FALL SEMESTER 2025-2026

Programme Name & Branch	: B. Tech EEE/EIE
Course Code and Course Name	: BEEE204L, Signals and Systems
Faculty Name(s)	: Amutha Prabha N, Mathew Mithra Noel & Yuvapriya T
Class Number(s)	: VL2025260101027 VL2025260101028 VL2025260101030
Date of Examination	: 18 August 2025
Exam Duration	: 90 minutes

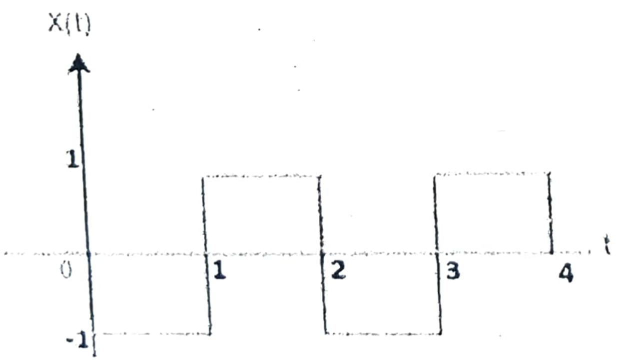
Maximum Marks: 50

General instruction(s):

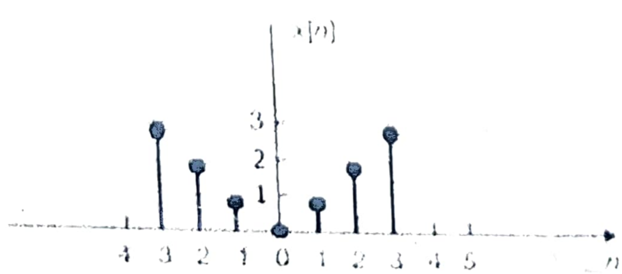
- Answer All Questions.
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyze, 5 – Evaluate, 6 – Create)
  Course Outcomes:
  CO1: Perform signal transformations on continuous and discrete - time signals and systems.
  CO2: Apply convolution integrals and convolution sums to obtain response of LTI systems.
  CO3: Apply frequency domain techniques to obtain steady state response of the continuous and discrete time LTI system.

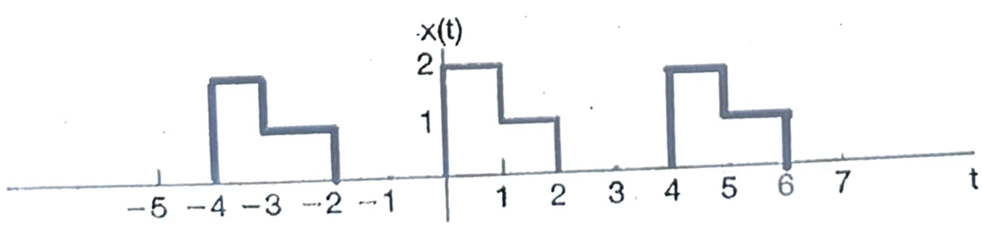
Q. No	Question	M	CO	BL
1	Consider the signals x(t) and x[n] shown below:	5	CO1	3

i) Neatly sketch $x(2t-1)$



ii) Neatly sketch $x[5n+1]$ (M: 5)



2a	Determine if the following signals are periodic and if periodic determine the fundamental period: rational D.T sig → periodic if $\frac{\omega}{2\pi} = \frac{k}{N}$ ← integers, N ← fundamental period i) $x[n] = 10cos\left(\frac{23\pi n}{5}\right)$ ii) $x(t) = Sin\, t + \sin 3t + \sin 7t$ (T > 0) T_1, T_2, T_3 | $\frac{\omega_1}{\omega_2}, \frac{\omega_2}{\omega_3}, \frac{\omega_1}{\omega_3}$ → rational — sum of sinusoids → if we check ratio of ω → rational/not	3 3	CO1	3
2b	Plot odd and even parts of the signal $x(t) = u(t)$. Where u(t) is the unit step signal. CT - normal func → (T > 0), periodic	4		
3	Determine whether the given system y(t)=x(3-2t) is (i) Memoryless (static) or dynamic → if s/m o/p only depends on i/p at the time (ii) linear or non-linear (iii) time invariant or time variant (iv) causal or non-causal (v) BIBO stable or unstable. if s/m has i) Time shift ii) Time advance/scale iii) ∫ iv) $\frac{d}{dt}$ v) any func. of past/future → dynamic Provide justification for your answers.	10	CO1	2
4	Convolve the signals $x_1[n]$ and $x_2[n]$ using the graphical convolution method: $x_1[n] = \{4\ \ 3\ \ 2\ \ 1\}$ $x_2[n] = \{2\ \ 3\ \ 2\ \ 1\}$ The signals start at n = 0.	10	CO2	3
5	Determine the Complex Exponential Fourier series representation of the signal shown below: 	10	CO3	4