

## THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2016

(CUCBCSS—UG)

Core Course—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  $\frac{1}{2}$  mark.

1.  $[4x^6]^{\frac{1}{2}} - 16 = 0$ , the value of  $x$  is \_\_\_\_\_.
- (i) 6. (ii) 2.  
(iii) 3. (iv) 1.
2. For a matrix  $A$ ,  $A^T = A$ , the matrix is, \_\_\_\_\_ matrix.
- (i) Symmetric. (ii) Skewsymmetric.  
(iii) Orthogonal. (iv) Identity.
3.  $\log_a b \times \log_b a =$  \_\_\_\_\_.
- (i) 0. (ii) 1.  
(iii)  $\log a - \log b$ . (iv) None of these.
4. The order of a matrix  $A$  is  $m \times n$ , that of  $B$  is  $n \times q$  then the order of  $AB$  is \_\_\_\_\_.
- (i)  $n \times n$ . (ii)  $m \times n$ .  
(iii)  $m \times q$ . (iv)  $n \times q$ .
5. When  $TR = 100 - x^2$ , the  $MR$  is \_\_\_\_\_.
- (i) 100. (ii)  $-2x$ .  
(iii)  $-x^2$ . (iv) None of these.
6. Which of the following is a positional average ?
- (i) Harmonic mean. (ii) Geometric mean.  
(iii) Median. (iv) None of these.

Turn over

7. The presence of extreme observations affects ———.
- (i) Arithmetic mean. (ii) Mode.  
(iii) Median. (iv) None of these.
8. For a set of  $N$  observations, median class is the class in which ——— observation is lying ?
- (i)  $\left(\frac{N}{4}\right)^{th}$ . (ii)  $\left(\frac{N}{2}\right)^{th}$ .  
(iii)  $\left(\frac{3N}{4}\right)^{th}$ . (iv) None of these.
9. Quartile deviation is ———.
- (i)  $\frac{Q_3 + Q_1}{2}$ . (ii)  $\frac{Q_3 - Q_1}{2}$ .  
(iii)  $\frac{Q_3 - Q_1}{Q_2}$ . (iv)  $\frac{Q_3 + Q_1}{Q_2}$ .
10. Mean of a symmetric distribution is 8. The mode is ———.
- (i) 8. (ii) 4.  
(iii) 2. (iv) 0.
11. If  $X$  and  $Y$  are perfectly obeys the equation  $2x + 5y - 2 = 0$ , the correlation between  $X$  and  $Y$  is ———.
- (i) +1. (ii) -1.  
(iii) 0. (iv) None of these.
12. The regression coefficient of  $y$  on  $x$  is ———.
- (i)  $\frac{\text{Cov}(X, Y)}{\text{SD}(Y)}$ . (ii)  $\frac{\text{Cov}(X, Y)}{\text{SD}(X)}$ .  
(iii)  $\frac{\text{Cov}(X, Y)}{V(Y)}$ . (iv) None of these.

(12 × ½ = 6 marks)



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

13. Find the value of  $\left[\frac{1}{25}\right]^{-\frac{3}{2}}$ .

14. Define rational number.

15. State the product rule and quotient rule on logarithm.

16. Define limit of a function.

17. Define orthogonal matrix.

18. If the matrix  $A = \begin{bmatrix} 4 & 2 \\ 0 & 5 \end{bmatrix}$ . Find  $A^2$ .

19. If  $A = \begin{bmatrix} -3 & 4 & 2 \\ 7 & 0 & 5 \\ 6 & -4 & -1 \end{bmatrix}$ , find  $|A|$ .

20. Define harmonic mean.

21. Find the marginal cost and average cost if the total cost is  $1000 + 100x - 10x^2 + x^3$ .22. Total revenue function of a firm is  $R = 21x - x^2$ . Find the marginal revenue when 10 units are sold.23. Test whether  $f(x) = 2x^2 - 8x + 2$  is minimum at  $x = 2$ .24. Given the regression lines  $9x - 4y + 15 = 0$  and  $25x - 6y - 7 = 0$ . Obtain the means of  $x$  and  $y$ .

(10 × 2 = 20 marks)

**Section C (Short Essay/Problem Type)***Answer any six questions.**Each one carries 5 marks.*

25. For a given matrix  $A = \begin{bmatrix} -3 & 4 \\ 3 & 2 \end{bmatrix}$ . Find  $(A^T)^T A$ .

26. Define coefficient of variation. Obtain coefficient of variation of 20, 22, 19, 22, 23.

**Turn over**

27. Find the equilibrium price and quantity, if the demand and supply equations are respectively,  $2p = 14 - x$  and  $12p = 14 + x$ .
28. Define kurtosis. What are the various measures of kurtosis ?
29. What are regression coefficients ? What are their properties ?
30. Explain the method of Lorenz curve and Gini Coefficient.

31. If  $A = \begin{bmatrix} 5 & 7 & 2 \\ 2 & 3 & 1 \\ 4 & 6 & 2 \end{bmatrix}$ , show that A is singular.

32. Write a note on graphical methods for correlation and regression.

(6 × 5 = 30 marks)

### Section D (Essay Type)

Answer any two questions.  
Each one carries 12 marks.

33. Using matrix inverse method solve the equations to get the values of x, y and z.

$$2x + y + z = 1 ; x - y + 4z = 0 ; x + 2y - 2z = 3.$$

34. Define skewness. How is it measured? Find the quartile coefficient of skewness to the following data :-

Class	:	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Frequency	:	3	4	68	30	10	6	2

35. Matrix A is given by  $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix}$ , show that  $A A^{-1} = I$ .

36. Define rank correlation coefficient. The following are the ranks obtained by 10 students in Economics and Mathematics :

Economics	:	1	2	3	4	5	6	7	8	9	10
Mathematics	:	1	4	2	5	3	9	7	10	6	8

To what extent is the knowledge of students in the two subjects related ?

(2 × 12 = 24 marks)