CBSE Class 11 Economics
Sample Paper 03 (2020-21)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. This question paper contains two parts: Part A - Statistics (40 marks) and Part B - Micro Economics (40 marks).

ii. Marks for questions are indicated against each question.

iii. Question No. 1-7 and Question No. 15 – 21 (including two Case Based Questions) are 1 mark questions and are to be answered in one word/sentence.

iv. Case Based Questions (CBQ's) are Question No. 7 and Question No. 15.

v. Question No. 8-9 and Question No. 22 – 23 are 3 marks questions and are to be answered in 60 - 80 words each.

vi. Question No. 10-12 and Question No. 24 – 26 are 4 marks questions and are to be answered in 80-100 words each.

vii. Question No. 13-14 and Question No. 27 – 28 are 6 marks questions and are to be answered in 100-150 words each.

viii. Answers should be brief and to the point and the above word limit be adhered to as far as possible.

PART - A (STATISTICS)

1. The square of standard deviation is known as:

   a. Variance

   b. Standard deviation

   c. Quartile deviation

   d. Mean deviation

OR

Calculate the standard deviation for the following data - 5, 8, 7, 11, 14

a. 3.12

b. 3.15

c. 3.16

d. 3.14

2. Fill in the blanks:

Production includes all those activities which are undertaken to produce goods and services for the generation of income by enhancing the utility of _____ and _____.

3. Mid-point is used to calculate the following except

a. Averages

b. Dispersion

c. Frequency graphs

d. Median

4. From the following which is not a kind of index number

a. value

b. quantity

c. price

d. Quality

5. Index Number reveals the state of

a. None

b. Inflation

c. Deflation

d. Both

6. A scatter diagram:

a. Is a graph of x and y values

b. Is a statistical test

c. Must be curvilinear

d. Must be linear

7. **Read the following hypothetical Case Study carefully and answer the questions on the basis of the same:**

NSSO is a government organisation under the Ministry of Statistics and Programme Implementation. This organisation conducts regular sample survey to collect basic statistical information relating to a variety of economic activity in rural as well as urban parts of the country. The National Sample Survey Office(NSSO) in India is a unique setup

to carry out surveys on socio-economic, demographic, agricultural and industrial subjects for collecting data from households and from enterprises located in villages and in the towns. It is a focal agency of the Govt.

  i. The statistical data collected by NSSO are released through its quarterly journal, called _____. (SARVEKSHANA/SURVEY).

 ii. The _____ is a governmental agency in India under the Ministry of Statistics and Programme Implementation responsible for co-ordination of statistical activities in India, and evolving and maintaining statistical standards. (CSO/DICGS).

iii. Statistical information published by UNO, IMF and foreign governments are used as _____ (Primary data/Secondary Data).

iv. NSSO collect, process and tabulate the statistical data of _____. (Economic change/Social Change).

8. State the objectives of classification.

9. The average of five quantities is 6 and the average of three out of the five quantities is 8. What is the average of the remaining two?

<div align="center">OR</div>

What is combined mean? How is it calculated?

10. Discuss merits and demerits of Lorenz curve.

11. Construct a frequency polygon without using histogram for the following data.

Wages (in Rs.)	Number of Workers
0-10	10
10-20	18
20-30	35
30-40	30
40-50	20
50-60	12
60-70	8
70-80	3

OR

Differentiate between sub divided and percentage bar diagram.

12. Find out the standard deviation and its coefficient from the following frequency distribution using assumed mean method.

Age(in years)	18 - 28	28 - 38	38 - 48	48 - 58
Number of Employees	5	8	10	7

13. Define Median. Discuss its merits and demerits.

OR

Calculate Q_1 and Q_3 from the following table.

Wages (in Rs.)	Number of Workers
0-5	4
5-10	6
10-15	3
15-20	8
20-25	12
25-30	7

14. From the following data, calculate coefficient of correlation between age and playing habits.

Age Group	20 -30	30 - 40	40 - 50	50 - 60	60 - 70
Number of students	25	60	40	20	20
Number of Regular Players	10	30	12	2	1

PART - B (MICRO ECONOMICS)

15. Which of the following statement is correct about Opportunity cost?
   a. Opportunity cost is always higher than the given price.
   b. Opportunity cost is always calculated in money.
   c. Opportunity cost is always less than the given price.
   d. Opportunity cost can be less than, more than or equal to given price.

16. The market demand curve for a perfectly competitive industry is $Q_d = 12 - 2P$. The market supply curve is $Q_s = 3 + P$ The market will be in equilibrium if:

   a. $P = 4$ and $Q = 4$
   b. $P = 6$ and $Q = 9$
   c. $P = 5$ and $Q = 2$
   d. $P = 3$ and $Q = 6$

17. **Assertion:** Budget line can shift to the right when the consumer is able to increase the consumption of both goods.

   Reason: When the level of income increases, the consumer will be able to buy more bundles of goods, which were previously not possible.

   a. Assertion and reason both are correct statements and reason is correct explanation for assertion.
   b. Assertion and reason both are correct statements but reason is not correct explanation for assertion.
   c. Assertion is correct statement but reason is wrong statement.
   d. Assertion is wrong statement but reason is correct statement.

OR

Assertion: Budget line can shift to the right when the consumer is able to increase the consumption of both goods.

Reason: When the prices of both goods fall, the consumer can not purchase more goods with the same income level.

   a. Assertion and reason both are correct statements and reason is correct explanation for assertion.
   b. Assertion and reason both are correct statements but reason is not correct explanation for assertion.
   c. Assertion is correct statement but reason is wrong statement.
   d. Assertion is wrong statement but reason is correct statement.

18. **Assertion:** Consumer is willing to sacrifice less and less units of a good to gain an additional unit of the other good.

   Reason: The utility that he gets from consuming an additional unit of a good goes on diminishing.

   a. Assertion and reason both are correct statements and reason is correct explanation

for assertion.
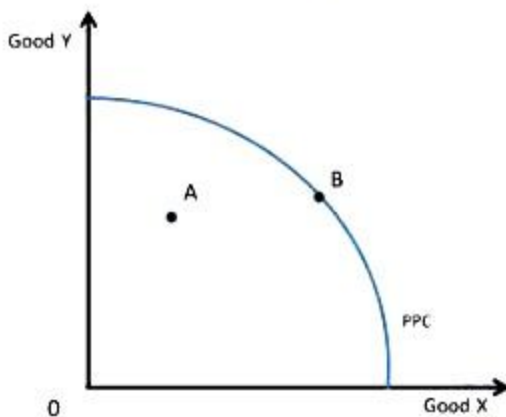
b. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c. Assertion is correct statement but reason is wrong statement.

d. Assertion is wrong statement but reason is correct statement.

19. A firm can sell as much as it wants at the market price. The situation is related to?

a. Oligopoly

b. Monopolistic competition

c. Perfect competition

d. Monopoly

20. When MR is zero, then:

a. TR is maximum

b. TR is minimum

c. TR is zero

d. TR is equal to MR

21. **Read the following Case Study carefully and answer the questions on the basis of the same:**

The demand curve is downward sloping, indicating the negative relationship between the price of a product and the quantity demanded. For normal goods, a change in price will be reflected as a move along the demand curve while a non-price change will result in a shift of the demand curve. The slope of the demand curve is estimated as- $\Delta P/\Delta Q$. It shows the ratio between the change in price corresponding to a unit change in quantity demanded of a commodity. It is constant at all points on the demand line DD. Positively sloped demand curve violates the law of demand. These are those inferior goods in case of which income effect is negative and greater than substitution effect so that net effect (or price effect) points to a positive relation between price and quantity demanded of the commodity.

i. Law of demand explains _____ relationship between own price of the commodity and its demand. (Positive/ Inverse)

ii. _____ is the assumption of law of demand. (Constant price/ factors other than own price constant)

iii. Elasticity of demand for a durable good is:

a. less than unity

b. greater than unity

c. equal to unity

d. zero

iv. The following are causes of shift in demand except the one:

a. change in income

b. change in own price

c. change in fashion

d. change in the price of substitute goods

22. Given PP is production possibility curve of an economy. Study the diagram carefully and answer the following questions :

i. Calculate Marginal opportunity cost, when the economy move from point A to C.

ii. Why PP is downward sloping?

iii. Is there any way to increase the agricultural production without increasing area under cultivation?

iv. What lesson you have learnt from the given PP Curve?

v. Should an economy operate at K level?

OR

Explain the problem of 'for whom to produce'

23. State properties of indifference curves.

24. How are the equilibrium price and quantity affected when both demand and supply curves shift in the same direction?

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

OR

Explain the feature of perfect knowledge about the market under perfect competition.

26. A consumer buys 10 units of a commodity at a price of Rs 10 per unit. He incurs an expenditure of Rs 200 on buying 20 units. Calculate Price Elasticity of Demand by percentage method. Comment on the shape of the demand curve based on this information.

27. Answer any two of the following questions:

   a. Explain the likely behaviour of total product under the phase of increasing return to a factor with the help of numerical example.

   b. Draw average cost, average variable cost and marginal cost curves on a single diagram and explain their relations.

   c. Will a profit-maximizing firm in a competitive market ever produce a positive level of output in the range where the marginal cost is falling? Give an explanation.

   d. There are three identical firms in the market. The following table shows the supply schedule of firm 1. Compute the market supply schedule.

Price	SS_1 (units)
0	0
1	0
2	2
3	4
4	6
5	8
6	10
7	12
8	14

28. Answer the following questions:

   a. What does the price elasticity of supply mean? How do we measure it?

   b. State the relation between Total Cost and Marginal Cost.

   c. How are the total revenue of a firm, market price, and the quantity sold by the firm related to each other?

Solution

PART - A (STATISTICS)

1. (a) Variance

   Explanation: Vairance is another measure based on standard deviation. Smaller the value of variance, lesser is the variability or greater the consistency and vice versa.

   OR

   (c) 3.16

   Explanation:

x(items)	x-$\bar{x}$	(x-$\bar{x}$)^2
5	-4	16
8	-1	1
7	-2	4
11	2	4
14	5	25
Σx= 45	Σ(x-$\bar{x}$)=0	Σ(x-$\bar{x}$)^2= 50

   $\bar{x}$= Σx/n= 45/5= 9

   σ = $\sqrt{\Sigma(x-\bar{x})^2}$/n=$\sqrt{}$ 50/5= 3.16

2. Good, services

3. (d) Median

   Explanation: Median is a positional average unlike mean, dispersion etc which are magnitudinal averages.

4. (d) Quality

   Explanation: Index number is measured for quantitative data not qualitative data .

5. (d) Both

   Explanation: In statistics, we assume that index no .of base year is hundred. If the index

number calculated from data is less than 100, it implies deflation and if it is greater than 100, it implies inflation .

6. (a) Is a graph of x and y values

   Explanation: Scatter disagram is a simple and attractive method of diagrammatic representation of a bivariate distribution to determine the nature of correlation between the variables.

7. i. SARVEKSHANA

   ii. CSO

   iii. Secondary Data

   iv. Economic change

8. Objectives of Classification:

   a] To simplify complex data

   b] To facilitate understanding

   c] To facilitate comparison

   d] To make analysis and interpretation easy.

   e] To arrange and put the data according to their common characteristics.

9. Given that the average of 5 numbers is 6, their sum is 5 × 6 = 30.

   Given that the average of the 3 selected numbers is 8, their sum is 3 × 8 = 24.

   So the remaining two numbers add up to 30−24=6 and their average is 6/2 = 3

   OR

   When two or more distributions are given with their number of items and arithmetic means, the combined mean can be calculated by applying the following formula.

   $$\bar{x}_{12} = \frac{N_1\bar{x}_1 + N_2\bar{x}_2}{N_1 + N_2}$$

   Where,

   $\bar{x}_{12}$ is combined mean of two series

   n_1 is number of items in first series

   $\bar{x}_1$ is mean of first series

   n_2 is number of items in second series,

   It can be extended to more than two series by applying the following formula:

   $$\bar{x}_c = \frac{N_1\bar{x}_1 + N_2\bar{x}_2 + ...Nn\bar{x}_n}{N_1 + N_2 + ...Nn}$$

10. **Merits:**

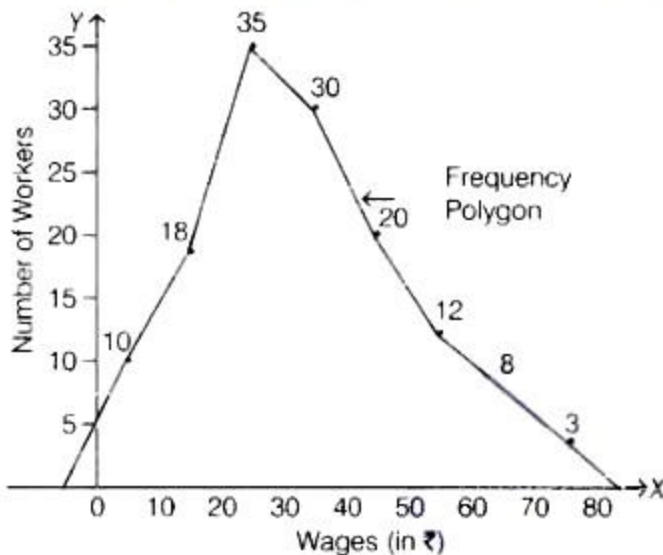   a. Lorenz Curve is attractive and it has permanent effect on the mind.

b. On seeing the diagram, a rough idea of extent of dispersion is obtained.

c. A comparative study of two or more series can be made very easily.

d. With the help of Lorenz curve we can study share prices, income, wages, profits etc.

Demerits:

a. It gives only a relative idea of the dispersion as compared with the line of equal distribution.It does not provide us any numerical value of the variablility for the given distribution.

b. It is very difficult to draw a Lorenz curve.

c. It cannot be used when further mathematical treatment is required.

11.

OR

Sub divided Bar Diagram	Percentage Bar Diagram
In Sub divided bar diagram, components are shown in absolute quantities.	In percentage bar diagram, quantities are shown in percentages.
In Sub divided bar diagrams, all bars are of different size.	In percentage bar diagram, all bars are of equal t height.
It cannot be used to compare relative importance of different components.	It can be used to campare relative importance of different components.

12. **Calculation of Standard Deviation and Its Coefficient**: This is a continuous series and we have to take assumed mean. Let the assumed mean be 33 (A). Then we find out the midpoint of the class intervals represented by m. The next step is to find the deviation

from the assumed mean (m- 33). Finally we find fd and fd^2 and calculate their totals. The same has been done here in the table given below:

Age(in years) (X)	Number of Employees(f)	Mid - point(m)	d(m - A), A = 33	fd	fd^2
18 - 28	5	23	-10	-50	500
28 - 38	8	33	0	0	0
38 - 48	10	43	+10	+100	+1000
48 - 58	7	53	+20	+140	2800
	$\Sigma f = 30$			$\Sigma fd = 190$	$\Sigma fd^2 = 4300$

Applying the formula for standard deviation,

$$\text{Standard Deviation}(\sigma) = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2}$$

$$= \sqrt{\frac{4300}{30} - \left(\frac{190}{30}\right)^2} = \sqrt{143.33 - \left(\frac{19}{3}\right)^2}$$

$$= \sqrt{143.33 - 40 \cdot 11} = \sqrt{103.22} = 01.16$$

Therefore, Standard Deviation = 10.16

13. Median may be defined a the middle value in the data set when its elements are arranged in a sequential order, that is, either in ascending or descending order of magnitude. It concentrates on the middle or centre of a distribution.

    According to Connor, "The median is that value of the variable which divides the group into two equal parts, one part comprising all parts greater, and the other values less than median."

    According to Horace Secrist, "Median of a series is the value of the item actual or estimated when a series is arranged in order of magnitude which divides the distribution into two parts."

    According to Croxton and Cowden, "the median is generally defined as the value which divides the distribution so that an equal number of items is on either side of it."

    Merits:

    1. The median is useful in case of frequency distribution with open-end classes.

2. The median is recommended if distribution has unequal classes.
3. Extreme values do not affect the median as strongly as they affect the mean.
4. It is the most appropriate average in dealing with qualitative data.
5. The value of median can be determined graphically where as the value of mean can not be determined graphically.
6. It is easy to calculate and understand.

Demerits:

1. For calculating median it is necessary to arrange the data, where as other averages do not need arrangement.
2. Since it is a positional average its value is not determined by all the observations in the series.
3. Median is not capable for further algebraic calculations.
4. The sampling stability of the median is less as compared to mean.

OR

Wages	Number of Workers	Cumulative Frequency (cf)
0-5	4	4
5-10	6	10
10-15	3	13
15-20	8	21
20-25	12	33
25-30	7	40
	$n = \Sigma f = 40$	

Calculation of Q_1 and Q_3

Q_1	$Q3$
First Quartile number (q_1)= Size of $\left(\frac{n}{4}\right)$ th item	Third Quartile number (q_3)= Size of $\left(\frac{3n}{4}\right)$ th item

$= \left(\frac{40}{4}\right)$ th item=10th item 10th item will correspond to the class 5-10. So, l_1=5, cf=4, f=6 and c=5 Now, $Q_1 = l_1 + \frac{\frac{n}{4}-cf}{f} \times c$ $= 5 + \frac{10-4}{6} \times 5$ $5 + \frac{6 \times 5}{6} = 5 + \frac{30}{6} = 5 + 5 \Rightarrow Q_1 = 10$	$= \left(\frac{3 \times 40}{4}\right)$ th item =30th items 30th item will correspond to the class 20-25. So, l_1=20, cf=21, f=12 and c=5 Now, $Q_3 = l_1 + \frac{\frac{3n}{4}-cf}{f} \times c$ $= 20 + \frac{30-21}{12} \times 5$ $= 20 + \frac{45}{12} = 20 + 3.75 \Rightarrow Q_3 = 23.75$

14. First, we are required to calculate the percentage of regular players.

Calculation of Percentage of Regular Players:

Number of Students	Number of Regular Players	Percentage of Regular Players
25	10	$\frac{10}{25} \times 100 = 40$
60	30	$\frac{30}{60} \times 100 = 50$
40	12	$\frac{12}{40} \times 100 = 30$
20	2	$\frac{2}{20} \times 100 = 10$
20	1	$\frac{1}{20} \times 100 = 5$

Denoting mid value of age as X and percentage of regular players as Y.

Age Group	X	dx(X - A), A = 45	dx' $\left(\frac{dx}{c_1}\right)$, c_1 =10	dx'^{2}	Y	dy(Y - A), A = 30	dy' $\left(\frac{dy}{c_2}\right)$, c_2 = 5	dy'^{2}	dx'dy'
20 - 30	25	-20	-2	4	40	10	2	4	-4
30 - 40	35	-10	-1	1	50	20	4	16	-4
40 - 50	45	0	0	0	30	0	0	0	0
50 - 60	55	10	1	1	10	-20	-4	16	-4
60 - 70	65	20	2	4	5	-25	-5	25	-10
			Σdx' = 0	Σdx'^{2} = 10			Σdy' = -3	Σdy'^{2} = 61	Σdx'dy' = -22

Here, n = 5, Σdx' = 0, Σdx'^{2} = 10, Σdy' = -3, Σdx'dy' = -22 Σdy'^{2} = 61

Now,Putting the values in the given formula:

$$r = \frac{\Sigma dx'dy' - \frac{\Sigma dx' \times \Sigma dy'}{n}}{\sqrt{\Sigma dx'^2 - \frac{(\Sigma dx')^2}{n}} \times \sqrt{\Sigma dy'^2 - \frac{(\Sigma dy')^2}{n}}} =$$

$$= \frac{-22 - \frac{0 \times -3}{5}}{\sqrt{10 - \frac{(0)^2}{5}} \times \sqrt{61 - \frac{(-3)^2}{5}}}$$

$$= \frac{-22}{\sqrt{10} \times \sqrt{61} - 1.8} = \frac{-22}{\sqrt{10} \times \sqrt{59.2}}$$

$$= \frac{-22}{3.16 \times 7.69} = \frac{-22}{24.3} = -0.90$$

- ***Therefore, Karl Pearson's coefficient of correlation between age and playing habits is -0.90.***
- ***Interpretation of r***

1. It indicates that there is a high degree of negative correlation between age and playing habits.
2. It indicates that as age increases, the tendency to play decreases.

PART - B (MICRO ECONOMICS)

15. (d) Opportunity cost can be less than, **more** than or equal to given price.

    Explanation: Opportunity cost is the value of the next best thing you give up whenever you make a decision. It may be equal, more or less than the price.

16. (d) P = 3 and Q = 6

    Explanation: Market is in equilibrium where Qd = Qs

    12 - 2P = 3 + P

    P = 3

    By putting the value of P

    Qd = 12 - 2P

    = 12 - 2 $\times$ 3

    Q = 6

    Hence, P = 3, Q= 6

17. (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

    Explanation: Assertion and reason both are correct statements and reason is correct explanation for assertion.

OR

(c) Assertion is correct statement but reason is wrong statement.

Explanation: When the prices of both goods fall, the consumer can purchase more goods with the same income level.

18. (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

Explanation: The consumer is willing to sacrifice less and less units of a good to gain an additional unit of the other good because the utility that he gets from consuming an additional unit of a good goes on diminishing.

19. (c) Perfect competition

Explanation: In a perfect competition there are large no. of buyers and sellers selling homogeneous products. The firm is a price taker and not price maker in perfect competition. So, the firm has to sell at the price determined by the market. They can sell as much as they want at the prevailing price.

20. (a) TR is maximum

Explanation: Marginal revenue is the change in total revenue when one more unit of a commodity is sold. When MR is zero, there is no change in TR. So, TR is maximum at this point.

21. i. Inverse
    ii. Factors other than own price constant
    iii. (b) Greater than unity
    iv. (b) Change in own price

22. i. $MOC = \dfrac{\Delta \ loss \ of \ output}{\Delta \ gain \ of \ output}$
    $= \dfrac{20-10}{4-2} = \dfrac{10}{2} = 5$

    ii. PP is downward sloping indicates that to increase production of one good, we have to scarify some quantity of other good.
    iii. Yes, agricultural production can also be increased by changing the technology.
    iv. Resources are limited and they have alternative uses.
    v. No, because at K level economy has used all its forest resources.

OR

This problem refers to the selection of the category of people who will ultimately consume the goods, i.e. whether to produce for poorer and less rich or richer and less poor.

All goods and services cannot be produced for everyone. If we produce for the rich, who have capacity to buy, then poor people will suffer from starvation.

On the other hand, if we produce for the poor for the sake of social justice, then we will have to consider, do they have resources to buy that particular good/service. Thus a problem of choice arises also this problem is concerned with the distribution of income. This problem has two aspects
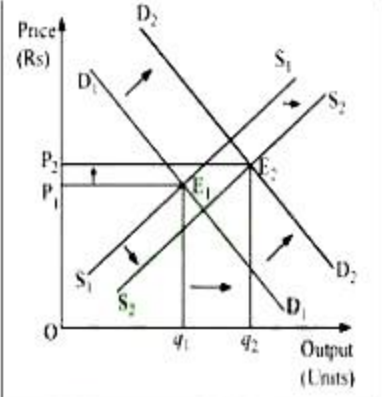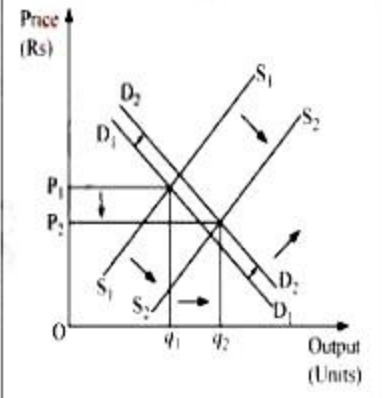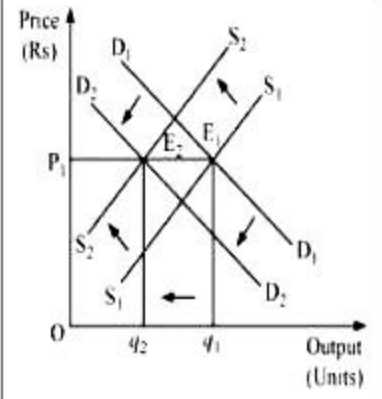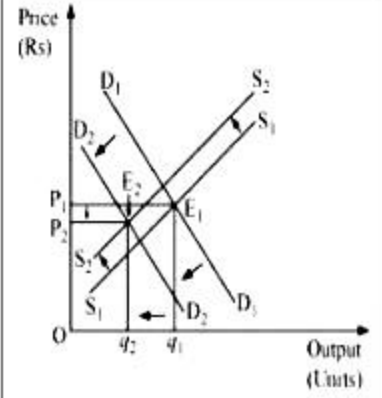
  i. Functional distribution of income,

  ii. Personal distribution of income.

23. Following are the properties of an indifference curve

   i. **Indifference curves are always convex to the origin:** Due to decreasing MRS, MRS declines continuously because of the law of diminishing marginal utility.

  ii. **Indifference curves never touch or intersect each other:** Each indifference curve shows a different level of satisfaction. Intersection point shows the same satisfaction level which is not possible.

 iii. **A higher indifference curve represents a higher level of satisfaction:** Due to monotonic preferences, higher indifference curve shows bundles having more of one commodity and not less of other good in comparison of la ower indifference curve.

 iv. **Indifference curve slope downwards:** It implies that as a consumer consumes more of one good, he must consume less of the other good.

24. Both demand and supply curves shift in the same direction. When an increase in demand is greater than the increase in supply, it is the situation of excess demand and vice versa.
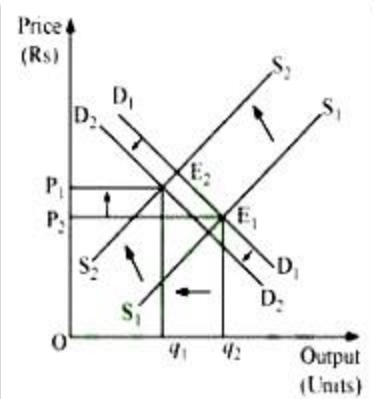
Cases	Equilibrium Price	Equilibrium Quantity	Figure
1) Increase in Dd = Increase in supply	Unchanged	Increases	

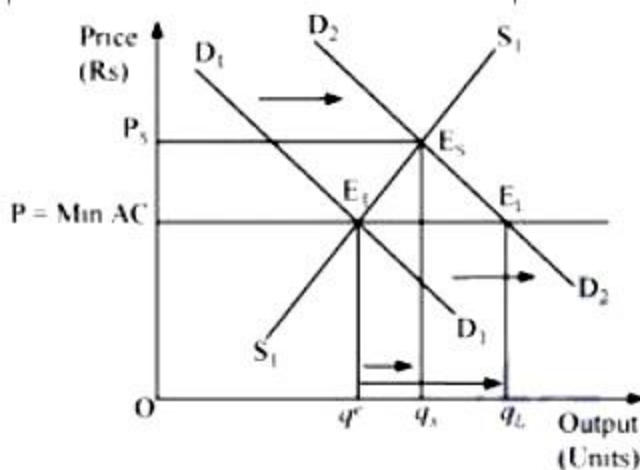|			
2) Increase in Dd is more than increase SS	Increases	Increases	
3) Increase in Dd is less than the increase in SS	Falls	Increases	
4) Decrease in Dd = decrease in SS	Unchanged	Falls	
5) Decrease in Dd is more than a decrease in SS	Falls	Falls	

6) Decrease in Dd is less than the decrease in SS	Increases	Falls

25.

The above figure depicts both the cases when the number of firms is fixed (in the short-run) and when the number of firms is not fixed (in long run). P = min AC represents the long-run price line; D_1D_1 and D_2D_2 represent the demand in the short run and the long run respectively. The point E_1 represents the initial equilibrium, where the demand and the supply intersect each other.
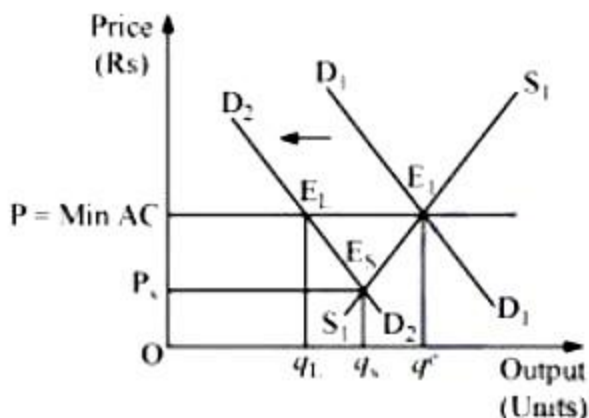
Let us suppose that the demand curve shifts, assuming that the number of firms is fixed. Now, the new equilibrium will be at E_s (as it is short-run equilibrium), where the supply curve and the demand curve D_2D_2 intersect each other. The equilibrium price is P_s and the equilibrium quantity is q_s.

On the other hand, under the assumption of free entry and exit, an increase in demand will shift the demand curve rightwards to D_2D_2. The new equilibrium will be at E_2 (as it is a long-run equilibrium) with the equilibrium price P = min AC and equilibrium quantity q_L. In the long run, a firm achieves equilibrium when it adjusts its plants to produce

output at the minimum point of their long-run Average Cost (AC) curve. This curve is tangential to the market price defined demand curve. In the long run, a firm just earns normal profits. If a firm earns supernormal profits in the short run, then the industry will attract new firms into it. Eventually, this leads to a fall in prices of the goods and an increase in prices of the factors as the industry expands. These changes continue until the AC curve is tangential to the demand curve.

Therefore, in comparing both the cases, we find that when the firms are given the freedom of entry and exit, the equilibrium price remains the same. The price is lower than that of the short-run equilibrium price (P_s); whereas, the long-run equilibrium quantity (q_L) is more than that of the short-run equilibrium quantity (q_s).

Similarly, for the leftward demand shift, it can be found that the short-run equilibrium price (P_s) is lower than the long-run equilibrium price and the short-run equilibrium quantity (q_s) in less than the long-run equilibrium quantity (q_L).

OR

i. Perfect Knowledge means both buyers and sellers are fully informed about the market.

ii. The firms have all the knowledge about the product market and the input markets. Buyers also have perfect knowledge about the product market.

iii. Let us first take the product market. The implication of perfect knowledge about the product market is that any attempt by any firm to charge a price higher than the prevailing uniform price will fail. The buyers will not pay because they have perfect knowledge. A uniform price prevails in the market.

iv. Regarding the knowledge about the input markets the implicit assumption is that each firm has an equal access to the technology and the inputs used in the technology.

v. No firm has any cost advantage. Cost structure of each firm is the same.

vi. Since there is uniform price and uniform cost in case of all firms, and since profit equals revenues less cost, all the firms earn uniform profits.

26. **Table showing expenditure and quantity purchased against given price**

Quantity (Q) (units)	Price (P) (Rs)	Total Expenditure (TE) (Rs) (P×Q)
10	10	100
20	10	200

It can be seen that 10 units are purchased at Rs 10 each , therefore, total expenditure here will be = Rs 10 X 10 = Rs 100,

Rs 200 are spend when price is Rs 10, therefore number of units purchased is Rs 200/10= 20 units.

Calculation for price elasticity of demand by percentage method:

Percentage change in quantity demanded.

$= \frac{\Delta Q}{Q} \times 100$

$= \frac{10}{10} \times 100 = 100\%$

Percentage change in price = $\frac{\Delta P}{P} \times 100$

$= \frac{0}{10} \times 100 = 0\%$

Elasticity of demand, $E_d = (-) \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$

Elasticity of demand, $E_d = (-) \frac{100}{0} = \infty$ or $E_d = \infty$, therefore, Elasticity of demand is perfectly elastic.
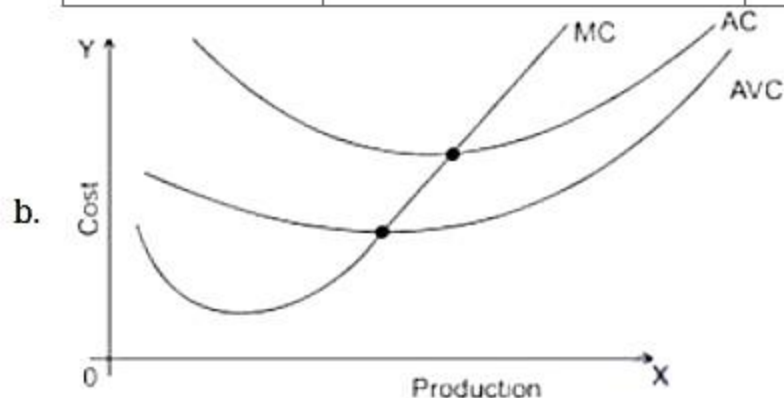
Therefore, demand curve is a straight line parallel to X-axis since demand is perfectly elastic.

27. Answer any two of the following questions:

a. Increasing return to a factor is the first phase of the Law of return to a factor. When more and more units of a variable factor is combined with fixed factor up to a certain level total physical product increases at an increasing rate. This is shown in the following table, as the units of labour increase from 1 to 2 total product increases from 10 to 24 this means that the marginal product of second unit of labour is 14. Similarly when another unit of labour is employed total product increases from 24 to
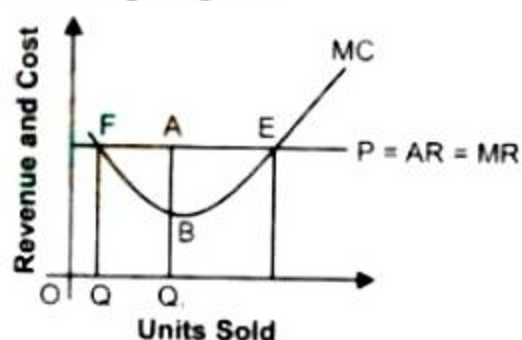
42, this means that the marginal product of third unit of labour is 18. This shows that total product increases at an increasing rate.

Machine	Unit of Labour	Total Physical Product
1	1	10
1	2	24
1	3	42

b.

Relation of AC, AVC, and MC
  i. MC interacts with AC and AVC at their minimum level.
 ii. AC and AVC decrease before the intersection by MC but remain greater than MC.
iii. AC and AVC start to increase after the intersection by MC and become less than MC.
 iv. As output increases, AC and AVC tend to be closer but the difference between AC and AVC can never be zero.
  v. AC, AVC and MC are U shaped, in accordance with the law of variable proportions.
c. No, as sufficient condition of producer equilibrium is Marginal Cost must be rising when Marginal Cost = Marginal revenue. It can be explained with the help of the following diagram:

Point F is not a producer equilibrium because at this point, marginal cost = marginal

revenue when marginal cost is falling. When MC is falling, the cost of producing an additional unit tends to fall. Other things remaining constant, it would lead to a rise in total profits. The producer will continue to produce as long as MR becomes equal to MC as the firm will find it profitable to raise the output level.

d. As all the three firms are identical, so they have the same individual supply curve and market supply will be the summation of supplies of all three firms.

Price	SS_1 (units)	SS_2 (units)	SS_3 (units)	Market Supply = SS_1 + SS_2 + SS_3
0	0	0	0	0
1	0	0	0	0
2	2	2	2	6
3	4	4	4	12
4	6	6	6	18
5	8	8	8	24
6	10	10	10	30
7	12	12	12	36
8	14	14	14	42

28. Answer the following questions:

a. Price elasticity of supply (e_s) is defined as the degree of the responsiveness of quantity supplied, to the change in the price of a good. According to basic economic theory, the supply of a good will increase when its price rises.

It is expressed as:

$$e_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

$$= \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100}$$

$$= \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

$$= \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where,

$\triangle Q$ = change in quantity supplied

$\triangle P$ = change in price

P = initial price

Q = initial supply

b. Marginal cost is the rate of total cost . It is the rate at which total cost increase or decrease . Relationship between Total Cost (TC) and Marginal Cost (MC) is given as under :

   i. When Marginal Cost is diminishing, Total cost increases at a diminishing rate.

   ii. When Marginal Cost is rising, Total Cost increases at an increasing rate.

   iii. When Marginal Cost is constant, Total cost increases at a constant rate.

c. Total revenue is the total receipts a seller can obtain from selling goods or services to buyers. It can be written as $P \times Q$, which is the price of the goods multiplied by the quantity of the sold goods.

Total Revenue = Price $\times$ Quantity of output sold

$TR = P \times Q$

$TR = PQ$

In a perfectly competitive market, the market price is given, i.e., a firm acts as a price taker and cannot influence the price. Hence, a particular firm can influence its TR by altering the quantity of output sold.