

D 31666

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Name.....

Reg. No.....

**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION  
NOVEMBER 2022**

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I  
(2017—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Section A (Objective type)**

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

1.  $2 \left[ x^2 \right]^{\frac{5}{2}} = 16x^2$ , the value of  $x$  is \_\_\_\_\_.  
 (i) - 8. (ii) 16.  
 (iii) 8. (iv) 2.
2. A matrix with order  $m \times n$  is called a square matrix if, \_\_\_\_\_.  
 (i)  $m = n$ . (ii)  $m > n$ .  
 (iii)  $m < n$ . (iv) None of these.
3. A matrix with order  $m \times n$  is called a row matrix \_\_\_\_\_.  
 (i)  $m = n$ . (ii)  $m = 1$ .  
 (iii)  $n = 1$ . (iv)  $m < n$ .
4. Which of the following function  $f(x)$  is an even function of  $x$  ?  
 (i)  $f(x) = 2x$ . (ii)  $f(x) = x^2 - 2$ .  
 (iii)  $f(x) = x^3$ . (iv)  $f(x) = x^3 - 3$ .
5. HM of the observations 5 and 10 is \_\_\_\_\_.  
 (i)  $\frac{6}{20}$ . (ii)  $\frac{10}{3}$ .  
 (iii)  $\frac{6}{10}$ . (iv)  $\frac{20}{3}$ .
6. Which of the following is a positional average?  
 (i) AM. (ii) GM.  
 (iii) H M. (iv) Median.

Turn over

7. First quartile is same to \_\_\_\_\_ percentile.
- (i) 75<sup>th</sup>. (ii) 50<sup>th</sup>.  
 (iii) 25<sup>th</sup>. (iv) None of these.
8. Sum of square of 10 observations of a set with mean 5 and variance 18 is \_\_\_\_\_.
- (i) 330. (ii) 430.  
 (iii) 43. (iv) 33.
9. Gini Co-efficient is usually expressed as :
- (i)  $\frac{p}{p+q}$ . (ii)  $\frac{q}{p+q}$ .  
 (iii)  $\frac{p+q}{p}$ . (iv)  $\frac{p+q}{q}$ .
10. For a symmetric distribution, co-efficient of skewness is \_\_\_\_\_.
- (i) Greater than 1. (ii) Less than 1.  
 (iii) 0. (iv) None of these.
11. \_\_\_\_\_ of regression co-efficients gives the absolute value of Co-efficient of correlation.
- (i) A.M. (ii) G.M.  
 (iii) H.M. (iv) M.D.
12. \_\_\_\_\_ is a two dimensional diagrammatic representation of data.
- (i) Bar diagram. (ii) Pictogram.  
 (iii) Pie diagram. (iv) Cartogram.

(12 × ½ = 6 marks)

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

13. Find the value of  $\left[2^3 \times 3^3 + (6^2 + 4)\right]^{\frac{1}{4}}$ .
14. State the power rule and base changing rule on logarithm.
15. Solve  $4x + 3y = 17$  and  $x + 3y = 11$ .
16. Distinguish between frequency curve and frequency polygon.
17. If the matrix  $A = \begin{bmatrix} 1 & 4 & -2 \\ 3 & 0 & 5 \\ 2 & -1 & 1 \end{bmatrix}$ , find  $4A - 5I$ .

18. Distinguish singular and non-singular matrices.
19. Write empirical relation connecting mean, median and mode. Use it to find the mean of a data whose median and mode are given as 13 and 15.
20. Find the average speed of a man who travels to office from home at a speed of 8 kmph and travels back at a speed of 12 kmph.
21. Define marginal cost and marginal revenue.
22. Find the slope of the curve  $y = x^2 - 6$  at the point  $(2, -2)$ .
23. If  $y = \log x$ , show that  $\frac{d^2y}{dx^2} + \frac{1}{x^2} = 0$ .
24. Given the means of  $x$  and  $y$  as 4 and 6. Their standard deviations as 2 and 3. Obtain the regression line  $y$  on  $x$ , when the co-efficient of correlation between  $x$  and  $y$  is 0.6.

(10 × 2 = 20 marks)

**Section C (Short essay/problem type)***Answer any six questions.**Each one carries 5 marks.*

25. If  $abc = X$ , show that  $\frac{1}{\log_a X} + \frac{1}{\log_b X} + \frac{1}{\log_c X} = 1$ .
26. Solve  $2x + \frac{4}{x} - 9 = 0$ .
27. Find the equilibrium price and quantity, if the demand and supply equations are respectively,  $2p = 14 - x$  and  $12p = 14 + x$ .
28. Obtain 4th decile and 65th percentile of  $x$  from the following data :
- |           |   |      |       |       |       |       |       |
|-----------|---|------|-------|-------|-------|-------|-------|
| Class     | : | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Frequency | : | 7    | 14    | 29    | 30    | 16    | 4     |
29. Define skewness. Explain Pearson's and Bowley's measures of skewness.
30. Explain less than and greater than ogives.
31. Find  $k$ , if  $A = \begin{bmatrix} 0 & -4 & 1 \\ k & 0 & -3 \\ -1 & 3 & 0 \end{bmatrix}$ , is a skew symmetric matrix.
32. Write a note on Lorenz curve.

(6 × 5 = 30 marks)

**Turn over**

**Section D (Essay type)***Answer any two questions.**Each one carries 12 marks.*

33. Solve the following equations by the method of matrix inverse :

$$2x - 4y + 3z = 3 ; 4x - 6y + 5z = 2 ; -2x + y - z = 1.$$

34. Define absolute and relative measures of dispersion. The fluctuations in the market rate of the shares of two companies A and B during 12 days in last month is recorded as follows :

A : 280, 282, 284, 285, 281, 280, 284, 285, 284, 288, 286 and 285

B : 49, 44, 41, 45, 46, 48, 42, 41, 43, 48, 49 and 50.

Share price of which company shows more consistency?

35. The matrix  $A = \begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix}$ .

(i) Show that  $[AB]^T = B^T A^T$ .

(ii) Show that  $|AB| = |A||B|$ .

36. Calculate Pearson's co-efficient of correlation between  $x$  and  $y$  using the data given. Also write the regression equations of  $x$  on  $y$  and  $y$  on  $x$ .

|       |    |    |    |    |    |
|-------|----|----|----|----|----|
| $x$ : | 5  | 9  | 13 | 17 | 21 |
| $y$ : | 12 | 20 | 25 | 33 | 35 |

(2 × 12 = 24 marks)