

1. Explain market equilibrium.

Market equilibrium is referred to as that state in the market where supply is equal to demand. When a market is at equilibrium, the corresponding price will not change unless there is an external factor which is instrumental in changing the supply or the demand. Under the condition of market equilibrium, the price at which a product is sold is known as the equilibrium price.

2. When do we say there is excess demand for a commodity in the market?

When the market demand for a product/commodity is greater than the market supply, it can be understood that there is an excess demand for that commodity in the market.

3. When do we say there is excess supply for a commodity in the market?

When the market supply for a commodity is greater than the market demand, it can be understood that there is an excess supply for that commodity in the market.

4. What will happen if the price prevailing in the market is (i) above the equilibrium price? (ii) below the equilibrium price?

i) When the price of a product prevailing in the market is above the equilibrium price, supply will be more than demand. Since the product can be sold at a price greater than the equilibrium price, the firm will produce more quantities of the given product and increase the supply. But the demand will be low since the competing firms will also increase their production and supply, creating excess supply.

ii) When the price of a product prevailing in the market is below the equilibrium price, supply will be less than demand. Since the product can only be sold at a price lower than the equilibrium price, the firm will produce fewer quantities of the given product and decrease the supply. The competing firms will also do the same, and therefore the supply will not adequately meet the demand creating excess demand.

5. Explain how price is determined in a perfectly competitive market with a fixed number of firms.

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In a perfectly competitive market with a fixed number of firms, the price will be determined by the supply and demand that exists in the market. Since the demand and supply will be the same, the price of any commodity will be at equilibrium. This is known as the equilibrium price.

6. Suppose the price at which equilibrium is attained in exercise 5 is above the minimum average cost of the firms constituting the market. Now, if we allow for free entry and exit of firms, how will the market price adjust to it?

When the equilibrium price is greater than the minimum average cost of the firms, more firms will enter the market and produce more quantities of the given commodity. This is due to the high-profit levels that can be gained due to the market's condition. But in the longer run, the market price will start to fall because of the rise in supply caused by the rush. Therefore, the market equilibrium price will decline, and the profit levels will return to normal.

7. At what level of price do the firms in a perfectly competitive market supply when free entry and exit are allowed in the market? How is equilibrium quantity determined in such a market?

In a perfectly competitive market, when free entry and exit are allowed, the equilibrium price will be the same as the minimum average cost in the long run. All the firms will earn zero to normal economic profit.

8. How is the equilibrium number of firms determined in a market where entry and exit are permitted?

When free entry and exit are permitted, the market price will remain the same as the minimum average cost. Therefore, firms will enter or exit the market. Since there is no profit to be gained by producing the given commodity, no company will be incentivised to enter the market. This is how an equilibrium number of firms is determined in such a market.

9. How are the equilibrium price and quantity affected when the income of the consumers (a) increase? (b) decrease?

(a) An increase in the income of the consumers is likely to increase the equilibrium price. Since the consumers have more money to spend, the demand for a given commodity will increase, and the quantity of the product produced will also increase.

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(b) A decrease in the income of the consumers is likely to decrease the equilibrium price. Since the consumers have less money to spend, the demand for a given commodity will decrease, and the quantity of the product produced will also decrease.

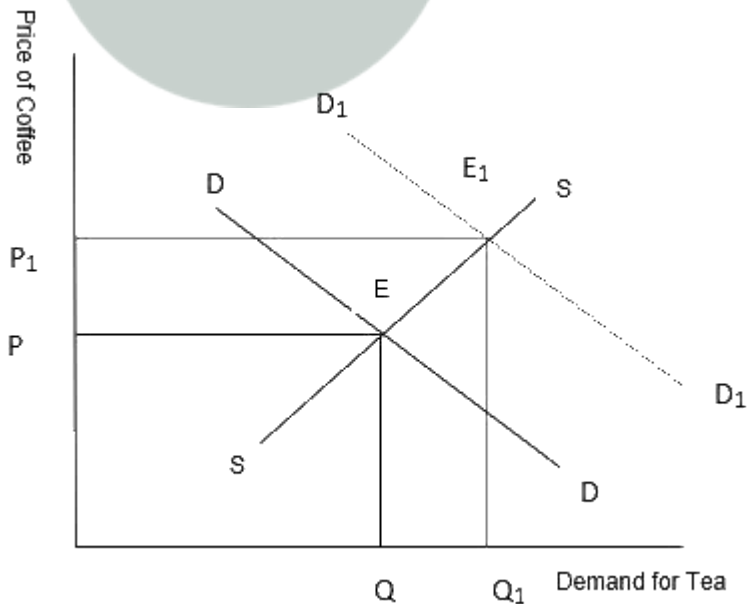
10. Using supply and demand curves, show how an increase in the price of shoes affects the price of a pair of socks and the number of pairs of socks bought and sold.

Shoes and Socks are complementary goods, and a change in one product's price will affect how the other product's supply. Since shoes and socks are usually bought together, when there is an increase in the price of shoes, the demand for socks will face a decline. Due to the decline in demand for shoes and socks, the number of socks sold and bought will decrease.

11. How will a change in the price of coffee affect the equilibrium price of tea? Explain the effect on equilibrium quantity also through a diagram.

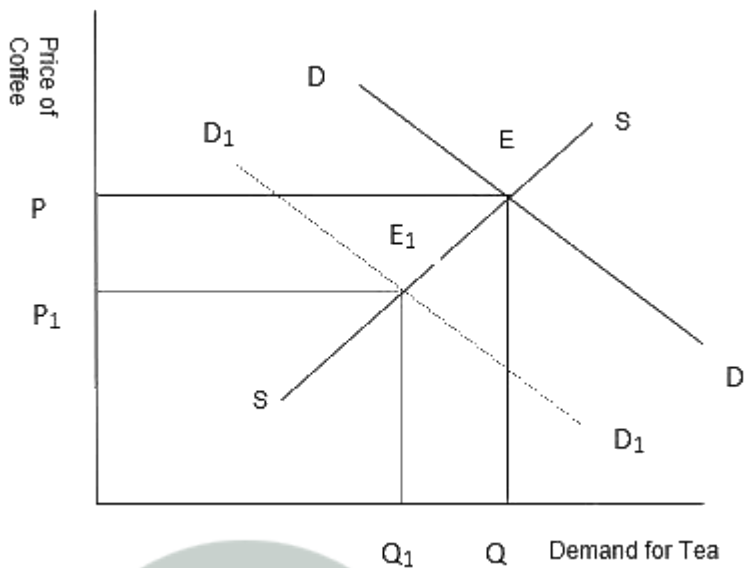
Coffee and tea are regarded as substitutes for each other, and therefore, any price change in coffee will result in changing the demand for tea. It can be said that when the coffee price increases, it will increase the demand for tea and when the coffee price decreases, the demand for tea is reduced.

Diagrammatically it can be represented as:



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In the above diagram, when the price of coffee increases (from P to P_1), the demand for tea increases which is shown by (Q to Q_1).



In the above diagram, when the price of coffee decreases from (P to P_1), there is a decrease in demand for tea (Q to Q_1).

12. How do the equilibrium price and the quantity of a commodity change when the price of input used in its production changes?

Change in input price brings about changes in equilibrium price and quantity of the commodity produced in the following ways:

1. When input price is increased: In case a firm increases the input price, the cost of production will increase, this will result in a decline in profit, and hence supply will take a hit. The supply curve will move left while the demand curve will remain the same. The equilibrium price will increase with reduced output.
2. When input price is decreased: In case a firm decreases the input price, the cost of production will reduce which will encourage the firm to produce more and increase supply. This will result in the supply curve moving right with the demand curve remaining still. The equilibrium price will be lower with increased output.

13. If the price of a substitute Y of good X increases, what impact does it have on the equilibrium price and quantity of good X ?

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As X and Y are substitutes for each other, any change in the price of the substitute will have an immediate effect on the price of the other. In this case, if the price of Y increases, then it will result in an increase in demand for X and due to this increase in demand, there will be a rise in equilibrium price and the quantity of output of the good X.

14. Compare the effect of the shift in the demand curve on the equilibrium when the number of firms in the market is fixed with the situation when entry-exit is permitted.

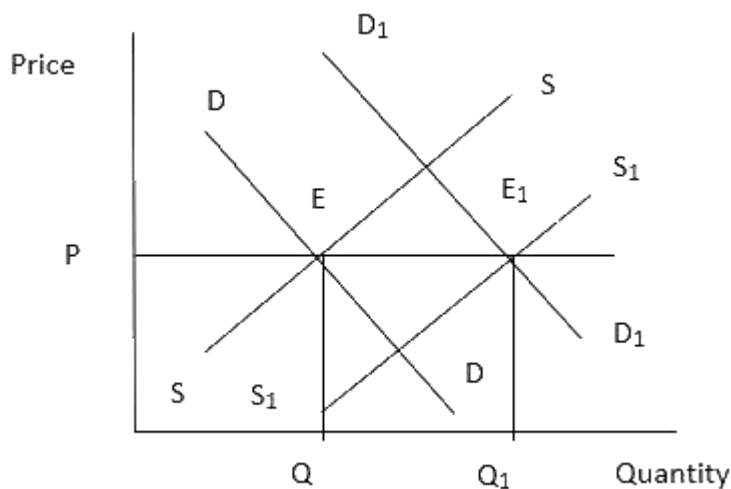
When the number of firms is fixed in a market, an increase in demand will result in an increased equilibrium price and increased output. Similarly, if entry-exit is allowed, then there will be a decrease in the equilibrium price. There will be more entry of firms as all will be looking to earn a super normal profit. But the entry of more firms causes a decrease in profit, and all firms will start earning normal profits.

15. Explain through a diagram the effect of a rightward shift of both the demand and supply curves on equilibrium price and quantity.

A rightward shift in both the demand and supply curves can occur in three situations, as explained below:

1. When both the demand and supply curve increase equally, then there will be no change in the equilibrium price, although there will be a change in the equilibrium point.

This can be depicted with a diagram as follows:



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2. When the demand curve increases at a faster rate than the supply curve, there will be a higher equilibrium price and higher output.

3. When the demand curve increases at a slower rate than the supply curve, there will be a fall in equilibrium price and a rise in output.

16. How are the equilibrium price and quantity affected when

(a) both demand and supply curves shift in the same direction?

(b) demand and supply curves shift in opposite directions?

(a) both demand and supply curves shift in the same direction

Conditions	Equilibrium Price	Equilibrium Quantity
1) Increase in demand equals increase in supply	No change	Increases
2) Increase in demand more than increase in supply	Increases	Increases
3) Increase in demand less than increase in supply	Falls	Increases
4) Decrease in demand equal to decrease in supply	No change	Falls
5) Decrease in demand more than decrease in supply	Falls	Falls
6) Decrease in demand less than decrease in supply	Increases	Falls

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(b) demand and supply curves shift in opposite direction

Conditions	Equilibrium Price	Equilibrium Quantity
1. Increase in demand equals to decrease in supply	Increase	Unchanged
2. Decrease in demand equals to increase in supply	Unchanged	Increases
3. Decrease in demand less than increase in supply	Decreases	Increases
4. Decrease in demand more than increase in supply	Decreases	Decreases
5. Increase in demand less than decrease in supply	Increases	Decreases
6. Increase in demand more than decrease in supply	Increases	Increases

17. In what respect do the supply and demand curves in the labour market differ from those in the goods market?

The points of differentiation between the labour market and the goods market are as follows:

1. In a goods market, consumers make the demand for goods, whereas, in a labour market, firms make the demands.
2. In a goods market, firms perform the supply of goods, whereas, in a labour market, households provide the supply of labour.
3. Firms act as suppliers in a goods market, whereas households act as suppliers in the labour market.

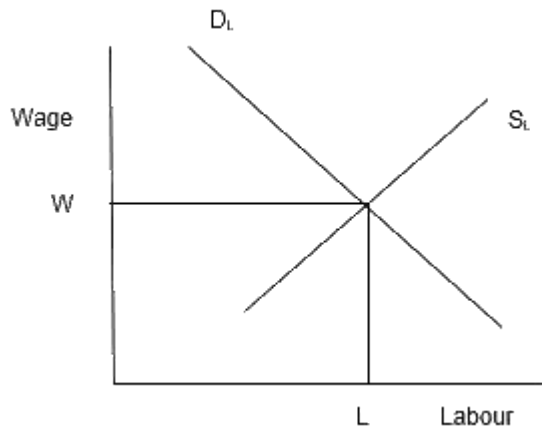
18. How is the optimal amount of labour determined in a perfectly competitive market?

In a perfectly competitive market, the optimal amount of labour is determined by considering the cost and benefit that is obtained by employing the additional labour. A firm will hire labourers till that point, where the cost of employing additional labour becomes equal to the

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benefits derived from it. At that point, it can be said that the marginal cost of labour is equal to the marginal benefit of labour, or the wage rate is equal to the marginal revenue product.

It can be represented as follows:



$$W = VMP_L$$

Where,

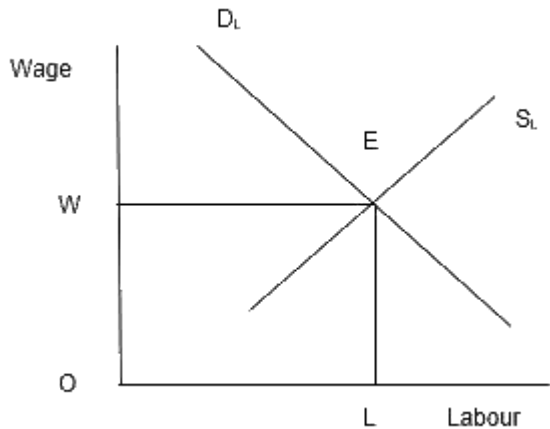
W = Wage rate

VMP_L = Value of Marginal Product of Labour

19. How is the wage rate determined in a perfectly competitive labour market?

In a perfectly competitive labour market, the wage rate will be determined by the point of intersection of the demand and supply of labour. The demand for labour is determined by the marginal product of labour. The rate at which demand equals supply is called as equilibrium wage rate.

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20. Can you think of any commodity on which a price ceiling is imposed in India? What may be the consequence of the price ceiling?

Price ceiling refers to the act of lowering prices as compared to the prevailing market price. This is done to help families below the poverty line survive with essential items. In India, a price ceiling is implemented on various food items such as wheat, rice and sugar and on fuels such as kerosene oil.

The consequences of the price ceiling are as follows:

1. As the price is artificially imposed by the government, it will lead to excess demand for the goods.
2. The amount of goods allotted is fixed per individual, and it may not be sufficient to meet the requirement. The shortage is detected, which makes the consumer dissatisfied.
3. It has been often seen that the quality of goods that are sent for supply is not fit for consumption due to adulteration.
4. Due to unfulfilled requirements from the allotted quota, people get ready to pay more for additional goods, which leads to black marketing leading to a man-made shortage in the market.

21. A shift in the demand curve has a larger effect on price and a smaller effect on quantity when the number of firms is fixed compared to the situation when free entry and exit are permitted. Explain.

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In the short run, the number of firms is fixed, while in the long run, there is no restriction on the number of firms, and free entry-exit is permitted. The following inference can be made from the situation when the market is running with a fixed number of companies (short run).

1. When demand increases, both equilibrium price and quantity are raised
2. When demand decreases, there is a fall in equilibrium price and quantity

The market situation, when the long run is taking place with free entry and exit of firms, is as follows:

1. When demand increases, there is no change in equilibrium price but the output increases.
2. When demand decreases, there is no change in equilibrium price, but the production quantity is reduced (less).

22. Suppose the demand and supply curve of commodity X in a perfectly competitive market is given by:

$$q^d = 700 - p$$

$$q^s = 500 + 3p \text{ for } p \geq 15$$

$$= 0 \text{ or } 0 \leq p < 15$$

Assume that the market consists of identical firms. Identify the reason behind the market supply of commodity X being zero at any price less than Rs. 15. What will be the equilibrium price for this commodity? At equilibrium, what quantity of X will be produced?

From the question, we can see that

$$q^d = 700 - p$$

$$q^s = 500 + 3p \text{ for } p \geq 15$$

$$= 0 \text{ or } 0 \leq p < 15$$

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It can be inferred from the given data that market supply is 0 as the price range defined is less than the minimum average variable cost. There will not be any output, and the supply curve becomes 0.

Now, when the equilibrium state is known

$$q^d = q^s \text{ (At equilibrium)}$$

$$700 - p = 500 + 3p$$

$$3p + p = 200$$

$$4p = 200$$

$$\text{Or } p = 50 \text{ (equilibrium price)}$$

Now, the equilibrium quantity can be calculated as q^s

$$q^s = 500 + 3P$$

$$= 500 + 3 \times 50$$

$$= 500 + 150$$

$$= 650$$

The total equilibrium quantity produced is 650 units.

23. Considering the same demand curve as in exercise 22, now let us allow for free entry and exit of the firms producing commodity X. Also, assume the market consists of identical firms producing commodity X. Let the supply curve of a single firm be explained as

$$q^s_r = 8 + 3p \text{ for } p \geq 20$$

$$= 0 \text{ for } 0 \leq p < 20$$

(a) What is the significance of $p = 20$?

(b) At what price the market for X will be in equilibrium? State the reason for your answer.

(c) Calculate the equilibrium quantity and the number of firms.

As per the question

$$q_s^r = 8 + 3p \text{ for } p \geq \text{Rs } 200$$

$$= 0 \text{ for } 0 \leq p < \text{Rs } 20.$$

$$q^d = 700 - p \text{ (Keeping the same value as the previous question)}$$

(a) No firm is going to produce any output for the price range of 0 to 20 as this is below the minimum average variable cost. Losses will be incurred if any output is done at the price range of 0-20. At the price of Rs. 20, the price line will be equal to the minimum of the average variable cost.

(b) In the long run, the firms will be earning zero profit, and also, there is the freedom of entry and exit of firms. So the minimum price for which the market will be in equilibrium for X will be Rs. 20, as it is the minimum average variable cost and any price lower than that will result in the exit of the firm.

(c) The equilibrium price is Rs. 20 as established. Now equilibrium quantity will be calculated.

As per question

$$q_s = 8 + 3p$$

$$= 8 + 3(20)$$

$$= 68$$

Therefore, 68 units are supplied.

We have

$$q^d = 700 - p$$

$$= 700 - 20$$

$$= 680$$

So, the number of firms can be calculated as

$$\text{No. of Firms} = q^d / q^s$$

$$= 680/68$$

$$= 10$$

24. Suppose the demand and supply curves of salt are given by:

$$q^d = 1,000 - p \quad q^s = 700 + 2p$$

(a) Find the equilibrium price and quantity.

(b) Now, suppose that the price of an input that is used to produce salt has increased so that the new supply curve is $q^s = 400 + 2p$.

How do the equilibrium price and quantity change? Does the change conform to your expectation?

(c) Suppose the government has imposed a tax of Rs. 3 per unit of sale on salt. How does it affect the equilibrium rice quantity?

(a) As per the question,

$$q^d = 1,000 - p$$

$$q^s = 700 + 2p$$

At equilibrium point $q^d = q^s$

$$1000 - p = 700 + 2p$$

$$3p = 300$$

$$p = 300/3$$

$$= 100$$

Equilibrium price = Rs. 100

$$\text{Now } q^d = 1000 - p$$

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$$= 1000 - 100$$

$$= 900$$

Equilibrium quantity = 900 units

(b) As per the question,

$$q^s = 400 + 2p$$

We know at equilibrium $q^d = q^s$

Therefore

$$1000 - p = 400 + 2p$$

$$3p = 600$$

$$p = 200$$

The equilibrium price is Rs. 200

$$q^s = 400 + 2p$$

$$= 400 + 2(200)$$

$$= 400 + 400$$

$$= 800$$

Equilibrium units = 800

The equilibrium quantity is reduced as the cost of production increases, and it moves the supply curve to the left. This shift brings about an increase in equilibrium price and a reduction in equilibrium quantity.

(c) As per the question

$$q^s = 700 + 2(p - 3) \text{ As a tax of Rs. 3 added to salt production,}$$

At equilibrium point $q^d = q^s$

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$$1000 - p = 700 + 2(p - 3)$$

$$1000 - p = 700 + 2p - 6$$

$$3p = 1000 - 694$$

$$p = 102$$

Hence, equilibrium price = 102

$$q^d = 1000 - p$$

$$= 1000 - 102$$

$$= 898$$

Hence, equilibrium quantity = 898 units

25. Suppose the market-determined rent for apartments is too high for common people to afford. If the government comes forward to help those seeking apartments on rent by imposing control on rent, what impact will it have on the market for apartments?

When the government intervenes in the market for apartments and imposes control on rent, it will bring down the prices. Due to the drop in prices, the demand for apartments will grow. The imposition of a price ceiling will facilitate more people to afford an apartment who would not otherwise be able to pay the rent. It will also make some builders indulge in black marketing.