

**ANURAG Engineering College**

(An Autonomous Institution)

I B.Tech II Semester Supplementary Examinations, Jan/Feb-2024

**MATHEMATICS – III**

(COMMON TO EEE, ECE &amp; CSE)

**Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	<b>Course Outcome</b>	<b>B.T Level</b>	<b>Marks</b>
1. Find the iterative formula for finding $\sqrt{N}$ where N is a real number using Newton-Raphson formula.	CO1	L2	2M
2. Write first approximation formula for method of False Position.	CO1	L1	3M
3. Write the formula for Lagrange's Interpolation.	CO2	L1	2M
4. Evaluate $\Delta^2(3e^x)$	CO2	L2	3M
5. Write the normal equations for fitting a straight-line $y = ax + b$ using the method of least squares.	CO3	L2	2M
6. State Newton's Cotes Quadrature formula.	CO3	L2	3M
7. Solve $\frac{dy}{dx} = 1 + xy, y(0) = 1$ using Taylor's series method and find $y(0.1)$ .	CO4	L2	2M
8. Write the formula of Adams-Bashforth Method to obtain the numerical solution of ordinary differential equation.	CO4	L2	3M
9. Form the partial differential equation by eliminating the arbitrary constants from $z = (x - a)^2 + (y - b)^2$	CO5	L2	2M
10. State the two-dimensional Laplace equation.	CO5	L2	3M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Solve the system of equations by Jacobi's Iteration Method.  
 $20x + y - 2z = 17; \quad 3x + 20y - z = -18; \quad 2x - 3y + 20z = 25$

**OR**

- B) Find a real root of the equation  $x^3 - x - 4 = 0$  using False position method.

12. A) Using Gauss's backward interpolating formula find the value of  $f(3.3)$  from the following table:

x	1	2	3	4	5
y = f(x)	15.30	15.10	15.00	14.50	14.00

**OR**

- B) Using Lagrange's Interpolation Formula, find  $f(2)$  for the following data.

x	0	1	3	4
y = f(x)	5	6	50	105

13. A) Fit a second-degree polynomial to the following data by the method of least squares: CO3 L3 10M

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

- B) Evaluate  $\int_0^2 e^{-x^2} dx$  using Simpson's rule taking  $h = 0.25$  CO3 L3 10M

14. A) Solve the differential equation  $\frac{dy}{dx} = x^2 + y, y(0) = 1$  by Modified Euler's method and compute  $y(0.02)$  and  $y(0.04)$  CO4 L3 10M

OR

- B) Obtain the values of  $y$  at  $x = 0.1, 0.2$  using Runge - Kutta method of fourth order for the differential equation  $\frac{dy}{dx} + y = 0, y(0) = 1$  CO4 L3 10M

15. A) Solve the partial differential equation  $x(y^2 - z^2)p - y(z^2 + x^2)q = z(x^2 + y^2)$  CO5 L3 10M

OR

- B) Solve by the method of separation of variables  $u_x = 2u, + u$  where  $u(x, 0) = 6e^{-3x}$  CO5 L3 10M