PG/IIS/MCA/206/25(Pr.)

MCA 2nd Semester Examination, 2025

MCA

(*Numerical Analysis*)

(Practical)

PAPER—MCA-206

Full Marks : 50

Time : 2 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Answer any **one** question on **Lottery** basis

35×1

1. Write a program for the Newton Forward interpolation formula to find $f(0.23)$ from the table :

x	0.20	0.22	0.24	0.26	0.26	0.30
y	1.6596	1.6698	1.6804	1.6912	1.7024	1.7139

2. Write a program for the Newton Backward interpolation formula to find $f(0.29)$ using the table of Q.1.

3. Write a program in C to find the root of the following equation using Regula-Falsi method

$$f(x)=x^3-4x-9$$

4. Write a program in C to find the root of the following equation using Bisection method

$$f(x)=e^x-3x=0$$

5. Write a program in C to find the root of the following equation using Secant method

$$f(x)=x^3+x^2-100=0$$

6. Write a program to find

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

By Trapezoidal formula by taking 8 intervals.

(*Continued*)

7. Write a program to find a real root of the equation $x - e^{-x} = 0$ using Newton Raphson method.

8. Write a program to solve the following linear equations by Gauss Jacobbi method :

$$4x1 + 2x2 - 2x3 = 0$$

$$x1 - 3x2 - x3 = 7$$

$$3x1 - x2 + 4x3 = 5$$

9. Write a program to find the value of $\frac{dy}{dx} = \frac{y - x}{1 + x}$ given $y(0) = 1$, find $y(0.1)$ by taking $h = 0.02$ by Runge Kutta 4th order formula.

10. Write a program to solve the system of equations using the Gauss Seidel method

$$26x1 + 2x2 + 2x3 = 12.6$$

$$3x1 + 27x2 + x3 = -14.3$$

$$2x1 + 3x2 + 17x3 = 6.0$$

11. Find the value $f(3)$ using Lagrange's interpolation formula for

x:	0	1	2	5
$f(x)$:	2	3	12	147

12. Write a program for gauss elimination method to solve the following :

$$2x+3y-z=5$$
$$3x+2y+z=10$$
$$x-5y+3z=0$$

13. Write a program for Euler's method with $h = 0.1$ to find approximate values for the solution of the initial value problem

$$y'+2y=x^3e^{-2x}, y(0)=1$$

at $x = 0.1, 0.2, 0.3x = 0.1, 0.2, 0.3$.

(*Continued*)

14. Write a program to find

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

By Simpson's 1/3 taking 10 intervals.

Viva - 10

PNB - 5
