



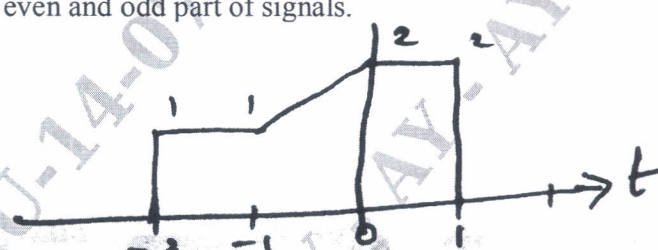
Third Semester B.E./B.Tech. Degree Examination, June/July 2025

Signals and Systems

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1				M	L	C
Q.1	a.	Explain the classification of signals.		10	L2	CO1
	b.	Derive the even and odd part of the signals.		10	L2	CO1
OR						
Q.2	a.	Sketch the even and odd part of signals.		10	L2	CO1
	b.	Find if the given signal is periodic or aperiodic signal! $x(t) = A_1 \sin 3t + A_2 \cos 4\pi t$		10	L2	CO1
Module – 2						
Q.3	a.	Derive commutative property of convolution sum.		5	L2	CO2
	b.	Derive distributive property of convolution sum.		5	L2	CO2
	c.	With an example explain convolution sum procedure using graphical method.		10	L2	CO2
OR						
Q.4	a.	Derive associative property of convolution sum.		10	L2	CO2
	b.	Find convolution sum of $x_1(n)$ and $x_2(n)$ $x_1(n) = \{1, 2, 3\}$; $x_2(n) = \{2, 1, 4\}$		10	L2	CO2
Module – 3						
Q.5	a.	Draw direct form I and II for $y(n) - \frac{1}{2}y(n-1) - y(n-3) = 3x(n-1) + 2x(n-2)$		10	L2	CO3
	b.	Find the forced response of $y'(t) + 2y(t) = \cos t u(t)$.		10	L2	CO3

OR					
Q.6	a.	Compute the forced response of $\frac{d^2y(t)}{dt^2} + \frac{5dy(t)}{dt} + 4y(t) = \frac{dx(t)}{dt}$ $y(0) = 0$; $y''(0) = 1$ and $x(t) = e^{-2t}u(t)$.	10	L2	CO3
	b.	Draw the block diagram representation of $\frac{d^2y(t)}{dt^2} + \frac{5dy(t)}{dt} + 4y(t) = \frac{dx(t)}{dt}$.	10	L2	CO3
Module – 4					
Q.7	a.	Derive frequency shifting and time differentiation for Fourier series.	10	L2	CO4
	b.	Derive Parseval's theorem for Fourier series.	10	L2	CO4
OR					
Q.8	a.	Derive modulation for Fourier series.	10	L2	CO4
	b.	Obtain the Fourier transforms of signal $x(t) = e^{-at}u(t)$ and plot magnitude and phase spectrum.	10	L2	CO4
Module – 5					
Q.9	a.	Derive linearity property of Fourier transform.	08	L2	CO5
	b.	Find DTFT $x(\Omega)$ of the signal $x(n) = (1 \ 2 \ 3 \ 2 \ 1)$ and evaluate $x(\Omega)$ at $\Omega = 0$.	12	L3	CO5
OR					
Q.10	a.	Derive time shift property of Fourier transform.	10	L2	CO5
	b.	Determine the DTFT of unit step sequence $x(n) = u(n)$.	10	L3	CO5
