M.A. DEGREE EXAMINATIONS, JULY 2025
Third Semester
M.A. Economics
M23EC10DC – Quantitative Methods for Economics II
(2023 July admissions)

Time: 3 Hours   Max Marks: 70

Section A

Answer any ten of the following questions in a word or sentence each. Each question carries 1 mark.

1. Rank of a matrix

2. Hawkin Simon Condition

3. Lorenz Curve

4. Mode

5. Sample Space

6. Conditional Probability

7. Skewness

8. Mathematical expectation

9. Random variable

10. Regression

11. Dynamic stability

12. First order linear difference equation

13. Inverse of a matrix

14. Rank correlation

15. Input output model

                                                                (1X10=10)

Section B

Answer any five of the following questions in two or three sentences each. Each question carries 2 marks.

16. Distinguish between singular and non-singular matrices with examples

17. Given that the mode of a distribution is 20 and the median is 22, find the mean.

18. y= $3x^3+5x^2-4x+7$. Find $\frac{dy}{dx}$

19. Outline any 2 assumptions of the Harrod-Domar growth model.

20. Compare positive and negative correlation with suitable examples.

21. Distinguish between classical and empirical probability using examples.

22. Define mutually exclusive events

23. Define standard deviation

24. Indicate the relevance of input-output tables in inter-industry analysis.

25. What is the importance of normal distribution in economics?

(2X5=10)

Section C

Answer any five of the following questions in a paragraph each. Each question carries 4 marks.

26. Find the inverse of the matrix A = $\begin{bmatrix} 4 & 7 \\ 2 & 6 \end{bmatrix}$

27. Find the higher order differential for y = $x^5 - 3x^4 + 2x^3 - x^2 + x - 7$

28. Differentiate between binomial and poisson distribution

29. Given the data set

X:	2	4	6	8
Y:	5	9	12	15

Compute the Pearson correlation coefficient.

30. From the following grouped data, calculate the mode

Class Interval	Frequency
10 – 20	5
20 – 30	8
30 – 40	12
40 – 50	20
50 – 60	10
60 – 70	5

31. Analyse the uses of regression analysis in economic research and forecasting.

32. Explain the major concepts of set theory

33. $A = \begin{bmatrix} 2 & -1 & 0 \\ 4 & 2 & -4 \\ 3 & 3 & -2 \end{bmatrix}$ Find the determinant

(4X5=20)

Section D

Answer any three of the following questions in two pages each. Each question carries 10 marks.

34. Using Leontief's input-output model, explain how sectoral interdependence can be captured in a two-sector economy. Present a numerical example and interpret the results

35. From the following frequency table, compute the mean, standard deviation, and coefficient of variation:

    Class Intervals: 10–20, 20–30, 30–40, 40–50

    Frequencies: 5   10   15   10

36. Compute and interpret the Pearson correlation coefficient using the following data:

    X   2   4   6   8   10

    Y   5   9   12   15   20

    Calculate the Pearson correlation coefficient (r). Interpret the strength and direction of the relationship between X and Y. Explain the economic relevance of correlation in this context.

37. Explain the role and significance of differential equations in economic analysis with suitable examples.

38. Solve the following system of equations using Cramer's Rule

    x+2y+3z=14
    2x+y+z=10
    3x+2y+z= 14

39. A manufacturer knows that 2% of the items produced in a factory are defective. A random sample of 10 items is selected for inspection. Using the binomial distribution,
    Calculate the probability that:
      i) Exactly one item is defective
      ii) At most two items are defective
      iii) No item is defective

(10X3=30)