International Islamic University Chittagong (IIUC)

Department of Computer and Communication Engineering

Midterm Examination

Program: **B.sc (Engg.)**
Course Code: **CCE-2401**
Total Marks: **30**

Semester: **Spring 2024**
Course Title: **Numerical Methods**
Time: **1 Hour 30 Minutes**

(i) Answer all the questions. The figures in the right-hand margin indicate full marks.
(ii) Course Outcomes (COs) and Bloom's Levels are mentioned in additional Columns.

Course Outcomes (COs) of the Questions

CLO1	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions.
CLO2	Apply numerical methods to obtain approximate solutions to mathematical problems.

Bloom's Levels of the Questions

Letter Symbols	**R**	**U**	**Ap**	**An**	**E**	**C**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Q1. **a)** Summarize the rules for determining the significant figures of **0.007008400** **CLO1** **An** **4**

b) For $f(x) = sinx$ at $x = 2$, find the following if $f'(x) \approx \frac{f(x+h)-f(x)}{h}$; **CLO1** **Ap** **6**

i) Approximate value of $f'(2)$ using $h = 0.3$
ii) True value of $f'(2)$
iii) True error of part (i)
iv) Relative true error as a percentage.

Q2. **a)** Find the root of $x^3 = 2x + 5$ by Regula Falsi method correct upto two decimal places. **CLO2** **Ap** **5**

b) Find the positive root of the equation $f(x) = x^3 - x - 1$ by Newton-Raphson method correct upto five decimal places. **CLO2** **Ap** **5**

Q3. **a)** Find the root of the equation $2x^3 - 2x - 5 = 0$ using Bisection method correct upto two decimal places. **CLO2** **Ap** **10**

Or

Q3. **a)** Applying Iteration Method, find the real root of the equation $3x = 1 + cosx$ correct upto four decimal places. **CLO2** **Ap** **10**