Assignment For Academic Year 2024-25 (Beginning January 2025)

B.A. -3rd Year **Course Code: MATH304TH** **Course Title: Numerical Methods**

ASSIGNMENT-1

Attempt any TWO of the following questions. **10 Marks**

Ques 1. Find a root of equation $2x^3 - 2x - 5 = 0$ between 1 and 2 correct to three decimal places using Newton Raphson method?

Ques 2. Use secant method to find an approximate value of $3\sqrt{48}$.

Ques 3. Solve the system of equations $x_1 + x_2 + x_3 = 1$, $3x_1 + x_2 - 3x_3 = 5$, $x_1 - 2x_2 - 5x_3 = 10$ by LU decompositions method.

Ques 4. Given system of linear equations is $2x - 6y - z = -38$, $-3x - y + 7z = -34$, $-8x + y - 2z = -20$ determine the values of x, y and z using Jacobi Iterative Method?

ASSIGNMENT-2

Attempt any TWO of the following questions. **10 Marks**

Ques 1. Using Newton's Forward interpolation formula find the cubic polynomial.

x	0	1	2	3
F(x)	1	2	1	10

Ques 2. Find $f(3.8)$ for an equation $f(x) = 2x^3 - 4x + 1$ using divided difference formula $s_0 +_0 x_1 = 2$ and $x_2 = 4$ with step size $h = 0.5$.

Ques 3. Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$ $Pog_{10} 661 = 2.8202$. Use Lagrange formula to find the value of $\log_{10} 656$.

Ques 4. Find solution of an equation $x^3 + x + 2$, $x1 = 2$ and $x_2 = 4$ at $x = 2.25$ here step value (h) = 0.25 using Newton's Forward difference formula.

ASSIGNMENT-3

Attempt any TWO of the following questions. **10 Marks**

Ques 1. Evaluate the following integral $f(x) = \int_{-2}^{2} \frac{t \sin t}{5+2t} dt$ using h = 1 by trapezoidal rule.

Ques 2. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ using Simpson's $1/3$ rule taking h = $1/4$.

Ques 3. Approximate value of $\int_1^4 \left(e^{-2x} + 4x^2 - 8\right) dx$ by application of Simpson's $\frac{3}{8}$ rule with n = 3

Ques 4. Use Euler's method to find the solution to the differential equation = $\frac{dy}{dx} = 3x + 4y$ at x = 1 with the initial condition y(0) = 0 and step size h = 0.25