Course Code: 23EE5D01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III-B. Tech I-Semester Regular Examinations (BR23), November -2025

SIGNALS AND SYSTEMS (EEE)

Time: 3 hours | Max. Marks: 70

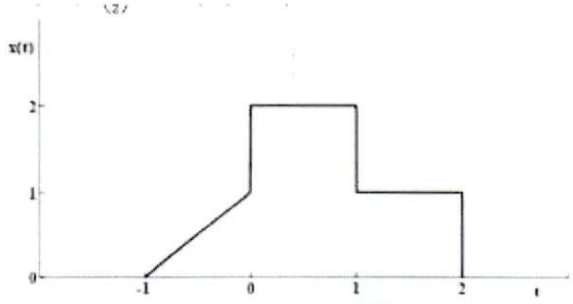
Question Paper consists of Part-A and Part-B

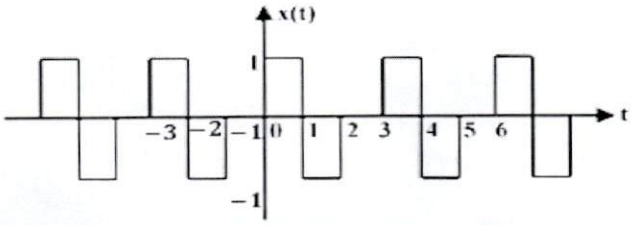
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

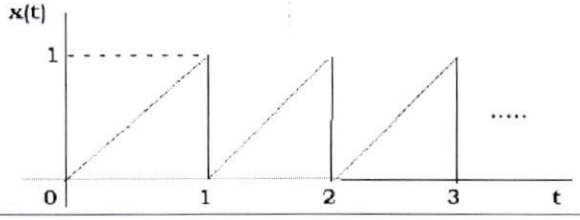
		Marks	CO	BL
1. a)	Define a system. How are the systems classified.	(2M)	CO1	BL1
b)	Discuss Time Invariant and Time Variant system with one Example.	(2M)	CO1	BL2
c)	Discuss about Dirichlet's Conditions.	(2M)	CO2	BL2
d)	Explain the Energy density spectrum.	(2M)	CO2	BL2
e)	Explain impulse sampling.	(2M)	CO3	BL2
f)	Explain LTV with one Example.	(2M)	CO3	BL2
g)	Define Region of Convergence (ROC) in Laplace Transforms.	(2M)	CO4	BL1
h)	Explain about Concept of Z-Transform.	(2M)	CO4	BL2
i)	Solve Z transform using Fourier Transform.	(2M)	CO5	BL3
j)	Explain about ROC in Laplace transform.	(2M)	CO5	BL2

PART–B (5X10 = 50M)

2a.	Define Systems and write different Classification of Signals and Systems.	5(M)	CO1	BL2
b.	Define a signal? Determine even and odd components of the following signals? i) $x(t) = \cos t + \sin t + \sin t \cos t$ ii) $x(t) = (1 + t^3)\cos^3 10t$	5(M)	CO1	BL2
	(OR)			
3a.	A continuous time signal x(t) is shown in figure Apply the following operations and sketch, label carefully. i) $x(t-4)$ ii) $x\left(\frac{t}{2}\right)$ iii) $x(4t+1)$ 	5(M)	CO1	BL2
b.	Define and sketch the unit step function and signum function? Bring out the relation between these two functions.	5(M)	CO1	BL2

4a.	Obtain the trigonometric Fourier series for the waveform shown in Fig 	5(M)	CO2	BL3
b.	Obtain the trigonometric Fourier coefficients in terms of exponential Fourier coefficients?	5(M)	CO2	BL2
	(OR)			
5a.	Explain the properties of Fourier transforms in detail.	5(M)	CO2	BL2
b.	Find the Fourier transform of the signum function and Also, sketch its magnitude and phase spectra $x(t) = \text{sgn}(t)$	5(M)	CO2	BL3

6a.	Write any two properties of cross correlation function for power signals.	5(M)	CO3	BL2
b.	Obtain the relation between correlation and convolution	5(M)	CO3	BL3
	(OR)			
7a.	Explain quantitatively about reconstruction of a signal from its sampled signal using interpolation.	5(M)	CO3	BL4
b.	Determine the Conditions for distortion less transmission through a system.	5(M)	CO3	BL3

8a.	Explain the properties of Laplace transforms.	5(M)	CO4	BL2
b.	Find the Laplace transform of the signal, also sketch its ROC. $x(t) = e^{-2t}u(t) - e^{-3t}u(t)$.	5(M)	CO4	BL2
	(OR)			
9a.	State and prove initial value and final value theorem of Laplace transforms.	5(M)	CO4	BL2
b.	Find the Laplace transform of a causal periodic signal shown in Fig. 	5(M)	CO4	BL2

10a	State and prove the Convolution Property of Z -Transform.	5(M)	CO5	BL2
b.	Find the inverse z-transform of $X(z) = \frac{z^{-1}}{3 - 4z^{-1} + z^{-2}}$; ROC: $\lvert z \rvert > 1$	5(M)	CO5	BL3
	(OR)			
11a	State and prove the initial and final value theorem in z-transform.	5(M)	CO5	BL2

b.	Define ROC? List out the properties of ROC related to z- transform.	5(M)	CO5	BL3

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