Mid-Term Examination

Semester: FALL 2019

Department of Computer Science and Engineering

Course Title: **Numerical Methods** Course Code: **CSE 234**

Level & Term: **L2T3** Sections: ALL

Course Teacher: All

Full Time: **1.5 hours** Full Marks: 5×5=**25**

Solve any ***Five*** of the following problems.

1. Find a real root of the equation $\cos x - xe^x = 0$ on $[0.51, 0.52]$ correct up to 4 significant figures by using Bisection method. [5]

2. In the table below the values of y are consecutive terms of a series of which the number 21.6 is the 6th term. [5]

x	3	4	5	6	7	8	9
y	2.7	6.4	12.5	21.6	34.3	51.2	72.9

Find the 1st and 10th terms of the series.

3. Estimate $\sqrt{27}$ using Lagrange's interpolation formula: [4+1]

x	21	22	26	29	30
$\sqrt{x}$	4.58	4.69	5.10	5.39	5.48

Now compute $\sqrt{27}$ using the calculator upto four decimal places. Hence find the error Percentage.

4. The table below gives the temperature T (in °C) and length l in mm) of a heated rod. If $l = a + bT$ find the values of a and b using linear least squares. [3+2]

T	40	50	60	70	80
l	60.5	60.6	60.8	60.9	61

Draw the line.

5. Form the polynomial $f(x)$ form the table by using an appropriate method: [4+1]

x	5	7	11	13	21
$f(x)$	150	392	1452	2366	9702

Hence compute $f(12)$.

6. Explain significant digit with examples. Evaluate the sum $S = \sqrt{2} + \sqrt{5} + \sqrt{7}$ to four significant digits and find its E_A, E_R and E_p. [2+3]