H   Roll No. ....

TBC–405

BCA (FOURTH SEMESTER) MID SEMESTER EXAMINATION, March, 2024
COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

Time : 1½ Hours
Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Discuss various types of errors in numerical analysis and write a program to compute absolute, relative and percentage error of a given number.   ..(CO1)

OR

(b) Define normalization and its significance in numerical analysis. Using floating point arithmetic perform. 1111E51 X.4444E50 and specify the steps and the underflow and overflow conditions if any.   (CO1)

2. (a) Find a real root of the equation $x^3 - 2x - 5 = 0$ using bisection method.

(CO1)

OR

(b) Find a real root of $3x + \sin x - e^x = 0$ correct upto four decimal places using false position method. (CO1)

3. (a) Evaluate $\sqrt{35}$ using Newton-Raphson method. (CO1)

OR

(b) Solve the system of linear equation by using gauss elimination method : (CO1)

$$2x + y + z = 10$$
$$3x + 2y + 3z = 18$$
$$x + 4y + 9z = 16$$

4. (a) Apply Gauss forward formula to obtain function at 32, given that function at : (CO2)

$f(25) = \cdot2707, f(30) = \cdot3027, f(35) = \cdot3386,$
$f(40) = \cdot3794.$

OR

(b) Using Gauss backward interpolation formula, find the population for the year 1936 given that : (CO2)

Year	Population (thousand)
1901	12
1911	15
1921	20
1931	27
1941	39
1951	52

5. (a) Find the cubic Lagrange's interpolating polynomial from the following data : (CO2)

x	f(x)
0	20
1	30
2	120
5	1470

OR

(b) By means of Newton Divided Difference formula find the value of $f(8)$ from the following table :

X	F(x)
4	480
5	1000
7	2940
10	9000
11	12100
13	20280