

Course Code: 23ES3T03  
 BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE  
 (AUTONOMOUS)

**II-B.TechI-Semester Regular Examinations (BR23), November -2024**  
**SIGNALS AND SYSTEMS (ECE)**

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 significance of Hilbert Transform.	(2M)	CO2	BL2
e)	Explain LTI system.	(2M)	CO3	BL2
f)	Explain LTV with one Example.	(2M)	CO3	BL2
g)	Define the Statement for Sampling Theorem.	(2M)	CO4	BL1
h)	Discuss Nyquist rate and Nyquist Interval.	(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)

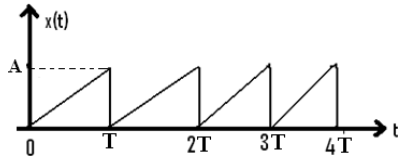
2a.	Discuss the error function while approximating signals and hence Find the Expression for condition for orthogonality between two waveforms $f_1(t)$ and $f_2(t)$ .	5(M)	CO1	BL2
b.	Discuss about elementary Continuous time Signals in Detail.	5(M)	CO1	BL2
(OR)				
3a.	Describe the basic operations on signals? Illustrate with an example.	5(M)	CO1	BL2
b.	Identify the Causality and Stability of the following system (i) $y(n) = x(n) - x(-n-1) + x(n-1)$ (ii) $y(t) = 5e^{-2t}u(t)$ .	5(M)	CO1	BL2

4a.	Solve the expression for Fourier Transform from Fourier Series	5(M)	CO2	BL3
b.	State and prove Differentiation and integration properties of Fourier Transform	5(M)	CO2	BL2
(OR)				
5a.	State and prove Parseval's relation of Fourier Series.	5(M)	CO2	BL2
b.	Develop the relation between trigonometric and exponential Fourier series coefficients.	5(M)	CO2	BL3

6a.	Explain about Poly-Wiener criterion.	5(M)	CO3	BL2
b.	Define rise time and bandwidth. Sove the relationship between them.	5(M)	CO3	BL3
(OR)				

7a.	Calculate the convolution of the following two signals: $x(t) = e^{2t} u(t)$ and $h(t) = u(t-3)$ .	5(M)	CO3	BL4
b.	Determine the Conditions for distortion less transmission through a system.	5(M)	CO3	BL3

8a.	Explain the difference between Impulse, Natural and Top Sampling.	5(M)	CO4	BL2
b.	State and explain the sampling theorem for band pass signals.	5(M)	CO4	BL2
(OR)				
9a.	Explain about Auto-correlation and list its properties	5(M)	CO4	BL2
b.	Discuss the relation between Convolution and correlation of the signals	5(M)	CO4	BL2

10a	State and prove the Convolution Property of Z -Transform.	5(M)	CO5	BL2
b.	Solve the inverse z- transform of $x(z) = z / (z + 2) (z - 3)$ when the ROC is i) ROC: $ z  < 2$ ii) ROC: $2 <  z  < 3$	5(M)	CO5	BL3
(OR)				
11a	State and prove final value theorem of Laplace transforms.	5(M)	CO5	BL2
b.	Solve the Laplace transform of the signal shown in below figure. 	5(M)	CO5	BL3

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