

A-0638

Total Pages : 3

Roll No.

MT-603

M.A./M.Sc. MATHEMATICS (MAMT/MSMT)

(Numerical Analysis-I)

3rd Semester Examination, Session December 2024

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. With the help of Synthetic Division, express $2x^3 - 3x^2 + 3x - 10$ and its differences in factorial notation, if interval of difference is one.
2. Find the inverse of :

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 2 & 3 & 2 \\ -1 & 1 & -1 \end{bmatrix}$$

by Crout's method.

3. Using Doolittle method, find the inverse of :

$$A = \begin{bmatrix} 2 & 1 & 0 \\ 4 & 3 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

4. Find the real root of the equation $x^2 + 4 \sin x = 0$, correct to four places of decimals by using Newton Raphson method.
5. Prove that :

$$x^{(-n)} = \frac{1}{(x + nh)(n)'}$$

where interval of difference is h .

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. Write a short note on the rate of convergence of an iterative process.
2. Evaluate $\Delta^2(\cos 2x)$.
3. What is the importance of Muller's method ?
4. Find the eigen values of :

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

5. What are the advantages of finding eigenvalues by Jacobian method ?
6. Write a short note on Graffe's root squaring method.
7. Prove that :

$$f(4) = f(3) + \Delta f(2) + \Delta^2 f(1) + \Delta^3 f(1)$$

8. Write some applications of Eigen vectors.
