Roll No. ------------------

**MAMT-08**

**Numerical Analysis**

MA/M.Sc. Mathematics (MAMT/MSCMT)

2ndYear Examination2024 (Dec.)

**TIME: 2 Hours 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**

**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. (2×19=38)**

1. Find the root of the equation using Chebyshev method.
2. Find all the derivatives of the polynomial at , using synthetic division.
3. Solve the system of linear equation by Gauss-Jordan method:







1. Using the chebyshev polynomials, obtain the least-squares approximations of second degree for the function , where .
2. Fit a curve to the following data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 2 | 4 | 6 | 8 | 10 |
| y | 4.077 | 11.084 | 30.128 | 81.897 | 222.62 |

Also estimate y at x = 7.

**SECTION – B**

**Short – answer – type questions**

**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.* (4×8=32)**

1. Find the real root of the equation using the Regula-Falsi methodcorrect to two decimal places.
2. Find the square root of 2 using Newton-Raphson method.
3. Find the eigen values and eigen vectors of the following matrix A,



1. Transform the following matrix to tridiagonal form by Given’s method



1. Using the method of least-squares find a straight line that fits the following data :

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 71 | 68 | 73 | 69 | 67 | 65 | 66 | 67 |
| y | 69 | 72 | 70 | 70 | 68 | 67 | 68 | 64 |

Also find the value of y at x = 68.5.

1. Use Picard’s method to compute , where is the solution to the given IVP

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1. Solve the boundary value problem.

By employing shooting method, take as initial guesses.

1. Using Taylor’s series method, solve , for some t, given that.