

## THIRD SEMESTER B.A. DEGREE EXAMINATION, NOVEMBER 2022

(Supplementary 2017 &amp; 2018 Admissions)

ECONOMICS

## AECO3B03T: QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS I

Time: 3 Hours

Maximum Marks: 80

PART A: Answer *All* the questions. Each carries *half* mark.

## A. Multiple Choice:

1.  $\frac{x^9}{x^3} =$ 
  - a).  $X^6$
  - b).  $X^{12}$
  - c).  $X^{27}$
  - d).  $X^3$
2.  $\sqrt{x} =$ 
  - a).  $x^{1/2}$
  - b).  $x$
  - c).  $x^2$
  - d).  $x^{3/2}$
3. If a matrix has full rank then its determinant cannot be .....
  - a). 0
  - b). 1
  - c). 2
  - d). -1
4. If the matrix  $A = \begin{bmatrix} 3 & 1 & 0 \\ 3 & 1 & 0 \\ 7 & 8 & 5 \end{bmatrix}$  then find the determinant of A is .....
  - a). 0
  - b). 2
  - c). 1
  - d). 4
5. Find the sum of  $A = [1 \ 2 \ 3 \ 4 \ 5]$  and  $B = [6 \ 7 \ 8 \ 9 \ 10]$ .
  - a).  $[7 \ 9 \ 11 \ 13 \ 15]$
  - b).  $[7 \ 3 \ 11 \ 12 \ 15]$
  - c).  $[5 \ 2 \ 11 \ 13 \ 11]$
  - d).  $[7 \ 1 \ 9 \ 11 \ 13]$
6. The choice of a particular graph depends on the .....
  - a). purpose of study
  - b). nature of data
  - c). type of audience
  - d). all the above
7. Ogives for more than type and less than type distributions intersect at .....
  - a). median
  - b). mode
  - c). mean
  - d). origin
8. If a constant 5 is added to each observations of a set, the mean is .....
  - a). increased by 5.
  - b). decreased by 5.
  - c). 5 times the original mean.
  - d). not affected.
9. A frequency distribution having two modes is said to be .....
  - a). unimodal
  - b). bimodal
  - c). trimodal
  - d). without mode
10. The number of partition values in case of quartiles is .....
  - a). 1
  - b). 2
  - c). 3
  - d). 4
11. Regression equation is also named as .....
  - a). prediction equation
  - b). estimating equation
  - c). line of average relation
  - d). all the above
12. The line of regression intersect at the point.
  - a).  $(X, Y)$
  - b).  $(\bar{X}, \bar{Y})$
  - c).  $(0, 0)$
  - d).  $(1, 1)$

(12 x 1/2 = 6 Marks)

(PTO)

**PART B: Very Short Answer questions; Answer any 10 questions. Each carries two marks.**

13. Find the difference  $A + B$  for  $A = \begin{bmatrix} 11 & 11 & 4 \\ 2 & 7 & 11 \end{bmatrix}$  and  $B = \begin{bmatrix} 11 & 15 & 0 \\ 2 & 5 & 11 \end{bmatrix}$
14. Explain the linear system of equations.
15. Define the minor of matrix.
16. Find the rank of  $A = \begin{bmatrix} 12 & 11 & 4 \\ 2 & 7 & 11 \end{bmatrix}$
17. Define harmonic mean.
18. State any two demerits of mean deviation.
19. Find standard deviation of first  $n$  natural numbers.
20. Explain the graphical determination of median.
21. Obtain the equation of the straight line passing through the point (3, 1) and having a slope  $3/4$ .
22. Find the cofactors of the following matrix  $A = \begin{bmatrix} 7 & 2 & 5 \\ 3 & 3 & 2 \\ 9 & 6 & 2 \end{bmatrix}$
23. Find the value of  $\log(50 \times 25)$ .
24. Given  $bxy = 0.85$ ,  $byx = 0.89$  and the standard deviation of  $X = 6$  find the value of  $r$  and  $\sigma_y$ .
- (10 x 2 = 20 Marks)**

**PART C: Short Answer questions; Answer any 6 questions. Each carries five marks.**

25. Solve for  $x$ , if  $-x^2 + 6x + 112 = 0$
26. If  $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$ , find Adjoint  $A$
27. Compute quartile deviation from the following:
- |     |   |   |   |    |    |    |
|-----|---|---|---|----|----|----|
| $X$ | 2 | 4 | 6 | 8  | 10 | 12 |
| $F$ | 1 | 3 | 8 | 10 | 15 | 3  |
28. Distinguish between dispersion and skewness.
29. Find the value of mode diagrammatically from the following data:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	4	8	12	14	10	5

30. A firm has the following total cost and revenue function:  $C = q^3 - 15q^2 + 10q + 100$  and  $R = 30q - q^2$ . Find the profit function and at what level of output profit is maximized.

31. Plot a scatter diagram for the following data, and then discuss the nature of correlation between them.

X	13	12	11	9	8	7	6	5
Y	2	3	4	7	8	10	11	13

32. Find rank of the matrix  $A = \begin{bmatrix} -3 & 6 & 2 \\ 1 & 5 & 4 \\ 4 & -8 & 2 \end{bmatrix}$

(6 x 5 = 30 Marks)

**PART D: Essay questions; Answer any 2 questions. Each carries twelve marks.**

33. Solve using Cramer's rule

$$2x_1 + 4x_2 - x_3 = 52$$

$$-x_1 + 5x_2 + 3x_3 = 72$$

$$3x_1 - 7x_2 + 2x_3 = 10$$

34. Define statistics. Highlight its scope and limitations from a social science perspective.

35. Calculate the mean, median and mode of the following:

Mid Value	5	10	15	20	25	30	35
Frequency	18	29	46	62	51	14	10

36. Calculate Karl Pearson's correlation coefficient for the following data:

X	22	26	29	30	31	33	34	35
Y	19	21	22	29	27	24	27	31

(2 x 12 = 24 Marks)