Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - MAY 2023

Semester : Semester II - 2022
Course Code : MAT2003
Course Name : Sem IV - MAT2003 - Numerical Methods for Engineers
Program : CAI&CSE

Date : 18-MAY-2023
Time : 10.30AM - 12.00PM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. State the second approximation of Gauss Siedel method for the system of equations, $a_{11}x + a_{12}y + a_{13}z = b_1, a_{21}x + a_{22}y + a_{23}z = b_2, a_{31}x + a_{32}y + a_{33}z = b_3.$

(CO1) [Knowledge]

2. For the equation $xlog_{10}x = 1.2$, Identify the initial approximation x_0

(CO1) [Knowledge]

3. Define the first term of Newton's divided difference polynomial of $f(x)$.

(CO2) [Knowledge]

4. From the below data define Δy_0

x	2	4	6	8	10
y	12	14	17	18	24

(CO2) [Knowledge]

5. Identify u_{11}, u_{12} from the given square matrix $A = \begin{bmatrix} 6 & -2 & 11 \\ 2 & \sqrt{2} & 8 \\ 0 & 3 & 1 \end{bmatrix}$.

(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(4 X 7 = 28M)**

6. Estimate lower triangular matrix L and upper triangular matrix U from the following system of equation $x + y + z = 1; 4x + 3y - z = 6; 3x + 5y + 3z = 4$

(CO1) [Comprehension]

7. Estimate the value of y when $x = 2$ using the appropriate interpolation formula from the table given below:

x:	-1	0	1	3
y:	2	1	0	-1

(CO2) [Comprehension]

8. Identify the real root of the equation $2x^3 - 2x - 5 = 0$ correct to three decimal places. Carry out three iterations

(CO1) [Comprehension]

9. Predict the value of y at x=0.13 for the following data.

X	0.1	0.15	0.2	0.25	0.3
Y	0.1003	0.1511	0.2027	0.2553	0.3093

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 12 = 12M)**

10. Employ Gauss Seidel iteration method to find the solution of following system of equations $10x_1 + x_2 + x_3 = 12, 2x_1 + 10x_2 + x_3 = 13, 2x_1 + 2x_2 + 10x_3 = 14.$ Carry out four iterations.

(CO1) [Application]