

2019**MCA****2nd Semester Examination****NUMERICAL LAB****PAPER – 293 (PR)****Full Marks : 100****Time : 3 Hours**

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their

Own words as far as practicable.

Illustrate the answers wherever necessary.

Answer any **TWO** questions (on lottery basis)

2x35=70

1. Write a C program to determine the value of $\log_{10}203$ using Lagrange interpolation ,

From the tabulated data given below :

X	200	204	205	207
$\log_{10}X$	2.3010	2.3096	2.3117	2.3159

(Turn Over)

2. Write a C program to solve the following system of equations using Gauss Elimination method.

$$2x+2y+z=10$$

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

$$4x+2y+9z=16$$

3. Write a C program to evaluate

$$\int_0^1 \frac{dx}{1+x^2}$$

Using Simpson's 1/3 rule with 10 intervals .

4. Find the root of the following polynomial using bisection method in the interval [1,2]

$$F(x) = x^3 - 5 + 3x$$

5. Write a C program to find the smallest root of the equation

$$F(x) = x^3 - 7x^2 + 17x - 8 = 0$$

By using Newton-Raphson method.

6. Write a C program to find the approximate value of the root of the equation

$$x^3 - x + 1 = 0$$

By Regula-Falsi method . Correct upto three decimal places .

7. Write a C program to solve the following system of equations

$$x - y + z = 0$$

$$-x + 2y = 3$$

$$x - 3z = -4$$

By Gauss-Seidel method.

8. Write a C program to solve the following system of equations

$$3x_1 + 2x_2 + 2x_3 = 6$$

$$x_1 + 2x_2 - 4x_3 = 8$$

$$3x_1 - 3x_2 - 4x_3 = 4$$

By the gauss Elimination method.

9. Write a C program to calculate the value of the integral

$$\int_4^{5.2} \log x \, dx$$

By Trapezoidal rule .

10. Given $dy/dx = y - x$ where $y(0) = 2$. Write a C program to find $y(0.1)$ and $y(0.2)$

Correct to four decimal places Runge-Kutta method .

11. Write a C program to evaluate the Integral

$$I = \int_0^1 \frac{dx}{1+x}$$

Using Simpson's 1/3 rule with 8 intervals.

12. Write a C program to find the value of $f(9)$ from the table

x	1	4	7	10	13	16
F(x)	10.1234	11.2345	12.3456	13.4567	14.5678	15.6789

Using Newton's forward difference interpolation formula .

13. Write a C program to solve the following system of equations by Gauss - Jordan's method

$$x_1 + 3x_2 + 2x_3 = 17$$

$$x_1 + 2x_2 + 3x_3 = 16$$

$$2x_1 - x_2 + 4x_3 = 13$$

14. Write a C program to find $f(0.33)$ from the following table using Newton's forward

Interpolation formula.

x	0.30	0.32	0.34	0.36	0.38	0.40
F(x)	1.7596	1.7698	1.7804	1.7912	1.8024	1.8139

15. Write a C program to solve the following system of linear equations using

Gauss – elimination method .

$$0.89x_1 + 4.32x_2 - 0.47x_3 + 0.95x_4 = 3.36$$

$$1.13x_1 - 0.89x_2 + 0.61x_3 + 5.63x_4 = 4.27$$

$$6.32x_1 - 0.73x_2 - 0.65x_3 + 1.06x_4 = 2.95$$

$$0.74x_1 + 1.01x_2 + 5.28x_3 - 0.88x_4 = 1.97$$

16. Write a C program to find the solution of the following system of equations

by Gauss-Seidel method.

$$6.7x_1 + 1.1x_2 + 2.2x_3 = 20.5$$

$$3.1x_1 + 9.4x_2 - 1.5x_3 = 22.9$$

$$2.1x_1 - 1.5x_2 + 8.4x_3 = 28.8$$

17. Write a C program to evaluate the integral

$$\int_0^1 \frac{dx}{x^2 - 2x + 3}$$

by Simpson's 1/3 rule .

[Viva – Voce : 20 Marks

Practical Note Book : 10 Marks]