

## THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Core Course

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 1 mark.*1. The value of  $(25)^{\overline{2}}$  is :(a)  $\frac{1}{25}$ (b)  $\frac{1}{125}$ 

(c) 25.

(d) 125.

2. Find  $x$  if  $\log_3 x = 4$  :

(a) 9.

(b) 27.

(c) 81.

(d) 243.

3. If  $\log 7 = 0.8451$ , find the number of digits in  $7^{20}$ .

(a) 14.

(b) 15.

(c) 16.

(d) 17.

4. The degree of a linear equation is :

(a) 1.

(b) 2.

(c) 3.

(d) 4.

5. Let the matrix A is of order  $2 \times 3$  and another matrix B is of order  $3 \times 2$ , then the product AB is of order :(a)  $2 \times 3$ .(b)  $3 \times 2$ .(c)  $3 \times 3$ .(d)  $2 \times 2$ .

Turn over

6. Let  $A$  be a matrix such that  $|A| = 0$ , then  $A$  is said to be :
- (a) Orthogonal. (b) Symmetric.  
(c) Singular. (d) Non-singular.
7. With the help of ogives, one can determine :
- (a) Mean. (b) Median.  
(c) Mode. (d) Geometric mean.
8. Sum of the deviations about mean is
- (a) Zero. (b) Minimum.  
(c) Maximum. (d) One.
9. If for values of  $X$ , A.M. = 25 and H.M. = 9, then the G.M. is :
- (a) 17. (b) 15.  
(c) 5.83. (d) 16.
10. If a constant value 5 is subtracted from each observation of a set of data, the variance is :
- (a) Reduced by 5. (b) Reduced by 25.  
(c) Unaltered. (d) Increased by 25.
11. If the correlation coefficient  $r = 0$ , the angle between the two lines of regression is :
- (a) 0. (b) 90.  
(c) 60. (d) 30.
12. The lines of regression intersect at the point :
- (a) (0, 0). (b) (1, 1).  
(c) ( $\bar{X}$ ,  $\bar{Y}$ ). (d) ( $\bar{X}$ ,  $\bar{Y}$ ).

(12 × ½ = 6 marks)

**Section B (Short Answer Type)**

*Answer any ten questions.  
Each question carries 2 marks.*

13. Simplify  $63x^8y^5 \div 9x^5y^3$ .
14. Simplify  $(9)^{\frac{3}{2}}(243)^{\frac{4}{5}}(729)^{\frac{5}{6}}$ .
15. Define Logarithm.
16. If  $\log 2 = 0.3010$  and  $\log 3 = 0.4771$ , find  $\log 12$ .
17. Define a quadratic equation. Also define the quadratic formula.

18. Define diagonal matrix with an example.
19. Define rank of a matrix.
20. Show that  $A = \begin{bmatrix} 3 & 4 & 2 \\ 0 & 1 & -3 \\ 2 & -2 & 8 \end{bmatrix}$  is non-singular.
21. The mean wage of 100 labourers working in a factory running two shifts of 60 and 40 workers respectively is Rs. 38. The mean wage of 60 labourers working in the morning shift is Rs. 40. Find the mean wage of labourers working in the evening shift.
22. Define standard deviation and coefficient of variation.
23. Explain Scatter diagram.
24. In the study of regression equations, following values are obtained :  $b_{yx} = 0.25, r = 0.42, \sigma_y = 4$ , find  $\sigma_x$ .

(10 × 2 = 20 marks)

### Section C (Short Essay/Problem Type)

Answer any six questions.  
Each question carries 5 marks.

25. Find the value of  $\left[ \frac{x^{-2}y}{x^3y^{-4}} \right]^{-3} \div \left[ \frac{xy^{-1}}{x^3y^{-3}} \right]^{-5}$
26. Evaluate  $\frac{24.395 \times (3.16)^3}{8.79}$  using logarithm.
27. Demand for goods of an industry is given by the equation  $pq = 100$  where  $p$  is the price and  $q$  is the quantity. Supply is given by the equation  $20 + 3p = q$ . What is the equilibrium price and quantity?
28. If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{bmatrix}$ , find  $AB$  and  $BA$ . Show that  $AB \neq BA$ .
29. The cost of manufacturing and selling a tin of chocolate powder is Rs. 15, with a fixed overhead cost of Rs. 900. Each is sold out for Rs. 20 per tin. Determine (i) Cost function ; (ii) Revenue function ; (iii) Profit function ; (iv) What is the cost, revenue and profit when 1000 tins are manufactured and sold?

**Turn over**

30. Find the harmonic mean from the following data :

Size	6	10	14	18
Frequency	20	40	30	10

31. The mean and standard deviation of 100 observations were worked out as 40 and 5 respectively by a computer who by mistake took value 50 in place of 40 for one observation. Recalculate the correct mean and standard deviation.

32. The ranking of 10 individuals at the start and at the finish of a course of training are as follows :

Individuals	A	B	C	D	E	F	G	H	I	J
Rank before	1	6	3	9	5	2	7	10	8	4
Rank after	6	8	3	2	7	10	5	9	4	1

Calculate Spearman's rank correlation coefficient.

(6 × 5 = 30 marks)

#### Section D (Essay Type)

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

33. Solve the following system of equations

$$x + 9y - z = 4 ; 2x + 7y + 3z = 7 ; 3x + 10y + 4z = 9.$$

34. If  $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & -3 & 0 \\ 1 & 1 & -1 \end{bmatrix}$ , show that  $A^3 + 4A^2 - A - 12I = 0$ .

35. Explain mean, median and mode.

36. From the following data, obtain the two regression equations :

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

(2 × 12 = 24 marks)