A–0717

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MT-603

MA/MSC Mathematics (MAMT/MSCMT)

(Numerical Analysis-I)

Examination, June 2025

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

(Long Answer Type Questions) 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Find the inverse of :

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$$

by Gauss Jordan method.

2. Represent the function :

$$f(x) = x^4 - 12x^3 + 42x^2 - 30x + 9$$

and its successive differences in factorial notation.

3. Find the inverse of :

$$A = \begin{bmatrix} 1 & 2 & 6 \\ 2 & 5 & 15 \\ 6 & 15 & 46 \end{bmatrix}$$

using Choleski's method.

4. Estimate the missing term in the following table :

X	$f(x)$
0	1
1	3
2	9
3	?
4	81

5. Find $\sqrt{(12)}$ to five places of decimal by Newton-Raphson method.

Section–B

(Short Answer Type Questions) 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Evaluate the value of $\Delta^2(3e^x)$.

2. Write a short note on the applications of eigen vectors.

3. Discuss briefly the rate of convergence of Newton-Raphson method.

4. Find the largest eigen value of :

$$A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

5. How can you say that complex eigen values are useful. Illustrate.

6. Write a short note on Birge-Vieta method.

7. Prove that :

$$f(4) = f(0) + 4\Delta f(0) + 6\Delta^2 f(-1) + 10\Delta^3 f(-1)$$

8. Write a short note on Complex roots of a polynomial.

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