that the third grade and so on. With the increase in population and with the consequent increase in the demand for agricultural produce, inferior grades of lands are cultivated, creating a surplus or rent for the superior grades. This is illustrated in Table 13.1.

Table 5.1: Calculation of Differential Rent

Grade of Land (the same size)	Total Produce and its Value	Cost of Production	Rent	Status of land
1st	40 kg×Rs. 5 = Rs. 200	Rs. 100	Rs. 100	Above-marginal Land
2nd	30 kg×Rs. 5 = Rs. 150	"	Rs. 50	"
3rd	20 kg×Rs. 5 = Rs. 100	"	Nil	Marginal (or No Rent) Land
4th	15 kg.×Rs. 5 = Rs. 75	"	Rs. –25	Below-marginal Land

Table 5.1 shows the position of 3 different plots of land of equal size. The total cost is the same for each plot of land. Let us assume that the order of

cultivation reaches the third stage when all the three plots of land of different grades are cultivated and the market price has come to the level of Rs. 5 per kg of wheat.

The first-grade land, being the most fertile, produces 40 kg, the second grade 70 kg and the third-grade land, being less fertile, only 20 kg. So, the first-grade land earns a surplus or rent of Rs. 100, the second grade a rent of Rs. 50 and the third one earns no surplus. The first two plots are called the intra-marginal and the third one is the marginal (or no-rent) land. This simple example shows how the differences in the fertility of the different plots of land create rent for the superior plots of lands.

The concept of differential rent arising due to differences in the fertility of different plots of land is illustrated in Fig. 5.2.

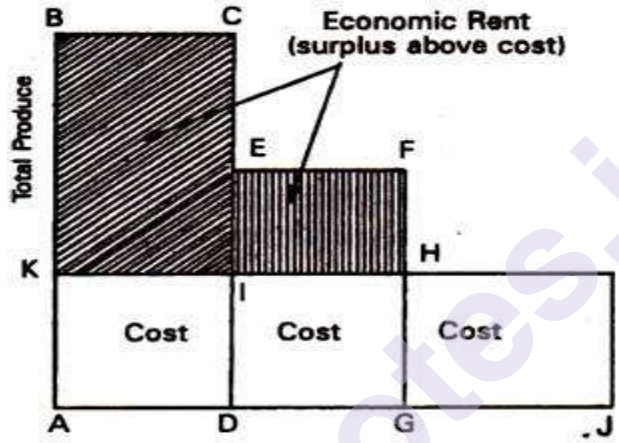

Figure No. 5.3: Differential Rent

Here, AD, DG and GJ are three separate plots of land of the same size, but of difference in fertility. The total produce of AD is ABCD, that of DG is DEFG and that of GJ is GHIJ. The first and second plots of land generate a surplus show by the shaded area, which represents the rent of the first two plots of land. Since the third plot GJ has no surplus, it is marginal land or no-rent land. Grade 4 (below-marginal) land will not be cultivated, because rent is negative (Rs. 25 in this example).

Rent and Price:

From the Ricardian theory we can show the relation between rent (of land) and price (of wheat). Since the market price of wheat is determined by costs of the marginal producer and since, for this marginal producer, rents are zero, Ricardo concluded that economic rent is not a determinant of market price. Rather, price of wheat is determined solely by the market demand for wheat and the availability of fertile land.

Deductions from the Theory:

If rent depends on price and on the superiority of rent-producing land over marginal land, we can deduce the following:

1. Improved methods of farming:

Improved methods of cultivation may lead to a fall in rent (demand remaining unchanged). It is because increased output on the superior grades of land will make the cultivation of inferior grades of land unnecessary.

2. Population growth:

Population growth is likely to lead to a rise in rent, since the increased demand for land will bring poor quality land into cultivation, thus lowering the output of marginal land. Thus, if the price of food increases, the rent of existing land will increase.

3. Improved transport facilities:

Improved transport facilities are likely to lead to a fall in rent. It is because the output of less fertile land of foreign countries may be able to compete more closely with the home produce. So, there will be no need to cultivate inferior home areas. As a result, the output of the marginal land rises and rent falls.

Thus, it is difficult to say whether or not rent increases with economic progress. However, rent is likely to fall with economic progress if population growth is unable to fully neutralise the effects of technological progress and improvement in transport facilities.

Criticisms of the Theory:

Ricardian theory has been criticised on the following grounds:

1. Ricardo considers land as fixed in supply. Of course, land is fixed in an absolute sense. But land has alternative uses. So, the supply of land to a particular use is not fixed (inelastic). For example, the supply of wheat land is not absolutely fixed at any given time.

2. Ricardo's order of cultivation of lands is also not realistic. If the price of wheat falls the marginal land need not necessarily go out of cultivation first. Superior grades of land might cease to be cultivated if a fall in the price of its output causes such land being demanded for other purposes (e.g., for constructing houses).

3. The productivity of land does not depend entirely on fertility. It also depends on such factors as position, investment and effective use of capital.

4. Critics have pointed out that land does not possess any original and indestructible powers, as the fertility of land gradually diminishes, unless fertilisers are applied regularly.

5. Ricardo's assumption of no-rent land is unrealistic as, in reality; every plot of land earns some rent, although the amount may be small.

6. Ricardo restricted rent to land only, but modern economists have shown that rent arises in return to any factor of production, the supply of which is inelastic.

7. According to Ricardo, rent does not enter into price (cost) but from the point of view of an individual farm rent forms a part of cost and price.

Conclusion:

In spite of the various shortcomings of the Ricardian theory, it cannot be discarded—as Stonier and Hague remarked — "The concept of transfer earnings helps to bring the simple Ricardian theory of rent into closer relation with reality."

5.5 MODERN THEORY OF RENT

Modern theory of rent does not confine itself to the reward of only land as a factor of production.

Rent in modern sense can arise in respect of any factor of production, and not merely land. Rent is a surplus. In the sense of surplus, rent is a payment in excess of transfer earnings.

Transfer earnings mean the amount of money which any particular unit could earn in its next best alternative use. Suppose a piece of land under cotton is yielding Rs. 150 and its next best use wheat fetches Rs. 100. The transfer earnings are Rs. 100 and, therefore, in its present use it is giving a surplus of Rs. 50.

We can also define transfer earnings as the minimum sum which must be paid for a unit of a factor of production in order to induce it to staty in its present use or employment. In the above example, a sum of Rs. 100 at least must be paid for the land under cotton in order to retain it under cotton; otherwise it will shift to wheat, which is its next best alternative use where it can fetch Rs. 100. Actually, this piece of land is earning Rs. 150, i.e., Rs. 50 extra or in excess of its transfer earnings. This is economic rent. Economic rent in this sense is thus the difference between the present earnings and the transfer earnings.

This concept of rent is applicable not merely to land but also to all factors of production i.e. labour, capital and entrepreneur's earnings too. They can all earn economic rent in the sense that the modern economists use the term 'rent'.

How Rent arises:

Rent in the sense of surplus arises when the supply of land, or for that matter that any other factor service, is less than perfectly elastic.

From the point of elasticity of supply, there are three possibilities:

(a) The supply may be perfectly elastic, which can be shown as a horizontal straight line, as in Fig. 5.3 above.

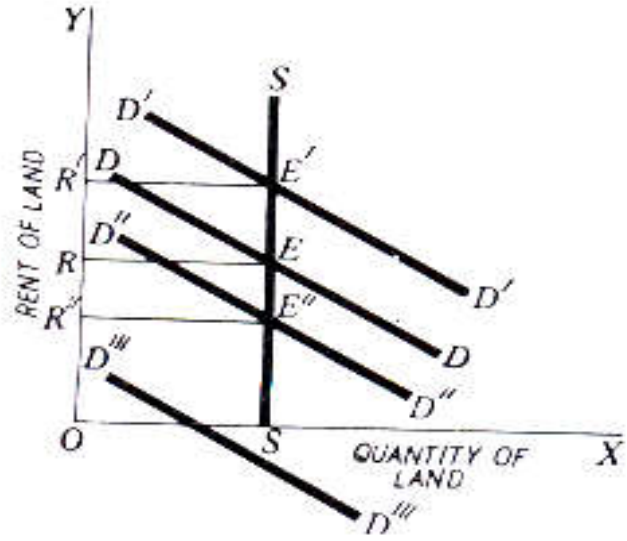

Figure No. 5.4: Determination of Rent under Inelastic Supply of Land

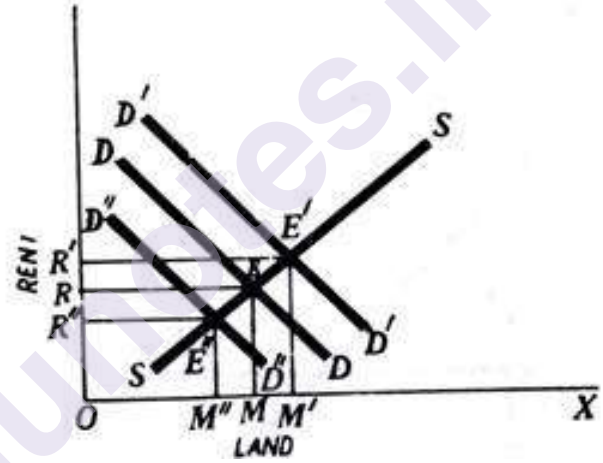

Figure No. 5.5: Determination of Rent under Elastic Supply of Land

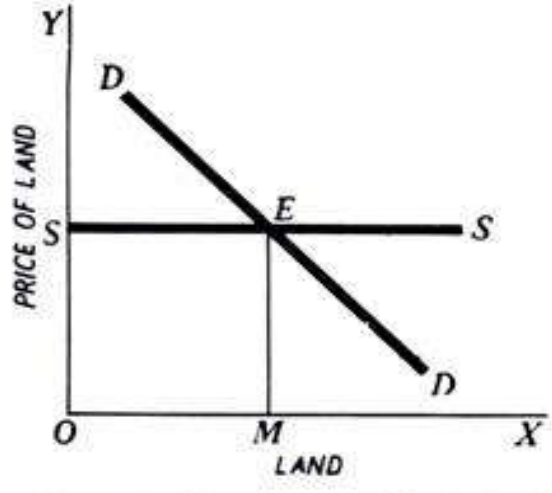

Figure No. 5.6: Determination of Rent under Elastic Supply of Land

(b) The supply of land may be absolutely inelastic. This is shown in Fig. 5.3 by a vertical straight line.

(c) There is the situation in between these two extremes, i.e., it is elastic, but not perfectly elastic. This is shown in Fig. 5.4.

In these three conditions, rent as a surplus over transfer earnings will be different.

If the supply is absolutely inelastic (see Fig. 5.3), the transfer earning is zero, because land cannot be transferred to any use; the supply of land is fixed, and it has only one use, whether it is used or not. In this case, the entire income from land is surplus, and hence rent.

When the supply of land is perfectly elastic, there will be no surplus and the actual earnings and transfer earnings will be equal. For example, for an individual firm or farmer, the supply of land is perfectly elastic.

Suppose the supply is elastic but not perfectly elastic, then a part of income from land is rent (in the sense of surplus over transfer earnings), and a part is not rent.

These three conditions are represented in the diagrams as mentioned below:

In Fig. 5.3, DD is the demand curve and SS a vertical straight line fixed supply curve. They intersect at E. Here OS is the quantity of land used. OR (=SE) is the rent per unit and total earnings are OSER. Since land is fixed in supply and cannot be transferred to any other use, its transfer earnings are zero. Hence its entire earnings OSER are rent as surplus over transfer earnings.

For the economy as a whole, land has no alternative use at all. Hence the transfer earnings of land, from the point of view of economy as a whole, are zero and all the earnings are rent.

In Fig. 5.5, the supply curve SS of land is a horizontal straight line which is perfectly elastic. DD is the demand curve. The two intersect at E. In this case, OM land is put to use. The rent per unit is OS (=EM) and the total earning is OMES. The transfer earning is also OMES. If this firm does not pay OS rent, the land will be transferred to some other use or firm. Since transfer earnings and actual earnings are equal, there is no surplus or rent.

In Fig. 5.7, SS supply curve is somewhat elastic. It cuts DD demand curve at E. In this case, OM land is used and the rent per unit is OR (= ME). The total earnings are OMER and the transfer earnings are OMES. If we deduct transfer earnings OMES from the actual earnings OMER, we get RES (shaded area). This is surplus or rent.

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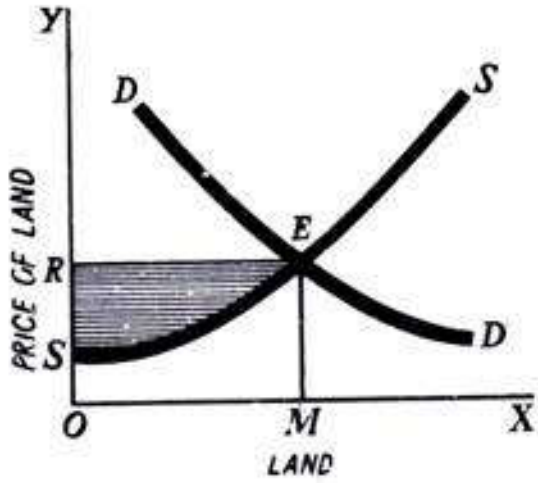

Figure No. 5.7: Rent as Surplus over Transfer Earnings

Surplus in Other Factors Too:

It should be borne in mind that the above analysis with regard to rent as surplus over transfer earnings is applicable not only to the share of land, but also to the shares of other factors, viz., wages, interest and profits. This applies to all cases where the supply of a factor is less than perfectly elastic. In such cases, a part of present earnings is the transfer earnings and the remainder is economic rent.

Comparison between the Ricardian Theory and the Modern Theory of Rent:

Now that we have studied the two main theories of rent, viz., the Ricardian theory (or the classical theory) and the modern theory of rent, we should be in a position to distinguish between the two. We can see that both theories regard rent as a surplus.

In Ricardo's theory, the surplus is due to superiority (or natural differential advantage) of the land in question over the marginal one. The superiority may be due to either quality of the land or better situation. Also both theories of rent have the same concept of land, i.e. a natural factor rather than a man-made factor like capital, but then where is the difference between the two theories.

The difference between two is basic and it lies in this that while Ricardo takes agricultural land (the cultivation of which is subject to the law of diminishing returns sooner or later), the modern economists, on the other hand, do not confine the concept of rent to agricultural land only.

As we have said earlier, rent can arise in the sense of surplus in the case of other factors of production also and even in a situation of increasing returns. Rent represents the opportunity cost or transfer earnings. In this sense, rent is of a more general nature applicable to all factors. That is why it is said. "It (land rent) is leading specie of large genus". That is, land rent is not a separate class by itself. It is only a prominent example of its type.

5.6 QUASI RENT

Quasi literally means 'almost'. Quasi- rent is, therefore, a payment which is almost rent but is not exactly economic rent.

Similar abnormal earnings or surplus may also arise in the case of other durable goods like houses and machines.

Similarly, quasi-rent may also arise due to a temporary scarcity of a particular kind of skill which can be increased only if enough time is given.

From the Ricardian theory of rent, a person might conclude that rent is a kind by itself and does not resemble any other payment. But this is not so. The peculiarity of land after all is that all its stock is fixed for ever. Rent arises from this peculiarity. That is why Benham defines rent as "a surplus accruing to a specific factor, the supply of which is fixed."

Now no other factor is permanently fixed like land. But whenever the supply of any other factor is fixed even temporarily, its return resembles rent and is called quasi-rent. Thus, an element of rent is present in interest, wages and profits, and is called quasi-rent. It lasts only for a short period of time and disappears when conditions become normal.

This concept of quasi-rent was introduced in economic theory by Marshall. It is an extension of the Ricardian concept of rent to the short-run earnings of capital equipment (such as machinery, buildings), which is in inelastic supply in the short-run, that is, whose supply cannot be increased in the short period. For example, during the last war merchant shipping became scarce. New ships could not replace the lost ones quickly as ships take long to build. As a result, the existing vessels began to charge high freights and earned exceptional profits.

These profits were temporary, because had the need lasted long enough, new- ships would have been constructed and profits reduced to normal. Such abnormal earnings, during the period the supply of machines or ships is fixed, are termed by Marshall as 'quasi-rent'.

Quasi literally means 'almost'. Quasi- rent is, therefore, a payment which is almost rent but is not exactly economic rent. Similar abnormal earnings or surplus may also arise in the case of other durable goods like houses and machines. Similarly, quasi-rent may also arise due to a temporary scarcity of a particular kind of skill which can be increased only if enough time is given.

It is the whole income and not extra income:

It may clearly be understood that quasi-rent stands for the whole of the earnings or income rather than the additional income. This income some agents of production yield when demand for them has suddenly increased, while their supply cannot be increased readily in response to that increase in demand.

Hence, quasi-rent is a short period concept. The adjoining diagram (Fig. 5.8) shows quasi-rent. Here SS, a vertical straight line, is the absolutely inelastic supply curve for machines. It cuts the demand curve DD at E. At the price OP (=SE), OS machines are supplied. If, in the short run, demand increases to D'D', the price will go up to OP' =SE'), but the supply of machines remains OS.

Since the number of machines is fixed in the short-run, the transfer earnings are zero, the whole earnings OSE'P' are quasi-rent. But in the long run, the supply of machines will increase to OM, because the supply is inelastic only in the short-run; it is perfectly elastic in the long run, which is represented by PL so that any number of machines can be supplied at OP. The price now comes down to E"M (= OP). The quasi-rent has vanished, because the price E" M just covers the supply price OP.

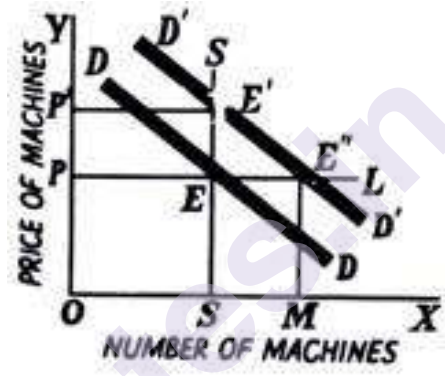

Figure No. 5.8: Quasi Rent

Rent, Quasi-rent and Interest:

Rent, we know, is a payment for the use of land. Quasi-rent is yielded by machinery and capital equipment i.e. old invested capital or 'sunk' capital, and interest is the return on new investments of capital. They are all fundamentally similar in that they are all scarce in- relation to demand for them. They all yield a differential surplus arising from limitation of their supply only the duration of the limitation of supply varies.

For instance, land is permanently limited and its supply is absolutely inelastic. That is why; it is put in a separate category. Since its supply is limited permanently, it is a perennial source of surplus income called rent. The supply of machinery, etc., is, however, limited for a short period because it takes some time to produce it. Its supply is, therefore, elastic but not so elastic i.e., it is less than perfectly elastic.

It also yields a surplus but only in the short-run. In the long run, more machines can be produced and the surplus will disappear. This is quasi-rent. On the other hand, the supply of new capital which yields interest is perfectly elastic. It cannot, therefore, yield any surplus. Thus, we find that rent, quasi-rent and interest are practically the same. They are derived from assets which differ only in the duration for which their supply is

limited. The difference between them is only a matter of degree and not of kind.

As Marshall observes, "that which is rightly regarded as interest on free or floating capital or on new investments of capital is more properly treated as a sort of rent—a quasi-rent on old investments of capital. And there is no sharp line of distinction between floating capital and that which has been sunk for a special branch of production, nor between new and old investments of capital; each group shades into the other gradually."

Rent is from land whose supply is inelastic absolutely, quasi-rent from sunken capital whose supply is inelastic temporarily and interest from floating capital whose supply is perfectly elastic. But all these differential surpluses are fundamentally similar. That is why it is said that "Rent is leading specie of a large genus."

Incomes from investments, whether in permanent assets like land or in semi-permanent things like machines or in perishable articles, are absolutely alike from the point of view of working of economic principles. The principle of scarcity is the basic principle which is applicable in all cases. Hence, rent, quasi-rent and interest are essentially similar.

Rent Element in Wages and Profits:

We know that skilled labour producing essential goods earns abnormal wages in times of war. This is due to the- scarcity of trained labour. Such extra earnings, too, resemble rent. The case of organisation is not different. For instance, if a health resort becomes very popular all at once, the hotel-owners there will make good profits till new hotel-keepers are attracted, and profits are reduced to the normal rate. During this short period, organization will earn surplus income resembling rent.

Just as some lands are more fertile than others, similarly some people are superior to others. A Laurel or a Hardy differs from a wayside joker. A Raj Kapoor on the screen will earn much more than a second rate actor. AH trades make extra payment to really gifted people. Special incomes due to these gifts are called Rent of Ability or "Personal Rent".

It, thus, follows from the above discussion that land rent does not form a separate class by itself. It is only a prominent example of its kind. Or, as Marshall describes it, "It is a leading specie of a large genus." Element of rent is present at times in wages, interest and profits.

5.7 MODERN THEORY OF WAGES

Modern theory of wages regards wages as a price of labour and all other prices determined by the usual supply and demand analysis. According to this approach, wages are determined by the interaction of market forces of demand and supply.

Demand for Labour:

The demand for labour comes from the entrepreneurs as it is used for the production of goods and services. Thus, the demand for labour depends upon the productivity of labour i.e., the higher the productivity of labour, the greater will be the demand for it from employers. Thus, demand for labour depends upon the marginal productivity of labour; since the marginal productivity of labour will slope downwards after a stage, the demand curve of labour will also slope downward.

Factors Affecting the Demand for Labour:

1. Technological Changes:

Technological changes influence the marginal productivity of labour. Therefore, these changes also influence the demand for labour.

2. Derived Demand:

Demand for labour is a derived demand. It means that demand for labour depends upon the demand for goods and services which it produces. If at any given time the demand for a particular commodity produced by the labour is high, it is natural that the demand for labour shall also be high. Hence, the greater is the consumer demand for the product, the higher will be the demand for the labour to produce that commodity.

3. Proportion of Labour:

The demand for labour also depends upon the proportion in which labour is mixed with other factors of production. When a small amount of labour is engaged in the production of a product, the demand for that type of labour is inelastic. For instance, the demand for labour for operating automatic machines or latest machines in large scale factories is inelastic.

4. Cost of other Factors:

The demand for labour depends upon the cost of other factors of production which can be used as substitute for labour. If substitute factors are costly, the entrepreneur will naturally substitute labour in place of costly factor.

In such a case the demand for labour will be high. If the prices of substitute factors which can be used in place of labour have declined, the substitute factor will be used in place of labour. Hence, the demand for labour will decline.

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This can be shown with the help of Fig. 5.9:

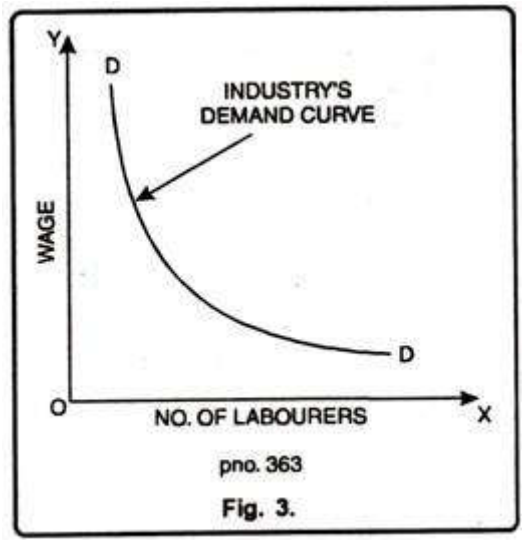

Figure No. 5.9

In Fig. 5.8 number of labourers has been measured on OX-axis and the wage rate on Y-axis. DD is the industry's demand curve. It slopes downward from left to right indicating that when wages are low, demand for labourers increases and when the wage rate tends to increase, demand for labour decreases.

Supply of Labour:

Supply of labour in an economy depends upon both economic as well as non-economic factors. Economic factors influencing the supply of labour comprises of existing employment, desire to increase monetary income, bargaining power of the labourers, size of population, income distribution etc. while the non-economic factors consist of family affection, social conditions, domestic environment etc.

Psychological factors also affect the supply of labour. It is only due to the psychological factors that a worker decides how much time he should devote to work and how much to leisure. Moreover, the supply of labour also depends on the elasticity.

The supply of labour for a firm is perfectly elastic, so, the firm at current wages can employ as many workers as it wishes. On the contrary the nature of supply of labour for an industry is not infinitely elastic. Thus, it cannot employ more and more labourers at the current wage rate. The industry can do so by attracting labourers from other industries by offering them higher wages. Following diagram clears this point more vividly.

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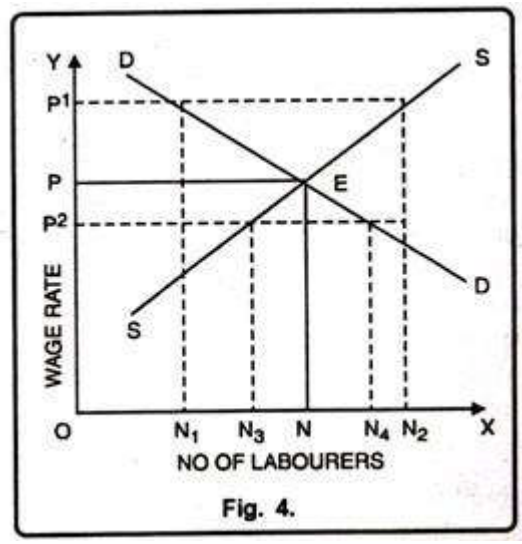

Figure No. 5.10

In Fig. 5.10 hours supplied has been taken on X-axis and wages on Y-axis. SS is the backward bending supply curve. OW relates to the initial wage rate. When the wage rate is OW', the hours supplied are OX_1. The maximum working hours are OX at wage rate OW. Now suppose the wage rate increases to OW", in that case hours supplied will decrease to OX_1. Thus, we may conclude that like other factors of production, supply curve of labour is also upward sloping from left to right.

Factors Affecting Supply of Labour:

1. Size of Population:

The supply of labour depends upon several factors. In the first place, the supply at any given time depends upon the number of labourers in the country. This, in itself is a result of the size of population and that proportion of this population which is called working population.

The size of population is determined by the difference in birth rate and the death rate. The proportion of total population which is called working population depends upon occupational distribution, level of technical advancement, conservation and mobility of labour.

2. Efficiency of Labour:

The supply of labour does not merely depend upon the size of population. It also depends upon the efficiency of labour. Efficiency depends upon several factors like hours of working, service and working conditions, wage rates, economic incentives and other conditions that have a bearing upon the working ability of labour.

3. Mobility of Labour:

The supply of labour also depends upon the mobility of labour. If the labour is less mobile either because the means of transport are not developed or there is conservatism among the labourers, or because there

are climatic, language or traditional hindrances, then it follows that supply of labour shall be highly limited.

5.8 COLLECTIVE BARGAINING

Collective bargaining is a techniques adopted by the unions and employers to bring about a compromise in their conflicting interest. It is called as 'collective' because the employees meet the employers, through their selective representatives to discuss their problems. It is unlike the individual bargaining where the individuals seek to sort out the differences directly with the management.

Collective bargaining is a broader concept. It does not only look to the economic relations between the employees and employers, but it is a technique whereby an inferior social class or group carries on a never slackening pressure for a bigger share in the social sovereignty as well as for more welfare, security and liberty for its individual members. However, in this lesson, we concern ourselves with the limited aspect of collective bargaining i.e. whether trade unions can succeed in raising the wages of workers. And whether union members do better than workers in unorganized industries.

There is an inconclusive debate on the issue of wage determination through collective bargaining. For instance, a study of wages, by Paul Douglas show that union had a positive effect on wages. It indicates that union members obtained a rise in wages after the formation of union. But country evidence is provided by the study of Albert Rees. In this study of basic steel industry for a period from 1945 to 1948, he concludes that rise in wages during this period should be attributed to other factors than collective bargaining. Hence, it would have been possible for wages to rise even faster in absence of collective bargaining.

5.9 SUPPLY CURVE OF LABOUR

It is important to know how many hours a worker will be willing to work at different wage rates. When the real wage rate increases, the individual will be pulled in two opposite directions. The real wage rate is the relative price of leisure which has to be given up for doing work to earn income.

As real wage rate rises, leisure becomes relatively more expensive (in terms of income foregone) and this induces the individual to substitute work (or income) for leisure. This is called substitution effect of the rise in real wage and induces the individual to work more hours (i.e. supply more labour) to earn more income.

But the increase in the real wage rate also makes the individual richer, that is, his income increases. This increase in income tends to make the individual to consume more of all commodities including leisure. This is called income effect of the rise in wage rate which tends to increase leisure and reduce number of work hours (i.e. reduce labour supply. The economists generally believe that substitution effect of a rise in real wage

is larger than its income effect and therefore individuals work for more hours (that is, supply more labour) at a higher wage rate.

However, beyond a certain higher real wage and number of hours worked, leisure becomes more desirable and income effect outweighs substitution effect, and as a result supply of labour decreases beyond a certain higher wage rate.

In what follows we shall explain how we derive a supply curve of labour of an individual and of the economy as a whole in all these circumstances. Thus, whether an individual will supply more work- effort or less as a result of the rise in the wage rate depends upon the relative strengths of the income and substitution effects.

The changes in the work-effort or labour supplied by an individual worker due to the changes in the wage rate is illustrated in Fig. 33.1(a) To begin with, the wage line is AW_1 the slope of the wage line indicates the wage rate per hour.

With wage line AW_1, the individual is in equilibrium at point Q on indifference curve I_1 and is working AL_1 hours in a week. Suppose the wage rate rises so that the new wage line is AW_2 with wage line AW_2, the individual is in equilibrium at point R on the indifference curve I_2, and is now working AL_2 hours which are more than before.

If the wage rate further rises so that the new wage line is AW_3, the individual moves to the point S on indifference curve I_3 and works AL_3 hours which are more than AL_1 or AL_2. Suppose the wage rate further rises so that the wage line is AW_4. With wage line AW_4, the individual is in equilibrium at point T and works AL_4 hours.

If points Q, R, S and Tare connected, we get what is called wage offer curve which shows the number of hours that an individual offers to work at various wage rates. It should be noted that the wage offer curve, strictly speaking, is not the supply curve of labour though it provides the same information as the supply curve of labour.

The supply curve of labour is obtained when the wage rate is directly represented on the Y-axis and labour (i.e. work effort) supplied at various w age rates on the X-axis reading from left to right. In Fig. 5.2 the supply curve of labour has been drawn from the information gained from Fig. 5.1. Let the wage line AW_1 represent the wage rate equal to P_1, wage line AW_2 represents wage rate P_2, wage line AW_3 represents wage rate P_3 and wage line AW_4 represent wage rate P_4. It will be seen that as the wage rate rises from P_1 to P_4 and as a result the wage line shifts from AW_1 to AW_4 the number of hours worked, that is, the amount of labour supplied increases from AL_1 to AL_4.

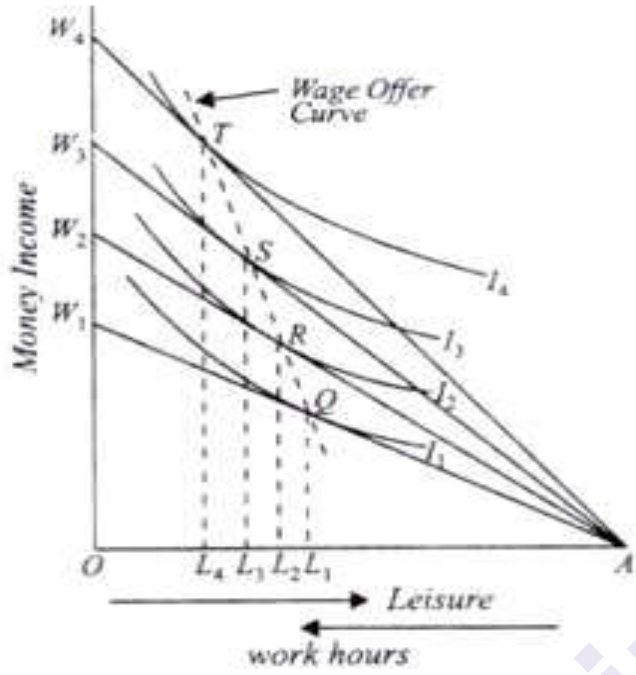

FIG 5.11 : Wage Offer Curve

As a result, the supply curve of labour in Fig. 5.2 is upward sloping. The indifference map depicted in Fig. 5.1 is such that the substitution effect of the rise in the wage rate is stronger than the income effect of the rise in the wage rate so that the work- effort supplied increases as the wage rate rises.

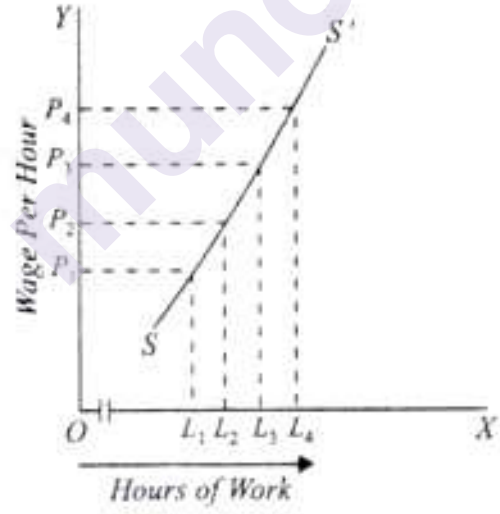

Fig 5.12 : Upward Stoping supply curve of labour

Backward-Sloping Supply Curve of Labour:

But the supply curve of labour is not always upward sloping. When an individual prefers leisure to income, then the supply of labour (number of hours worked) by an individual will decrease as the wage rate rises. This is because in such a case income effect which tends to reduce the work effort outweighs the substitution effect which tends to increase the work effort.

In Fig.5.11 such an indifference map is shown which yields a backward sloping supply curve of labour which indicates that the number of hours worked per week decreases as the wage rate rises. AW_1, AW_2, AW_3 and AW_4 are the wage lines when the wages rates are P_1, P_2, P_3 and P_4 respectively.

Q, R, S and Tare the equilibrium points with the wage lines AW_1, AW_2, AW_3 and AW_4 respectively. It will be noticed from Fig. 33.3(a) that when the wage rate rises and as a consequence the wage line shifts from AW_1 to AW_4 the number of hours worked per week decreases from AL_1 to AL_4.

In Fig. 33.3(b) supply curve of labour is drawn with K-axis representing the hourly wage rate and X-axis representing number of hours worked per week at various wage rates. It will be seen from Fig. 33.3(b) as the wage rate rises from P_1 to P_4 the supply of labour (i.e., number of hours worked per week) decreases from OL_1 to OL_4. In other words, the supply curve of labour slopes backward, that is, slopes upward from right to left. It should be noted that it is the nature or pattern of indifference curves between income and leisure that yields backward sloping supply curve.

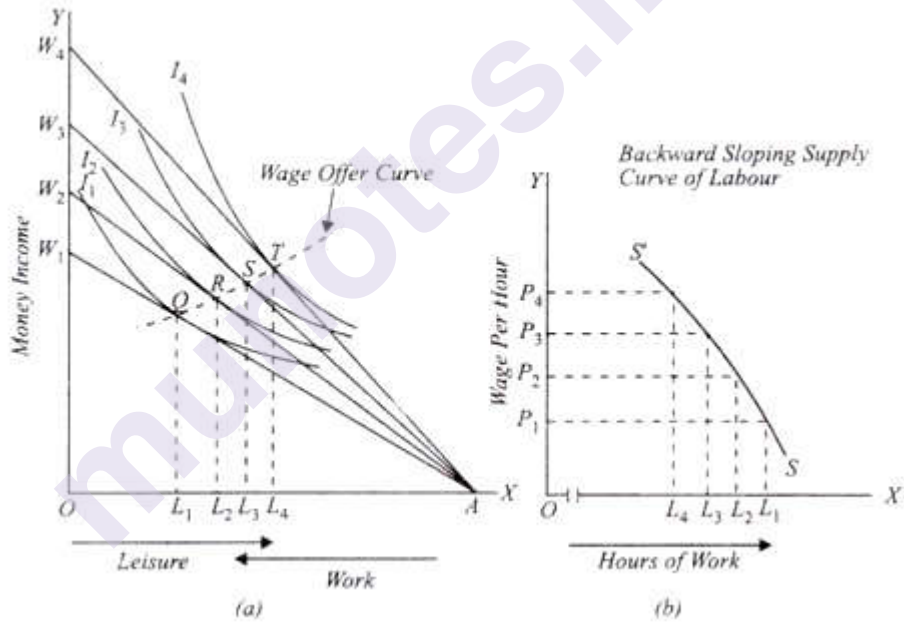

Figure No. 5.13 : Backward Bending Supply Curve Labour

A glance at Fig.5.13(a) and Fig. 5.13(b) will reveal that the nature of indifference curves in the two is different. As said above, the nature of indifference curves depends upon the relative preference between income and leisure.

In Fig. 5.13(a) indifference curves between income and leisure are such that the individual's preference for leisure is relatively greater than for income. In this case, when the wage rate rises the individual enjoys more leisure and accordingly reduces the number of hours worked per week.

But it sometimes happens that as the hourly wage rate rises from a very low level to a reasonably good level, the number of hours worked per

week rises and as the hourly wage rate rises further, the number of hours worked per week decreases.

This may be the case of an individual who has some more or less fixed minimum wants for goods and services which he can satisfy with a certain money income. When the wage rate is so low that he is not earning sufficient money income, then to satisfy his more or less fixed minimum wants for goods and services, his preference for income will be relatively greater than that for leisure and, therefore, when the wage rate rises the individual will work more hours per week.

When the wage rate has risen to a level which is sufficient to yield a sufficient money income for satisfying his fixed minimum wants, then for further increases in wage rate the number of hours worked per week will decrease because now the individual can afford to have more leisure and also earn an income sufficient to meet his minimum wants for goods and services.

It follows from above that up to a certain wage rate the supply curve will slope upward from left to right and then for further increases in the wage rate the supply curve of labour will slope backward.

5.10 QUESTIONS

1. Explain the marginal productivity theory of distribution with the help of diagram.
2. Explain the Ricardian Theory of Rent with the help of diagram.
3. Explain the Modern Theory of Rent in detail.
4. Give the definition of wages and explain the modern theory of wages.
5. Write a note on collective bargaining.
6. Write a note on the supply curve of labour.

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6

FACTOR PRICING: INTEREST AND PROFIT

Unit Structure:

6.0 OBJECTIVES

- To study the meaning of interest.
- To explain the classical theory of interest and loanable fund theory of interest.
- To study the meaning of profit.
- To study the risk theory of profit.
- To study the uncertainty theory of profit.
- To study the innovation theory of profit.

6.1 INTEREST

In simple words, interest means the reward for the use of capital. It is also called the income of the owner of capital for lending it.

In other words, it is the price paid by the borrower of money to its lender. Now, question arises, why interest is paid?

The answer follows:

We know that people keep their money in three forms:

(i) In banks

(ii) In bonds, securities or debentures

(iii) In cash.

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The third form has the advantage that this amount can be used at any time. Therefore, when one person parts with this amount, he gets a price which is known as interest.

Definitions:

The concept of interest can be explained in a number of ways as under:

"Interest is the price paid for the use of capital in any market." -Marshall

"Interest is a reward for parting with liquidity for a specified period." -J.M. Keynes

"Interest is the price paid for the hire of loan capital." -Cairncross

"Interest is the income which goes to the lender of capital by virtue of its productivity as a reward for its abstinence." -Carver

6.2 CLASSICAL THEORY OF INTEREST

The classical theory of interest also known as the demand and supply theory was propounded by the economists like Marshall and Fisher.

Later on, Pigou, Cassel, Knight and Taussig worked to modify the theory.

According to this theory rate of interest is determined by the intersection of demand and supply of savings. It is called the real theory of interest in the sense that it explains the determination of interest by analyzing the real factors like savings and investment. Therefore, classical economists maintained that interest is a price paid for the supply of savings.

Demand for Savings:

Demand for savings comes from those who want to invest in business activities. Demand for investment is derived demand. Any factor of production is demanded for its productivity. The demand for the factor is high when there are higher expectations from it.Since, all the factors are not equally productive, so, capital demand will be high for more productive uses first and then gradually with the increase in its supply, will shift to less productive uses.

Therefore, classical economists maintained that with the aid of capital facilities we turn out more goods per man-hour than when we produce with bare hands or with scant tools. Moreover, marginal productivity of the business goes on decreasing with more and more doses of investment of savings in his business venture. It is due to the operation of the law of diminishing returns.

Now a very important question arises is that how much capital a person will demand because when a person borrows money he has to pay interest on it. The answer according to this theory is that demand for capital can be raised to a point where marginal productivity of capital becomes equal to

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the interest paid on it. Thus, if marginal productivity of capital is more than the interest paid, then it is beneficial to borrow money and vice-versa. Equilibrium will prevail at a point where marginal productivity of capital equals the rate of interest. This shows that there exists inverse relationship between demand for capital and the interest rate.

This fact can be made clear with the help of the following table 6.1 and diagram 6.1:

Table No. 6.1

Table 1

Rate of Interest	Investment (in crores)
10%	500
9%	600
8%	700
7%	800
6%	900
5%	1000

It is clear from the table 6.2 that rate of interest and savings have a positive relationship. As the rate of interest increases, savings will also increase. On the other hand, a fall in rate of interest leads to a decrease in savings. When the rate of interest is 10%, the savings are of Rs. 1000 crores.

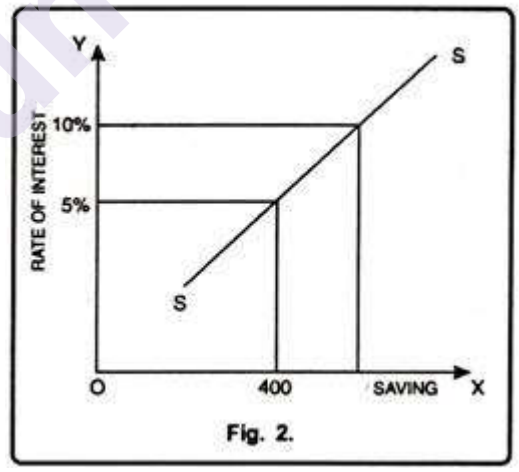

Figure No. 6.1

In the successive periods, as rate of interest falls from 10% to 5%, the total savings also decline. Suppose as the rate of interest falls to 5%, savings also decrease to Rs. 400 crores.

In Fig. 6.1 savings have been represented on X-axis and interest rate on Y-axis. SS is the supply curve which moves upward from left to right. It shows that supply of savings is interest elastic. Higher the interest rate, more will be saved and vice-versa. With 5% rate of interest money savings

are Rs. 400 crores. As the interest rate increases to 10% people are persuaded to save more and the money savings rise to Rs. 1000 crores. This signifies that there is a direct relationship between savings and the rate of interest.

Equilibrium Rate of Interest:

According to classical theory, equilibrium interest rate is restored at a point where demand for and supply of capital are equal i.e.

Table No. 6.2

Table 3

Rate of Interest	Investment	Savings
10%	500	1000
9%	600	800
8%	700	700
7%	800	600
6%	900	500
5%	1000	400

The table 3 reveals that equilibrium rate of interest will be determined at a point where demand for and supply of capital are equal. As is clear from the table that equilibrium interest rate 8% is determined because at this level demand for and the supply of capital are equal i.e. Rs. 700 crores.

Now, if the rate of interest increases to 10%, investment is Rs. 500 crores and savings are of Rs. 1000 crores i.e. savings exceed the investment. On the other hand, if the rate of interest falls to 5% investment is Rs. 1000 crores and savings are Rs. 400 crores.

This fact is clearer from the diagram below:

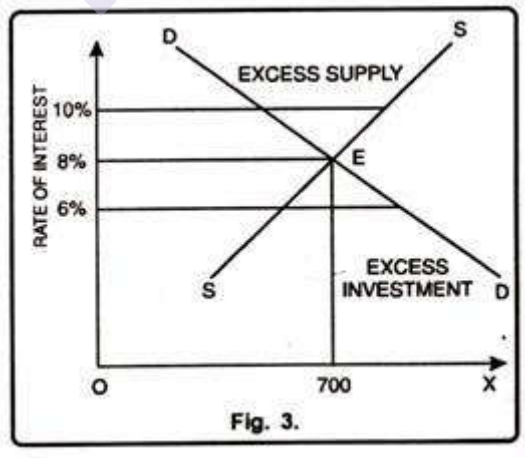

Figure No. 6.2

In Fig. 6.2, rate of interest is determined by the intersection of demand and supply curves. Equilibrium is restored at point E which determines rate of interest as 8% and demand and supply of capital as Rs. 700 crores. Now, if the rate of interest increases to 10% supply of savings exceeds the demand for capital i.e. supply is more than demand. This will lead to a fall in interest rate to the level of 8%.

On the other hand, when the interest rate falls to 6%, demand for savings exceeds the supply of savings which will push up the rate of interest to restore an equilibrium rate i.e. 8%. Therefore, rate of interest is in equilibrium only at a point where the demand for capital equals the supply of capital.

Criticism:

The classical theory of rate of interest has been criticized on the basis of the following shortcomings as discussed below:

1. Indeterminate Theory:

Keynes has maintained that the classical theory is indeterminate in the sense that it fails to determine the interest rate. In this theory, interest is determined by the equality of demand and supply. But the position of savings varies with the income level. Thus, unless we know the income, interest rate cannot be determined.

2. Fixed Level of Income:

Classical theory assumes that the level of income remains constant. But in actual practice income changes with a small change in investment. Thus, it is not correct to assume a fixed level of income.

3. Long Run:

Classical theory determines the interest rate through the interaction of demand and supply of capital in the long run. Keynes pointed out that in the long run we all are dead. Therefore, there was an urgent need of a theory which determines rate of interest in the short-run.

4. Full Employment:

This theory assumes that there is full employment of resources in the economy. But, in reality, unemployment or less than full employment is a general situation. Full employment is only an abnormal case… Thus, this theory does not apply to the present world.

5. Savings and Investment:

Classical economists assume that savings and investment are interring dependent. But actually, investment changes, income also changes which leads to a change in savings. Thus, both are interdependent on each other.

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6. Ignores Monetary Factors:

Classical theory takes into consideration only the real factors for determining the rate of interest and ignores the monetary factors.

6.3 LOANABLE FUNDS THEORY OF INTEREST

The neo-classical theory of interest or loanable funds theory of interest owes its origin to the Swedish economist Knut Wicksell.

Later on, economists like Ohlin, Myrdal, Lindahl, Robertson and J. Viner have considerably contributed to this theory.

According to this theory, rate of interest is determined by the demand for and supply of loanable funds. In this regard this theory is more realistic and broader than the classical theory of interest.

Demand for Loanable Funds:

Loanable funds theory differs from the classical theory in the explanation of demand for loanable funds.

According to this theory demand for loanable funds arises for the following three purposes viz.; Investment, hoarding and dissaving:

1. Investment (I):

The main source of demand for loanable funds is the demand for investment. Investment refers to the expenditure for the purchase of making of new capital goods including inventories. The price of obtaining such funds for the purpose of these investments depends on the rate of interest. An entrepreneur while deciding upon the investment is to compare the expected return from an investment with the rate of interest. If the rate of interest is low, the demand for loanable funds for investment purposes will be high and vice- versa. This shows that there is an inverse relationship between the demands for loanable funds for investment to the rate of interest.

2. Hoarding (H):

The demand for loanable funds is also made up by those people who want to hoard it as idle cash balances to satisfy their desire for liquidity. The demand for loanable funds for hoarding purpose is a decreasing function of the rate of interest. At low rate of interest demand for loanable funds for hoarding will be more and vice-versa.

3. Dissaving (DS):

Dissaving's is opposite to an act of savings. This demand comes from the people at that time when they want to spend beyond their current income. Like hoarding it is also a decreasing function of interest rate.

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Supply of Loanable Funds:

The supply of loanable funds is derived from the basic four sources as savings, dishoarding, disinvestment and bank credit.

They are explained as:

1. Savings (S):

Savings constitute the most important source of the supply of loanable funds. Savings is the difference between the income and expenditure. Since, income is assumed to remain unchanged, so the amount of savings varies with the rate of interest. Individuals as well as business firms will save more at a higher rate of interest and vice-versa.

2. Dishoarding (DH):

Dishoarding is another important source of the supply of loanable funds. Generally, individuals may dishoard money from the past hoardings at a higher rate of interest. Thus, at a higher interest rate, idle cash balances of the past become the active balances at present and become available for investment. If the rate of interest is low dishoarding would be negligible.

3. Disinvestment (DI):

Disinvestment occurs when the existing stock of capital is allowed to wear out without being replaced by new capital equipment. Disinvestment will be high when the present interest rate provides better returns in comparison to present earnings. Thus, high rate of interest leads to higher disinvestment and so on.

4. Bank Money (BM):

Banking system constitutes another source of the supply of loanable funds. The banks advance loans to the businessmen through the process of credit creation. The money created by the banks adds to the supply of loanable funds.

Determination of Rate of Interest:

According to loanable funds theory, equilibrium rate of interest is that which brings equality between the demand for and supply of loanable funds. In other words, equilibrium interest rate is determined at a point where the demand for loanable funds curve intersects the supply curve of loanable funds. It can be shown with the help of a Figure 4.

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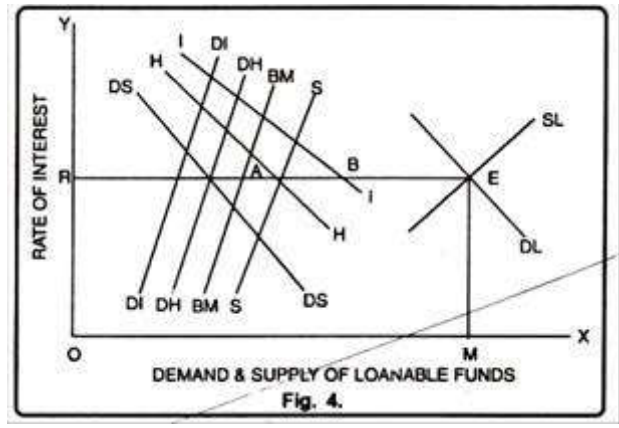

Figure No. 6.3

The rate of interest is determined at the point of intersection of the two curves—the supply of loanable funds curve (SL) and the demand for loanable funds curve, DL. Fig. 4 shows that the equilibrium rate of interest is EM; at this rate, the demand for loanable funds is equal to the supply of loanable funds i.e. OM.

Criticism:

Although, loanable funds theory is superior to classical theory, yet, critics have criticised it on the following grounds:

1. Full Employment:

Keynes opined that loanable funds theory is based on the unrealistic assumption of full employment. As such, this theory also suffers from the defects as the classical theory does.

2. Indeterminate:

Like classical theory, loanable funds theory is also indeterminate. This theory assumes that savings and income both are independent. But savings depend on income. As the income changes savings also change and so does the supply of loanable funds.

3. Impracticable:

This theory assumes savings, hoarding, investment etc. to be related to interest rate. But in actual practice investment is not only affected by interest rate but also by the marginal efficiency of capital whose affect has been ignored.

4. Unsatisfactory Integration of Real and Monetary Factors:

This theory makes an attempt to integrate the monetary as well as real factors as the determinants of interest rate. But, the critics have maintained that these factors cannot be integrated in the form of the schedule as is evident from the frame work of this theory.

5. Constancy of National Income:

Loanable funds theory rests on the assumption that the level of national income remains unchanged. In reality, due to the change in investment, income level also changes accordingly.

Improvement over the Classical Theory:

Loanable funds theory is considered to be an improvement over the classical theory on the following aspects:

1. Loanable funds theory recognizes the importance of hoarding as a factor affecting the interest rate which the classical theory has completely overlooked.
2. Loanable funds theory links together liquidity preference, quantity of money, savings and investment.
3. Loanable funds theory takes into consideration the role of bank credit which acts as a very important source of loanable funds.

6.4 PROFIT

Profit is the financial benefit realized from the business activity when the revenues generated exceeds the costs and expenses incurred in the operation of such activities. Simply, the total cost deducted from total revenue yields profit.

The profits of the organization depend on the successful management of business operations, i.e., how well an entrepreneur manages the risks and uncertainties of the firm. Although the profits are directly linked to the entrepreneur and his functions, several economists have given their varied views on origin, nature and role of profit. Till date, there is no complete consensus among the economists with respect to the true nature and origin of profit. Due to this, several theories of profit came into existence.

6.5 RISK THEORY OF PROFIT

Hawley's Risk Theory of Profit was propounded by F.B. Hawley, who believed that those who have the risk taking ability in the dynamic production have a sound claim on the reward, called as **profit.** Simply, profit is the price that **society pays to assume the business risk**.

The risk in business may arise due to several factors, Viz. Obsolescence of a product, non-availability of crucial materials, sudden fall in the prices, introduction of a better substitute by the competitor, risk due to war, fire or any other natural calamity.

Hawley's risk theory of profit is based on the notion that the businessman would expect adequate compensation in excess of the **actuarial value**, i.e., **premium on calculable risk**, for assuming the risk. Every entrepreneur strives to gain in excess of wages of the management for bearing the business risk.

The major reason behind the Hawley's opinion that profit should be maintained over and above the actuarial risk is that the assumption of **risk is annoying**; it leads to trouble, anxiety, and disutilities among the businessman of several kinds. Thus, assuming risk grants entrepreneur a claim to a reward above the actuarial business risk.

According to Hawley, the **profit consists of two parts**: **One** representing the compensation for the actuarial loss suffered due to several classes of risks assumed by the entrepreneur; **Second** part represents the inducement to bear the consequences due to the exposure to risk in the entrepreneurial adventures.

Hawley's risk theory of profit is based on the assumption that profits arise from the **factor ownership,** as long as the ownership involves risk. Hawley believed that an entrepreneur must assume risks to qualify for the additional rewards (profit). On the contrary, if he avoids the risk by insuring against it, then he would cease to be an entrepreneur and would not be entitled to profits. Thus, it can be concluded that it is the uninsured risk from which the profit arises and until the product is sold an entrepreneur's amount of reward cannot be determined. Hence, in Hawley's opinion, the profit is a residue and therefore his theory is also called a

Thus, it can be concluded that it is the uninsured risk from which the profit arises and until the product is sold an entrepreneur's amount of reward cannot be determined. Hence, in Hawley's opinion, the profit is a residue and therefore his theory is also called a **Residual Theory of Profit**.

6.6 UNCERTAINTY THEORY OF PROFIT

The **Knight's Theory of Profit** was proposed by Frank. H. Knight, who believed profit as a reward for uncertainty-bearing, not to risk bearing. Simply, profit is the residual return to the entrepreneur for bearing the uncertainty in business.

Knight had made a clear distinction between the risk and uncertainty. The risk can be classified as a **calculable** and **non-calculable** risk. The calculable risks are those whose probability of occurrence can be anticipated through a statistical data. Such as risks due to the fire, theft, or accident are calculable and hence can be insured in exchange for a premium. Such amount of premium can be added to the total cost of production.

While the non-calculable risks are those whose probability of occurrence cannot be determined. Such as the strategies of a competitor cannot be accurately assessed as well as the cost of eliminating the completion cannot be precisely calculated. Thus, the risk element of such events is not insurable. This incalculable area of risk is the **uncertainty**.

Due to the uncertainty of events, the decision-making becomes a crucial function of an entrepreneur or manager. If the decisions prove to be correct by the subsequent events, an entrepreneur makes a profit and vice-versa. Thus, the Knight's theory of profit is based on the premise that profit arises out of the decisions made under the conditions of uncertainty.

Knight believes that profit might arise out of the decisions made concerning the state of the market, such as decisions with respect to increasing the degree of monopoly in the market, decisions regarding

holding stocks that might result in the windfall gains, decisions taken to introduce new product and technique, etc.

The major criticism of the knight's theory of profit is, the total profit of an entrepreneur cannot be completely attributed to uncertainty alone. There are several functions that also contribute to the total profit such as innovation, bargaining, coordination of business activities, etc.

6.7 THE INNOVATION THEORY OF PROFIT

The **Innovation Theory of Profit** was proposed by Joseph. A. Schumpeter, who believed that an entrepreneur can earn economic profits by introducing **successful innovations**.

In other words, innovation theory of profit posits that the main function of an entrepreneur is to introduce innovations and the profit in the form of reward is given for his performance. According to Schumpeter, **innovation** refers to any new policy that an entrepreneur undertakes to **reduce the overall cost of production** or **increase the demand for his products.**

Thus, innovation can be classified into two categories; The **first category** includes all those activities which reduce the overall cost of production such as the introduction of a new method or technique of production, the introduction of new machinery, innovative methods of organizing the industry, etc.

The **second category** of innovation includes all such activities which increase the demand for a product. Such as the introduction of a new commodity or new quality goods, the emergence or opening of a new market, finding new sources of raw material, a new variety or a design of the product, etc.

The innovation theory of profit posits that the **entrepreneur gains profit** if his innovation is successful either in reducing the overall cost of production or increasing the demand for his product. Often, the profits earned are for a shorter duration as the competitors imitate the innovation, thereby ceasing the innovation to be new or novice. Earlier, the entrepreneur was enjoying a monopoly position in the market as innovation was confined to himself and was earning larger profits. But after some time, with the others imitating the innovation, the profits started disappearing.

An entrepreneur can earn **larger profits for a longer duration** if the law allows him to patent his innovation. Such as a design of a product is patented to discourage others to imitate it. Over the time, the supply of factors remaining the same, the factor prices tend to rise as a result of which the cost of production also increases. On the other hand, with the firms adopting innovations the supply of good sand services increases and their prices fall. Thus, on one hand the **output per unit cost increases** while on the other hand the **per unit revenue decreases**.

There is a point of time when the difference between the costs and receipts gets disappear. Thus, the profit in excess of the normal profit disappears. This innovation process continues and also the profits continue to appear or disappear.

6.8 QUESTIONS

1. Give the meaning of interest and explain the classical theory of interest with the help of diagram.
2. With the help of diagram explain the loanable fund theory of interest.
3. Give the meaning of profit and explain the risk theory of profit with the help of diagram.
4. Explain the uncertainty theory of profit with the help of diagram.
5. With the help of diagram explain the innovation theory of profit.

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Module IV

7

INTRODUCTION TO EQUILIBRIUM

Unit Structure:

7.0 OBJECTIVES

- To study the conditions of equilibrium of a firm.
- To study the features of perfect competition.
- To study the meaning and determination of equilibrium price under perfect competition.
- To study how a firm attains an equilibrium in the short run and long run under perfect competition.
- To study the short run and long run equilibrium of an industry under perfect competition.

7.1 CONCEPT OF EQUILIBRIUM

Introduction -

A firm is said to be in equilibrium when it has no tendency either to increase or to decrease its output. In this chapter we shall explain general conditions for the equilibrium of the firm under all types of market.

There are two approaches regarding the equilibrium or profit maximization of a firm firstly, is total revenue and total cost approach and secondly, marginal revenue and marginal cost approach.

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Conditions of Equilibrium of a Firm: Total Revenue and Total Cost Approach-

The firm is in equilibrium when it maximizes its total profits (π). Total profit is the difference between total revenue (TR) and total cost (TC). Symbolically,

$$\pi = TR - TC$$

Max. π = Max. the positive difference (TR- TC).

Graphically, maximization of total profits is illustrated in the following diagram.

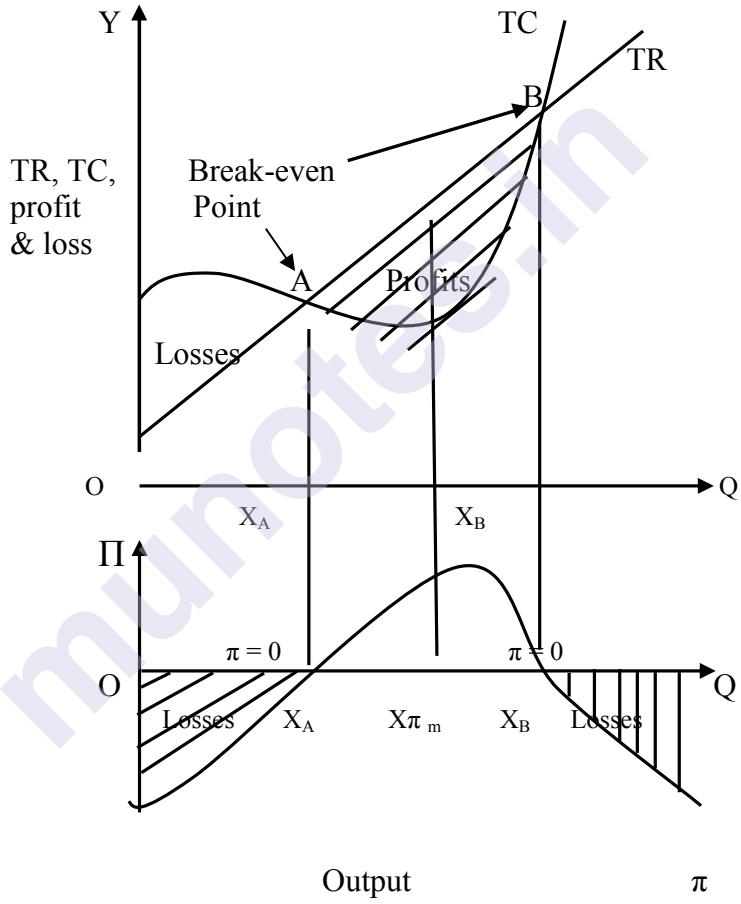

Figure 7.1

Where,

TR = Total revenue curve is a straight positively slopping line from the origin increasing in the same proportion as sales. It shows that the firm is a price- taker and can sell any amount of output at the going market price

TC = Total cost curve which is inverse- S shaped starting from the level of fixed cost, reflecting the law of variable proportions.

π = Total profit curve. It is obtained by subtracting TC form TR at each level of output.

$X\pi_m$ = Output showing maximum profit. At this level of output, the vertical distance between TR and TC curves is maximum. In other words, both TR and TC curves have same slope at this output level.

Points A & B = At these points TR = TC and the firm break even i.e. profit is zero.

Losses = The firm icurrs losses from origin till XA level of output and beyond XB level of output because TC is mote than TR. It is shown by shaded areas.

7.2 CONDITIONS OF EQUILIBRIUM OF A FIRM: MARGINAL COST AND MARGINAL REVENUE APPROACH-

7.3.1 Conditions for the equilibrium or profit maximization of a firm under perfect competition-

A firm is in equilibrium when its MR is equal to MC. This approach is called as MR-MC equality approach. A firm attains equilibrium i.e. it maximizes its profit and minimizes its losses when its MR is equal to its MC.

So long as MR is greater than MC, the residual profits would be less than maximum. In such a situation, every additional unit of output will add to the total revenue of the firm than to its total cost. Hence, the total profit would go on rising or losses would go on falling, with an increase in its output and sale. When MR is equal to MC no more units will be produced.

If the output is increased beyond this point, MC will be greater than MR i.e. it would add more to the total cost of the firm than to its total revenue. In such a case its residual profits will be less than maximum or its losses would rise. When MR is equal to MC the difference between TR and TC would be maximum. Hence, a firm will be in equilibrium when MR is equal to MC.

Under the condition of prefect competition the demand curve of a firm is perfectly elastic i.e. horizontal straight line to the 'X' axis at the height of the given market price. Hence, under perfect competition the price or AR is always equal to MR. A perfectly elastic demand curve is called as AR as well as MR curve.

There are two conditions for the equilibrium or profit maximization of a firm.

1. MR of a firm must be equal to its MC.
2. MC curve must cut MR curve from below not from above.

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The conditions for the equilibrium or profit maximization of a firm under perfect competition can be explained with the help of following diagram.

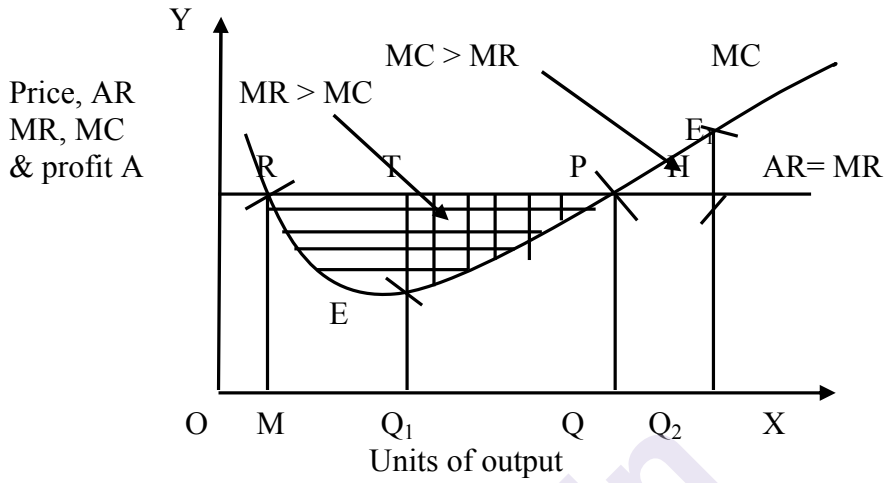

Figure 7.2

In the diagram the horizontal line AH is the demand curve. It represents AR and MR. Suppose that MC is the marginal cost curve. It intersects the MR curve from above at point 'R' and from below at point 'P'. When MC curve intersect MR curve from above at point R' MR is equal to MC with an output of OM units. But point 'R' is not point of stable equilibrium. This is because by increasing the output beyond OM units it can add more to its TR than to its TC. So, its residual profit will increase.

It is only at point 'E' where the MC curve intersects the MR curve from below that the firm attains a stable equilibrium. This is because the last unit produced ads to the TR which is equal to the cost of producing that unit. Here, the firm gets maximum profits.

So, at the output of OQ units MR is equal to MC and MC curve rises and intersects the MR curve from below at point 'P'. The output of OQ units is a profit maximization output. The area REP is the maximum profit area.

If it produces less than OQ units, say OQ_1 units MC will be less than MR. So, the profit will increase by an area of TEP when the output is increased up to OQ units. On the other hand, any output beyond OQ units say OQ_2 units, will reduce profits by an area of 'PHE' for MC is greater than MR. Hence, the profits will increase until the output is contracted to OQ unit. At point 'E' there is a stable equilibrium. This is because at point 'P' MR is equal to MC and MC curve intersect the MR curve from below OQ is the equilibrium output. Prof. Samuelson calls the point 'P' as the best profit point.

7.2.2 Conditions for the equilibrium or profit maximization of a firm under monopoly-

A monopoly firm will also be in equilibrium when it maximizes its profits or minimizes its losses. A monopoly firm is in equilibrium when MR is equal to MC. This approach is called as MR- MC equality approach.

A firm is in equilibrium when MR is equal to MC. When MR is equal to MC, the firm would enjoy maximum total profit. Here the difference between TR and TC is maximum. This is shown in the following figure.

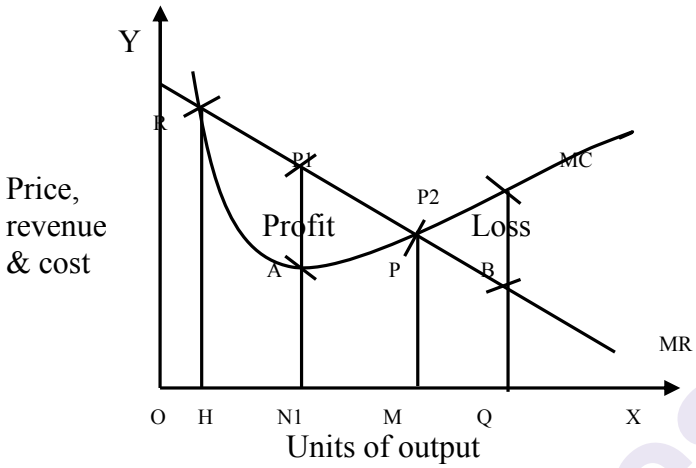

Figure 7.3

In this figure MR is marginal revenue curve slopes downward from left to right. MC is the marginal cost curve falls in the beginning and then rises. At first, the MC curve intersects the MR curve from above at point 'R' when MR is equal to MC. It would produce OH units. But it can not maximize its profit at this point. This point 'R' is the breakdown point. When the output is increased beyond OH units MC becomes less than MR and there are residual profits. It would increase its output until the MC curve intersects the MR curve from below at point 'P' where MR is equal to MC and the monopoly firm attains equilibrium and enjoys maximum profits. OM is the equilibrium output.

It shows that up to the OM units of output MR is more than MC and thus, each unit provides profit.

If it produces less than OM units say ON1, MR is greater than MC by AP1. This is because while MC is AN, MR is P1N. So the profit would be less than maximum. The profits can still be increased. They are increased by expanding the production so long as MR is greater than MC but with OM unit MR is equal to MC and profits are increased by PAP1 Here the total profits are maximized. RAP is the maximum profit area. Thus, with output OM it would maximize its profits.

IF the output is increased beyond OM units MC is greater than MR, so its profit would be reduced, if OQ units are produced the MC is P2Q while

MR is BQ. Thus, the net loss is BP2 and the total loss is PBP2. So the output must be decrease until the output OM is reached at which MR is equal to MC. Hence, the equality between MR and MC is a necessary condition for the equilibrium of a monopoly firm, but it is not sufficient condition. The sufficient condition is that the MC curve must intersect the MR curve form below, at point 'P' where the stable equilibrium is attained.

7.3 QUESTIONS

1. Explain fully the concept of Break-even analysis.
2. Explain the condition of Total Revenue and Total Cost approach to attain equilibrium of a firm.
3. Discuss the profit maximization condition of a firm under perfect competition.
4. Discuss conditions for the equilibrium of a firm under monopoly

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8

EQUILIBRIUM OF FIRM AND INDUSTRY UNDER PERFECT COMPETITION

Unit Structure:

8.0 OBJECTIVES

- To study the features of perfect competition.
- To study the meaning and determination of equilibrium price under perfect competition.
- To study how a firm attains an equilibrium in the short run and long run under perfect competition.
- To study the short run and long run equilibrium of an industry under perfect competition.

8.1 INTRODUCTION OF PERFECT COMPETITION

A firm is an individual production unit which produces particular type of a commodity. Under perfect competition the term industry refers to a group of firms which produce a homogeneous or identical product. So all firms producing a particular identical commodity are together called industry.

Perfect competition is one type of market structure. Perfect competition may be defined as, 'that market situation, in which there are large number of firms producing homogeneous product, there is free entry and free exit, perfect knowledge on the part of buyer, perfect mobility of factors of production and no transportation cost at all.'

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Features: -

The main features of perfect competition are as follows.

1. Large number of buyers and sellers: There are so many buyers and sellers that no individual buyer or seller can influence the price of a commodity in the market. Any change in output supplied by a single firm will not affect the total output of an industry. A producer can sell whatever output he produces at the given price. So, a firm is a price taker. Similarly, no individual buyer can influence the price of the commodity by his decision to vary the amount that he would like to buy.

2. Homogenous product: Firms in the market produce homogeneous products. Homogeneity of a product implies that one unit of the product is a perfect substitute for another. The products are identical in quality, shape, size, colour, design, packing etc. There cross elasticity is infinity. Since the products are identical buyers make no difference between sellers.

3. Free entry and free exit: Industry is characterized by freedom of free entry and exit of firms, In a perfectly competitive market, there are no barriers to movement in and out of an industry.

4. Perfect knowledge: All buyers and sellers have a complete knowledge of the market conditions; viz; prevailing market prices, quality of the product sold, availability of factors of production etc. Information is free and costless. Under there conditions there are no uncertainty about future development in the market. Advertising has no role to play in the perfectly competitive market.

5. Perfect mobility of factors of production: The factors of production can move easily from one firm to another. Workers can move between jobs and between places.

6. Absence of transportation cost: All goods are produced locally. Therefore, transportation costs are zero.

As already mentioned above when the first three assumptions are satisfied, there exists pure competition.

The competition becomes perfect when three additional assumptions are satisfied.

8.2 EQUILIBRIUM

Equilibrium literally means a state of balance or a state of rest or position of no change. In economics, the term equilibrium means the state in which there is no tendency on the part of consumers and producers to change.

It may be defined as, ‘when two opposite forces balanced each other on a particular object, that object is said to be in a state of equilibrium.’ Two factors determining equilibrium price- are demand and supply.

Thus, equilibrium price is the price at which demand and supply are equal to each other. At this price, there are no incentives to change.

Determination of Equilibrium Price:

Equilibrium price is determined by the equality between demand and supply. At this price, Quantity demanded = Quantity supplied.

Prof. Marshall compared demand and supply to the two blades of a pair of scissors. It shows that it is not blade that cuts the cloth. Both the blades together, do it. Similarly, it is not demand or supply alone that determines the price of a commodity. Together through interaction they determine the equilibrium price of a commodity.

The process of determination of equilibrium price can be explained under three heads.

1. Demand- A commodity is demanded because it has utility and satisfies human want. The law of demand states that there is an inverse relationship between price and quantity demanded of a commodity. Higher the price, lower is the demand and vice versa. The aim of the consumer is to maximize his satisfaction.

2. Supply- The law of supply states that there is a direct relationship between the price and quantity supplied of a commodity. More the price, more will be the supply and vice versa. The aim of the producer is to maximize profits.

3. Equilibrium between demand and supply- The forces of demand and supply determine the price of a commodity. There is a conflict in the aim of producers and consumers. Producers want to sell the goods at the highest price to maximize profit and consumer want to buy the goods at the lowest price to maximize satisfaction.

Equilibrium price will be determined where quantity demanded is equal to quantity supplied. This is called market price. A demand and supply schedule and curve will show the determination of equilibrium price.

Table No. 8.1 Demand- supply schedule of Salt

Price ` (per k.g.)	Demand (k.g./month)	Supply (k.g./month)
10	1	5
9	2	4
8	3	3
7	4	2
6	5	1

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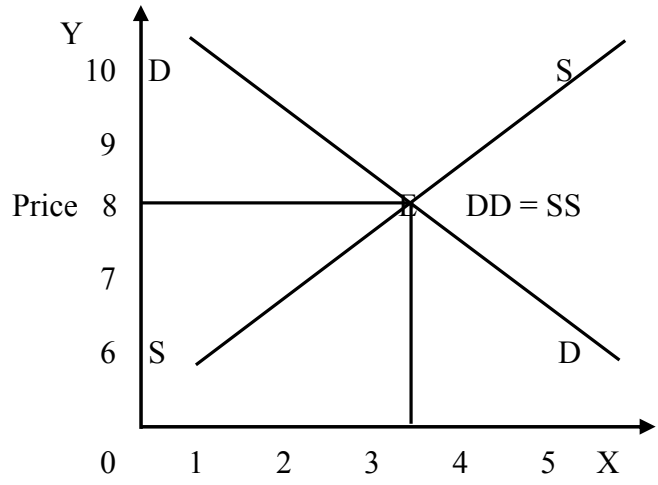
Figure No. 8.1 Equilibrium Price



Demand and Supply

In the above table demand and supply of salt at different prices are shown. Equilibrium price is fixed at ₹ 3 where quantity demanded and the quantity supplied are equal i.e. equal to 3 units.

In Fig. 01 quantity demanded and supplied are measured on the X axis and price on the Y axis. DD is the downward sloping demand curve and SS is the upward sloping supply curve. Both these curves intersect each other at point 'E' which is the equilibrium point and it implies that at price of ₹ 6, demand is 3 units and supply is also 3 units. Thus equilibrium price is ₹6.

Effects of Changes in Demand and Supply on Equilibrium Price:-

Equilibrium price is derived by that point where quantity demanded is equal to quantity supplied. Therefore, if either demand changes or supply changes or both change, equilibrium price and output will change. The effect of changes in demand and supply on equilibrium price and output can be explained as follows.

Changes in Demand: -

Changes in demand take place due to changes in prices of related goods, income, fashion, tastes and habits of the consumers etc. When demand changes, demand curve shifts. Due to changes or shifts in demand curve, supply curve remaining the same, there is a change in the equilibrium price and output. Demand may (a) increase or (b) decrease.

(a) **Increase in demand: -** When demand of a commodity increases, while supply remains constant, equilibrium price will increase. At the same time, quantity sold and purchased will also increase. This is shown in Fig. No. 02

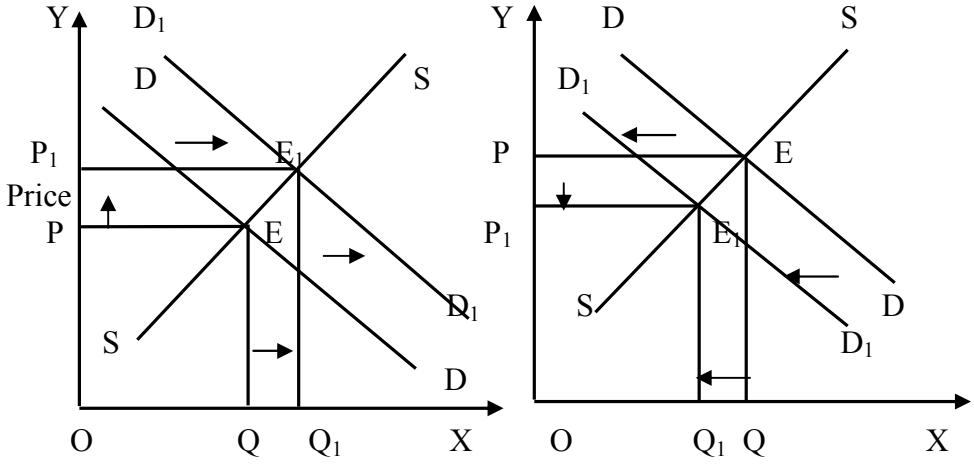


Fig. No. 8.2 Increase in Demand **Fig. No. 8.3 Decrease in Demand**

In the original situation, the DD and SS curves intersect at point E at this equilibrium point the equilibrium price is OP and output is OQ. While supply remain constant, if the demand increases the demand curve shifts from DD to D_1D_1. The new equilibrium is established at point E_1. The equilibrium price goes up from OP to OP_1 and output from OQ to OQ_1. Therefore, when demand curve shifts upwards, equilibrium price and output increases.

(b) **Decrease in demand:** If the demand of a commodity decreases, while supply remains constant, the equilibrium price and output will fall. This is shown in the Fig. No. 3.

In Fig. 3 quantity demanded and supplied are shown on the X axis and price of commodity on the Y axis. DD is the original demand curve. SS is the original supply curve, E is the equilibrium point. Decrease in demand is shown by downward shift of DD curve to D_1D_1. New demand curve intersects the supply curve at point E_1. Equilibrium price falls from OP to OP_1 and output falls from OQ to OQ_1. Therefore, when demand curve shifts downwards both equilibrium price and output falls.

Changes in Supply: -

Like demand, supply of a commodity also changes. Changes in supply take place due to chages in the cost of production, production techniques, etc. Due to changes in supply, supply curve shifts. It may (a) Increase of (b) Decrease.

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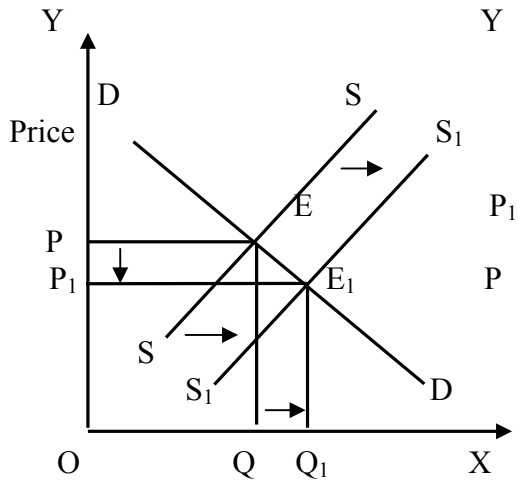
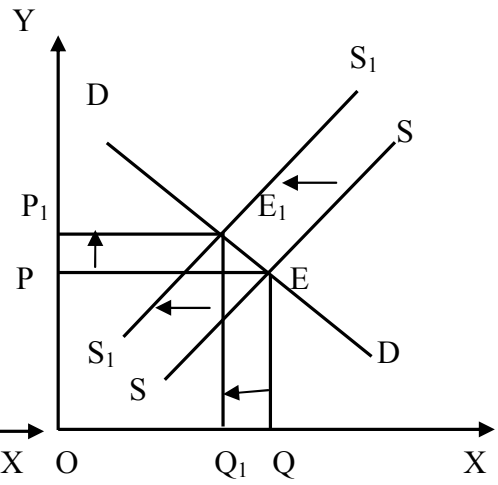


Demand & supply

Fig. No. 8.4 Increase in Supply



Demand & supply

Fig. No. 8.5 Decrease in Supply

(a) Increase in Supply: - If the supply of a commodity increases, while demand remains constant, equilibrium price will fall. This is shown in Fig. 4. In the figure, quantity demanded and supplied is shown on the X axis and price on Y axis. DD is the original demand curve. SS is the original supply curve. E is the original equilibrium point. SS increase to S_1S_1. New supply curve cuts demand curve DD at point E_1, which is the new equilibrium point. At this equilibrium point, price falls from OP to OP_1 and quantity demanded and supplied rises from OQ to OQ_1. Thus, if supply increases, while demand is constant, equilibrium price will decrease and quantity supplied will increase.

(b) Decrease in Supply: - If the supply of a commodity decreases, while demand remain constant, equilibrium price will increase. It is shown in Fig. 5. In the figure, quantity demanded and supplied are shown on the X axis and price of a commodity on the Y axis. DD is the original demand curve. SS is the original supply curve. E is the original equilibrium point. Supply decreases to S1S1. New supply curve cuts the demand curve DD at E1, which is the new equilibrium point. Equilibrium price has gone up form OP to OP1 and the quantity supplied decreased from OQ to OQ1. Thus, if supply decreases, while demand remains constant, equilibrium price will rise and output will fall.

8.3 EQUILIBRIUM OF A FIRM IN THE SHORT RUN AND LONG RUN

Under perfect competition a firm has to fulfill two conditions for the short run and long run equilibrium of a firm.

1. MR is equal to MC.
2. MC curve should cut MR curve from below.

For the purpose of the study equilibrium of a firm or price- output determination by a firm can be studied under two heads- short run equilibrium and long run equilibrium. Let us first study the short run equilibrium.

8.3.1 Short run equilibrium of a firm:

A short run equilibrium of a firm under homogenous and heterogynous cost conditions is reached as under. There are three possibilities of short run equilibrium of a firm.

1. Excess profit 2. Normal profit and 3. Loss.

A firm has to fulfill two conditions for the short run equilibrium of a firm. We can explain the above three possibilities and two conditions with the help of following figure.

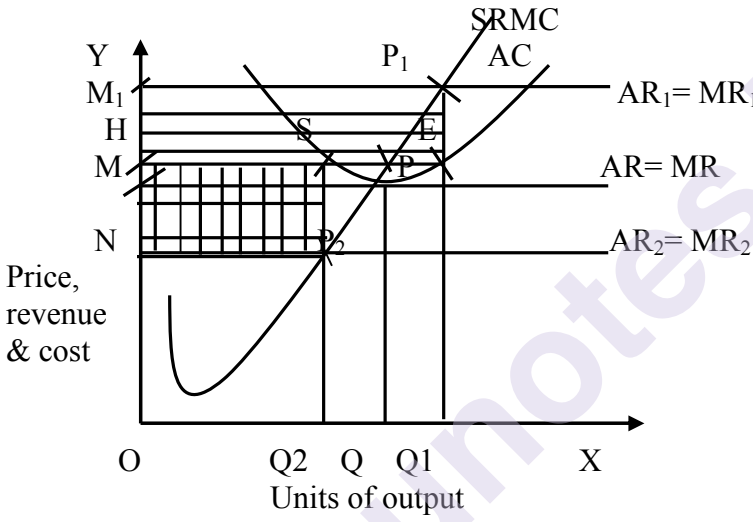


Fig. No. 8.6

In the above diagram 'X' axis represent units of output and 'Y' axis represent price, revenue and cost. There are horizontal AR and MR curves. 'SMRC' curve intersects MR curve at three points P, P_1 and P_2. OQ commodities are produced at OM price. OQ1 commodities are produced at OM_1 price and OQ_2 commodities are produced at ON price.

* At point 'P'- SRMC = MR & AR = AC.

At this point AR = AC, so at this equilibrium point OQ commodities are produced at OM price. Hence, the firm is in short run equilibrium and enjoys only normal profit.

* At point 'P1'- MR = MC and AR > AC.

The excess profit and loss is determined by the difference between AR and AC. At this equilibrium point OQ1 commodities are produced at OM1 price. Hence, some firms in the industry enjoy excess profit shown by the area 'M_1P_1EH'.

* At point 'P2' – MR = MC and AR < AC.

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At this equilibrium point OQ2 commodities are produced at ON price. Hence firm would suffer a loss at a price which is less than AC shown by the area 'MSP$_2$N'.

In short there are three possibilities depending upon AR and AC.

8.3.2 Long run equilibrium of a firm:

In the long run the equilibrium of a firm under homogenous and heterogeneous cost condition is explained as under.

In the long run all the factors of production can be changed. In the short run some loss making firms would leave the industry in the long run. The excess profit is divided among the firms in a same proportion. Hence, in the long run no one firm would enjoy excess profit or suffer a loss.

The long run equilibrium of a firm is attained by the equality between MR = MC and AR = AC. This is explained with the help of the following diagram.

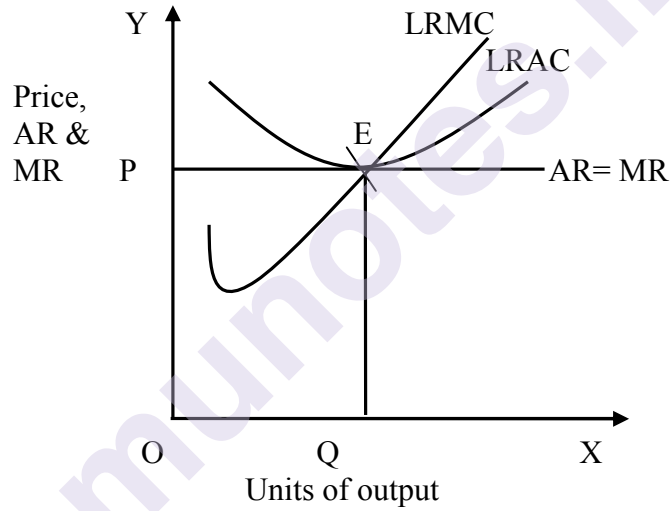

Fig. No. 8.7

In the above diagram 'X' axis represent units of output and 'Y' axis represent price, revenue and cost. LRMC curve intersect AR = MR curve at point 'E' from below. This equilibrium point shows that both the AR = AC and MR = MC. This equilibrium point also shows that no one firm would earn excess profit or suffer a loss. Here each and every firm in the long run enjoys only normal profit. Hence the firm will be in a stable equilibrium.

7.4 EQUILIBRIUM OF AN INDUSTRY

Industry simply means a group of firms producing a particular type of a commodity.

The equilibrium of an industry in the short run and in the long run can be explained as follows.

8.4.1 Short run equilibrium:

An industry which consists of large number of firms producing identical product is to be in equilibrium. Under perfect competition in order to attain an equilibrium three conditions must be fulfilled by the industry. The conditions are-

1. Every firm must be in equilibrium i.e. MR of every firm must be equal to its MC. The MC curve of every firm must cut its MR curve from below.

2. Industry as a whole must be in equilibrium i.e. the AR of every firm should be equal to its AC. However, in the short run industry may not be in a stable equilibrium because, the AR of every firm may not necessarily be equal to its AC.

3. The short run sub normal price in the industry is in equilibrium, when the short run demand and short run industry's supply are equal.

8.4.2 Long run equilibrium:

In the long run an industry would be in a stable equilibrium when every firm enjoys only normal profit. In the long run an industry has to fulfill three conditions. They are-

1. MR of every firm must be equal to its MC. The MC curve of every firm must cut its MR curve from below.

2. The AR of every firm must be equal to its AC.

   When AR = AC the number of firms in the long run industry would remain constant and the industry would attain a stable equilibrium.

In the case the AR is more of less than AC the industry would not be in a stable equilibrium. When AR is greater than AC the existing firms would enjoy excess profit. This would induce new firms to enter the industry. The output would increase and the price would come down until it is equal to AC. On the other hand, when AR is less than AC some existing firms would suffer losses. This would force some of them to leave the industry. Hence the output would decrease and the price would rise until it becomes equal to AC.

When AR is equal to AC the industry as well as every firm will be in a stable equilibrium. In such a situation the number of firms in the industry and its output would remain constant.

3. The long run normal price in the industry is in equilibrium when the long run demand and long run industry's supply are equal.

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8.5 QUESTIONS

1. Explain the features of perfect competition.
2. Discuss how equilibrium price is determined under perfect competition.
3. Explain how a firm under perfect competition attains an equilibrium in the short run.
4. How a firm under perfect competition attains an equilibrium in the long run. Discuss
5. Describe the equilibrium condition of the industry in the short run and long run under perfect competition.

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9

EQUILIBRIUM UNDER MONOPOLY MARKET & MONOPOLISTIC COMPETITION

Unit Structure:

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9.0 OBJECTIVES

- To study the meaning and types of monopoly.
- To study the equilibrium of a monopoly firm in the short run and long run.
- To study the meaning and features of monopolistic competition.
- To understand the equilibrium of a firm in the short run and long run under monopolistic competition.
- To study the concepts of product differentiation and selling cost.
- To study the wastes of monopolistic competition.

9.1 INTRODUCTION OF MONOPOLY

The term 'Monopoly' consist of two words 'Mono' and 'poly'. Mono means single, poly means seller. Thus, when there is only one seller of a commodity in the market can be called as monopoly market. There is various definition of 'monopoly' given by various economists. Prof. Lerner defines it as, 'any seller who is confronted with a falling demand curve for his product.'

The Monopoly refers to, 'that market situation in which there is only one firm (seller) in the market, that has a control over the supply of a commodity and which has no close substitutes for its product in the market.'

It is to be noted here that in practice we rarely come across the pure monopoly (single seller) except in case of government monopolies. When we refer to monopoly, normally we have 'lesser degree of competition' in our mind rather than complete absence of competition.

Features of Monopoly-

The above definitions help us in determining certain broad features of monopoly market.

1. Single Seller – There is only one producer/firm/seller of the product in the market. Obviously, he has complete control over the supply of the commodity.

2. Absence of perfect substitutes – In a monopoly market the product of a monopolist does not have perfect or close substitutes.

3. Price Maker – A monopolist is a price maker and not a price taker. It means that monopolist himself is in a position to decide the price. He does not have to accept the price in the market.

4. Profit Maximization – Unlike a competitor seller, the monopolist necessarily aims at earning maximum profits. As Marshall puts it the price setting by a monopolist is not just for covering the cost of production but is essentially for earning maximum net revenues.

5. Firm and Industry – As pointed out earlier in a monopoly market, there is no distinction between a firm and an industry. The monopolist firm is itself the industry.

6. Falling Demand Curve – As Prof. Lerner points out that a monopolist is always confronted by a falling demand curve which means that he gets a fairly inelastic demand curve for his product.

Thus, a market characterized by all the above features is a monopoly market.

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9.2 TYPES OF MONOPOLY

Monopoly may be classified into various types. These types of monopoly are based on various criteria. The main types can be described in the following manner.

1. **Pure monopoly and Imperfect monopoly**: The classification of monopoly into pure and imperfect is based on degree of competition in the market. Pure monopoly is said to exist when there is no competition at all in the market. It is possible only if there are no substitutes for the monopolist's product. On the other hand, imperfect monopoly implies a market where the monopolist may have a few substitutes though the substitutes may not be absolute or perfect substitutes.

2. **Private and Public Monopolies:** This classification is made on the basis of the ownership of monopoly firm. Private monopoly refers to a monopoly firm owned by a private individual. Public monopoly, on the other hand is a firm owned, managed and controlled by Govt. There are certain types of activity which are exclusively meant for public undertaking. Indian Railway or Post can be cited as examples of such public monopolies.

3. **Natural, legal, technological and joint monopolies:** This classification is based on the sources of getting monopoly power by firms.

   Natural monopolies refer to a situation where, by advantageous location, age-old reputation etc. the firm derives a monopoly power.

   Legal monopolies arise out of legal sanctions for patents trade- marks etc. The other firms are forbidden to make use of patents and trade-marks already given to certain firms.

   Technological monopolies refer to the monopoly power gained by certain firms because of their technological expertise.

   Joint monopolies are enjoyed by certain firms who come together with a definite objective and form combinations like cartels, trusts etc.

4. **Simple Monopoly and Discriminating Monopoly:** Such a classification is made on the basis of the pricing policies adopted by the monopoly firms. Simple monopoly has a uniform price policy for all customers while the discriminating monopoly firms charges different prices from different customers for the same product.

9.3 EQUILIBRIUM OF A FIRM

In order to understand the price output determination or equilibrium of a firm in a monopoly market in the short run and in the long run we shall make some basic assumptions.

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1. Monopoly of a seller.
2. Perfect competition among the buyer.
3. No close substitutes.
4. Profit maximization.

With the above assumption we shall now first deal with the short run equilibrium of a firm under monopoly.

9.3.1 SHORT RUN EQUILIBRIUM

It may be recalled here that in the monopoly market AR and MR differs from each other. This is on account of price variations. It should also be noted here that for a monopoly firm AR curve represents the demand curve. The AR curve also denotes the price under any market situation as AR is equal to price. The equilibrium condition is equality of MR and MC. The monopoly price may be greater than, equal to or less than AC which may lead to excess profits, no profit no loss and loss respectively. This means there are three possibilities in the short run equilibrium. The figure No. 11.1, 11.2, and 11.3 will make it clear.

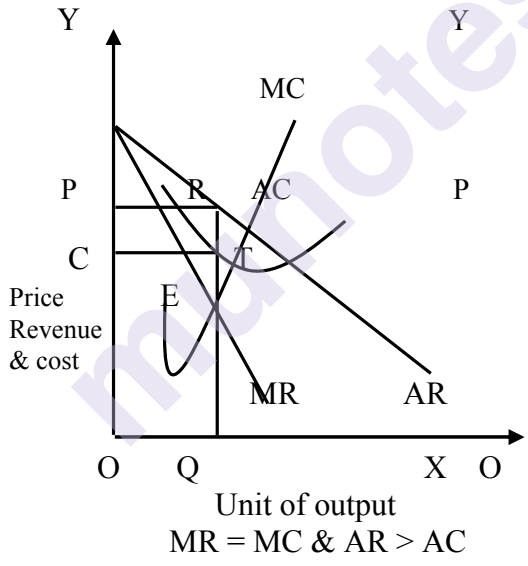

Figure 9.1

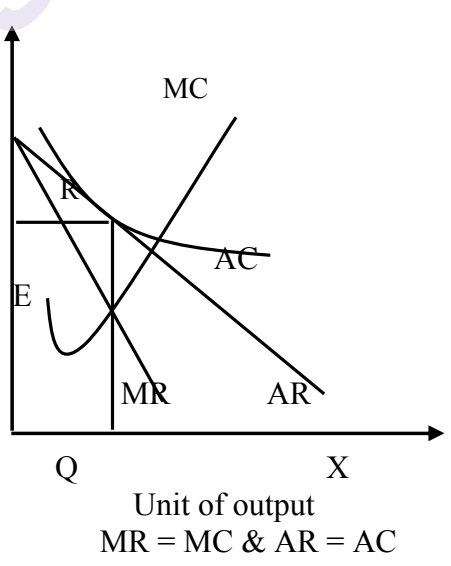

Figure 9.2

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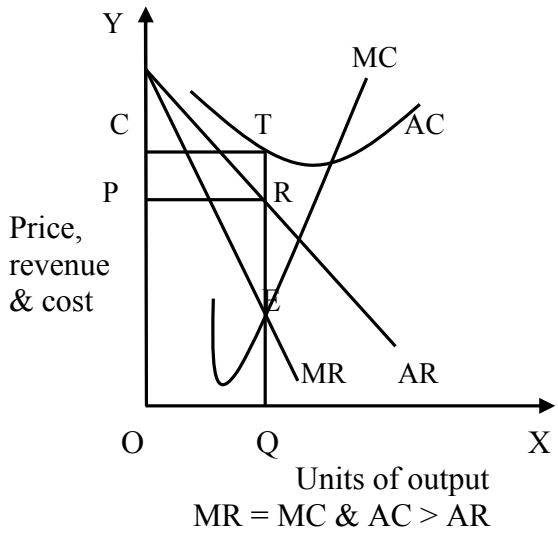

Figure No. 9.3

The above figure No. 9.1 shows that X axis represent units of output and Y axis represent price, revenue and cost. MC is the marginal cost curve which intersects MR curve at point 'E'. At this equilibrium point AR average revenue is more than AC average cost. At point 'E' OQ units are produced and sold at OP price. The average cost of OQ units of output is OC which is less than average revenue or price OP. The average revenue curve AR lies above the AC average cost curve. This enables the monopolist to earn excess profits shown be the area PRTC.

The figure No. 9.2 shows that MC curve intersects MR curve at point 'E'. Point 'E' is the equilibrium point. At this equilibrium level AC average cost curve is tangent to AR average revenue curve. This shows that at point 'E' not only MR = MC but also AR = AC, OQ units are produced at OP price. The average cost of OQ units is equal to average revenue or price OP. Hence at this output the monopolist is able to earn only normal profit i.e. no loss no profit.

The above figure No. 9.3 shows that at point 'E' the monopoly firm attains equilibrium. At this equilibrium point the average cost curve AC lies above the AR average revenue curve which shows that average cost is greater than average revenue. At point 'E' OQ units are produced and sold at OP price. The average cost at OQ units is OC which is more than the average revenue or price OP. Hence, firm has to bear a loss shown by the area PCTR.

9.3.2 Long run equilibrium :

The long run equilibrium of the monopoly firm is attained at point 'E' where LMR and LMC curves intersects each other. In the long run the firm can change the variable as well as fixed factors of production. The monopolist will try to maximize profits to the extent possible.

In the long run the monopolist will earn supernormal or excess profits. In any case he will not earn normal profit or bear the losses. The following figure shows the condition of excess profit earning and long run equilibrium.

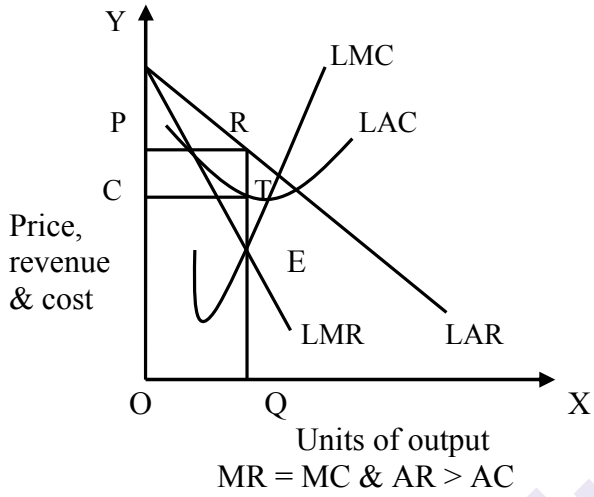

Figure No. 9.4

The above figure No. 9.4 shows that units of output is measured on X axis and price, revenue and cost are measured on Y axis. LMC is the marginal cost curve which intersects LMR curve at point 'E'. At this equilibrium point AR average revenue is more than LAC average cost. At point 'E' OQ units are produced and sold at OP price. The average cost of OQ units of output is OC which is less than average revenue or price OP. The average revenue curve AR lies above the AC average cost curve. This enables the monopolist to earn excess profit shown be the area PRTC. It should be remembered that the elasticity of demand decides the price. If the demand is elastic lower price will be set and if the demand is more inelastic the price would be higher.

9.4 INTRODUCTION OF MONOPOLISTIC COMPETITION

The term 'monopolistic competition' is used interchangeable with the term 'imperfect competition'.

The concept of 'Monopolistic Competition' was introduced by Prof. E. H. Chamberlin in his book, 'Theory of Monopolistic Competition'. Monopolistic Competition refers to that market situation,' where there is large number of sellers producing a commodity with their own peculiarities.' This means the commodity is not identical or homogeneous. There is product differentiation. Each producer is producing a different type of a commodity than the others.

Monopolistic Competition strictly means a market with competitive monopoly of a large number of sellers.

9.4.1 Features/ Characteristics:

1. **Large Number of Firms:** Monopolistic competition is characterized by a large number of firms producing a similar product. Each firm will have a definite group of customers and enjoys a some sort of monopoly in respect of the particular group of customer. Each firm has to face competition from the other firms. Therefore, each firm has to make efforts for maintaining and increasing its market share. As the number of firms is large, each firm produces a relatively smaller share of the total market supply.

2. **Product differentiation:** The large number of firms under monopolistic competition produces differentiated products which are relatively close substitutes for each other but not perfectly substitutes. Each firm, in order to attract maximum buyers will have its own peculiarities of the product which distinguishes its product from other similar products in the market. This is called as product differentiation. Product differentiation may occur in many ways. The firm may have its own quality, Brand- name, material used, packing, appearance, fragrance, shape, technology etc. of the commodity.

3. **Easy entry and exit:** The entry in and exit from such a market is not very difficult. There are no such restrictions on the entry and exit of firms. Though each faces competition, is independent in case of price and output decisions.

4. **Selling costs:** The market is characterized by selling costs. In order to attract and better known to the customers the firm has to go for sales promotion activities like advertising, free service and buy one and get one more free etc. For this each firm requires to be incurred huge amount of money. These expenses are called as selling costs.

5. **Sloping demand curve:** Each firm under this type of market has a downward sloping demand curve because the demand for a commodity of a monopolistic competitive firm is more elastic. The demand curve is less steep than the demand curve of a monopoly firm.

6. **Concept of Group:** Professor Chamberlin used the word group instead of industry. Under monopolistic competition, there is heterogeneity and therefore he has used the concept of group to imply a collection of firms producing closely related but not homogeneous goods. Under monopolistic competition, due to qualitative differences and buyers' preferences, there are wide divergences in the curves of cost of production and a variety of demand curves. The result is heterogeneity of prices and variations over a wide range of output and in profits.

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9.5 EQUILIBRIUM OR PRICE-OUTPUT DETERMINATION OF THE FIRM UNDER MONOPOLISTIC COMPETITION

The monopolistic competition pricing can be divided into twp broad categories, short run equilibrium of a firm and long run equilibrium of a firm. We deal each of them separately.

9.5.1 Short run equilibrium :

Like any other type of market the equilibrium of a firm under monopolistic competition will be established where the MR is equal to MC. In the short run period, the firm may make profits, incur losses or may have no profit no loss situation.

The demand curve of a firm under monopolistic competition may differ in its elasticity from firm to firm. However, it will neither be perfectly elastic nor perfectly inelastic. The slope of AR curve may therefore vary accordingly. We can understand the three possibilities of short run equilibrium with the help of following diagrams.

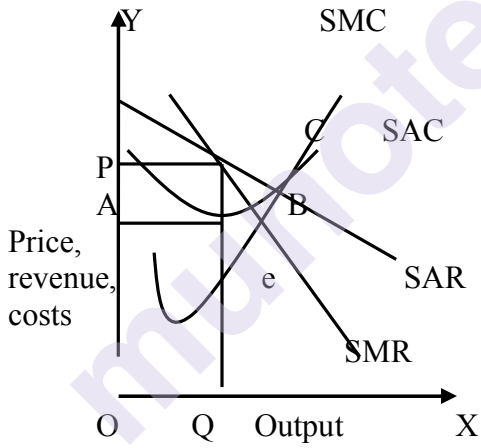

Figure 9.5

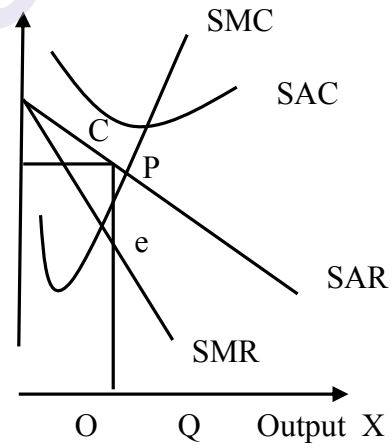

Figure 9.6

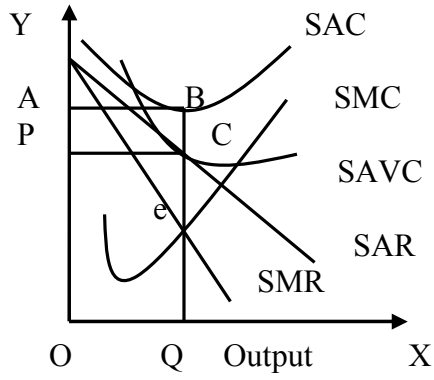

Figure 9.7

The above three diagrams shows that there are three possibilities of short run equilibrium of a firm in the monopolistic competition.

Fig. 9.5 shows that, SMC curve cuts the SMR curve at point 'e' when the average cost is OA or QB and the price or average revenue is OP. The price or average revenue is more than the average cost and hence the firm enjoys profits as shown by the area PCBA.

In Fig. 9.6 the SMR = SMC and SAC curve is tangent to SAR curve and hence the firm earns only normal profit. It means the firm neither earns excess profits nor does it incur any losses.

In Fig. 9.7 the SMR = SMC, SAVC curve is tangent to SAR curve and SAC lies above the SAR. It means that average cost is more than the average revenue hence the firm has to incur losses shown by the area ABCP but its price or average revenue is just sufficient to take care of the average variable costs.

Thus, the short run equilibrium may enable this firm in monopolistic competition to earn profits, to sustain losses and with no profit no loss situation.

9.5.2 Long run equilibrium:

If the firm is earning supernormal profits, more firms will enter the 'group' in the long-run. If the firm is incurring losses, firms will leave the group in the long-run. If the firm is making no loss no profit in the short run, it will continue to remain in the same position in the long-run.

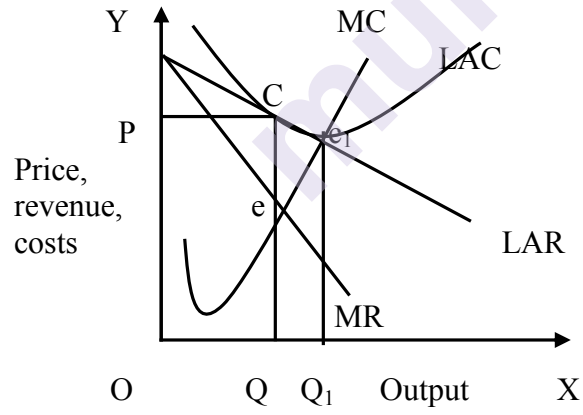

Figure 9.8

In the long-run, at point 'e' the LAC long run average cost curve become tangent to the LAR long run average revenue curve or the demand curve. Since at this point, the slope of the AR and AC curves is equal to the MR and MC curves will intersect vertically below it. This is shown by point 'e' in the following diagram.

The long-run equilibrium conditions are- MR = MC and AR = AC.

As the firm is earning just normal profit, there is no tendency for the number of firms in the group to change. Thus, the long run equilibrium of the firm implies equilibrium for the group as a whole also.

Since the long run equilibrium is shown by the tangency between the AR and AC curves; it implies that the equilibrium output OQ will necessarily be less than the least cost output OQ_1. This is true because a downward sloping AR curve can be tangential to U shaped AC curve at some point to the left of the minimum point (c_1). It means that in the long run economies of scale are not fully exploited by the firm and there is excess or unutilized capacity equal to OQ_1 amount of output.

9.6 PRODUCT DIFFERENTIATION

Monopolistic competition is characterized by product differentiation and selling costs. Product differentiation emerges out of the typical nature of competition in such market. Each individual firm in a group producing a particular type of commodity has to face the competition from the other firms in the group. The competition is of two types i.e. price competition and product differentiation.

Price competition is reflected in the individual price setting of a firm. The firm may set a slightly lower price than its rivals for inducing the buyers to purchases its product. Thus price decisions are independently taken by every firm.

Product competition is reflected in the product differentiation. Product differentiation implies the special features introduced by the firm so as to distinguish its product from the other similar products in the market.

It may occur in many ways. The firm may have its own physical features of the product such as color, shape, appearance, size, fragrance etc. which may be helpful in giving some distinction to its product.

The firm may also have a different technique of production or other qualities of the product. Sometimes the brand- name, trade- mark, packing etc. are also used for product differentiation.

The product differentiation is a specific character introduced by each individual firm in the monopolistic competition.

9.7 SELLING COSTS

The firm in order to bring its distinguishing character to the notice of the customer has to spend on advertising and publicity of its product through other methods of sales promotion. Most of the firms spend on advertising on radio and television. The modern age is in fact an age of advertisement hence the firm has to spend sizeable amount of money on advertisements. The market in the modern days has changed in such a manner that the customers are prejudiced in favour of certain goods. At present, they go to

the market with pre- determined choice of the products, mostly formed by the advertisements. Considering this the firms have to spend a lot on publicity, if they have to induce the customers to buy their product. They try to impress upon the customer the specialties of differentiating qualities of their product. The expenses incurred on such sales promotion activities are called as selling costs.

Prof. Chamberlin has defined selling costs as, "costs incurred in order to alter the position or shape of the demand curve for a product."

9.8 WASTES OF MONOPOLISTIC COMPETITION

Under monopolistic competition there are several wastes and both the consumers and factors of production are exploited. These wastes have been pointed out by Prof. Chamberlin. The wastes are-

1 **Excess Capacity-** Under monopolistic competition a firm's equilibrium output is less than the optimum output. The average cost at the equilibrium level is more than minimum. There is excess or unused capacity, which is a waste in monopolistic competition.

2 **High Price for the Consumer-** Under monopolistic competition a consumer has to pay a higher price for a product than under perfect competition even in the long run period. Though the firm is earning only normal profits the price paid by the consumer is more than that under perfect competition.

3 **Selling Cost-** Under monopolistic competition extra expenditure is incurred by firms on competitive advertising to increase individual sales. The advertising is considered as a waste under monopolistic competition because it leads to wasteful competition among rival firms and increase cost which is not necessary in the market. This cost is passed on to the consumers in the form of higher price. Thus, competitive advertising is a clear waste of resources.

4 **Unemployment-** In monopolistic competition, the problem of unemployment is created due to many reasons. One of these is the fact that the productive capacity is not fully utilized under monopolistic competition and therefore, employment is not increased. Further, in order to maintain high prices, production is sacrificed and this may create cyclical unemployment.

5 **Lack of Specialization-** Since there are many rival firms producing similar but not identical products the scope for large scale production is limited by smallness of size. There is inadequate specialization and a firm can not reap the advantages or economies of large scale production. Thus consumers are deprived of the fruits of specialization and large scale production.

6 **Cross Transport-** There is a waste of cross transport under monopolistic competition. The product of Calcutta manufacturer may be sold in Mumbai and a similar product of Mumbai may be sold in

Calcutta. The consumers have to pay an increased price, which would include transport costs. If the Calcutta producer serves the Calcutta market and Mumbai producer serves the Mumbai market, transport cost can be avoided and consumers would be benefitted. But this does not happen because of product differentiation and every rival producer likes to capture the market throughout India.

9.9 QUESTIONS

1. Explain the features of monopoly.
2. What are the various types of monopoly.
3. Explain how a monopolist attains an equilibrium in the short run.
4. Discuss long run equilibrium of a monopoly firm.
5. Explain the characteristic features of monopolistic competition.
6. Explain how a firm attains an equilibrium in the short run and long run under monopolistic competition.
7. Discuss the wastes of monopolistic competition.

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