CLASS: B.TECH   SEMESTER : IV
BRANCH: CSE/ECE/EEE   SESSION : SP/2024

SUBJECT: MA203 NUMERICAL METHODS

TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. **Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

		CO	BL

Q.1(a) Considering floating point arithmetic, perform the following arithmetic operations   [2]   CO1
and express the obtained result in 4 digit NFP:

   i) $0.6544 \times 10^{-2} + 0.9412 \times 10^{-4}$
   ii) $0.8325 \times 10^{5} - 0.8012 \times 10^{5}$

Q.1(b) The radius of a circular plate is measured as 12.65 cm instead of the actual length   [3]   CO1
12.5 cm. find the following in calculating the area of the circular plate:
(i) Absolute error (ii) Relative error (iii) Percentage error

Q.2(a) Find the approximate roots of the equation $x^3 - 2x - 5 = 0$ between $(2, 3)$ by   [2]   CO1
using bisection method correct up to two decimal place.

Q.2(b) Find the root of the equation $2x = \cos x + 3$ correct to three decimal places using   [3]   CO1
fixed-point iteration method over the interval $[0, \pi/2]$, take $x_0 = \pi/2$.

Q.3(a) Use Gauss-Jordan method to find the inverse of the following matrix   [5]   CO2

$$\begin{bmatrix} 1 & -3 & 4 \\ 2 & -5 & 6 \\ -3 & 3 & 4 \end{bmatrix}$$

Q.4(a) Find the LU decomposition of the matrix   [2]   CO2

$$\begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$$

Q.4(b) Using Gauss Seidel Method with initial approximation $(x_0, y_0, z_0) = (0,0,0)$, find   [3]   CO2
the 4-th iteration for the following linear system of equations
$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$

Take all values upto 4 decimal places.

Q.5(a) Find the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for the   [5]   CO3
below points:

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