

H

Roll No.

TMA-502

B. TECH. (FIFTH SEMESTER)

MID SEMESTER

EXAMINATION, Oct., 2023

**COMPUTER BASED NUMERICAL
TECHNIQUE**

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) Find a root of the equation $x^3 - 7x^2 - 14x - 6 = 0$ using Bisection method, correct up to three decimal places. (CO1)

OR

- (b) Use Newton-Raphson method to find the root of the equation $x^4 - x = 10$ correct to four decimal places. (CO1)

(2)

TMA-502

2. (a) Use Gauss forward interpolation formula to obtain value of $f(32)$, given that $f(25) = 0.2707$, $f(30) = 0.3027$, $f(35) = 0.3386$, $f(40) = 0.3794$. (CO2)

OR

- (b) In the following table, x = height and y = distance. Find the value of y when $x = 218$ using Newton's forward interpolation :

x	y
100	10.63
150	13.03
200	15.04
250	16.81
300	18.42
350	19.90
400	21.27

(CO2)

3. (a) Find a root of the equation $x^3 - 2x - 5 = 0$ using False-position method, correct up to three decimal places.

(CO1)

(3)

TMA-502

OR

- (b) Find the root of the equation $x^3 - 2x^2 - 4 = 0$, using the Iteration method, correct up to four decimal places.

(CO1)

4. (a) Find the value of $(1.06)^{19}$ using Gauss-Backward Interpolation : (CO2)

$$(1.06)^{10} = 1.79085$$

$$(1.06)^{15} = 2.39656$$

$$(1.06)^{20} = 3.20714$$

$$(1.06)^{25} = 4.29187$$

$$(1.06)^{30} = 5.74349$$

OR

(b)

x	$F(x)$
0	2
1	3
2	12
5	147

Find the polynomial $f(3)$ using Lagranges's formula. (CO2)

P. T. O.

(4)

TMA-502

5. (a) Apply Gauss Elimination method to solve the equations : (CO1)

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x - y - z = 4.$$

OR

- (b) Apply Gauss-Jordan method to solve the equations : (CO1)

$$10x - 7y + 3z + 5u = 6$$

$$-6x + 8y - z - 4u = 5$$

$$3x + y + 4z + 11u = 2$$

$$5x - 9y - 2z + 4u = 7.$$