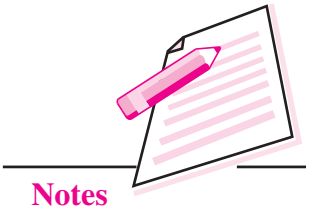

22

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PRICE DETERMINATION UNDER PERFECT COMPETITION

One of the objectives of firm and industry is to maximize profit. As an alternative, the firm also wants to minimize loss. Whatever it may be, a firm must determine the price and quantity that will ensure achieving these goals. The manner in which a firm/industry determines the price and output depends on the market form in which it is operating. In the preceeding lesson, you learnt that there are various forms of market in which a firm or industry operate. This lesson is devoted towards determination of price and quantity by the industry and a firm under the market form or perfect competition.

OBJECTIVES

After completing this lesson, you will be able to:

- explain the meaning of equilibrium price;
- explain the process by which the twin market forces of demand and supply determine the equilibrium market price of a commodity under perfect competition;
- explain the concepts of excess demand and excess supply;
- identify the effects of change in demand and/or supply on equilibrium price and quantity; and
- understand the process of price determination of a competitive firm.

22.1 MEANING OF EQUILIBRIUM PRICE

Equilibrium means a position from which there is no tendency to change.

Prof. Marshall compared demand and supply to the two blades of a pair of scissors. A moment of reflection will show that it is not blade alone 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 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 consumers 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 in the market. This is called market equilibrium price of the commodity.

Industry Demand and Supply Under Perfect Competition

In lesson 21, you have learnt that the industry under perfect competition is defined as the collection of Large number of firms producing the homogeneous product. In such a situation no firm enjoys any power to determine its own price. The price of the commodity is determined at the level of the industry through the interaction of the forces of demand and supply of the commodity in the market. Since industry is the price maker, the industry demand curve is downward sloping (same as the market demand for a product given in lesson 15). Similarly the industry supply curve of the product is an upward sloping curve (same as the market supply curve given lesson 19).

22.2 PROCESS OF ARRIVING AT EQUILIBRIUM PRICE

Consider the following schedule 22.1 showing market demand and market supply of good X are given..

Table 22.1 Determination of Equilibrium Price of good X.

Price (₹ Per kg)	Market Demand (kg)	Market Supply (kg)
6	16	24
5	18	22
4	20	20
3	22	18
2	24	16

Let us assume that the initial price is ₹ 6 per kg and the respective levels of quantity demanded and supplied are 16 and 24 kg respectively. Obviously, quantity supplied at this price is exceeding quantity demanded. So, the suppliers or producers will offer a lower price to the buyers to ensure that their goods do not remain unsold. So, the price gradually moves from ₹ 6 to ₹ 5 per kg. At this relatively lower price, demand expands to 18 kg while supply contracts to 22 kg (in accordance with the respective laws of demand and supply), but still there is a gap between supply and demand. So the suppliers still feel that all of their goods might not sell in the market as quantity demanded is less than quantity supplied. So, they reduce price further so as to ensure that their goods do not remain unsold. This process continues till the price level reaches a point where quantity demanded equals quantity supplied. Thus, when the price falls from ₹ 5 to ₹ 4, quantity demanded as well as quantity supplied is equal to 20 kg. Now the suppliers have no reason to reduce their price further. Hence as long as quantity supplied exceeds the quantity demanded, price of the commodity keeps falling till both become equal.

Note that, when supply exceeds demand, we call it excess supply that causes price to fall till demand and supply become equal to each other.

On the otherhand, at a very low price of ₹ 2, quantity demanded in 24 kg which is higher than quntity supplied of 16 kg. Since demand is higher then supply, price of the commodity increases to ₹ 3. At ₹ 3, the quantity demanded is 22 kg which is still higher than the quantity supplied of 18 kg. This further results in increase in price to ₹ 4 where we find that quantity demanded and supplied have become equal at 20 kg.

Hence as long as quantity demanded exceeds the quantity supplied, the price of the commodity keeps increasing till both demand and supply become equal to each other.

Note that when demand exceeds supply, we call it excess demand that causes price to rise till demand equals supply.

In the example, at ₹ 4, demand and supply of the commodity are equal and hence there is no reason for the price to fluctuate from here. Hence ₹ 4 is the equilibrium market price. At this price 20 kg is equilibrium quantity.

The process of price determination has also been explained with the help of figure 22.1. In the figure, DD is the demand curve and SS is the supply curve. The negative slope of demand curve DD indicates a negative relation between price of

the commodity and its quantity demanded. Similarly, positive slope of the supply curve SS indicates a positive relation between price of the commodity and its quantity supplied. Demand curve DD and supply curve SS intersect each other at point E, which is the point of equilibrium at which equilibrium price is ₹ 4 per kg. and equilibrium quantity demanded and supplied is 20 kg. Equilibrium price is also defined as the price at which demand curve and supply curve intersect each other. (alternatively, equilibrium price is the price at which quantity demanded of a commodity equals its quantity supplied).

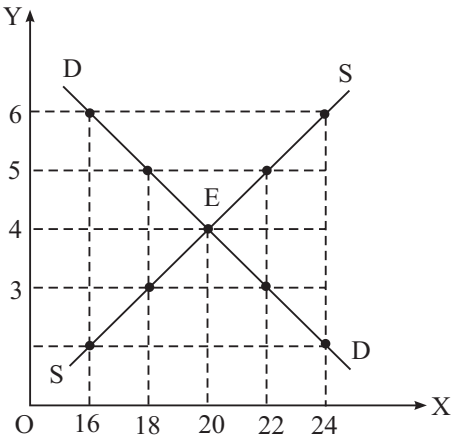


Fig. 22.1

Price Determination for a Firm under Perfect Competition

Under perfect competition, the industry determines the price following the same route of adjustment as described above with the help of twin market forces of demand and supply. Firms have to accept the price determined by the industry and offer their output at this price. This canbe shown with the help of the following figure.

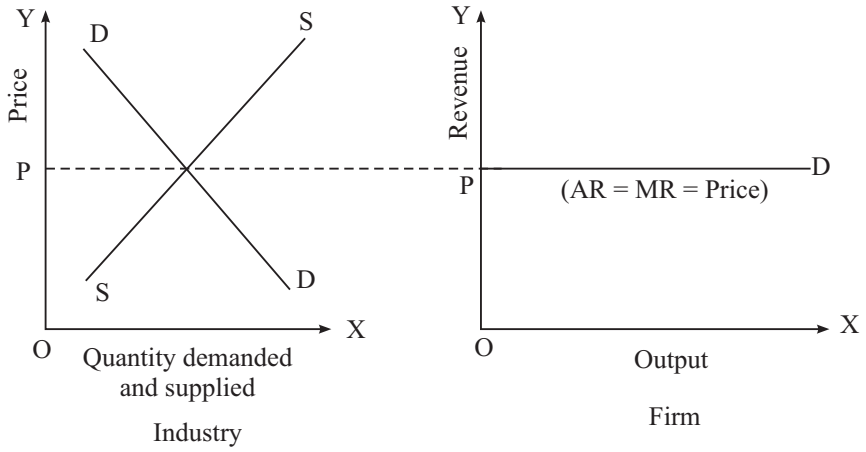
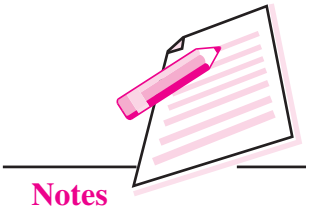


Fig. 22.2



Industry		Firm					
Price (₹ per kg)	Quantity Demanded (kg)	Quantity Supplied (kg)	Price (₹ per kg)	Quantity Supplied	TR (P×Q)	AR AR = P	MR
2	20	12	4	0	0	4	–
3	18	14	4	1	4	4	4
4	16	16	4	2	8	4	4
5	14	18	4	3	12	4	4
6	12	20	4	4	16	4	4

Under perfect jcompetition at price ₹ 4 per kg industry demand and industry supply are both equal to 16 kg and hence the equilibrium price determined by the industry is ₹ 4 per kg which has to be followed by all the firms of the industry. The firm may sell any quantity but the price remains constant at ₹ 4 per kg. That is why AR = MR in perfect competitioin, and are represented by a revenue curve which is parallel to x-axis.

INTEXT QUESTIONS 22.1

1. Define equilibrium price.
2. Which force of price determination is relatively more important and why?
3. Can we have two levels of equilibrium price for demand curve DD and supply curve SS? Support your answer with reason.
4. Tick the correct answer:
   (i) Point of intersection of demand curve and supply curve shows:
      (a) The equilibrium price
      (b) The equilibrium quantity
      (c) Neither of the two
      (d) Both equilibrium price and quantity
   (ii) Equilibrium price of a commodity is the price at which
      (a) Quantity demanded and supplied, both rise
      (b) Supply is maximum'
      (c) Demand is maximum
      (d) Quantity demanded and supplied are equal.

(iii) Equilibrium means

(a) The variables are changing continuously

(b) Demand and supply are unequal

(c) The variables show no tendency to change

(d) None of the above

(iv) If at some particular price, the quantity demanded exceeds its quantity supplied, then

(a) Price will rise

(b) Demand will fall

(c) Supply will increase

(d) All of the above

Let us now explain the excess demand and excess supply situation by using diagrams.

22.3 EXCESS DEMAND

Excess Demand is the gap between demand and supply when demand is more than supply. If at a given price, the quantity demanded of a commodity exceeds its quantity supplied we have excess demand. For example, in the table 22.1, when price is ₹ 2 per kg., demand is 24 kg. while supply is just 16 kg. So this is a situation of excess demand.

Process of Adjustment

One very interesting and important feature of price mechanism is that any disequilibrium is self-correcting. Thus if there is excess demand at any price, price will move in such a way so as to bring equilibrium between demand and supply. In Fig. 22.1, when price is ₹ 2, quantity demanded is 24 kg but quantity supplied is just 16 kg. So there is excess demand of 24 – 16 = 8 kg. In this situation, buyers realize that some of them will have to go without the commodity as supply is less than that of demand. So they compete to buy the product and in the process, offer a higher price. So, effectively price moves from ₹ 2 to ₹ 3 per kg. At this relatively higher price, demand contracts from 24 kg to 22 kg and supply expands from 16 to 18 kg. So, the magnitude of excess demand has diminished from 8 kg to 4 kg, but still there is a gap and some of the buyers have still to go without the commodity. So there is still competition, which raises the price further to ₹ 4 per kg, where demand contracts further to 20 kg and supply expands to 20 kg. Now, both quantity demanded and quantity supplied are equal.

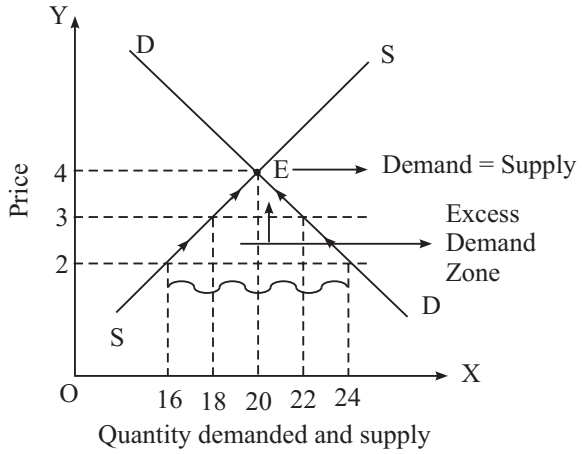


Fig. 22.3

So, the equilibrium has been brought about by increase in price, which also contracts demand and expands supply. We can summarize the process as follows:

(a) In case of excess demand, price starts rising, as the buyers try to compete out each other.

(b) As a result of rise in price, demand starts contracting and supply starts expanding.

(c) All these movements of price, demand and supply result in getting equilibrium restored, though at a higher price, than before.

22.4 EXCESS SUPPLY

Excess Supply is the gap between demand and supply when Supply is more than demand. If at a given price, the quantity supplied of a commodity exceeds its quantity demanded we have excess Supply. For example, in the table 22.1, when price is ₹ 6 per kg., demand is 16 kg. while supply is just 24 kg., obviously this is a situation of excess Supply.

Process of Adjustment

When quantity supplied is more than quantity demanded at price of ₹ 6 per kg., the suppliers are now worried as they know that because of excess supply, all of their goods might not be sold. Every supplier now wants to ensure that his goods are not left unsold. In a bid to ensure this, the supplier, tries to lure consumers by lowering the price to ₹ 5 per kg. But other suppliers are also doing precisely the same. So, the price effectively falls to ₹ 5 per kg. But even at this relatively lower price, supply still exceeds demand by 4 kg. and so another cycle of offering a lower

price starts. This continues till the price reaches the level of ₹ 4 per kg where quantity demanded equals quantity supplied. At this price, suppliers have no reason to offer a lower price, as they know that at this price all their goods are going to be sold. So the equilibrium in this case has been brought about by decrease in price, which also contracts supply and expands demand.

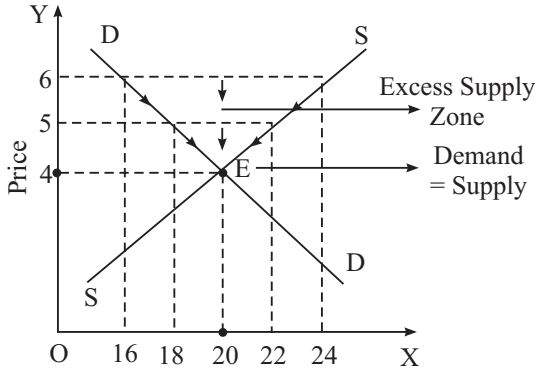


Fig. 22.4

We can summarize the process as follows:

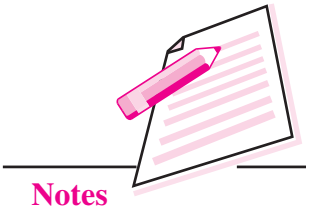
(a) In case of excess supply, price starts falling, as the suppliers try to compete out each other.

(b) As a result of fall in price, demand starts expanding and supply starts contracting.

(c) All these movements of price, demand and supply result in getting equilibrium restored, though at a lower price, than before.

INTEXT QUESTIONS 22.2

1. What is excess demand?
2. What is excess supply?
3. How is equilibrium between demand and supply restored in case of excess demand?
4. How is equilibrium between demand and supply restored in case of excess supply?
5. Explain the effect of adjustment process on price, demand and supply in case of excess demand?
6. Explain the effect of adjustment process on price, demand and supply in case of excess supply?



22.5 EFFECT OF CHANGE IN DEMAND ON EQUILIBRIUM PRICE AND QUANTITY

As demand and supply are the twin forces determining the equilibrium price of a commodity, any change in either or both of them is bound to bring in some change in price. We will study, in this section, the effect of change in demand, supply held constant.

(i) Effect of Increase in demand

When due to any external factor such as rise in population, rise in income of people, demand for a commodity increases (for every price level), the demand curve shifts rightwards. As a result, it now intersects the supply curve at a new, higher level, which causes the price to rise. As shown in the figure below, initial demand curve DD intersects supply curve SS at point e.

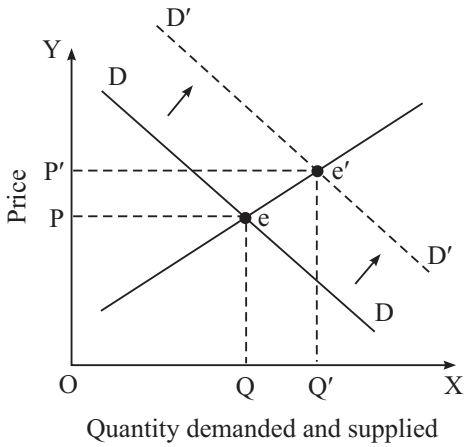


Fig. 22.5

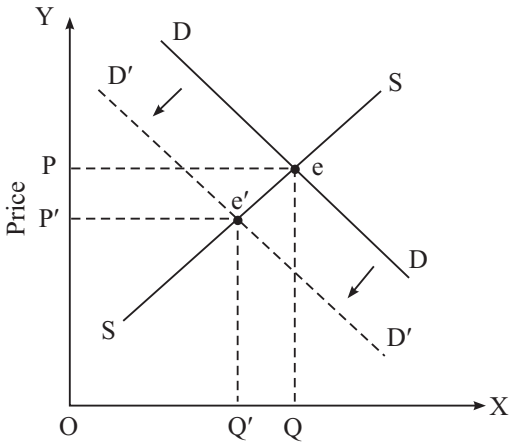
The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ. Now, suppose demand increases and as a result, demand curve shifts rightwards. This new demand curve D'D' intersects the supply curve SS at pointt e'. So, the new equilibrium price is OP' which is higher than the earlier. price OP. It may also be noted that the equilibrium quantity demanded and supplied have also risen from OQ to OQ'.

(ii) Effect of Decrease in Demand

When due to any external event such as fall in income level, demand for a commodity falls, the demand curve shifts leftwards. So, this new demand curve intersects supply curve at a lower level which causes the price to fall. As shown in

the figure 22.8, initial demand curve DD intersects the supply curve SS at point e.

The equilibrium price is OP and the equilibrium, quantity demaned and supplied are OQ. Now, suppose demand decreases and as a result, demand curve shift leftwards. This new demand curve D'D' intersects the supply curve SS at point e'. So, the new equilibrium price is OP' which is lower than the earlier price OP. It may also be noted that the equilibrium quantity demanded and supplied have also decreased from OQ to OQ'.



Quantity demanded and supplied

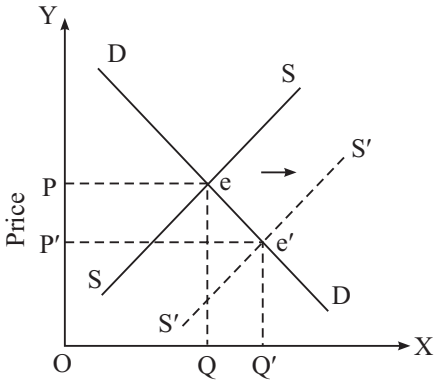
Fig. 22.6

22.6 EFFECT OF CHANGE IN SUPPLY ON EQUILIBRIUM PRICE AND QUANTITY

In this case, we will show the impact of change in supply of the commodity while demand for it remains the same.

(i) Effect of Increase in Supply

When due to any external factor such as a bumper crop, supply of a commodity increases (for every price level), the supply curve shifts rightwards. As a result, it now intersects the demand curve at a new, lower level, which causes the price to fall. As shown in the figure 24.9, demand curve DD intersects the initial supply curve SS at point e.



Quantity demanded and supplied

Fig. 22.7

The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ. Now, suppose, supply increases and as a result, supply curve shifts rightwards. This new supply curve S'S' intersects demand curve DD at point e'. So, the new equilibrium price is OP' which is higher than the earlier price OP. It may also be noted that the equilibrium quantity demanded and supplied have fallen from OQ to OQ'.

(ii) Effect of Decrease in Supply

When due to any external event such as paucity of raw material or say, floods or drought, supply for a commodity falls, the supply curve shifts leftwards. So, this new supply curve intersects demand curve at a higher level which causes the price to rise. As shown in the figure 22.10 demand curve DD intersects the initial supply curve SS at point e.

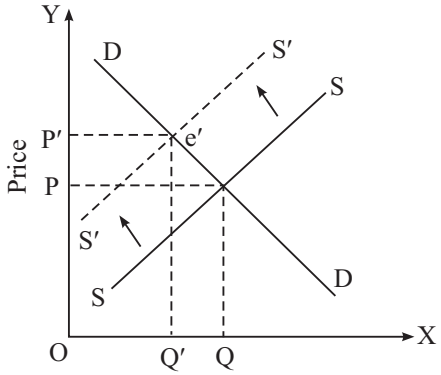


Fig. 22.8

The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ. Now, suppose supply decreases and as a result, supply curve shifts leftwards. This new supply curve S'S' intersects the demand curve DD at point e'. So the new equilibrium price is OP' which is higher than the earlier price OP. It may also be noted that the equilibrium quantity demanded and supplied have also decreased from OQ to OQ'.

22.7 EFFECT OF SIMULTANEOUS CHANGE IN DEMAND AND SUPPLY ON EQUILIBRIUM PRICE AND QUANTITY

Effect of any change in demand and supply will lead to a resultant change on equilibrium price. The direction of change in price will depend on relative strength

of change in demand and supply. For example, if both supply and demand increase and increase in demand is greater than increase in supply, price will rise. Any kind of change in demand and supply and their effect on price can be shown by drawing relevant demand and supply curves. A few cases are given here.

Increase in Both Demand and Supply

The three possible cases when both demand and supply are increasing can be explained as follows:

(a) Increase in Demand = Increase in Supply

The upward effect of increase in demand on price equals downward effect of increase in supply. As both the forces are equal in magnitude, price level remains the same. This is shown in the figure 22.11.

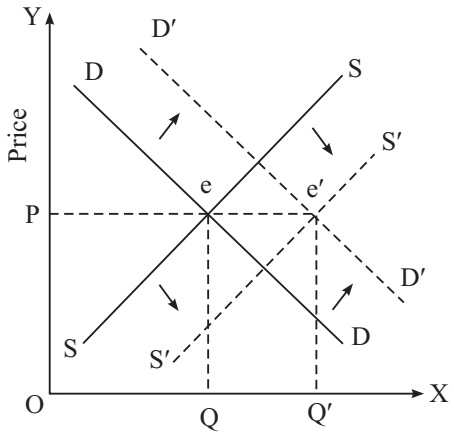
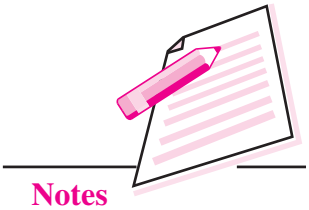


Fig. 22.9

(b) Increase in Demand > Increase in Supply

As in this case, the upward effect of increase in demand on price is greater than that of downward effect of increase in supply. As a result, price level rises. This is shown in the figure 22.12.



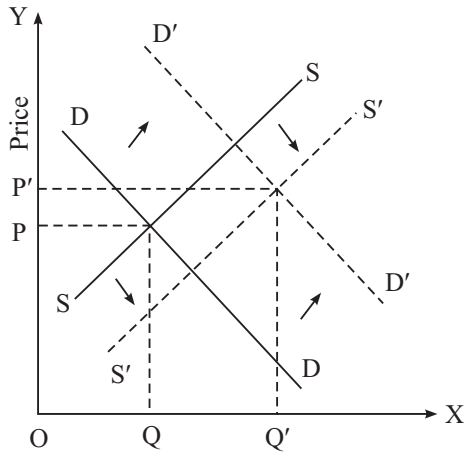


Fig. 22.10

(c) Increase in Demand < Increase in Supply

In this case, the upward effect of increase in demand on price is less than that of downward effect of increase in supply. As a result, price level falls. This is shown in the figure 22.13.

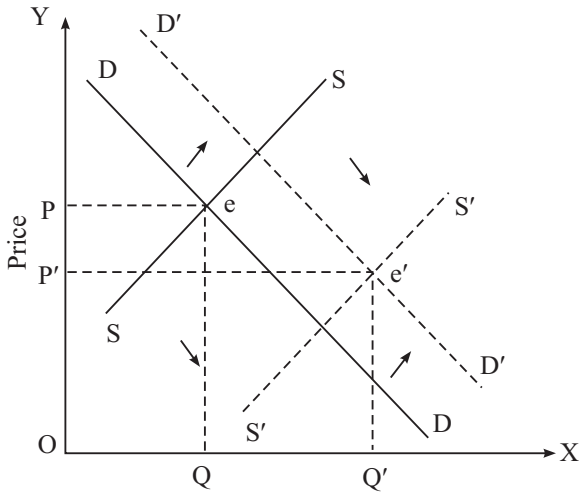


Fig. 22.11

Some other Cases

Similarly, we may conceive of many more other cases of change in demand and supply. A simultaneous decrease in both of them with three possibilities as described above or decrease in one of them and increase in the other again the magnitude of decrease or increase affecting the price and quantities change in demand and supply

with their different elasticities and so on. The possibilities may be numerous but the method to arrive at the equilibrium price remains essentially the same.

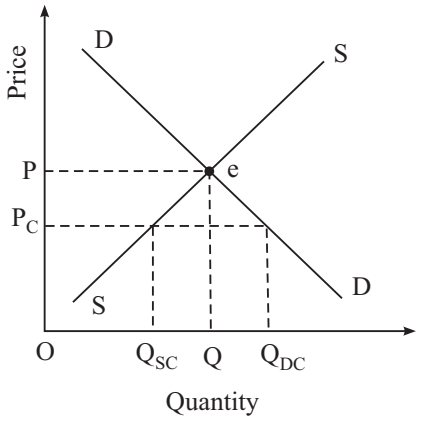
INTEXT QUESTIONS 22.3

1. With the help of diagrams, show the effect of increase and decrease in demand on price when supply remains constant.
2. With the help of diagrams, show the effect of increase and decrease in supply on price when demand remains constant.
3. Show the effect of increase in supply on price of a commodity when its demand is perfectly elastic.
4. Show the effect of simultaneous decrease in demand and supply on price when supply changes relatively to a greater extent.

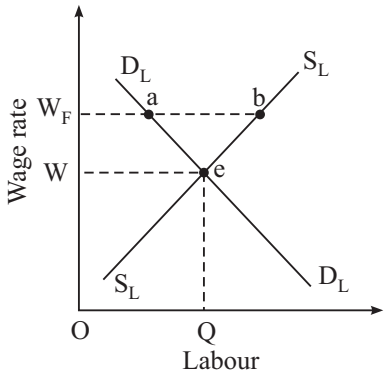
22.8 SIMPLE APPLICATION OF DEMAND AND SUPPLY ANALYSIS

Determination of equilibrium price finds many applications in daily life and has implications for formulation of policies by the government. For example, formation of policies regarding floor price and ceiling price can be explained with the help of equilibrium price.

(a) Ceiling price: When the price prevailing in the market is too high and is affecting the interests of the consumers adversely, the government has to step in and decide ceiling price. The sellers are not allowed to raise price of their products beyond this ceiling price and thus the interests of the consumers are protected. An example of this may be rent control policy. Suppose the current rent for a particular type of flats is determined at OP which is exorbitant. In such a case, the government can fix the rent arbitrarily at OPc which is lower then OP and will give some relief to tenants (consumers). It may be mentioned that at this controlled rent OPc, the demand for flats (OQ_{DC}) exceeds supply of flats (OQ_{SC}) and this may lead to unscrupulous practices for which the government may have to take preventive and remedial measures. It may also be mentioned that fixation of price at a level above OP has no point as price mechanism will automatically push the price level back to OP.



(b) Floor Price: It is not necessary that price determined is always too high. Sometimes it may be too low also. It may happen especially in markets with excessive supply of something. For example, Indian labour market is a market with excessive supply of labour. In such a setting, the wage rate determined by the market forces of demand and supply is generally too low (especially in the market for unskilled labour). To protect workers' interests in such a case the government may pass minimum wage legislation. Suppose, the wage rate prevailing in the market is OW which is too low. The government may pass minimum wage legislation and fix minimum wages at OW_F. This minimum wage level is floor price. The government does not allow the price level to go lower than floor price and thus sellers' interests are protected. (worker is the seller of his labour).



INTEXT QUESTIONS 22.4

1. What is ceiling price?
2. What is floor price?
3. What is the need for minimum wage legislation?
4. Explain ceiling price with the help of graph.
5. Define equilibrium price?

WHAT YOU HAVE LEARNT

- Equilibrium price is the price at which market demand for a commodity equals it market supply.
- Equilibrium price is determined by the interaction of the forces of demand and supply of a commodity. The point of intersection of demand curves and supply curve is called 'Equilibrium point' and the price and quantity determined at this point are called 'equilibrium price' and 'equilibrium quantity'.
- The property of flexibility ensures that any disequilibrium in demand and supply is self correcting through movement of price.

- Excess demand means more demand than supply at a given price.
- Excess supply means more supply than demand at a given price.
- With rise/fall in demand for a commodity, for a given supply both equilibrium price and quantity will rise/fall.
- With rise/fall in supply of a commodity for a given demand, both equilibrium price and quantity will fall/rise.
- When both demand and supply increase or decrease, their effect on equilibrium price and quantity depends on relative magnitude of change in demand and supply.
- Ceiling price is the price fixed below equilibrium price to protect consumers' interests. The government does not allow the price to mover above the ceiling price.
- Floor price is the price fixed above equilibrium price to protect sellers' interests. The government does not allow the price to fall below the floor price. Minimum wage legislation is an example.

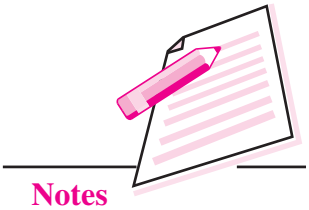
TERMINAL EXERCISE

1. What is equilibrium price? Explain with the help of diagram.
2. What is excess demand? How is equilibrium between demand and supply restored in case of excess demand?
3. What is excess supply? How is equilibrium between demand and supply restored in case of excess supply?
4. Explain the effect of simultaneous increase in demand and increase in supply on equilibrium price and quantity. Use relevant diagrams.
5. Market demand and supply schedule of a commodity is given below:

Price (Rs per kg)	Quantity demanded (kg)	Quantity supplied (kg)
2	20	12
3	18	14
4	16	16
5	14	18
6	12	20

(i) What is the equilibrium price of the commodity?

(ii) What is the equilibrium quantity demanded and supplied at this price?



(iii) What happens if initial price is Rs 2 per kg?

(iv) What happens if initial price is Rs 6 per kg?

6. Explain the concept of ceiling price and floor price.

ANSWER TO INTEXT QUESTIONS

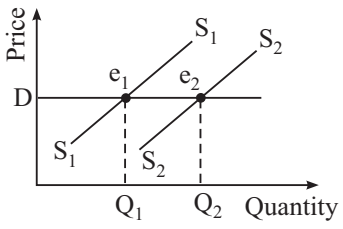
22.1

1. Refer to 22.1
2. Refer to 22.1
3. Refer to 22.2
4. (i) (d)
   (ii) (d)
   (iii) (c)
   (iv) (d)

22.2

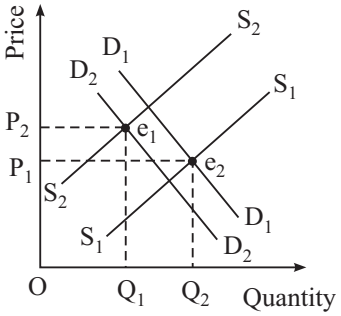
1. Refer to 22.3
2. Refer to 22.4
3. Refer to 22.3 (Process of Adjustment)
4. Refer to 22.4 (Process of Adjustment)
5. Refer to 22.3
6. Refer to 22.4

22.3

1. Refer to 22.5
2. Refer to 22.6
3. 

So price remains the same, whereas quantity rises.

4. As a result of shift in demand curve from D_1D_1 to D_2D_2 and supply curve from S_1S_1 to S_2S_2, the equilibrium point moves from e_1 to e_2. (Note that the magnitude of shift is greater for supply curve). consequently, equilibrium price increases from p_1 to p_2 which equilibrium quantity falls from Q_1 to Q_2.



22.4

1. Refer to 22.8(a)
2. Refer to 22.8(b)
3. Refer to 22.8(b)
4. Refer to 22.8(a)