GIET UNIVERSITY, GUNUPUR – 765022
M. C. A(First Semester) Examinations, May – 2021
MCA20104 – Computer Oriented Numerical methods

Time: 2 hrs   Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

PART – A   **(2 x 10 = 20 Marks)**

Q.1. Answer *ALL* questions

a. What is fixed point representation?
b. Explain absolute error with an example.

c. Form the forward difference table for the following data:

X	2	5	10
Y	5	29	109

d. Find $\nabla f(x)$ if $f(x) = x^2 + 2x + 2$ and interval of differencing is unity.
e. What is the rate of convergence of Newton-Raphson method?
f. Write Lagrange's interpolation formula.
g. If n sets of x and y values are given, then what is the degree of the interpolating polynomial formed with these n points?
h. Explain the sufficient condition for Gauss-Seidel method to converge.
i. Write the difference scheme for solving the Laplace equation.
j. Draw a flowchart for implementing bisection method to solve $f(x) = 0$

PART – B   **(6 x 5 = 30 Marks)**

Answer *ANY FIVE* questions   Marks

2. Solve the equation $x\,tanx = -1$ by Regula Falsi method starting with $x_0 = 2.5\ and\ x_1 = 3.0$ correct to three decimal places   (6)

3. Evaluate $\sqrt{12}$ correct to four decimal places by Newton-Raphson method.   (6)

4. Solve the following system of equations using Gauss-Seidel method: (6)

$$4x + 2y + z = 14, x + 5y - z = 10, x + y + 8z = 20$$

5. Using Lagrange's formula for interpolation, find the value of f(4) from the following table: (6)

x	0	2	3	6
f(x)	-4	2	14	158

6. Obtain the value of $y(0.2)$ from $y' = y - x$, $y(0) = 2$ using fourth order Runge-Kutta method by taking $h = 0.1$ (6)

7. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule with h=0.2 and hence determine the value of π (6)

8. Write an algorithm to implement LU decomposition of a matrix   (6)

--- End of Paper ---