UG/PG Even Semester Examination, 2025

COMPUTER SCIENCE

(2nd Semester)

Course No.: MCSC-204

(Scientific Computation)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the right margin indicate full marks for the question.
Answer any five questions selecting one from each unit.

UNIT-I

1. (a) Write the Computational steps flowchart of Newton Raphson method. 8

   (b) Find a root of an equation $f(x)=x3-x-1$ using Newton Raphson method in 3 iteration6

2. (a) Write the Algorithm of Bisection method with example. Mention two advantages and disadvantages of using Bisection method for approximating the roots of a given equation. 8

   (b) What do you understand by the following term? Explain each one with suitable example. 6

   (i) Absolute errors

   (ii) Relative errors

UNIT-II

3. (a) Explain briefly the Lagrange's Interpolation Formula with suitable example. 10

   (b) Differentiate between Forward and Backward Difference with suitable example 4

4. (a) Using the given data form a difference table and interpolate the value of f(x) when x = 4, by applying Newton Forward Interpolation. 8

X	1	3	5	7
F (X)	150	120	90	60

   (b) Consider the following function: 6

The function $y = \sin x$ is tabulated below

x	$y = \sin x$
0	0
$\pi/4$	0.70711
$\pi/2$	1.0

Using Lagrange's Interpolation Formula find the value of sin $(\pi/6)$

UNIT-III

5. Write the algorithm of Matrix inverse method. Solve the following system of equation by using Matrix inverse method. 14

$2X + y + z = 7$

$X - y + 2z = 6$

$x + 5y - 7z = 14$

6. Use Gauss elimination method to solve the following system of equation. 14

$2x + y + x = 10$

$3x + 2y + 3z = 18$

$X + 4y + 9z = 16$

UNIT–IV

7. Explain briefly with suitable example the Trapezoidal rule. 14

8. Explain briefly with example Simpson's 1/3 and 3/8 Rule. 14

UNIT-V

9. Explain briefly the Euler's Method. Illustrate the Euler's Method, consider the differential equation y' = -y with the condition y(0) = 1.

10. Explain with suitable example Runge – Kutta Methods. Given dy/dx = y – x where y(0) = 2, find y(0.1) and y(0.2) correct to four decimal places.

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