RTE020526AB-1

Reg No.: _____ Name : _____

Jyothi Engineering College(Autonomous)

M.Tech Degree S2 (R) Examination, May 2026 (2025 Scheme)

25PTET201- ADVANCED NUMERICAL METHODS

Total Mark: 60 **Total Time: 2hr 30min**

CO MARK

PART A

Answer All Questions

1. Solve the system of equations by Gauss elimination method.
$2x + 3y - z = 5$
$4x + 4y - 3z = 3$
$2x - 3y + 2z = 2$ CO1 (5)

2. Evaluate the solution of differential equation $y^1 = y^2 + 1$ by taking 4 terms of Maclaurin's series for $x = 0, 0.2, 0.6$ given $y(0) = 0$. CO2 (5)

3. Solve $u_{xx} = u_t$ .Given $u(0,t) = 0, u(4,t) = 0, u(x,0) = x(4-x)$ assuming h=k-1. Find the value of u up to t=5. CO3 (5)

4. What are the important steps in mathematical modeling? CO4 (5)

5. Explain natural coordinates in Finite Element Analysis. CO5 (5)

PART B

Answer Any Five Question(s)

6. Solve the following system of equations by Gauss Jacobi method.
$4x - 5y - 2z = 3, x - 10y + 3z = -3, x + 6y + 10z = -3$ CO1 (7)

7. Solve the following system of equations by Factorisation method.
$x + y + z = 1, 4x + 3y - z = 6, 3x + 5y + 3z = 4$ CO1 (7)

8. Using Euler's method , solve numerically the equation $y^1 = x + y$, $y(0) = 1$, for $x = 0, 0.2, 1.0$. CO2 (7)

9. Obtain the value of y at $0.1, 0.2$ using R-K method of fourth order for the differential equation $y^1 = -y$,given $y(0) = 1$. CO2 (7)

10. Solve $u_{xx} - 2u_t = 0$, given $u(0,t) = 0 = u(4,t), u(x,0) = x(4-x)$. Assume $h = 1$.Find the value of u upto $t = 5$. CO3 (7)

11. Explain governing equations used in engineering problems. CO4 (7)

12. Explain the Concept of Finite Element Method(FEM). CO5 (7)

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