Seat No. : _____

DJ-102

December-2025

Integrated M.Sc. (CA & IT), Sem.-III

IDC – IMSCIT – 234T : Computer Oriented Numerical Methods (NEP)

Time : 1 Hour] **[Max. Marks : 25**

Instruction : Use of non-programmable scientific calculator is allowed.

1. (a) Use Gauss elimination method to solve the following system of linear equations : **5**

$$2x + 2y + z = 6$$

$$4x + 2y + 3z = 4$$

$$x + y + z = 0$$

1. (b) Use Newton Raphson method to calculate the value of $\sqrt[5]{27}$ correct up to four decimal places. **5**

OR

1. (a) Use Gauss Siedel method to find approximate values of x, y and z after fourth iteration for the following system of linear equations : **5**

$$7x + y + z = -1$$

$$x + 5y + z = 5$$

$$x + y + 9z = 3$$

1. (b) Find the approximate root of $x^3 - 2x - 1 = 0$, between 1.5 and 2, correct up to three decimal places using Secant method. **5**

2. (a) State and prove Newton forward interpolation formula. **5**

2. (b) Use Runge-Kutta fourth order method to find y (0.2) for the differential equation $y' = x^2 - y$ using step size as 0.1 and the initial condition y (0) = 1. **5**

OR

2. (a) Apply the modified Euler's method to solve the initial value problem $y' = x + y$, $y(0) = 0$ by taking step size 0.2. Find the value of y correct up to four decimal places when the value of $x = 0.4$. **5**

2. (b) Estimate $\int_0^3 \cos^2 x \, dx$ using Simpson's 1/3 and 3/8 rule With n = 6. **5**

3. Attempt any **five** : **5**

(1) The value of $\sqrt[3]{75}$ is _____.

(2) Prove : $(1 + \Delta)(1 - \nabla) = 1$

(3) Give one solution of $2x + 3y + z = \frac{3}{7}$.

(4) In which interval the root of the equation $f(x) = x^3 + 10x + 3 = 0$ lies ?

(5) If $f(x) = \sin(1°)$ then $f'(x)$ = _____.

(6) Define : Interpolation.

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