Course Code: 2040412 **Roll No:** **MLRS-R20**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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II B.Tech II Sem Regular End Examination, July 2022

Signals and Systems

(EEE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1.	a)	Define Signal and System. What are the major classifications of the signal?	2M	CO1	BL1
	b)	Define orthogonal functions. Give some examples of orthogonal functions.	2M	CO1	BL1
	c)	State the time shifting property of Fourier series.	2M	CO2	BL1
	d)	Explain convolution in frequency property of Fourier transform.	2M	CO2	BL4
	e)	Define LTI CT systems .What is the condition of LTI system to be stable?	2M	CO3	BL1
	f)	List and state the properties of convolution Integral.	2M	CO3	BL1
	g)	Define ROC of the Laplace Transform.	2M	CO4	BL1
	h)	Write the time reversal property of z transform	2M	CO4	BL1
	i)	Define power spectrum.	2M	CO5	BL1
	j)	Write the significance of sampling.	2M	CO5	BL1

PART- B

(10*5 Marks = 50 Marks)

2	a)	Explain the Orthogonality concept between two complex functions $f_1(t)$ and $f_2(t)$ for a real variable t	5M	CO1	BL4
	b)	State and prove the properties of Impulse function .	5M	CO1	BL3
		OR			
3		Derive the expression for component vector of approximating the function of $f_1(t)$ over $f_2(t)$ and also prove that the component vector becomes zero if $f_1(t)$ and $f_2(t)$ are orthogonal	10M	CO1	BL6
4	a)	Evaluate the trigonometric Fourier series expansion of a Half wave rectified cosine function.	5M	CO2	BL5
	b)	Find the Fourier transform of a single symmetrical gate pulse.	5M	CO2	BL3
		OR			

5		Obtain the Fourier transform of Signum function and sketch its phase spectrum.	10M	CO2	BL3
6	a)	Explain the graphical convolution with an example	5M	CO3	BL4
	b)	What is an LTI system? Derive an expression for the transfer function of an LTI system.	5M	CO3	BL6
		OR			
7		Determine whether the following systems are Linear or Nonlinear, Shift variant or Invariant, Causal or Non-causal, Stable or unstable. i) $y(t)= x(t+10)+x(2t)$ ii) $dy(t)/dt+10\ y(t)= x(t)$	10M	CO3	BL3
8	a)	Explain the properties of ROC of Z transform	5M	CO4	BL4
	b)	State and prove the following properties of Laplace transform. i)Time shifting ii) Differentiation in time	5M	CO4	BL3
		OR			
9		Find the Z transform of $x(n) = 3(1/2)^n u[n] - 2(1/4)^n u[-n-1]$.	10M	CO4	BL3
10	a)	Write the properties of power spectral density.	5M	CO5	BL1
	b)	Define sampling Theorem and discuss any one way of performing sampling	5M	CO5	BL2
		OR			
11		Explain the sampling theorem for band limited signals with graphical proof.	10M	CO5	BL4

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