International Islamic University Chittagong (IIUC)

Department of Electronic and Telecommunication Engineering

Mid Term Examination

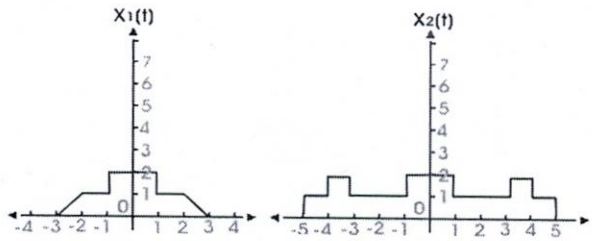
Program: **B.sc (Engg.)**
Course Code: **ETE-2325**
Total Marks: **30**

Semester: **Spring 2023**
Course Title: **Signal and System**
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	
CO1	Classify signals and systems based on their properties and determine the mathematical representations of signals and systems.
CO2	Analysis of signals transformation and predict the behaviour of Linear time invariant (TIV) system

Bloom's Levels of the Questions						
Letter Symbols	**R**	**U**	**Ap**	**An**	**E**	**C**
Meaning	Remember	Understand	Apply	Analyse	Evaluate	Create

Q1	a)	Distinguish between periodic and aperiodic signal	U	CO1	3
	b)	Determine the power and energy for the given signal $x(t) = e^{-3t}u(t)$	Ap, E	CO1	3
	c)	Find the even and odd components of the following signals (i) $x(t) = e^{-2t}cost$ (ii) $x(t) = \cos(t) + \sin(t) + \cos(t)\sin(t)$	E	CO1	4
Q2	a)	Define Amplitude Scaling, Time Scaling with classification.	R	CO1	4
	b)	Sketch the x(t) output of addition, multiplication of $x_1(t)$ and $x_2(t)$ signals in the following figure and shift the multiplication output by 4 unit negatively. 	E	CO1	4
	c)	Determine whether the given signals are periodic or non-periodic. If periodic, find out the fundamental time period (i) $x[n] = (-1)^n$ (ii) $x(t) = e^{-2t}\cos(2\pi t)$	Ap, E	CO1	2
Q3	a)	Why static system and dynamic system are called memoryless and memory with system respectively?	U	CO1	2

	b)	Determine the following systems are static or dynamic; causal or non-causal, time variant or time invariant and linear or non-linear with proper justification. (i) $y(t) = x(sint)$ (ii) $y(t) = 2t + x(t)$	An, E	CO1	8
		OR			
	a)	Define the cascade and parallel interconnection	R	CO1	2
	b)	Distinguish between Discrete Time System and Continuous Time System	U	CO1	3
	c)	Describe the following signals (i) Impulse Signal (ii) Step Signal (iii) Sinusoidal Signal (iv) Ramp Signal (v) Exponential Signal	R	CO1	5