

# Microeconomics II & Indian Economy

As per new BCom CBCS syllabus 2017 for CU

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# Preface

The study of economics can be effective only when it combines theoretical concepts with real world analysis. While understanding the concepts of demand, supply, consumer behaviour and market morphology is fundamental to the study of economics, applying these concepts in the analysis of competition between firms, the government's decisions to impose taxes or offer subsidies is more important to bring the study of economics to its fruition. This book combines both these aspects creating a synergy between the theoretical aspects and the current economic affairs around us. Students have the opportunity to learn the microeconomic concepts and then analyse the economic development in India in the light of their understanding of the microeconomic theories. Once they understand how the interplay of demand and supply determines the market price and also the amount being bought and sold in the market, they will be able to recognize why bumper crop results in fall in price of the agricultural product and requires market intervention in the form of minimum support price (MSP). They will also be able to recognize that low production in industries can result in low employment which can result in higher incidence of unemployment and poverty.

For a student of economics it is quite important to understand the Indian economy. This understanding only can make their study of economics functional. Students should be aware of the policies of the government and their effects. The aim of our educational system is not only to create professionals or build careers but to make socially, politically and economically aware and alert citizens. Thus the study of economics can only be complete when the students understand which policies are beneficial for the economy in the long run and as a result develop opinions and voice them to make the world's biggest democracy a success.

## About the Book

The book is mainly designed for the students pursuing B Com Semester IV (Hons.) course under the University of Calcutta (CU). Apart from this, the book will also be useful for the students pursuing commerce and economics courses in other universities at graduation level. Students of professional courses can also find the necessary ingredients and inputs from the book consistent with their requirements. Above all, young researchers in this field can gather basic ideas and information from this book.

The objective of the book is to make the readers aware of the various aspects of microeconomics and Indian economy. The book provides theoretical knowledge of microeconomics with appropriate examples. Apart from microeconomics, the book focuses on different aspects of the Indian economy. The text explains the contents of the chapters in a lucid manner for the benefit of students. Thus we are hopeful that this book will not only enhance the number of books in the field but will also occupy a separate identity due to its special features.

## Key Features

- The book clearly mentions the learning objectives at the beginning of each chapter which will enable the students to stay focused.

- The chapters are written in a simple and lucid style so that the students can independently understand the content without the instructor's help.
- The content is prepared with the objective of providing conceptual understanding and logical explanations of the subject matter to students.
- One of the most appealing features of the book is the simple diagrammatic representation of the content through figures, tables and flow charts.
- Content is updated with current and latest data for better understanding of the trends of various macroeconomic indicators.
- Many topics are accompanied by graphical representations so that students can grasp the subject matter thoroughly.
- All chapters are followed by multiple choice questions for practice and self-valuation.
- The detailed summary at the end of each chapter will help the students get a quick recap of the contents and subject matter discussed in a chapter.
- The important and relevant portions of the subject are highlighted so that students can focus on the bull's eye.
- After all the chapters, two model question papers are provided which will help the students in practising for university examinations.

## Coverage and Structure

The first module of the book covers the course of Microeconomics II in three units—Monopoly, Theories of Imperfect Competition and Factor Price Determination.

- Unit 1 elucidates the concept of monopoly and the sources of monopoly power. It illustrates short-run and long-run equilibrium conditions of a monopoly firm numerically.
- Unit 2 explains the various theories of imperfect competition and covers topics like monopolistic competition and oligopoly (collusive and non-collusive oligopoly) in detail.
- Unit 3 lists the factor price theory and marginal productivity theory of distribution. Through mathematical formulas, it explains the relationships between demand and supply curves of a factor. It also explains the various theories of rent, profit and interest rate determination.

The second module covers the course of Indian Economy in four units—Growth and Development, Basic Features of Indian Economy, Sectoral Trends and Issues and Social Issues in Indian Economy.

- Unit 4 discusses the basic issues in economic development and the concept and measures of national income.
- Unit 5 details the basic features of Indian economy along with the sectoral distribution of national income. It also sheds light on the structural changes in the Indian economy.
- Unit 6 explains the sectoral trends and issues related to all the sectors, i.e. agriculture, industry, service and external sectors. Starting with green revolution and land reforms, it goes on to explain the industrial reforms in the pre- and post-reform periods. The roles of public sector, MSME sector and service sector are discussed in ample detail. Problems related to unfavourable balance of payments and policy measures are also described in a lucid manner.
- Unit 7 talks about the social issues of poverty and unemployment along with the measures taken to address them.

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# Module I

## Microeconomics II

UNIT 1: Monopoly

UNIT 2: Theories of Imperfect Competition

UNIT 3: Factor Price Determination





# UNIT 1 Monopoly

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## Learning Objectives

After studying this chapter, you will be able to

- understand the concept of monopoly and its features
  - gain insight into the sources of monopoly power
  - understand short-run and long-run equilibrium conditions of a monopoly firm
  - comprehend monopoly and elasticity
  - measure the monopoly power
  - elucidate price discrimination and the social concept of monopoly
- 

## DEFINITION AND CONCEPTS

Monopoly refers to a market structure where a single seller or a firm sells a product in the market and the product has no close substitute available in the market. The word ‘monopoly’ originates from the Greek words *monos polein* which mean ‘alone to sell’. Since the product has no close substitute, the monopolist enjoys enormous power in the market. Here, the single seller implies one seller or firm or a group of sellers. For example, Calcutta Electricity Supply Corporation (CESC) has the sole right to supply electricity in Calcutta. Indian Railways has the monopoly to run trains in the railway tracks of India.

In a perfectly competitive set-up, the firms are price takers as the price is determined by the interaction of demand and supply. The producers have no power to influence the market price. They only have to determine the output given the market price. Conversely, the monopolists are the price makers. They face two decisions—determination of price and determination of output. However, since the monopolists face downward sloping demand curve, their decisions become interdependent. Either they will set the price and sell the corresponding output in the market or set the output which will be sold at the corresponding price. Thus, a monopolist cannot determine the price and output in the market simultaneously.

## FEATURES OF MONOPOLY

The main features of a monopoly market are described below.

**Single seller and many buyers** The monopoly market is characterised by a single seller and many buyers. The single seller may be a single person or a firm or a group of sellers. The sellers are selling the product to the numerous buyers. However, in a competitive market, we observe many buyers and sellers.

**Price maker** The monopolists have the power to set the price in the market. In that sense, monopolist is the price maker even though he cannot fix the price and the output simultaneously. He has an enormous influence over the market price. However, in a competitive market, the firm is a price taker who is bound to take the fixed price as determined by the market forces.

**Absence of competition** In a perfectly competitive market, there are a number of sellers and hence all firms face competition from one another. In monopoly, due to the presence of a single seller, the question of competition will never arise. Hence, a monopolist enjoys enormous power in the market.

**Profit maximisation** Profit is the difference between revenue and cost. A monopoly firm always pursues the objective of profit maximisation. In most of the cases, all the firms in different markets pursue the objective of profit maximisation. However, there are some exceptional cases of sales maximisation, growth maximisation, etc.

**Non-availability of substitutes** The products sold by the monopolist have no close substitute. Non-availability of the substitutes raises the monopoly power in the market. This is the source of monopoly power. However, in a competitive market, all products are substitutes of one another.

**Entry-deterrence** The monopolist always tries to restrict the entry of any other seller in order to maintain his supremacy in the market. There are many entry deterrence techniques which a monopolist applies to prevent other sellers from stepping in the market. In a competitive set up, there is free entry and exit.

**Indifference between firm and industry** In reality, many firms unite to constitute an industry for a particular product. Since only a single firm exists in the monopoly market, it implies the indifference between the firm and the industry. This is not the case in a competitive market as there are a large number of firms due to the availability of the substitutes.

**Economies of scale** If the average cost of production declines continuously over a large range of output, this is known as economies of scale. Economies of scale give rise to 'natural monopoly'. A natural monopolist is someone who experiences an overwhelming cost advantage over the potential competitors so that an automatic entry-deterrence is created.

### SOURCES OF MONOPOLY POWER

As explained earlier, in monopoly there are no close substitutes for the commodity and there are some entry barriers which prevent the other firms from entering the market. Thus, the monopolist enjoys enormous power in the market. In this section, we will discuss the sources of monopoly power in the market. There are some specific sources for the existence of monopoly power. They are explained below.

**Limit pricing** The monopolist often opts for limit pricing in the market. It sets the price which is just below the equilibrium price. This acts as a barrier for the entry of new firms in the market. Sometimes, this limit pricing policy is combined with product differentiation strategies and excessive advertisement which make the entry really meaningless and unattractive. Sometimes, a mobile service provider opts the strategy of limit pricing to restrict other service providers in the market.

**Ownership of strategic raw materials** If the monopoly firm owns strategic raw materials for production, then it is almost impossible for the other firms to avail these materials and produce the substitute of the

product sold by the monopolist. This is one of the principal reasons for the existence of monopoly power in the market. Ownership of coal mines is an example of ownership of strategic raw materials.

**Market size** It is often observed that the market size does not permit the existence of more than a single large plant. The technology is such, so that the substantial economies of scale have to be reaped only if there is a single large plant in the market. The economies of scale are realised only at the production of a large scale of output. Thus, here the market gives birth to the natural monopoly. Electricity sector is an example of natural monopoly.

**Exclusive production techniques and innovations** The monopoly firm, in some cases, utilises exclusive improved production techniques which are not available to the other firm. Thus, the existing firm is capable of producing more of the improved product in less time. This is applicable for new softwares.

**Patent rights** Sometimes, the monopolists have the patent rights for producing a particular product. In these cases, it is not possible for other firms to produce such products or even to follow the process of production because the firm can enjoy both the product and the process patent. This is applicable for some specific drugs.

**Trade or import license** A monopoly firm may also hold the right of producing or marketing the product with the help of trade or import license acquired by itself. This actually restricts the other firms from producing the same product as the monopolist. This is applicable for particular machineries imported by a specific agent.

**Imposition of the trade barriers** There are two types of trade barriers which are popular in the field of international trade. One of them is tariff and the other one is quota. The imposition of import tariff raises the price of the foreign product in the domestic market which in turn helps the domestic monopolist. However, the imposition of quota increases the monopoly power to a greater extent if the monopolist acquires the quota license. Sometimes if the domestic monopolist overproduces, then the government of the country can impose various trade restrictions to limit the import of that particular product.

The above mentioned factors act as the sources of monopoly power in the market. In the forthcoming sections in this chapter, we will learn to measure the monopoly power.

## RELATIONSHIP AMONG THE LINEAR DEMAND CURVE, AVERAGE REVENUE (AR) CURVE AND MARGINAL REVENUE (MR) CURVE IN THE MONOPOLY MARKET STRUCTURE

In the perfectly competitive market, the firm faces a horizontal demand curve since price is given or fixed in the market. However, the aggregate demand curve, which is constructed after considering all the firms in the market is negatively sloped or downward sloping. As we have already mentioned, in monopoly, due to the presence of a single firm in the market, the market demand curve and aggregate demand curve are same. Therefore, the aggregate demand curve in the monopoly market is downward sloping.

In all the markets, Total Revenue ( $TR$ ) = Price of the product ( $P$ )  $\times$  Output sold ( $Q$ )

$$\text{i.e., } TR = PQ \quad (1)$$

## 6 Microeconomics II and Indian Economy

Hence, Average Revenue ( $AR$ ) =  $TR/Q = (PXQ)/P$

$$AR = P \quad (2)$$

This implies,  $AR$  curve represents the average product price of the firm. In other words, it shows the relationship between  $AR$  ( $P$ ) and output sold ( $Q$ ). Thus,  $AR$  curve is nothing but the demand curve or the price of the product curve in the market.

Let the demand curve or  $AR$  curve be linear and is represented by—

$$P = a - bQ \quad (3)$$

where  $a$  and  $b$  are constants.

Equation (3) definitely depicts the inverse relationship between  $P$  &  $Q$ , which means it should be the equation of a demand curve. Now, equation (3) represents a straight line which is in the form,  $y = mx + c$ , whose slope ( $m$ ) =  $-b$ , and the vertical intercept ( $c$ ) =  $a$ .

Thus, the demand curve here is a negatively sloped straight line.

Now, as  $P = a - bQ$

$$\begin{aligned} TR = PQ &= (a - bQ) Q \\ &= aQ - bQ^2 \end{aligned}$$

Therefore, Marginal Revenue ( $MR$ ) =  $d(TR)/dQ$

$$\text{or, } MR = d(aQ - bQ^2)/dQ$$

$$\text{or, } MR = d(aQ)/dQ - d(bQ^2)/dQ$$

$$\text{or, } MR = a - 2bQ \quad (4)$$

Equation (4) implies that  $MR$  is also a straight line which is in the form,  $y = mx + c$ , whose slope ( $m$ ) =  $-2b$ , and vertical intercept ( $c$ ) =  $a$ .

Thus,  $MR$  curve is also a negatively sloped straight line.

Now, comparing equation (3) and (4), we can say that both the demand and  $MR$  curves have the common vertical intercept 'a' which implies that they will start from a common point along the vertical axis. However, the  $MR$  curve will be twice steeper than the demand curve as their respective slopes are  $(-2b)$  and  $(-b)$ .

Thus, both the demand curves or the  $AR$  curve and the  $MR$  curve will be downward sloping straight lines with common vertical intercept but the slope of the  $MR$  curve will be twice the slope of the demand curve.

The output at which the  $MR$  curve touches the horizontal axis is definitely a point on the horizontal intercept made by the demand or the  $AR$  curve. When the  $MR$  curve touches the horizontal axis, then  $MR = 0$ .

Now,  $TR = PQ$

$$\text{Hence, } MR = d(TR)/dQ = d(PQ)/dQ = P + Q \cdot dP/dQ$$

$$\text{or, } MR = P [1 + (Q/P)dP/dQ] \quad (5)$$

Now  $e = -(dQ/dP) \cdot (P/Q)$ , where  $e$  refers to the price elasticity of demand

$$\text{So, } (Q/P)/(dP/dQ) = -1/e \quad (6)$$

Substituting the value of  $(Q/P)/(dP/dQ)$  from equation (6) to (5) we get,

$$MR = P [1 - (1/e)], \text{ or } MR = AR (1 - 1/e)$$

When  $MR = 0$ , then

$$0 = AR [1 - (1/e)]$$

$$\text{or, } 1 - (1/e) = 0$$

$$\text{or, } 1/e = 1$$

$$\text{or, } e = 1$$

Thus,  $MR$  will be 0 or it will touch the horizontal axis at the level of output (at point  $N$  in the figure 1.1) where  $e = 1$ . Now, we know that the price elasticity of demand at a point on a straight line demand curve is the ratio of the lower segment to the upper segment of the demand curve with respect to the particular point. So,  $e = 1$  is possible only at the midpoint of the demand curve (at  $M$ ).

Now, we also know that if we draw a straight line from the midpoint of a side of a triangle parallel to the second side, it will definitely bisect the third side of the triangle. In the diagram, the line  $MN$ , which is parallel to  $OA$  of  $\Delta OAB$  will bisect  $OB$ . Thus,  $N$  is the midpoint of  $OB$  through which  $MR$  passes.

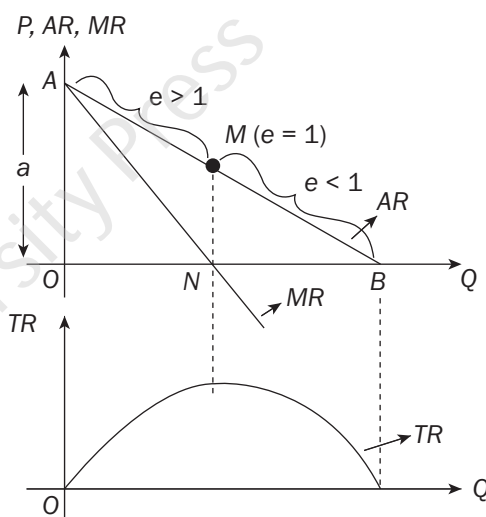
From this, we can say that  $MR$  is not only twice steeper than the demand curve, it will also bisect the horizontal intercept made by the demand or  $AR$  curve. This is clearly depicted in figure 1.1.

As we get  $MR = P (1 - 1/e)$

The above analysis can also depict the shape of Total Revenue ( $TR$ ) curve in this context.

- If  $e > 1 \Rightarrow MR > 0 \Rightarrow TR$  will be rising.
- If  $e = 1 \Rightarrow MR = 0 \Rightarrow TR$  will be constant and maximum.
- If  $e < 1 \Rightarrow MR < 0 \Rightarrow TR$  will be falling.

This implies  $TR$  will rise up to the level of output when  $e > 1$ , it will be maximum at



**Fig. 1.1:** Relationship among Total Revenue (TR), Average Revenue (AR), Marginal Revenue (MR) and Price Elasticity of the Demand Curve

**Table 1.1:** Relationship among Total Revenue (TR), Average Revenue (AR) and Marginal Revenue (MR)

Units	Total Revenue	Average Revenue	Marginal Revenue
0	0	–	–
2	12	12	12
3	21	7	9
4	27	6.75	6
5	30	6	3
6	30	5	0
7	28	4	–2

the level of output where  $e = 1$ , and it will start to diminish for the output level where  $e < 1$ . Thus,  $TR$  will take the shape of an inverted 'U'.

So, a monopolist will always try to operate at the elastic portion of the demand curve, as his total revenue will increase (details in section Monopoly and Elasticity).

## SHORT RUN EQUILIBRIUM CONDITION OF A FIRM UNDER MONOPOLY: DETERMINATION OF PRICE AND OUTPUT IN SHORT RUN

The short run refers to a time period where at least one of the factors of production should remain fixed. A monopoly firm is in equilibrium when it obtains maximum profit. It implies a state of rest for the firm. The monopolist will determine equilibrium price and output when he reaches the equilibrium point. Thus, the equilibrium point is compatible with the profit maximising situation of a monopolist. In this section, we

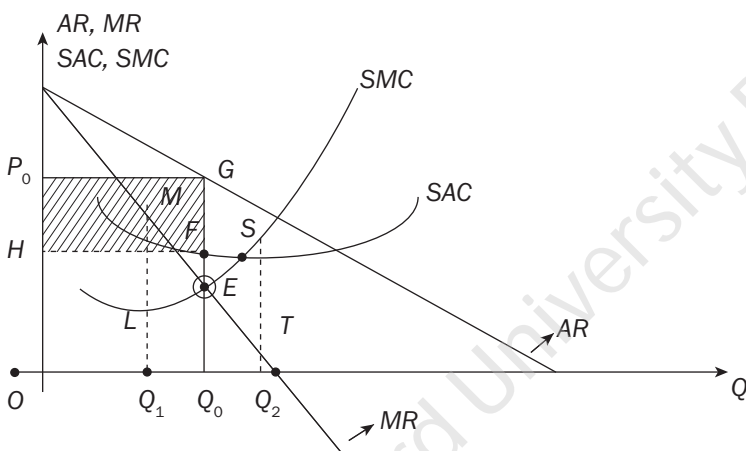


Fig. 1.2: Short Run Equilibrium of a Firm under Monopoly

will determine the equilibrium conditions of a firm under monopoly in the short run time period. This is depicted in figure 1.2.

The monopolist faces a downward sloping demand curve  $D = AR$ . We have already shown that if the demand or  $AR$  curve is linear, the corresponding marginal revenue curve  $MR$  is also linear and it is twice steeper than the demand curve. The marginal cost curve in the short run is usual U shaped and represented by short run marginal cost ( $SMC$ ). It passes through the minimum point

of the short run average cost curve ( $SAC$ ) which is also U shaped. It should be noted that in this figure, we have introduced  $SAC$  in order to determine the supernormal profit of the monopolist. In the figure, we can term point  $E$  as the equilibrium point where  $MR$  cuts  $SMC$ . In other words, the equilibrium point in the short run is established at point  $E$ , where  $MR$  intersects  $SMC$ . Accordingly,  $OQ_0$  will be the equilibrium output and  $OP_0$  is the equilibrium price. We should justify why the intersection point of  $MR$  and  $MC$  depicts the profit maximisation condition of the monopolist. For any output level to the left of  $OQ_0$  (say at  $OQ_1$ ), clearly  $MR(MQ_1) > MC(LQ_1)$ . This means that by selling an additional output, the firm earns more revenue than the cost. This will encourage the firms to increase the output level towards  $OQ_0$ . Conversely, for any output level to the right of  $OQ_0$  (say at  $OQ_2$ ),  $MC(SQ_2) > MR(TQ_2)$ . Thus here, production of an additional output will imply more cost than revenue for every level of output. So the firm here will try to reduce the output level towards  $OQ_0$  in order to minimise the profit. Thus, the firm will definitely settle at point  $E$ , where  $MR = MC$ . This will be the resting point of the firm where the profit will be maximum in the short run. It should also be noted that in the figure, slope of  $MC >$  slope of  $MR$ . Thus, we have determined the conditions of short run equilibrium of a monopoly firm, which are—

- At the equilibrium point,  $MC = MR$
- At the equilibrium point, slope of  $MC >$  slope of  $MR$

It should be interesting to note that the greater slope of  $MC$  compared to  $MR$  does not imply that the  $MC$  must be positively sloped at the point of equilibrium. In monopoly,  $MR$  is negatively sloped. At the equilibrium point, slope of  $MC$  is greater than slope of  $MR$ . This implies that the slope of  $MR$  can be positive, zero or even negative. This creates the possibility of occurrence of monopoly equilibrium even in the negatively sloped portion of  $MC$ .

Now, we will determine the profit earned by the monopoly firm in the short run equilibrium position. We know,

$$\text{Profit } (\pi) = \text{Total Revenue } (TR) - \text{Total Cost } (TC)$$

$$\text{Hence, Average Profit} = \text{Average Revenue } (AR) - \text{Average Cost } (AC)$$

$$\text{So at Equilibrium Output } OQ_0, \text{ Average Profit} = GQ_0 - FQ_0 = FG$$

$$\text{Hence, Total Profit } (\pi) = FG \times OQ_0 = FG \times FH \text{ (as } FH = OQ_0\text{)}$$

$$= \text{Area of rectangle } GFHP_0$$

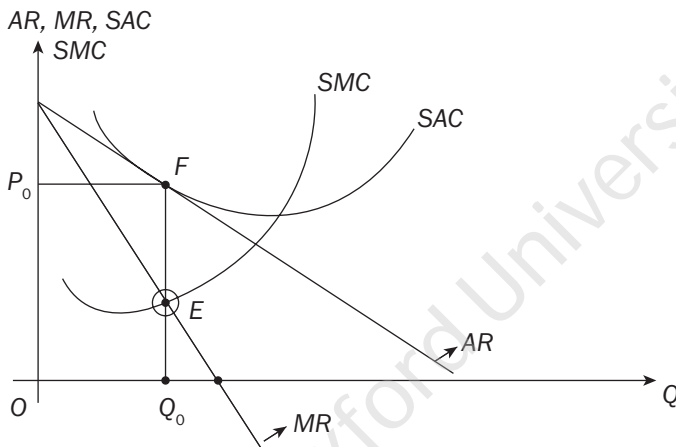


Fig. 1.3: Short Run Equilibrium (Normal Profit)

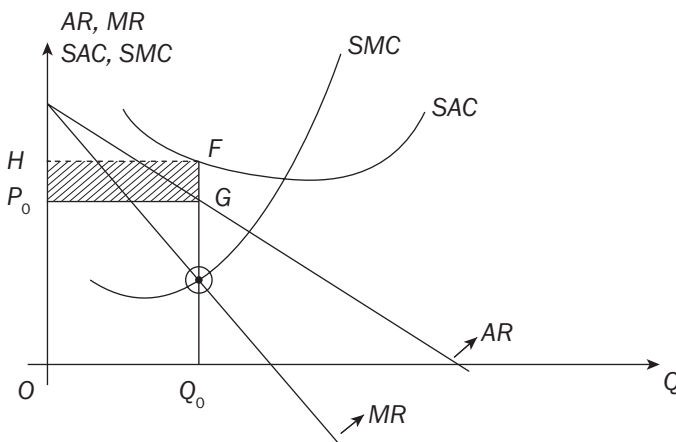


Fig. 1.4: Short Run Equilibrium (Losses)

Thus, in figure 1.2, the monopolist is capable of earning supernormal profit or excess profit. It can also be shown that in the short run equilibrium situation, a monopolist can earn normal profits or can even suffer from losses. This is depicted in fig. 1.3 and fig. 1.4 respectively.

In figure 1.3, the short run equilibrium is established at point  $E$  where both the conditions are satisfied. Accordingly, equilibrium price and output are  $OP_0$  and  $OQ_0$  respectively. Here, the demand curve is tangent to  $SAC$  curve at  $F$ . So, both the total revenue and total cost at equilibrium output level are  $OP_0FQ_0$ . Hence, the monopolist is not able to earn any supernormal or excess profits here.

In figure 1.4, we can show that the monopolist can suffer from losses in the short run equilibrium position. Here, the  $SAC$  curve lies above the  $AR$  curve. The  $SMC$  cuts  $MR$  at  $E$ , which is the short run equilibrium point. Equilibrium price and output are  $OP_0$  and  $OQ_0$  respectively. At  $OQ_0$ ,  $AC (FQ_0) > AR (GQ_0)$ . Thus, average loss is given by  $FG$ . Hence, total loss is represented by  $FG \times OQ_0 = FG \times GP_0 = \text{Area of rectangle } HFGP_0$ .

## LONG RUN EQUILIBRIUM OF A FIRM UNDER MONOPOLY: DETERMINATION OF PRICE AND OUTPUT IN THE LONG RUN

In a competitive market, if a firm earns supernormal or excess profits in the short run, then attracted by these profits, other firms enter the market. However, this is not possible in the monopoly market as there is restricted entry. Even if a monopolist earns supernormal profit in the short run, there are no threats of entry of other firms in the long run. Now, if a monopolist suffers from losses in the short run, it adopts various steps for rectification so that it can earn excess profit in the long run. We know that in a perfectly competitive market, a firm earns only normal profit at the equilibrium point in the long run where the equilibrium occurs at the minimum point of the long run average cost curve (*LAC*). Here, we can show that a monopolist can enjoy abnormal or supernormal profits in the long run even if its long run average cost is minimum at the equilibrium output level (unlike the long run equilibrium situation in the perfect competitive market). This is depicted in figure 1.5.

The long run equilibrium conditions of a monopolist are given by—

- $MC = MR$
- Slope of  $MC >$  Slope of  $MR$

These conditions are satisfied at point  $e$  in figure 1.5a where  $LMC$  cuts  $MR$  and at that point, slope of  $LMC$  exceeds slope of  $MR$ . The equilibrium price and output are  $OP_0$  and  $OQ_0$  respectively. It should be noted that  $e$  is also the minimum point of the  $LAC$ . Now, at the equilibrium output  $OQ_0$ ,  $AR(FQ_0) > AC(eQ_0)$ . So, the average profit will be  $eF$ . Hence, the total profit =  $eF \times OQ_0$  or total profit =  $eF \times eG$ , i.e., the area of the rectangle  $GeFP_0$ . So in this case, the monopolist earns supernormal profit in the long run, even if the equilibrium point is at the minimum point of  $LAC$ .

The monopolist may also earn normal profits in the long run at the profit maximising output level. This can be shown in figure 1.5b. The equilibrium is established at point  $e$ , where  $LMC$  cuts  $MR$ . Thus, the equilibrium output is  $OQ_0$  and equilibrium price is  $OP_0$ . Here, the demand curve is tangent to the  $LAC$  at  $F$ . At equilibrium output level,  $AR = AC = FQ_0$  and there is no scope of supernormal profit in the long run for a monopolist in this case.

Thus, a monopolist can earn both supernormal and normal profits in the long run.

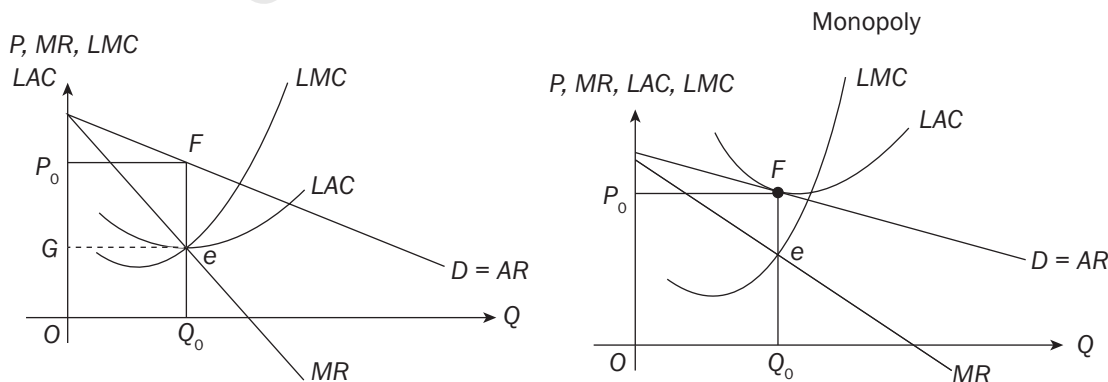


Fig. 1.5(a): Long Run Equilibrium (Supernormal Profit); (b): Long Run Equilibrium (Normal Profit)



## MONOPOLY AND ELASTICITY

It can be said that monopolist always operates at the elastic portion of the demand curve. Thus, he always wants to sell the output corresponding to which the price elasticity of demand is greater than unity ( $e > 1$ ).

We know the  $MR$  curve is twice steeper than the demand curve and it bisects the horizontal intercept made by the demand curve. In figure 1.6,  $MR$  cuts the horizontal intercept  $OD_1$  at  $F$ , which is naturally the midpoint of  $OD_1$ . At  $F$ ,

$MR = 0$ . Now, we know if we draw a parallel of the second side from the midpoint of the first side of a triangle, it will bisect the third side. In the figure, from the midpoint of  $OD_1$  (from  $F$ ) of  $\Delta DOD_1$  we draw line  $EF$ , parallel to  $OD$ . So,  $EF$  will bisect the third side i.e.  $DD_1$ . This means  $E$  is the midpoint of the demand curve  $DD_1$ . We know that at the midpoint of a demand curve, the price elasticity of demand is equal to 1. So at the  $DE$  segment of  $DD_1$ ,  $e > 1$  and at the  $ED_1$  segment of  $DD_1$ ,  $e < 1$ . Now, it is always observed that the monopolist sets

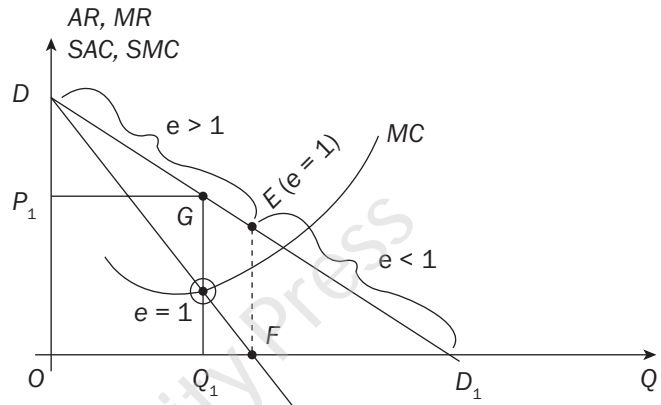


Fig. 1.6: Monopoly and Elasticity

price at the elastic portion of the demand curve. In this section, we will explain the reason behind the operation of the monopolist at the elastic portion of the demand curve.

In the figure, the  $MC$  cuts the  $MR$  at  $e$ , which is the equilibrium point. Thus, equilibrium price and output are  $OP_1 (= GQ_1)$  and  $OQ_1$  respectively. We can clearly observe that point  $G$  is in the  $ED$  portion of the demand curve, i.e., in the elastic portion. Thus, monopolist always fixes the price at the elastic portion of the demand curve.

We know,  $MR = P(1 - 1/e)$

So, when  $e < 1$ ,  $MR < 0$ . So, at equilibrium  $MR = MC < 0$ . But negative  $MC$  is not possible.

When  $e = 1$ ,  $MR = 0$ . So, at the equilibrium  $MR = MC = 0$ . But zero  $MC$  is not possible.

When  $e > 1$ ,  $MR > 0$ . So, at the equilibrium  $MR = MC > 0$ . We know,  $MC$  cannot be 0 or negative. It is always positive. A positive  $MC$  is possible only if  $e > 1$ . Thus, the monopolist always sets the price at the elastic portion of the demand curve.

## MEASURE OF MONOPOLY POWER

As we have already mentioned, monopolist sells a product in the market which has no close substitute. Hence, the monopolist enjoys enormous power in the market which is referred to as the monopoly power. In a competitive market, the profit maximising condition of a firm is given by  $P = MC$ . In this market, the producer has no power. As the difference between price and marginal cost rises, the monopoly power increases. *Lerner* suggested a measure of the monopoly power in the market which is the difference between price and marginal cost relative to the price. This is given by  $(P - MC)/P$ .

$$\text{Thus, degree of monopoly power (DMP)} = (P - MC)/P \quad (1)$$

Now at the point of equilibrium,  $MC = MR$

$$\text{Therefore, } DMP = (P - MR)/P \quad (2)$$

We know,  $MR = P(1 - 1/|e|)$

So, substituting the value of  $MR$  in equation (2)

$$\begin{aligned} DMP &= [P - P(1 - 1/|e|)]/P \\ &= (P - P + P/|e|)/P \\ &= 1/|e| \end{aligned}$$

This is known as Lerner's index.

In a perfectly competitive market, the demand curve of the firm is perfectly or infinitely elastic. This implies  $|e| = \alpha$ . So in a perfectly competitive market, degree of monopoly power ( $DMP = 1/\alpha = 0$ ).

## PRICE DISCRIMINATION

When a monopolist is able to charge different prices for different units of the same product at different markets, it is called price discrimination. The monopolist in this case is known as price discriminating monopolist. Since the product has no close substitute, the monopolist is able to discriminate the price charged in different markets to different customers. For example, Calcutta Electric Supply Corporation (CESC) provides electricity to domestic household and commercial sector at different prices. A reputed physician can charge different fees to treat the patients at different chambers. He can charge high fee in his chamber in the posh area and a nominal fee in the economically backward area by providing the same quality of treatment. The price discrimination can occur also in the form of dumping. This is the case when a price discriminating monopolist keeps lower export price compared to the domestic price of the same product.

### Conditions for Price Discrimination: When is Price Discrimination Possible?

Price discrimination can be only practised by a monopolist. It is not possible for every seller to discriminate the price. Generally, a monopolist earns significant amount of profit irrespective of the time period. Still, if he goes for discrimination, this suggests an excess profit over these profits. So, price discrimination leads to increased profits for the monopolist. Price discrimination is possible under the following situations—

**Nature of the market** As mentioned earlier, price discrimination is not possible in all the markets. It is only the monopolist who can discriminate the price according to his convenience. However, monopolists are not able to practise price discrimination whenever they wish. There are also some additional conditions apart from the presence of monopoly, for price discrimination. Thus, price discrimination is not possible without monopoly and all monopolists cannot discriminate price due to the absence of certain other conditions.

**Presence of different sub-markets** One of the most important conditions for price discrimination is the presence of different sub-markets. Price discrimination is only possible if the monopolist is able to divide the markets into two or more segments based on location, nature of consumers and products, etc.

**No reselling** The monopolist cannot discriminate price if there is a possibility of reselling. Resale of a product in different markets prevents price discrimination. For instance, a monopolist sells a product in market A at ₹ 15. The same product is sold by him in market B at ₹ 20. Now, if one buyer has the opportunity to buy the product at ₹ 15 from market A and resell it to market B at a price below ₹ 20, then price discrimination would not be possible. Thus, resale of a product leads to the absence of price discrimination.

**Distance and entry restriction** If there is a fair amount of distance between the sub-markets, then price discrimination would be possible. In that case, price of the product at the market in which it is lower plus the transport cost should exceed the price of the product in the other markets, where it is expensive. Sometimes, especially in case of dumping, the prices in domestic and export market are differentiated. So, it is not possible to enter the export market and purchase the commodity at the reduced rate. This encourages the monopolist to discriminate the price.

**Interference of the government** Generally, the market price is determined by the interaction of market forces. However, sometimes the government imposes control over the price by fixing it and ignoring the demand supply conditions. In that case, price discrimination would not be possible.

**Direct services** Doctors, lawyers, or private tutors can charge different fees from different clients for providing the same quality services. There are no possibilities of reselling for these sorts of services. Hence, these professionals can charge variable fees for providing the same quality specialised services to their clients.

**Consumer's behaviour** The consumer's attitude, behaviour, knowledge, etc. are also responsible for successful price discrimination. Price discrimination is possible in the following cases—

- Lack of consumer's awareness often leads to price discrimination. Here, the specific customer is not aware of the fact that the product is available at a lower price.
- Sometimes, the consumer is irrational in his behaviour. He thinks higher price implies better quality of the same product.
- A rich consumer in some cases ignores the price difference between the same quality products and pays higher prices.

These are the conditions which make price discrimination possible in the monopoly market.

## Degrees of Price Discrimination

The famous British economist Pigou, has classified price discrimination into the following three types. These are called the degrees of price discrimination.

**First degree price discrimination** In this type of price discrimination, the monopolist has the strategy of dealing individually with a buyer and selling every unit of output at its corresponding price. His objective is to extract the entire consumer surplus of the consumer. In this limiting case, the demand curve and *MR* curve coincide with each other. Here, the monopolist is selling the product on the basis of 'take it or leave it'. He has the opportunity of selling the product at the maximum price to the buyer as there is always a threat from the part of the seller to deny the sale. Hence, it is often called 'take it or leave it' price discrimination. We can give the example of an amusement park, where initially an entry fee is collected and then different charges are levied on different rides in the park. Thus, the monopolist is able to drag the consumer's surplus by imposing entry fee in the amusement park.

**Second degree price discrimination** Here, the monopolist fixes more than two prices to extract a significant portion of the consumer's surplus. The consumer is bound to pay a single price upto a certain amount of quantity and another price for the amount exceeding that particular amount. Thus, different prices are charged for different blocks, where the blocks imply a band of quantity. Hence, second degree price discrimination is often known as block pricing. For example, CESC often discriminates price through block pricing. CESC charges different prices for different slabs. Apart from this, CESC also charges different rates for the units for domestic usage and commercial usage.

**Third degree price discrimination** In this type of discrimination, a particular consumer will pay a specific price for whatever quantity he wants to purchase. However, the price charged to other consumers differs. Thus, different prices are set for different groups of customers.

In this analysis, we will mainly focus on the third degree price discrimination.

### Conditions of Profitability: When is Price Discrimination Profitable?

In the previous subsection, we have shown that price discrimination occurs due to the fulfilment of certain conditions. Naturally, the monopolists want to discriminate price for maximisation of profit. But there is no guarantee that price discrimination is always profitable. In this subsection, we will determine the condition for which the price discrimination is profitable.

Let there be two sub-markets—1 and 2. Hence, the prices, marginal revenue curves and price elasticities of these two markets are  $P_1$  and  $P_2$ ,  $MR_1$  and  $MR_2$ ,  $e_1$  and  $e_2$  respectively. Now we know,  $MR = P(1 - 1/e)$

$$\text{So in market-1, } MR_1 = P_1(1 - 1/e_1) \quad (1)$$

$$\text{So in market-2, } MR_2 = P_2(1 - 1/e_2) \quad (2)$$

The equilibrium condition for a price discriminating monopolist is given by  $MR_1 = MR_2 = MC$ .

$$\text{From this, } P_1(1 - 1/e_1) = P_2(1 - 1/e_2)$$

$$\text{or, } P_1/P_2 = (1 - 1/e_2)/(1 - 1/e_1) \quad (3)$$

Now, if  $e_1 = e_2$ , then  $P_1 = P_2$ .

This means, price discrimination is not profitable.

Thus, for successful and profitable price discrimination, the price elasticities of demand in different sub-markets should be different.

One important thing should also be noted from here. If  $e_1 > e_2$ , then from equation (3), we can say  $(1 - 1/e_1) > (1 - 1/e_2)$

This implies  $P_1 < P_2$ .

Thus, the market with lower price elasticity of demand depicts higher price and vice versa.

### Equilibrium of a Price Discriminating Monopolist

The deductions in the previous subsections show that price discrimination will be possible and profitable if the market is divided into effectively separated sub-markets where no reselling is possible. Moreover, the price elasticities of demand in the sub-markets should be different.

Let there are two sub-markets—1 and 2. The demand curves of market 1 and 2 are given by  $D_1$  and  $D_2$  respectively. The corresponding marginal revenue curves are  $MR_1$  and  $MR_2$  respectively. The marginal cost ( $MC$ ) is same for all units of output irrespective of the markets in which the product is sold. In figure 1.7, we represent the situations of market 1 (7a), market 2 (7b) and the industry as a whole (7c). In the figure,  $D_2$  is drawn as more elastic than  $D_1$ . The aggregate marginal revenue curve ( $MR$ ) is drawn in 7(c) by horizontal summation of  $MR_1$  and  $MR_2$ . The  $MC$  curve is usual u-shaped which is also drawn in panel (c) of fig. 1.7.

The price discriminating monopolist has to decide two things when he wants to discriminate prices. These are—

- How much to produce?
- How much to sell in the two sub-markets and at what prices, so that total profit as well as individual profits of the sub-markets get maximised?

We know that the profit maximising conditions of a monopoly market require equality between  $MR$  and  $MC$ . So in market 1, the equilibrium condition would be

$$MR_1 = MC \quad (1)$$

In market 2, the equilibrium condition would be

$$MR_2 = MC \quad (2)$$

$$\text{Thus, from equation (1) and (2), we get } MR_1 = MR_2 = MC \quad (3)$$

If  $MR_1 > MR_2$ , the monopolist will sell more goods in market 1 and lesser amount of commodities in market 2 unless equation (3) is fulfilled.

Now, the equilibrium in the industry is established at point  $e$  in fig. 7(c) where  $MC$  and combined  $MR$  ( $CMR = MR_1 + MR_2$ ) intersect each other. Thus, the equilibrium output is  $OQ$ . Accordingly the equilibrium  $MC$  is  $eQ$ . Now the monopolist has to decide how this equilibrium output  $OQ$  will be distributed in the two markets. To determine this, a horizontal straight line  $eF$  is drawn from  $e$ . This cuts  $MR_1$  at  $e_1$  and  $MR_2$  at  $e_2$ . This  $eF$  represents nothing but equilibrium  $MC$ . Hence,  $e_1$  represents the equality between  $MR_1$  and  $MC$  and  $e_2$  represents the equality between  $MR_2$  and  $MC$ . So,  $e_1$  is the equilibrium point in market 1 and  $e_2$  is the equilibrium point in market 2. Thus, as a result we can easily determine the equilibrium price  $OP_1$  and

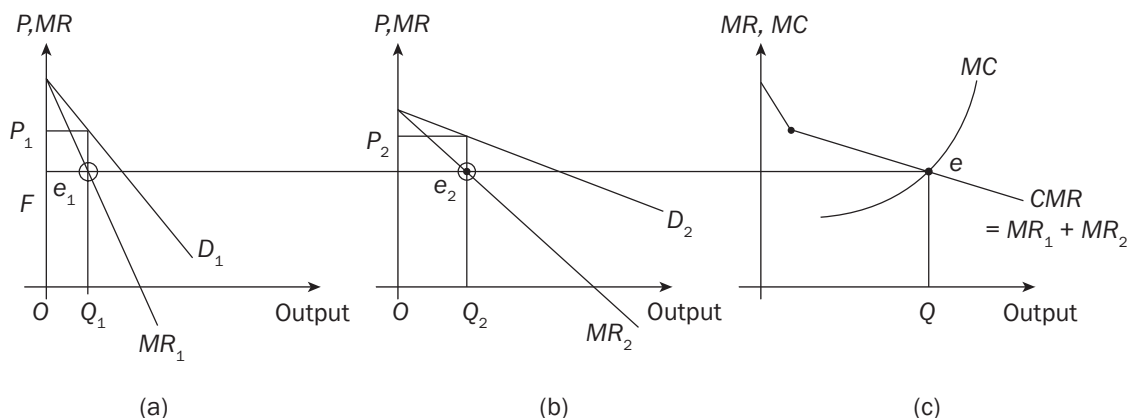


Fig. 1.7: Equilibrium of a Price Discriminating Monopoly

equilibrium output  $OQ_1$  in market 1. Similarly from  $e_2$ , we can determine the equilibrium price  $OP_2$  and equilibrium output  $OQ_2$ . Hence, in both market 1 and 2 and even in the industry as a whole, the equality condition between  $MR$  and  $MC$  is satisfied. This suggests the profit maximisation in all the sub-markets.

It should be important to note that, the monopolist thus sells  $OQ_1$  units of commodity at  $OP_1$  price and  $OQ_2$  units of commodity at  $OP_2$  price for profit maximisation. Clearly,  $OQ_1 + OQ_2 = OQ$  in the diagram.

## SOCIAL COST OF MONOPOLY

The social cost of monopoly basically refers to the welfare cost of the monopoly. In a competitive set-up, the equilibrium condition is given by  $P = MC$ . However, in monopoly, the monopolist has a monopoly power and  $P$  is greater than  $MC$ . The equilibrium condition is given by  $MR = MC$ . If we compare between the equilibrium situations in perfect competition and monopoly, we'll observe that competitive price is less than monopoly price but competitive output is greater than monopoly output. The rise in the price in the monopoly leads to net benefit losses in the consumer surplus and the producer surplus.

Apart from this, monopoly means a single seller. So, the market is characterised by non-availability of substitutes which ruins the consumer's sovereignty. The existence of monopoly often leads to excess capacity or underutilisation of resources. All these actually increase the social cost of monopoly.

### SUMMARY

- Monopoly refers to a market structure where a single seller or a firm sells a product in the market and the product has no close substitute available in the market.
- The monopolists are price makers. They face two decisions—determination of price and output.
- Since the monopolist faces downward sloping demand curve, their decisions become interdependent. Either he will set the price and sell the corresponding output in the market or set the output which will be sold at the corresponding price. Thus, a monopolist cannot determine the price and output in the market simultaneously.
- The monopoly power exists because Limit pricing, Ownership of strategic raw materials, Market size, Exclusive Production techniques and innovations, Patent rights, Trade or import license, and Imposition of the trade barriers.
- The relationship between  $AR$ ,  $MR$  and  $e$  can be represented as  $MR = AR (1 - 1/e)$
- At the short run equilibrium of a monopoly firm, he equilibrium conditions are
  - a. At the equilibrium point  $MC = MR$
  - b. At the equilibrium point, slope of  $MC >$  slope of  $MR$ .
- Monopoly equilibrium can occur at the falling portion of the  $MC$ .
- Monopolist can suffer from losses in the short run.
- A monopolist can earn both supernormal and normal profits in the long run.
- The monopolist always operates at the elastic portion of the demand curve.
- Monopoly power is measured by  $(P - MC)/P = 1/e$ . This is known as Lerner's index. Thus increase in the price elasticity of demand monopoly power will come down.
- When a monopolist is able to charge different prices for different units of the same product at different market, it is called price discrimination.
- Second degree price discrimination is known as 'block pricing'.
- For successful price discrimination there should be no reselling.
- For profitable price discrimination, the elasticity of different submarkets should be different.
- Greater the elasticity of demand lower will be the price in the market.

## MULTIPLE CHOICE QUESTIONS

1. Monopoly means a market with
  - (a) one seller.
  - (b) two sellers.
  - (c) infinite number of sellers.
  - (d) more than one but less than twenty sellers.
2. Natural monopoly refers to a situation when
  - (a) monopoly firm is created by restricted entry.
  - (b) government has a monopoly.
  - (c) a firm is enjoying economies of scale over a large range of output.
  - (d) a firm has monopoly in natural resources.
3. Which of these features is not suited to monopoly?
  - (a) There is no close substitute.
  - (b) The firm is a price taker.
  - (c) The firm cannot set both the price and the output simultaneously.
  - (d) There is no difference between the firm and the industry.
4. The demand curve faced by the monopolist is
  - (a) upward sloping.
  - (b) horizontal.
  - (c) vertical.
  - (d) downward sloping.
5. If the monopolist faces a linear demand curve, its slope will be
  - (a) same as the slope of  $MR$  curve.
  - (b) double of the slope of  $MR$  curve.
  - (c) half of the slope of the  $MR$  curve.
  - (d) one-fourth of the slope of the  $MR$  curve.
6. Which of these curves can have a negative value?
  - (a)  $AR$
  - (b)  $TR$
  - (c)  $MR$
  - (d)  $AP$
7. In a monopolistic set-up, total revenue curve
  - (a) is a straight line through the origin.
  - (b) is horizontal.
  - (c) is vertical.
  - (d) is initially increasing and after reaching a maximum, falling.
8. If  $e < 0$ , what will be the value of  $MR$  in monopoly?
  - (a) 1
  - (b) 0
  - (c)  $< 0$
  - (d)  $> 0$
9. In a monopolistic market,  $AR > MR$ 
  - (a) for all levels of output.
  - (b) for all positive output level.
  - (c) only at the equilibrium output level.
  - (d) only at the output level corresponding to inelastic portion of the demand curve.
10. If the equation of the demand curve in a monopoly market is given by  $10P = 50 - 20Q$ , what will be the slope of the  $MR$  curve?
  - (a) 2
  - (b)  $-2$
  - (c)  $-4$
  - (d)  $-1$
11. If the equation of the demand curve in a monopoly market is given by  $Q = 120 - 8P$ , what will be the slope of the  $MR$  curve?
  - (a)  $-8$
  - (b)  $-4$
  - (c)  $-1/4$
  - (d)  $-16$
12. If the equation of a demand curve in a monopoly market is given by  $Q = 120 - 12P$ , then what will be the price at  $Q = 0$ ?
  - (a) 10
  - (b) 120
  - (c) 12
  - (d)  $-12$
13. A monopolist always sets the price at a portion of the demand curve where
  - (a)  $e = 1$
  - (b)  $e < 1$
  - (c)  $e > 1$
  - (d)  $e < 0$

14. The short run equilibrium condition of a monopoly firm is as follows—
- $MC = MR$  and  $MC$  cuts the  $MR$  curve from below
  - $MC = MR$  and  $MC$  must be positively sloped at the equilibrium point
  - $MC = MR$  and slope of  $MC >$  slope of  $MR$
  - $P = MC = MR$  and slope of  $MC =$  slope of  $MR$
15. Lerner index refers to
- second degree price discrimination.
  - degree of monopoly power.
  - a situation when  $e = 1$ .
  - deadweight loss under monopoly.
16. If the price elasticity of demand rises, the degree of monopoly power
- falls.
  - rises.
  - remains constant.
  - initially rises then falls.
17. Greater the divergence between  $P$  and  $MC$ ,
- greater will be the degree of monopoly power.
  - lesser will be the degree of monopoly power.
  - outcome will be uncertain.
  - there will be no impact on the degree of monopoly power.
18. What is the degree of monopoly power in a perfectly competitive market?
- 0
  - 1
  - $> 0$  but  $< \alpha$
  - $\alpha$
19. Which of these statements is true?
- A monopoly equilibrium can occur even at the falling portion of the  $MC$  curve.
  - First degree price discrimination is also known as block pricing.
  - Monopoly ensures optimal allocation of resources.
  - A monopolist never suffers from losses in the short run.
20. A monopolist
- can earn only supernormal profits in the long run.
  - can earn both normal and supernormal profits in the long run.
  - can earn only normal profits in the long run.
  - can suffer from losses in the long run.
21. ‘Take it or leave it’ pricing is applicable in
- first degree price discrimination.
  - second degree price discrimination.
  - third degree price discrimination.
  - all types of discrimination.
22. Block pricing is applicable to
- first degree price discrimination.
  - second degree price discrimination.
  - third degree price discrimination.
  - all types of discrimination.
23. In which of these discriminations the demand curve coincides with the marginal revenue curve?
- First degree price discrimination
  - Second degree price discrimination
  - Third degree price discrimination
  - All types of discrimination
24. The entire amount of consumer surplus can be extracted in which of these price discrimination strategies?
- First degree price discrimination
  - Second degree price discrimination
  - Third degree price discrimination
  - None of the above
25. In third degree price discrimination,
- monopolist always makes profit.
  - different prices are charged for different group of customers.
  - entire amount of consumer surplus can be extracted by the monopolist.
  - the demand elasticities of the sub-markets may be equal.
26. Which of the following conditions is not essential for price discrimination to occur?
- There should be more than one sub-markets.
  - There should be no reselling of the products.
  - There should be block pricing.



- (d) There should be different price elasticities in different sub-markets.
27. The price discrimination will be profitable only if
- the price elasticities of demand in different sub-markets differ.
  - the markets are subdivided.
  - there is no reselling.
  - the consumers are peculiar.
28. In monopoly,
- both price and output are greater than perfectly competitive price and output in equilibrium.
  - both price and output are lower than perfectly competitive price and output in equilibrium.
  - price is greater but output is lower in equilibrium compared to competitive equilibrium.
  - price is lower but output is greater in equilibrium compared to competitive equilibrium.
29. Which of the statements regarding monopoly is not true?
- Price discrimination is possible but that does not imply it is profitable also.
  - If the monopoly power is infinite, then the price elasticity of demand must be zero.
  - The monopolist always sets the price at the output level corresponding to the elastic portion of the demand curve.
  - The supply curve of the monopolist is positively sloped.
30. A perfectly competitive firm may transform into a monopoly firm if
- its production function is characterised by increasing returns to scale
  - it makes supernormal profits in the short run
  - its short run supply curve starts from shut down point
  - its long run average cost curve is horizontal

### Answers

- |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a)  | 2. (c)  | 3. (b)  | 4. (d)  | 5. (c)  | 6. (c)  | 7. (d)  | 8. (c)  | 9. (b)  |
| 10. (b) | 11. (c) | 12. (a) | 13. (c) | 14. (c) | 15. (b) | 16. (a) | 17. (a) | 18. (a) |
| 19. (a) | 20. (b) | 21. (a) | 22. (b) | 23. (a) | 24. (a) | 25. (b) | 26. (c) | 27. (a) |
| 28. (c) | 29. (d) | 30. (a) |         |         |         |         |         |         |