CBSE
Class XI Economics

Time: 3 hrs **Max. Marks: 80**

General Instructions:

i. **All** questions are **compulsory**.
ii. Marks for questions are indicated against each question.
iii. Question Nos. **1–4** and **13–14** are very short answer questions carrying **1** mark each. They are required to be answered in one sentence.
iv. Question Nos. **5–6** and **15–18** are short answer questions carrying **3** marks each. Answers to them should normally not exceed **60** words each.
v. Question Nos. **7–9** and **19-20** are also short answer questions carrying **4** marks each. Answers to them should normally not exceed **70** words each.
vi. Question Nos. **10–12** and **21–23** are long answer questions carrying **6** marks each. Answers to them should normally not exceed **100** words each.
vii. Answers should be brief and to the point, and the above word limits should be adhered to as far as possible.

SECTION A: Introductory Microeconomics

1. How does AFC change as output increases? [1]

2. At the point where MR is zero, TR is [1]

3. A firm is a price taker in [1]
a. Perfect competition
b. Monopolistic competition
c. Oligopoly
d. Monopoly

4. Why does Average Product continue to rise even when Marginal product starts falling? [1]

5. A consumer is in equilibrium in consuming two Goods X and Y. With the help of utility analysis, show that if the price of Good X falls, then its demand would rise. [3]

6. The market for a good is in equilibrium. What would be the impact on the market price if there is a simultaneous increase in both demand and supply of the good? (the increase in demand being more than increase in supply) [3]

7. Explain with the help of an example the effect of change in the price of substitute good to change in the demand of the commodity. [4]

8. Complete the following table: [4]

Output	***Average Cost***	***Marginal Cost***
1	5	-
2	3	-
3	-	9
4	7	-
5	-	17

9. Explain the central problem of 'what to produce'. How is this problem solved under market economy? [4]

10. Explain consumer equilibrium using indifference curve analysis. [6]

11. With the help of a numerical example, illustrate producer's equilibrium. [6]

12. Explain the following features under perfect competition market: [6]

a. Large number of buyers and sellers
b. Free entry and exit of firms in the market

SECTION B: Statistics for Economics

13. Which of the following statements represents Statistics in the plural sense? [1]

a. Statistics involves presentation of data
b. Statistics refers to aggregate of facts
c. Statistics involves collection and organisation of data
d. Statistics includes interpretation of data

14. Which of the following is obtained by dividing the total of set of observations by their number? [1]

a. Simple average
b. Weighted average
c. Both a and b
d. None of the above

15. Give the differences between discrete and continuous variables. [3]

16. What is meant by ogive or cumulative frequency curve? From the following distribution, construct the 'less than' ogive: [3]

Capital (in lakh)	0–20	20–40	40–60	60–80	80–100	100–120	120–140
Number of Companies	4	5	7	13	17	7	21

17. Calculate range and coefficient of range from the following data: [3]

8, 16, 24, 30, 49, 45, 66, 54

18. During a particular period, the cost of living index increases from 120 to 210 and the daily wages of a worker in a factory was also increased from Rs 70 to Rs 115. Has the worker actually gained, if yes, by how much in real terms? [3]

19. The mean wage of 100 workers is Rs 324. The mean wage of 60 workers is Rs 340. Find the mean wage of the remaining 40 workers. [4]

20. The best paper was wrongly scored 75 instead of 85. What will be the new mean if the average score of 24 students in a class is 58 marks? [4]

21. Find the average age of workers in a factory from the following data by using the step deviation method: [6]

Age (in years)	Less than 10	10–20	20–30	30–40	More than 40
No. of workers	6	10	12	14	8

22. Calculate the coefficient of correlation by Karl Pearson's method from the following data: [6]

X	6	2	10	4	8	12
Y	9	11	-	8	7	5

Arithmetic mean of the X and Y series is 7 and 9, respectively.

23. a. 'Samples provide appropriate outcome than surveys'. Why? [3]

b. Differentiate between univariate and bivariate frequency distribution. [3]

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Class XI Economics
Solution

SECTION A: Introductory Microeconomics

Answer 1

With an increase in output, AFC falls.

$AFC = \frac{TFC}{Q}$.

Answer 2

The correct answer is (a). At the point where MR is zero, TR is maximum. After this point, TR starts falling and MR becomes negative.

Answer 3

The correct answer is (a). A firm is a price taker under perfect competition market. As there are a large number of firms in perfect competition, no individual firm can influence the price. It takes the price as set by the industry.

Answer 4

Average Product will continue to rise when Marginal Product starts falling till Marginal Product is greater than Average Product.

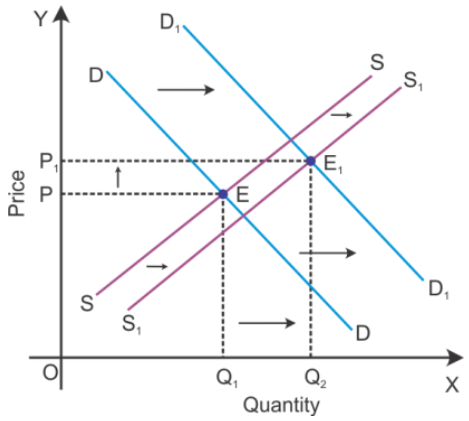
Answer 5

According to utility analysis, a consumer is in equilibrium when

$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$

When price of Good X falls, the ratio $\frac{MU_x}{P_x}$ increases so that $\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$. To restore the equilibrium, the consumer would increase the consumption of Good X. With an increase in consumption, the marginal utility of Good X will increase. The consumer will continue to increase the consumption of Good X till $\frac{MU_x}{P_x}$ again becomes equal to $\frac{MU_y}{P_y}$.

Answer 6

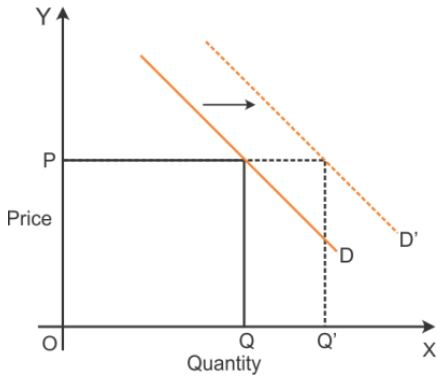


In the diagram, DD is the initial demand curve and SS is the initial supply curve. Point E is the initial equilibrium point where DD intersects SS. Correspondingly, OQ is the equilibrium quantity and OP is the equilibrium price. With the increase in demand, the demand curve shifts parallelly outwards to D′D′. On the other hand, with the increase in supply, the supply curve shifts parallelly outwards to S′S′. However, the increase in demand is more than the increase in supply. The new equilibrium is established at Point E′ where D′D′ intersects S′S′. Here, both equilibrium price and equilibrium quantity have risen to OP_1 and OQ_1, respectively.

Answer 7

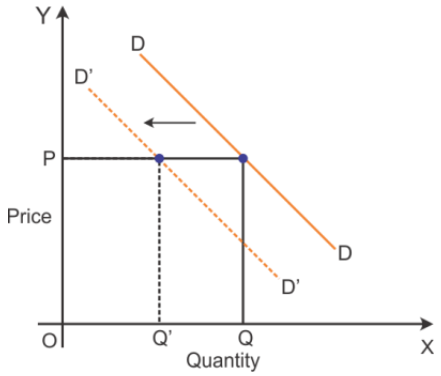
Substitute goods refer to goods which can be consumed instead of each other. For example, tea and coffee are substitute goods. In case of substitute goods, the demand for a good shares a positive relation with the price of the substitute good.

i. ***Increase in price of substitute good***: With an increase in the price of the substitute good, the demand of the concerned good increases. For example, with an increase in the price of coffee, the demand for tea increases.



According to the diagram, *DD* is the initial demand curve for tea. At price OP, OQ quantity of tea is demanded. With an increase in the price of coffee, the demand for tea increases. Accordingly, the demand curve for tea shifts parallelly rightwards to *D′D′*. Here, even at the existing price OP, the quantity demand of tea rises to OQ′.

ii. ***Fall in price of substitute good***: With a fall in the price of the substitute good, the demand of the concerned good falls. For example, with a fall in the price of coffee, the demand for tea increases.



According to the diagram, *DD* is the initial demand curve for tea. At price OP, OQ quantity of tea is demanded. With a fall in the price of coffee, the demand for tea falls. Accordingly, the demand curve for tea shifts parallelly leftwards to *D′D′*. Here, even at the existing price OP, the quantity demand of tea falls to *OQ′*.

Answer 8

Output	***Average Cost***	***Marginal Cost***	***Total Cost***
1	5	-	5
2	3	1	6
3	5	9	15
4	7	13	28
5	9	17	45

Answer 9

This problem relates to what goods and services are to be produced and in what quantities. In every economy, the resources are limited. Accordingly, a choice must be made between various goods and services. Specifically, a choice must be made between consumer goods and capital goods. As both goods are necessary, a choice must be made with respect to the quantity of the goods which are to be produced. Producing more of one good would imply producing less of the other. Producing more of consumer goods improves the quality of life of the present generation; on the other hand, producing more of capital goods would improve the production capacity for the future. A suitable choice must be made keeping in mind the various factors.

In a market economy, the answer to the question of what to produce is determined by the profit motive. Goods and services which have a greater demand and command a greater price in the market are produced.

Answer 10

According to the indifference curve analysis, the consumer's equilibrium is struck at the point where the following two conditions are met:

i. MRS is equal to price ratio, i.e. $MRS = \frac{P_x}{P_y}$

ii. Indifference curve is convex to the origin at the point of equilibrium

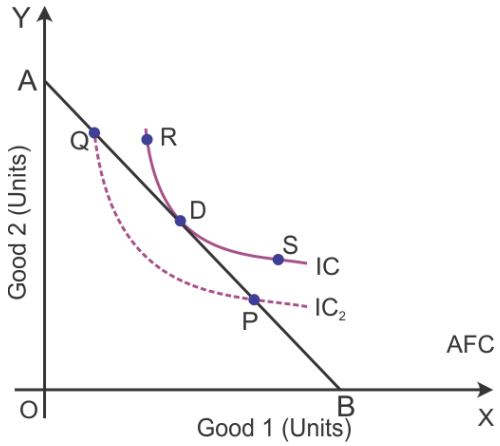
Condition 1

MRS is equal to price ratio: MRS is the slope of the indifference curve and the price ratio is the slope of the budget line. So, at the point of equilibrium, MRS equals price ratio which implies that the indifference curve is tangent to the budget line. At this point, the rate at which the consumer is willing to substitute one good for the other is equal to the actual rate of substitution as defined by the market price. At all other points on the budget line other than the tangency point, the consumer receives a lower satisfaction.

Condition 2

At the point of tangency of the budget line and the indifference curve, the indifference curve must be convex to the origin, i.e. the MRS must fall. In other words, for every additional unit increase in consumption of one good, the consumer must be willing to sacrifice less and less units of the other good. That is the law of diminishing marginal utility must be followed.

The two conditions of consumer equilibrium can be understood with the help of the following diagram:



In the diagram, AB is the budget line. It represents the various combinations of two goods which are available to the consumer given his income and the prices of the two goods. The slope of the budget line is the price ratio which shows how much units of one good must be sacrificed by the consumer to increase the consumption of the other good by one unit.

IC is the indifference curve. It shows the various combinations of two goods, the consumption of which provides consumers the same level of satisfaction. The slope of IC is the MRS which shows how many units of one good the consumer is willing to sacrifice to increase consumption of the other good by one unit.

Point E is the point of equilibrium where IC is tangent to the budge line AB.

At all other points on the budget line other than the tangency point, the consumer receives a lower satisfaction.

For instance at Point P and Point F, the consumer is on a lower IC, thereby at a lower satisfaction level.

Similarly, at all the other points on the IC, the consumer is not at equilibrium. For instance at Point R, $MRS > \frac{P_x}{P_y}$. So, the consumer can increase satisfaction by substituting more of Good X for Good Y. That is, he moves down along the IC till MRS equals price ratio again at Point E.

Similarly, at Point S, $MRS < \frac{P_x}{P_y}$. So, the consumer can increase satisfaction by substituting more of Good Y for Good X. That is, he moves up along the IC till MRS equals price ratio again at Point E.

Thus, Point E is the point of equilibrium. A rational consumer would not wish to move away from this point.

Answer 11

According to the MR–MC approach, a consumer strikes equilibrium at the point where the following two conditions are met

i. MR is equal to MC

ii. MC is rising

This can be understood with the help of the following example.

Output (units)	***Marginal Revenue (Rs)***	***Marginal Cost (Rs)***
1	5	10
2	5	5
3	5	3
4	5	5
5	5	9

The two conditions of equilibrium are met when 4 units of output are produced. At this point, MR and MC are equal to 5, and the producer maximises profits.

MR is equal to MC at 2 units of output as well. However, at this point, MC is falling. So, this is not the equilibrium point.

Answer 12

a. ***Large number of buyers and sellers***: Under a perfect competition market, there are a large number of buyers and sellers such that each individual buyer or each individual seller constitutes only a small proportion of the total market. Consequently, no individual firm or individual buyer can influence the price in the market by altering the supply or demand of the commodity. This implies that in a perfect competition market, the price remains constant as determined by the industry. An individual firm is only a price taker.

b. ***Free entry and exit***: Under perfect competition, there is free entry and exit of firms. While new firms can enter the market, existing firms can leave the market.

SECTION B: Statistics for Economics

Answer 13

The correct option is (b). Statistics in the plural sense represents a ***collection of numerical facts***. Single figures are not statistics because they cannot be compared for study purposes. Hence, Statistics involves an aggregate of facts which represents Statistics in the plural sense.

Answer 14

The correct answer is (a). Simple average is obtained by dividing the total set of observations by their number. This method is the most commonly used measure of central tendency.

Answer 15

Discrete Variable	Continuous Variable
A variable which can take only certain values.	A variable which can take any value in a particular limit.
It jumps from one value to another value, but it will not consider the intermediate value between two values. Thus, the value of the variables can increase in complete numbers.	Its value increases in fractions but not in jumps.
Example: Number of students who opt for Commerce in Class 11, say 30, 35, 40, 45 and 50	Examples: Height, weight and age of family members; in weight, say 50.5 kg, 30 kg, 42.8 kg and 18.6 kg

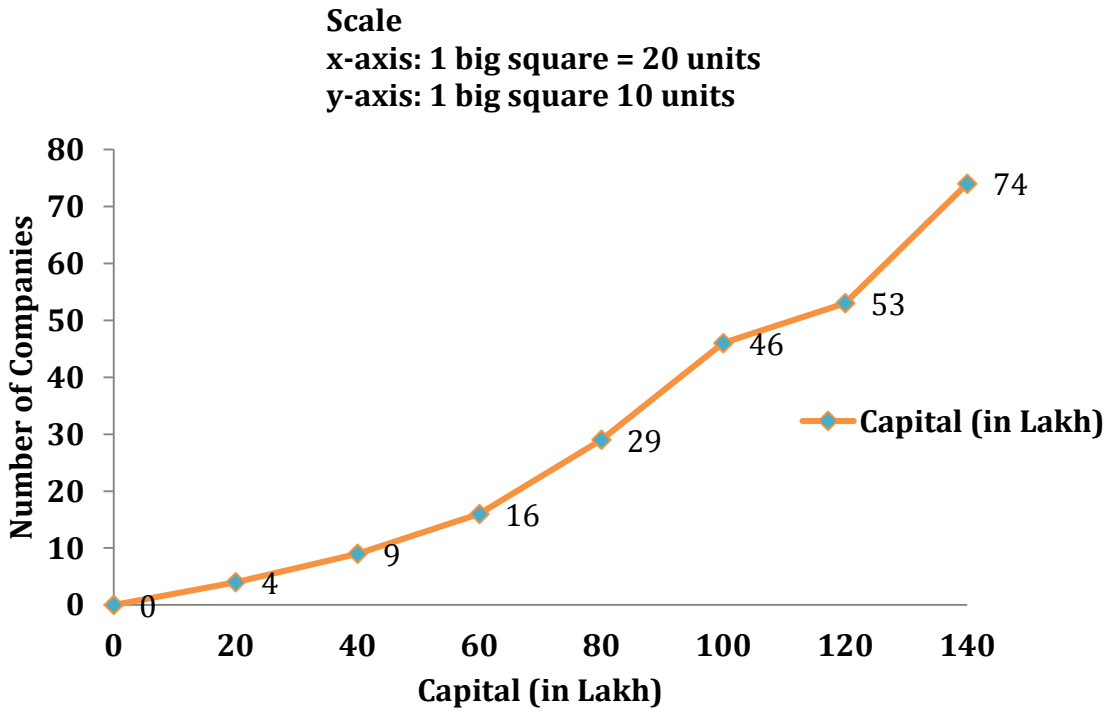
Answer 16

An ogive curve is a smooth curve presented by plotting the frequency data on a graph. This curve represents the frequencies corresponding to lower limits or upper limits in the distribution of data.

Less than ogive curve: In this method, frequencies are cumulated and presented in a graph corresponding to the upper limits of the classes in a frequency distribution. First, all the data are converted to less than cumulative frequency distribution as follows:

Capital (in lakh)	Cumulative Frequency
Less than 20	4
Less than 40	4 + 5 = 9
Less than 60	9 + 7 = 16
Less than 80	16 + 13 = 29
Less than 100	29 + 17 = 46
Less than 120	46 + 7 = 53
Less than 140	53 + 21 = 74

This curve is drawn by plotting cumulative frequencies against the upper limit of the class intervals, and these points are joined to obtain the less than ogive curve.



Answer 17

Given:

Lowest value in the series (L) = 8

Highest value in the series (H) = 66

Range (R) = H − L

Range (R) = 66 − 8

$\therefore \boxed{\text{Range}(R) = 58}$

$$\text{Coefficient of range} = \frac{H - L}{H + L}$$

$$\text{Coefficient of range} = \frac{66 - 8}{66 + 8}$$

$$\text{Coefficient of range} = \frac{58}{74}$$

$\therefore \boxed{\text{Coefficient of range} = 0.78}$

Answer 18

Cost of living index increases from 120 to 210.

Daily wages of a worker in a factory should increase to

$$= \frac{70 \times 210}{120} = \text{Rs } 122.5$$

But, the daily wages of a worker in a factory increased to Rs 120. Thus, the worker did not gain and the real wages have decreased to

$$= \frac{115 \times 120}{210} = \text{Rs } 65.71$$

The real wage of the worker is Rs 65.71 as compared to Rs 70 before the rise in the price.

Answer 19

Given:

Mean wage of 100 workers $(\bar{X}_{1,2})$ = Rs 324

Mean wage of 60 workers $(\bar{X}_1)$ = Rs 340

Mean wage of 40 workers $(\bar{X}_2)$ = ?

$N_1 = 60$ and $N_2 = 40$

$$\text{Combined Mean } (\bar{X}_{1,2}) = \frac{N_1\bar{X}_1 + N_2\bar{X}_2}{N_1 + N_2}$$

$$324 = \frac{(60 \times 340) + (40 \times \bar{X}_2)}{60 + 40}$$

$$324 = \frac{20400 + (40 \times \bar{X}_2)}{100}$$

$$324 \times 100 = 20400 + 40\bar{X}_2$$

$$32400 = 20400 + 40\bar{X}_2$$

$$40\bar{X}_2 = 32400 - 20400$$

$$40\bar{X}_2 = 12000$$

$$\therefore \boxed{\bar{X}_2 = 300}$$

Thus, average mean wage of 40 workers is Rs 300.

Answer 20

Given :

$\bar{X} =$ 58 marks

N = 24 students

$$\bar{X} = \frac{\sum X}{N}$$

$$\sum X = \bar{X} \times N$$

$$\sum X = 58 \times 24$$

$$\sum X = 1392$$

Correct $\sum X = 1392 - 75 + 85 = 1402$

$$\text{Correct Mean } (\bar{X}) = \frac{\sum X}{N} = \frac{1402}{24}$$

$$\therefore \boxed{\text{Correct Mean } (\bar{X}) = 58.4 \text{ marks}}$$

Thus, new mean is 58.4 marks.

Answer 21

In the given data, the class intervals are equal, i.e. 10. Hence, it can be assumed that class intervals of open-end classes are also equal to 10. This implies that the lower limit of the first class-interval is zero (i.e. 0–10) and the upper limit of the last class interval is 50 (i.e. 40–50).Thus, mean can be calculated by arranging the frequency distribution.

Age (in years) (X)	**No. of Workers (f)**	**Mid-value (m)** $\left(\frac{l_1 + l_2}{2}\right)$	**d = m − A (A = 25)**	$d' = \frac{m - A}{i}$ $(i = 10)$	**fd′**
0–10	6	5	−20	−2	−8
10–20	10	15	−10	−1	−10
20–30	12	**25 (A)**	0	0	0
30–40	14	35	10	1	14
40–50	8	45	20	2	16
	$\sum f = 50$				$\sum fd' = 12$

$$\bar{X} = A + \frac{\sum fd'}{\sum f} \times i$$

$$\bar{X} = 25 + \frac{12}{50} \times 10$$

$$\bar{X} = 25 + 0.24 \times 10$$

$$\bar{X} = 25 + 2.4$$

$$\therefore \boxed{\bar{X} = 27.4}$$

Thus, average age of workers in a factory is 27.4 years.

Answer 22

Given:

Arithmetic mean of X series = 7

Arithmetic mean of Y series = 9

Here, the Y series is not complete, so we need to find the missing value of the Y series.

Assuming that the missing value of Y is b,

$$\bar{Y} = \frac{\sum Y}{N}$$

$$9 = \frac{9 + 11 + b + 8 + 7 + 5}{6}$$

$$9 = \frac{40 + b}{6}$$

$$40 + b = 54$$

$$b = 54 - 40$$

$$\therefore \boxed{b = 14}$$

Hence, the complete series is as follows:

X	6	2	10	4	8	12
Y	9	11	14	8	7	5

Coefficient of correlation:

X	Deviation $(x = X - \bar{X})$ $\bar{X} = 7$	Square of Deviation (x^2)	Y	Deviation $(y = Y - \bar{Y})$ $\bar{Y} = 9$	Square of Deviation (y^2)	Multiple of Deviations (xy)
6	**−1**	**1**	**9**	**0**	**0**	**0**
2	**−5**	**25**	**11**	**2**	**4**	**−10**
10	**3**	**9**	**14**	**5**	**25**	**15**
4	**−3**	**9**	**8**	**−1**	**1**	**3**
8	**1**	**1**	**7**	**−2**	**4**	**−2**
12	**5**	**25**	**5**	**−4**	**16**	**−20**
$\sum X = 42$	$\sum x = 0$	$\sum x^2 = 70$	$\sum Y = 54$	$\sum y = 0$	$\sum y^2 = 50$	$\sum xy = -14$

$$r = \frac{-\sum xy}{\sqrt{\sum x^2 \times \sum y^2}}$$

$$r = \frac{-14}{\sqrt{70 \times 50}}$$

$$r = \frac{-14}{\sqrt{3500}}$$

$$r = \frac{-14}{59.16}$$

$$\therefore \boxed{r = -0.23}$$

Answer 23

a. Samples provide better results than surveys because of the following reasons:

i. ***Less costly***: The sample method is less costly as only some items of the population are studied.
ii. ***Time saving***: This method saves a lot of time and energy of the investigator as fewer items of the population are studied.
iii. ***Easy identification of errors:*** Errors under the sampling method can be easily identified and rectified as the number of items is small.
iv. ***Feasible for large population****:* When the size of the population is large, the sampling method is feasible as the cost of conducting it is low.
v. ***Less non-sampling errors:*** The number of non-sampling errors in the sampling method is less as a limited number of items are studied.

b.

Univariate Frequency Distribution	**Bivariate Frequency Distribution**
The word 'Uni' refers to one.	The word 'Bi' refers to two.
This implies a series of statistical information representing the frequency distribution of one variable.	This implies a series of statistical information representing the frequency distribution of two variables such as production and sales of a particular product.
Examples: Marks of a Class VI student, income of an individual in a particular area	Example: Production and sales of a particular product