CBSE Class 11 Economics
Sample Paper 05 (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. Which of the following is not a measure of dispersion?

    a. Standard deviation

    b. Median

    c. Mean deviation

    d. Variance

OR

Square of standard deviation is called

    a. Square Deviation

    b. Mean Square Deviation

    c. Root-Mean Square Deviation

    d. Variance

2. Fill in the blanks:

Activities which are undertaken to earn money are called _____.

3. Statistical calculations in classified data are based on:

    a. The class mid-points

    b. The lower class limits

    c. The actual value of observation

    d. The upper class limits

4. _____ serves as an economic barometer

    a. Skewness

    b. Kurtosis

    c. None

    d. Index numbers

5. Index numbers helps in _____

    a. All of these

    b. deflating values

    c. policy formation

    d. studying the trends

6. Study of price and demand eliminating supply side

    a. Total correlation

    b. Both

    c. None

    d. Partial correlation

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

Sampling can be explained as a specific principle used to select members of population to be included in the study. It has been rightly noted that "because many populations of interest are too large to work with directly, techniques of statistical sampling have been devised to obtain samples taken from larger populations." In other words, due to the large size of target population, researchers have no choice but to study the number of

cases of elements within the population to represent the population and to reach conclusions about the population. Sample method is that method in which data is collected about the sample on a group of items taken from the population for examination and conclusions are drawn on their basis.

i. Under _____ sampling, each and every item of the universe has equal chance of being selected. (Random/Purposive)

ii. _____ errors are related to the collection of data. (Sampling/ Non- Sampling)

iii. If more than one sample are selected from universe, these samples should be _____. (Heterogeneous/ Homogeneous)

iv. _____ method is used when the area of investigation is relatively small. (Census/ Sample)

8. Explain the steps involved in construction of a discrete series.

9. Suppose mean of a series of 5 items is 60. Four values are 10,25,30, and 35 respectively. Find the missing 5th value of the series.

OR

Calculate arithmetic mean from the following data using step deviation method.

Size	20-29	30-39	40-49	50-59	60-69
Frequency	10	8	6	4	2

10. Calculate standard deviation and its coefficient from the following data.

Income per Day		10	20	30	40	50	60
Number of Workers		10	20	25	20	15	10

11. Construct a pie diagram to represent the cost of construction of a house in Delhi.

Items	Expenditure (in %)
Labour	25
Bricks	15
Cement	20
Steel	15
Timber	10

Supervision	15

OR

In a trip, organised by a college, there were 80 people, each of whom paid Rs. 15.50 on an average. There were 60 students, each of whom paid Rs. 16. Members of teaching staff were charged at a higher rate, the number of servants (all males) were 6 and they were not charged anything. The number of females were 20% of the total and there was only one female staff member. Tabulate this information.

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. Determine the missing frequencies when mode = 36 and total frequency is 30.

Class Interval	10-20	20-30	30-40	40-50	50-60
Frequency (f)	-	5	12	-	2

OR

Write merits and demerits of mean and median.

14. Compute Karl Pearson's coefficient of correlation from the following data by direct method.

X	10	12	11	13	12	14	9	12	14	13
Y	7	9	12	9	13	8	10	12	7	13

PART - B (MICRO ECONOMICS)

15. Which of the following will lead to shift PPF leftward?
    a. Unemployment
    b. Growth of resources
    c. Improvement in technology
    d. Degradation in technology

16. The market for a good is in equilibrium. There is an increase in demand for this good.

The steps to this chain of Effects are given below-

i. Equilibrium quantity and equilibrium price rise.
ii. A rise in price.
iii. Competition among buyers.
iv. Demand started to falling and supply starts Rising.
v. Shift demand curve rightward leading excess demand.

The correct sequence of the above said steps is-

a. ii, v, iv, i, iii
b. v, iii, ii, iv, i
c. ii, iii, i, v, iv
d. i, ii, iii, iv, v

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. The product of AR and price at every unit sold is the firm's

a. TVC

b. AR

c. TR

d. MR

20. What is the shape of the average revenue curve under perfect competition?

a. Downward to the right

b. Horizontal straight line

c. Rectangular hyperbola

d. Vertical straight line

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

If our income rises, we generally tend to buy more of the goods. More income would mean more pens, more shirts, more shoes, more cars and so on. But there are exceptions. If initially, you are buying coarse grain, how would you take your increase in income now? Perhaps, as a first step, you would discard the consumption of inferiors. Surely, this happens in the deserts of Rajasthan where the rich minority eats wheat while the poor majority eats Bajra as their staple food.

i. The law of demand does not apply to _____ goods.(Normal/ Giffen)

ii. Inferior goods are those whose income effect is _____. (Negative/ Positive)

iii. A fall in income of the consumer (in case of normal goods) will cause

a. upward movement on the demand curve.

   b. downward movement on the demand curve

   c. rightward shift of the demand curve

   d. leftward shift of the demand curve

iv. As a result of rise in consumer's income, the demand curve for coarse-grain (inferior good)

   a. becomes a horizontal straight line

   b. becomes a vertical straight line

   c. shifts to the right

   d. shifts to the left

22. If more & more resources are constantly explored and new techniques of production are constantly discovered, don't you think a day will come when our central problems will be solved once for all?

OR

Define opportunity cost with the help of an example, how does it differ from marginal opportunity cost?

23. Distinguish between total utility and marginal utility.

24. Market for a good is in equilibrium. There is simultaneous 'decrease' both in demand and supply of the good. Explain its effect on market price.

25. 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:

$q^s_f = 8 + 3p$ for $p \geq 20$

$= 0$ for $0 \leq p < 20$

 a. What is the significance of p = 20?

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

 c. Calculate the equilibrium quantity and number of firms.

OR

How are equilibrium price and quantity affected when income of the consumers

a. increase?

b. decrease?

26. Draw diagrams showing elasticity of demand equal to:

    i. zero

    ii. one and

    iii. infinity.

27. Answer any two of the following questions:

    a. Let the production function of a firm be $Q = 2 L^2 K^2$

       Find out the maximum possible output that the firm can produce with 5 units of L and 2 units of K. What is the maximum possible output that the firm can produce with zero unit of L and 10 units of K?

    b. Explain the likely behaviour of total product. When only the unit of a variable factor is increased and keeping all other factor fixed. Use numerical example.

    c. Show the break-even point with the help of a diagram.

    d. Define Market Supply. How it is obtained?

28. Answer the following questions:

    a. Explain how input prices are a determinant of supply of a good by a firm.

    b. Why should TVC increases at an increasing rate in the initial stages of production?

    c. Why is Average Revenue always equal to price?

Solution

PART - A (STATISTICS)

1. (b) Median

   Explanation: Median is not a measure of dispersion. It is a measure of central tendency.

   OR

   (d) Variance

   Explanation: The Standard Deviation is a measure of how spread out numbers are. Its symbol is **σ** (the greek letter sigma). The formula is easy: it is the **square root** of the **Variance. So the square of σ is variance.**

2. 1. Economic activities

3. (a) The class mid-points

   Explanation: Statisticians maintain that most values of a variable concentrate on respective mid values of classes.

4. (d) Index numbers

   Explanation: Index numbers are today one of the most widely used statistical devices. They, are used to feel the pulse of the economy and they have come to be used as indicators of inflationary or deflationary tendencies.

5. (a) All of these

   Explanation: Index numbers possess much practical importance in measuring changes in the cost of living, production trends, trade, policy formation, income variations, etc.

6. (d) Partial correlation

   Explanation: Partial correlation measures the degree of association between two random variables while controlling or eliminating the effect of one or more other variables.

7. i. Random

   ii. Non- Sampling

   iii. Homogeneous

   iv. Census

8. Following steps are involved in construction of a discrete frequency distribution:
    - **Arrange the series in ascending or descending order:** First of all, arrange the raw data in ascending or descending order.
    - **Place different values of variable:** Place all values of the variable in the first column of the series beginning with the lowest till last value of variable.
    - **Determine Frequency of each value:** To determine frequency of a class, count, how many times a value is repeating itself. For counting, also make a column of tally bars before frequency. A vertical line is put for each repetition and after for five four lines are intersected like this-
    - **Place Frequencies:** Count the bars. Write it in front of each class in frequency column.
    - **Check Mathematical Accuracy:** Total the frequency column to verify if sum total of frequencies is equal to number of total observations.

9. Let the missing value be X_5

    Given, $X_1=10$, $X_2=25$, $X_3=30$, $X_4=35$, $X_5=?$

    There are 5 items in the series. So, no. of observations, i.e. n = 5

    applying the formula of mean, we have

    $$\overline{X} = \frac{X_1+X_2+X_3+X_4+X_5}{n}$$
    $$\Rightarrow \quad 60 = \frac{10+25+30+35+X_5}{5}$$
    $$\text{or} \quad 60 = \frac{100+X_5}{5}$$
    $$\Rightarrow 60 \times 5 = 100 + X_5$$
    $$\Rightarrow 300 = 100 + X_5$$
    $$\Rightarrow X_5 = 300-100 = 200$$

    Thus, the value of the 5th item = 200

    OR

    For the calculation of Arithmetic Mean, let Assumed mean (A) =34.5

    Calculation of Arithmetic Mean

Class Interval	Frequency (f)	Mid-Value (m)	d=m-A A=34.5	d'm=dm/c c=10	fd'm	

		m=(L1+L2)/2				
20-29	10	24.5	-10	-1	-10	-10
30-39	8	34.5	0	0	0	
40-49	6	44.5	+10	+1	+6	
50-59	4	54.5	+20	+2	+8	+20
60-69	2	64.5	+30	+3	+6	
	$\Sigma f = 30$				$\Sigma fd'm = +10$	

Here

$A = 34.5$, $\Sigma f = 30$, $\Sigma fd'm = +10$, c = 10

Now, $\overline{X} = A + \dfrac{\Sigma fd'm}{\Sigma f} \times c$

$\Rightarrow \quad \overline{X} = 34.5 + \dfrac{10}{30} \times 10$

$\Rightarrow \quad = 34.5 + \dfrac{100}{30} = 34.5 + 3.33$

$\Rightarrow \quad \overline{X} = 37.83$

Therefore, arithmetic mean of the given data is 37.83

10. **Calculation of Standard Deviation and its Coefficient :** The given series is a discrete series. We have been given the frequency f for each level of income X. The arithmetic mean has to be taken out and then the deviation from the arithmetic mean is to be calculated, which is represented by d. The deviations found out has to be squared, i.e. we find d^2 and multiply f with d^2 for each income level. The calculations are depicted in the table given below:

Income per Day(X)	Frequency(f)	fX	d(X - $\overline{X}$), $\overline{X}$ = 34	d^2	fd^2
10	10	100	-24	576	5760
20	20	400	-14	196	3920
30	25	750	-4	16	400
40	20	800	6	36	720
50	15	750	16	256	3840
60	10	600	26	676	6760
Σf =n = 100		ΣfX = 3400			Σfd^2 = 21,400

Here, sum of frequencies, $\Sigma f = 100$

$\therefore$ Mean $(\overline{X}) = \dfrac{\Sigma fX}{\Sigma f} = \dfrac{3,400}{100} = 34$

Standard deviation $(\sigma) = \sqrt{\dfrac{\Sigma fd^2}{\Sigma f}} = \sqrt{\dfrac{21,400}{100}} = \sqrt{214} = 14.63$

Coefficient of Standard Deviation $= \dfrac{\sigma}{\overline{X}} = \dfrac{14.63}{34} = 0.43$

11. For constructing a pie diagram, it is necessary to convert the percentage into corresponding degrees in the circle. Since one circle contains 360 degrees, therefore we multiply the expenditure percentage by 3.6. i.e. $\dfrac{360}{100}$ which is equal to 3.6. This conversion is shown in the following table :

Items	Expenditure (in %)	Expenditure in Degree
Labour	25	$\dfrac{25}{100} \times 360° = 90°$
Bricks	15	$\dfrac{15}{100} \times 360° = 54°$
Cement	20	$\dfrac{20}{100} \times 360° = 72°$
Steel	15	$\dfrac{15}{100} \times 360° = 54°$
Timber	10	$\dfrac{10}{100} \times 360° = 36°$
Supervision	15	$\dfrac{15}{100} \times 360° = 54°$
	100	$360°$

A pie diagram to show cost of construction of a house in Delhi is given below
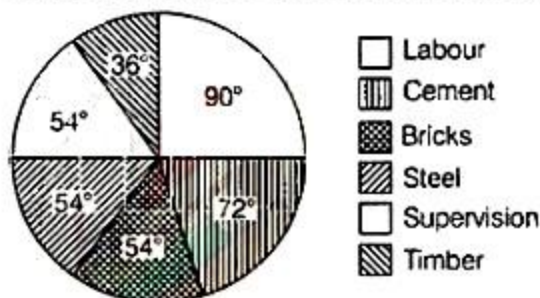
OR

From the information given in the question, we have

Total participants = 80

Number of students = 60

Number of servants = 6

∴ Number of teaching staff = 80 - (60 + 6) = 14

It is given that the number of female teaching staff = 1

∴ Number of male teaching staff = 14 - 1 = 13

It is also given that the number of females is 20% of the total.

Therefore, total number of females = 80 × 20% = $\frac{80 \times 20}{100}$ = 16.

Number of female students = 16 - 1 = 15 (since no. of female teaching staff is 1, we deduct that from the total no. of females to get the no. of female students).

Total contribution = 80 × 15.50 = Rs. 1240

Contribution from students = 60 × 16 = Rs. 960

Contribution from teaching staff = 1240 - 960 = Rs. 280

∴ Contribution per head from teaching staff = $\frac{280}{14}$ = Rs. 20

Now, this information can be tabulated as below

Participants	Sex		Total	Contribution Per Head	Total contribution
	Males	Females			
Students	45	15	60	16	960
Teaching Staff	13	1	14	20	280
Servants	6	-	6	-	-
Total	**64**	**16**	**80**	**15.50**	**1240**

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. Let the missing frequencies be x and y.

Class Interval	Frequency (f)
10-20	x
20-30	5
30-40	12
40-50	y
50-60	2
	n=30

Calculation of Missing Frequencies

Mode = 36 (given)	Sum of frequencies=$n = \Sigma f = 30$ (given)
As the value of mode is 36, so the modal class is 30-40. $\therefore$ Mode, $M_0 = l_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times c$ $\Rightarrow 36 = 30 + \frac{12-5}{24-5-y} \times 10$	x + 5 + 12 + y + 2 = 30 $\therefore \Rightarrow$ x + 5 + 12 + 7 + 2 = 30 [$\because$ y=7]

$\Rightarrow 6 = \dfrac{7}{19-y} \times 10$ $\Rightarrow 6(19-y) = 70 \Rightarrow 114-6y = 70$ $\Rightarrow 6y = 44 \Rightarrow y = \dfrac{44}{6} = 7.33 = 7$ [as the frequencies cannot be in fractions]	$\because x = 4$

Thus, the two missing frequencies are 4 and 7.

OR

MERITS

Sr no.	Mean	Median
1.	No need of arrangement of data	Definite value
2.	Easy to calculate	Expressed/determined graphically.
3.	Based on all values of series.	Easy to calculate

DEMERITS

Sr. No.	Mean	Median
1.	Can't be located graphically	Arrangement of data is required
2.	Calculation not possible if single item missing	Not suitable for algebric treatment
3.	Not used in case of qualitative measurement	Affected by fluctuations of items.

14. For calculation purpose: Let, Square of Deviation corresponding to X be (x^2) and Square of Deviation corresponding to Y be(y^2)

X	$x(X - \overline{X})$, $\overline{X} = 12$	x^2	Y	$y(Y - \overline{Y})$, $\overline{Y} = 10$	y^2	xy
10	-2	4	7	-3	9	6
12	0	0	9	-1	1	0

11	-1	1	12	2	4	-2
13	1	1	9	-1	1	-1
12	0	0	13	3	9	0
14	2	4	8	-2	4	-4
9	-3	9	10	0	0	0
12	0	0	12	2	4	0
14	2	4	7	-3	9	-6
13	1	1	13	3	9	3
ΣX = 120	Σx = 0	Σx^2 = 24	ΣY = 100	Σy = 0	Σy^2 = 50	Σxy = -4

Here, n = 10

Mean of X series = $(\overline{X}) = \frac{\Sigma X}{n} = \frac{120}{10} = 12$; Mean of Y - series $(\overline{Y}) = \frac{\Sigma Y}{n} = \frac{100}{10} = 10$

Standard deviation of X series$(\sigma_x) = \sqrt{\frac{\Sigma x^2}{n}} = \sqrt{\frac{24}{10}} = \sqrt{2.4} = 1.55$

Standard deviation of Y series = $\sqrt{\frac{\Sigma y^2}{n}} = \sqrt{\frac{50}{10}} = \sqrt{5} = 2.24$

$\because r = \frac{\Sigma xy}{n \cdot \sigma_x \cdot \sigma_y} \therefore r = \frac{-4}{10 \times 1.55 \times 2.24} = \frac{-4}{34.72} = -0.115$

- *Therefore, Karl Pearson's coefficient of correlation between X and Y is -0.115*
- *Interpretation:* There is a low degree of negative correlation between X and Y.

PART - B (MICRO ECONOMICS)

15. (d) Degradation in technology

    Explanation: Degradation in technology reduces production in the country. Due to which PPF shifts to the left.

16. (b) v, iii, ii, iv, i

    Explanation: Excess demand creates competition among buyers. Due to which Price increases. When price rises, there will be an extension in supply and contraction of demand, which leads to rising in equilibrium price and quantity.

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.

(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) TR

    Explanation:

    We know that $AR = \frac{TR}{output}$. From this we can derive $TR = \frac{AR}{output}$

20. (b) Horizontal straight line

    Explanation: AR curve is Horizontal straight line. It is because, under perfect competition, the firm is a price taker and cannot influence the market price. AR is constant for a firm.

21. i. Giffen

    ii. Negative

    iii. Leftward shift of the demand curve

    iv. Shifts to the left

22. When more & more resources are explored and new technology is discovered, PPC would expand, indicating a larger & larger flow of goods and services in the economy. But the scarcity of resources in relation to human wants will always exist. Because human wants are unlimited while the resources are limited and these limited resources have alternative uses. Accordingly, central problems can never be solved once for all.

OR

In microeconomic theory, the opportunity cost also known as the alternative cost is the value of the choice in terms of the best alternative while making a decision. Opportunity cost is a key concept in economics, and has been described as expressing "the basic relationship between scarcity and choice."

The term marginal cost refers to the opportunity cost associated with producing one more additional unit of a good. Opportunity cost is a critical concept to economics. It refers to the value of the highest value alternative opportunity.

23. i. **Total utility** is the sum total of utility derived from the consumption of all the units of a commodity. To illustrate, if 2 units of a commodity are consumed and 1st unit yields satisfaction of 10 utils, while the 2nd unit yields satisfaction of 9 utils, then total utility is 19 utils. Utils is the unit of utility.

ii. **Marginal utility** refers to additional utility obtained from the consumption of an additional unit of a commodity. To illustrate, if the 10th unit yields satisfaction of 100 utils, while 11th unit yields satisfaction of 105 utils, the then marginal utility derived from the 11th unit is 5 utils.

$MU = TU_{11} - TU_{10}$

24. A situation in which the supply of an item is exactly equal to its demand, it is known as market equilibrium. Since there is neither surplus nor shortage at equilibrium position in the market, price tends to remain stable. Now suppose there is a simultaneous 'decrease' both in demand and supply of the good, it will have effects on equilibrium price and equilibrium quantity. These effects are given below:

1. If the relative (percentage) decrease in demand is greater than the decrease in supply, equilibrium price will fall. The price will fall because of excess supply in the market.

2. If the relative (percentage) decrease in demand is less than the decrease in supply price will rise. The equilibrium price will rise because of eccess demand in the market.

3. If the relative (percentage) decrease in demand is equal to the decrease in supply price will remain unchanged.
   The price will remain unchanged because there is neither excess demand nor excess supply in the market.

25. $q^s_f = 8 + 3p$ for $p \geq$ Rs 20

$= 0$ for $0 \leq p <$ Rs 20.

$q_d = 700 - p$

a. For the price between 0 to 20, no firm is going to produce anything as the price in this range is below the minimum of LAC. So, at the price of Rs 20, the price line is equal to the minimum of LAC.

b. As there exists the freedom of entry and exit of firms, the minimum of AVC is at Rs 20,

also, the price of Rs 20 is the equilibrium price. Each individual firm is able to operate at the point where the minimum of long-run average cost curve (LAC) is tangent to the price line. Thus, freedom of entry and exit of firms under perfect competition implies that all firms earn only normal profits in the long run which implies that the price of Rs 20 is the equilibrium price and at any price lower than Rs 20, the firm will move out of the market.

c. At equilibrium price of Rs 20

Quantity supplied = $q_s = 8 + 3p$

= 8 + 3 (20) (putting value of p in the equation)

q_s = 68 units

Quantity demanded $q_d = 700 - p$

= 700 – 20

$q_d = 680$

Number of firms (n) = $\frac{q_d}{q_f}$

$n = \frac{680}{68}$

n = 10 firms

Therefore, the number of firms in the market is 10 and the equilibrium quantity in 680 units.

OR

a. Increase in income of consumers
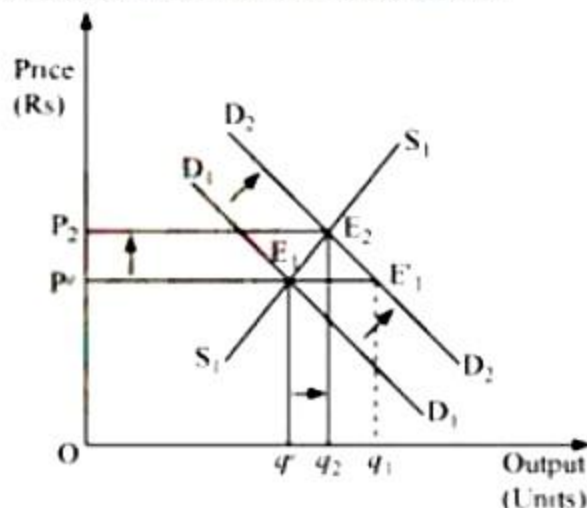
If the number of firms is assumed to be fixed, then the increase in consumers' income will lead to an increase in demand of consumers which results in the equilibrium

price to rise.

Let us understand how it happens:

D_1D_1 and S_1S_1 represent the market demand and market supply respectively. The initial equilibrium occurs at E_1, where the demand and the supply intersect each other. Due to the increase in consumers' income, the demand curve will shift rightward parallelly because of an increase in the demand of the consumers while the supply curve will remain unchanged. Hence, there will be a situation of excess demand, equivalent to (q^e - q^1). Consequently, the price will rise due to excess demand. Due to the rise in price, extension in supply shows upward movement from E_1 to E_2. The price will continue to rise until it reaches E_2 (new equilibrium), where D_2D_2 intersects the supply curve S_1S_1. The equilibrium price increases from P^e to P^2 and the equilibrium output increases from q^e to q^2 and the equilibrium point shifts from E_1 to E_2.

b. Decrease in the income of consumers
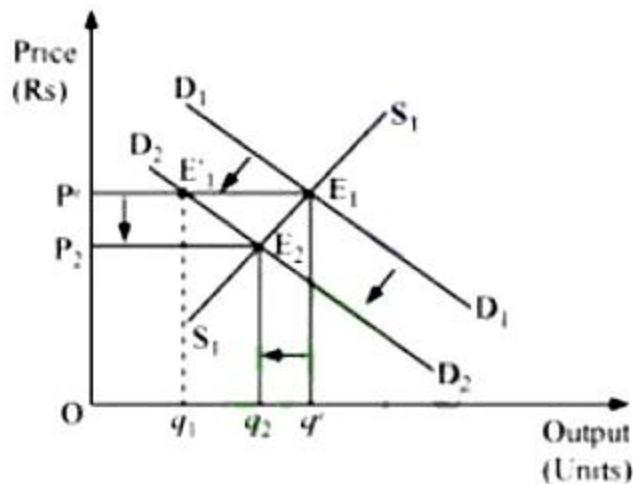
The decrease in consumers' income is depicted by the leftward parallel shift of demand curve from D_1D_1 to D_2D_2 because of the decrease in the demand of consumers. Consequently, at the price P^e, there will be an execs supply (q^e - q^1), resulting in the price to fall. At the new equilibrium (E_2), where D_2D_2 intersect the supply curve, the equilibrium price falls from P^e to P_2 and the equilibrium quantity falls from q^e to q_2 and the equilibrium points shifts from E_1 to E_2.
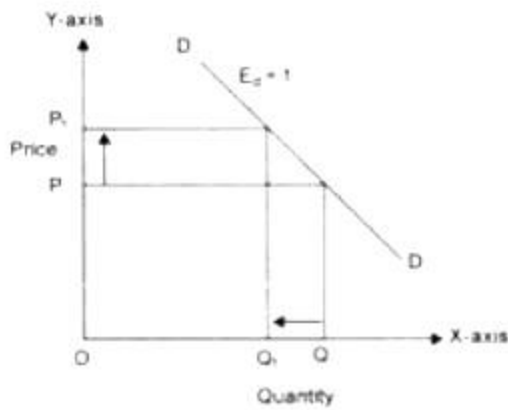
26.
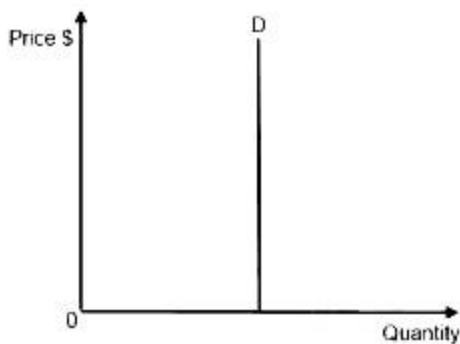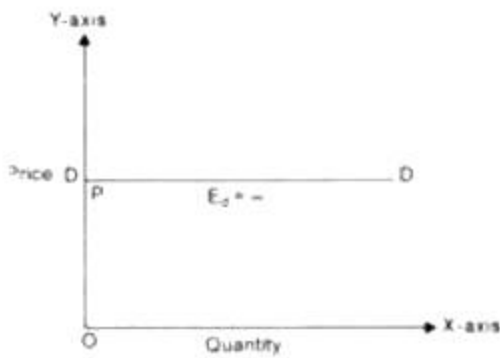
This figure represent $E_d = 0$

27. Answer any two of the following questions:

a. $Q = 2L^2K^2$

L = 5 Units of labour

K = 2 units of capital

$Q_x = (X_1 . X_2)$

After putting given values

$Q = 2(5)^2(2)^2$

= 200 units

Maximum possible output with 0 unit of Labour and 10 units of capital

Again putting new values in the equation

$Q = 2(0)^2(10)^2$

= 0 units

b. We know from the Law of Variable Proportion that when units of a variable factor are increased, keeping fixed factors constant in the short-run, total product first increases to a point and after that it declines with increase in the variable factor. It states that as more and more units of the variable factors are used (along with the fixed factor), a stage must come when Total Product of the variable factor starts declining, and eventually starts falling.

Three phases of production

Land (Acre)	Number of Labourers	Total Physical Product (TPP Quintal)	Average Physical Product (APP Quintal)	Marginal Physical Product (MPP Quintal)	Remarks / Phases
1	0	0	0	-	Phase I (Increasing returns to factors)
1	1	2	2	2	
1	2	6	3	4	
1	3	12	4	6	
1	4	16	4	4	Phase II (Decreasing returns to factors)
1	5	18	3.6	2	
1	6	18	3	0	
1	7	14	2	(-)4	Phase III (Negative returns to factors)
1	8	8	1	(-)6	

$AP = TP/Q, MP_{nth} = TP_n - TP_{n-1}, TP = AP \times Q$

As per the above schedule, in phase I, Total Product tends to rise at an increasing rate. This corresponds to the situation of increasing returns to a factor. In phase II, Total Product tends to rise at a diminishing rafe this corresponds to a situation of

diminishing returns to a factor. In Phase III, Total Product starts declining,-this is actuation of negative returns to a factor.

c.
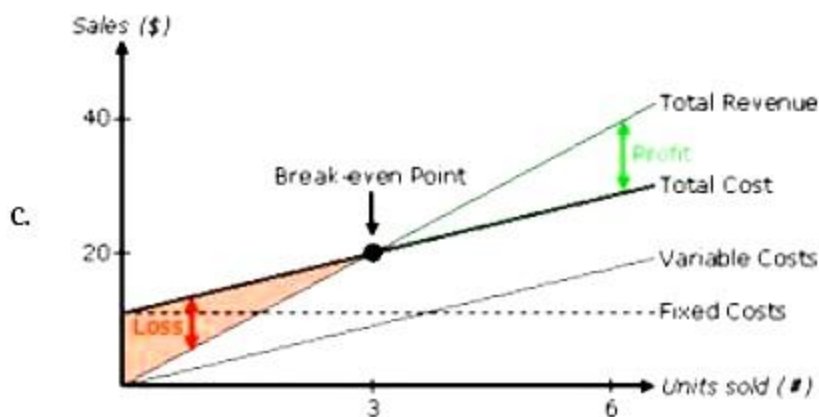
A break-even point for a firm occurs, when it is able to cover its all costs of production. At this point, the firm earns only normal profits. In other words, it's a financial calculation for determining the number of products or services a company should sell to cover its costs (particularly fixed costs).

d. Market Supply refers to quantity of a commodity that all the firms are willing and able to offer for sale at a given price during a given period of time. It is obtained by adding all the individual supplies at each and every level of price. Market supply schedule is expressed as

$$S_m = S_a + S_b + \ldots\ldots\ldots$$

Where S_m is the market supply and $S_a + S_b + \ldots\ldots$ are the individual supply of supplier a, b and so on.

28. Answer the following questions:

a. In case of an increase in input price, Cost tends to rise. This will reduce the profits of the producers. Accordingly, producers will supply less of the good at its constant price. This implies a backward shift in supply curve. From SS to S_1S_1, or decrease in supply.

However, if input prices fall, Cost will also fall. This will increase the profits of the producers. Accordingly, producers will supply more of the good at the constant price. Then supply curve of that good shifts to rightward. From SS to S_2S_2.
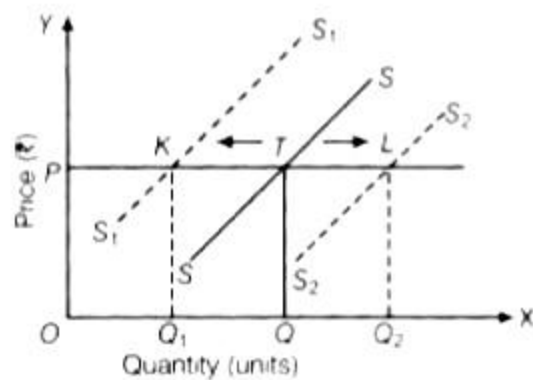
Shift in Supply Curve

b. The overall expense associated with producing a good or providing a service that change in direct proportion to the quantity produced or provided. The total variable cost of producing an item will typically include the cost of labor and raw materials used in the process.

In the initial stages of production, a firm may be enjoying increasing returns to a factor. It is a situation when MP (of the variable factor) tends to rise. Cost is just the opposite of productivity. Rising MP means falling cost. When the cost of producing an additional unit is falling TVC should be increasing only at the decreasing rate.

c. Average Revenue is the per unit revenue i.e price received from the sale of one unit of a commodity.

With the help of following equation we can prove that Average Revenue is equal to Price (P)

As we know, $AR = \dfrac{\text{Total Revenue (TR)}}{\text{Quantity (Q)}}$ .... (i)

Also, Total Revenue=Price × Quantity .... (ii)

Thus, $AR = \dfrac{P \times Q}{Q}$ [from Equation (i) & (ii)]

Hence, it is proved Average Revenue is equal to Price.