MCA 2nd Semester Examination, 2023

MCA

[Practical]

PAPER — MCA-296

Full Marks : 100

Time : 3 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

Write the answers to questions of each Unit in separate books wherever necessary

SECTION—A

(*Numerical Analysis*)

Answer any **one** question :   35 × 1

1. Write a program for the Newton Forward interpolation formula to find $f(1915)$ from the table :

X	1891	1901	1911	1921	1931
Y	46	66	81	93	101

2. Write a program in C to find the root of the following equation using Regula-Falsi method $f(x) = x^3 - 4x - 9$.

3. Write a program to find

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

by Simpson's 1/3 and Trapezoidal formula by taking 10 intervals.

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

5. Write a program to solve the following linear equations by Gauss Jacobi method :

$$4x_1 + 2x_2 - 2x_3 = 0$$
$$x_1 - 3x_2 - x_3 = 7$$
$$3x_1 - x_2 + 4x_3 = 5$$

6. 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.

Viva — 10 Marks

PNB — 05 Marks

SECTION—B

(*Optimization Techniques*)

Answer any **one** question : 35×1

1. Write a program in C/C++ to find the solution of the following transportation.

Destination

	D1	D2	D3	D4	Supply(Si)
01	3	1	7	4	250
Source 02	2	6	5	9	350
03	8	3	3	2	400
Demand (Di)	200	300	350	150	

2. Write a program in C/C++ to find the solution of the following LPP using simplex method :

Maximize $Z = 40x_1 + 30x_2$

subject to : $x_1 + x_2 \leq 12$
$2x_1 + x_2 \leq 16$
$x_1 \geq 0; \ x_2 \geq 0.$

3. Write a program in C/C++ to find the solution of the following LPP using simplex method :

Maximize $P = 7x + 12y$

subject to : $2x + 3y \leq 6$
$3x + 7y \leq 12$
$x, \ y \geq 0.$

4. Write a program in C/C++ to find the solution of the following transportation problem —

Source	Destination				Available
	D1	D2	D3	D4	
S1	6	8	6	4	80
S2	8	6	7	8	50
S3	5	9	9	4	60
Demand	20	60	70	50	

Viva — 10 Marks

PNB — 05 Marks

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