

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

Time : Three Hours

Maximum : 80 Marks

Section A (Objective Type)

*Answer all questions.**Each question carries ½ mark.*

- $k = (3x^6)^0 - 6$, the value of k is _____.
(i) - 3. (ii) - 5.
(iii) - 6. (iv) 0.
- A matrix with equal number of rows and columns is called a _____.
(i) Diagonal matrix. (ii) Square matrix.
(iii) Zero matrix. (iv) None of these.
- For an orthogonal matrix A , $AA^T =$ _____.
(i) I . (ii) A .
(iii) A^T . (iv) None of these.
- $\log_a a =$ _____.
(i) 0. (ii) 1.
(iii) $\log a$. (iv) a .
- For two matrices A and B with orders $m \times n$, and $p \times q$, AB is possible when _____.
(i) $m = q$. (ii) $m = p$.
(iii) $n = p$. (iv) $n = q$.

6. Cost function $C = x^2 + 4x$, then MC is _____.
- (i) $\frac{x^3}{3} + 4\frac{x^2}{2}$. (ii) $2x + 4$.
- (iii) x^2 . (iv) None of these.
7. _____ is a two dimensional diagrammatic data representation.
- (i) Frequency curve. (ii) Bar diagram.
- (iii) Pie diagram. (iv) Pictogram.
8. Geometric mean of two values is 4. One of them is 8 the second value is _____.
- (i) 2. (ii) 4.
- (iii) 8. (iv) 16.
9. A value which divides the observations into two equal parts is _____.
- (i) Mode. (ii) Median.
- (iii) Decile. (iv) Mean deviation.
10. For a positively skewed distribution, _____.
- (i) Mean = Mode. (ii) Mean < Mode.
- (iii) Mean > Mode. (iv) None of these.
11. If the regression lines are perpendicular, the co-efficient of correlation is _____.
- (i) + 1. (ii) - 1.
- (iii) 0. (iv) None of these.
12. Absolute value of the co-efficient of correlation is _____ of regression co-efficients.
- (i) AM. (ii) HM.
- (iii) Median. (iv) GM.

(12 × ½ = 6 marks)

Section B (Short Answer Type)*Answer any ten questions.**Each one carries 2 marks.*

13. Find the value of $\left[\sqrt[3]{125}\right]^{-2}$.
14. Define Linear equation.

15. Define order of a matrix.
16. Solve the equation $x^2 - 6x + 8 = 0$.
17. Define Symmetric matrix.
18. For the matrix $A = \begin{bmatrix} 4 & 0 \\ 0 & 4 \end{bmatrix}$, if $kA = I$ find k .
19. If $A = \begin{bmatrix} 5 & 7 & 2 \\ 2 & 3 & 1 \\ 4 & 6 & 2 \end{bmatrix}$, show that $|A| = 0$.
20. Define Geometric mean.
21. Find the marginal cost when the production is 5 units if the cost function of a firm is $C = x^3 - 3x^2 + 2x$.
22. Obtain $\frac{d^2R}{dx^2}$ where $R = 2x - 4x^2$.
23. Show that $f(x) = 3x^2 - 18x + 7$ is minimum at $x = 3$.
24. Define Scatter diagram.

(10 × 2 = 20 marks)

Section C (Short Essay/Problem Type)

Answer any six questions.

Each one carries 5 marks.

25. For the matrices $A = \begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 4 & -2 \end{bmatrix}$, show that $(A + B)^T = A^T + B^T$.
26. Define mean deviation about mean. Obtain the mean deviation about mean for the data 5, 8, 10, 14, 15, 18, 20 and 22.

27. Find the elasticity of demand for the demand function $4q = \frac{64}{p^3}$.
28. Define Skewness. What are the various measures of skewness ?
29. Given the regression lines $9x - 4y + 15 = 0$ and $25x - 6y - 7 = 0$. What are the regression co-efficients x on y and y on x ?
30. Explain the method of Lorenz curve and Gini Coefficient.

31. If $A = \begin{bmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{bmatrix}$, show that $|A| = 0$.

32. Explain rank correlation coefficient.

(6 × 5 = 30 marks)

Section D (Essay Type)

*Answer any two questions.
Each one carries 12 marks.*

33. Use Cramer's rule, solve the equations to get the values of x , y and z .

$$3x + y + z = 1; 2x + 2z = 0; 5x + y + 2z = 2.$$

34. Define Kurtosis. How is it measured ? Find the co-efficient of kurtosis to the following data :

Class	:	100-120	120-140	140-160	160-180	180-200	200-220	220-240
Frequency	:	1	2	6	20	11	3	2

35. Matrix A and B are given by $A = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$, then show that

(i) $[A + B]^2 \neq A^2 + 2AB + B^2$; and

(ii) $(A + B)(A - B) \neq A^2 - B^2$.

36. Explain direct and inverse correlation. Obtain Pearson's co-efficient of correlation between x and y using the following data :

x	:	12	20	15	22	18	24	20	12	15	22
y	:	30	35	28	36	29	39	30	25	30	38

(2 × 12 = 24 marks)