International Islamic University Chittagong (IIUC)
Department of Electronic and Telecommunication Engineering (ETE)
Final Examination

Program: **B.sc (Engg.)**
Course Code: **ETE-2427**
Total Marks: **50**

Semester: **Autumn 2023**
Course Title: **Numerical Analysis**
Time: **2 Hours 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

Part A

Q1. a) From the following table of values of x and y, find $\frac{dy}{dx}$ when x= 0 using Newton's Forward Difference formula.

x	0	0.1	0.2	0.3	0.4
y	1	0.9975	0.99	0.9776	0.8604

CLO12 | Ap | 5

b) Find the cubic polynomial which takes the following values y(0)=1, y(1)=0, y(2)=1, and y(3)=10. Obtain y(4).

CLO 2 | Ap | 5

OR

a) Applying Srirling's formula, find $\frac{dy}{dx}$ from the following tables of values of x and y.

i)

x	7.47	7.48	7.49	7.5	7.51	7.52	7.53
y	0.193	0.195	0.198	0.201	0.203	0.206	0.208

ii)

x	0	300	600	900	1200	1500	1800
y	135	149	157	183	201	205	193

CLO12 | Ap | 10

Q2. a) Evaluate $\int_4^{5.2} log x dx$ by Simpson's 3/8 rule.

CLO 2 | E | 5

b) Use Trapezoidal rule to compute $\int_1^2 \frac{1}{x} dx$

CLO12 | Ap | 5

Part B

Q3. a) Find y(0.2) for $y' = -y$, $x_0 = 0$, $y_0 = 1$ with step length 0.1 using Taylor's series method.

CLO 2 | Ap | 5

	b)	Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by Simpson's 1/3 rule.	CLO 2	An	
Q4.	a)	Solve the following system of equations by Gauss's Elimination method, $x+3y+2z = 5$ $2x+4y-6z = -4$ $x+5y+3z = 10$	CLO 2	Ap /C	
	b)	By Gauss-Jacobi Iteration method, solve the following system of equations, $6x+2y-z = 4$ $x+5y+z = 3$ $2x+y+4z = 27$ [upto two decimel places]	CLO 2	Ap	
		OR			
Q4.	a)	Solve the following system of equations by Gauss's-Jordan method, $x-2y = -4$ $-5y+z = -9$ $-4x-3z = -10$	CLO 2	Ap /C	
	b)	By Gauss-Seidel Iteration method, solve the following system of equations, $10x-5y-2z = 3$ $4x-10y+3z = -3$ $x+6y+10z = -3$ [upto three decimel places]	CLO 2	Ap	
Q5.	a)	Fit a straight line to the following set of data point-	CLO 2	An	

x	1	2	3	4	5
y	3	4	5	6	8

	b)	Fit a curve of form the $y = a+bx+cx^2$ following set of data point-	CLO 2	An	

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3