Course Code: 1930403 Roll No: **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech I Sem Regular End Examination, March 2021

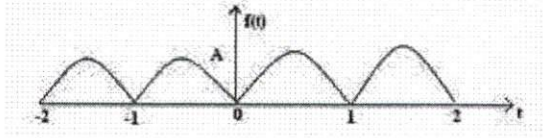
SIGNALS AND SYSTEMS

(ECE)

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

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

			CO	BL	
1	a)	Derive the expression for computing Mean Square Error in approximating a function f(t) by a set of n orthogonal functions.	7M	2	1
	b)	Derive the expression for component vector of approximating the function $f_1(t)$ over $f_2(t)$ and also prove that the component vector becomes zero if the $f_1(t)$ and $f_2(t)$ are orthogonal.	7M	2	1
2	a)	Briefly explain about the classification of signals and systems.	7M	2	1
	b)	Define the following basic signals with graphical representation. i) Unit Sample Signal ii) Unit Step Signal iii) Ramp Signal iv) Sinusoidal signal.	7M	2	1
3	a)	Find the transfer function of the system governed by the following impulse response. $h(t) = u(t) + 0.5e^{-6t}u(t) + 0.2e^{-3t}\cos t\, u(t)$.	7M	3	3
	b)	Define Hilbert Transform and determine the Hilbert transform for $x(t) = \cos(\omega t)$.	7M	3	4
4	a)	Define Time variant and invariant systems and given the system function of a LTI system be 1/jw+2 evaluate the output of the system for an input (0.9)tu(t)	7M	4	3
	b)	Check whether the following system is linear, casual and time invariant or not. $d^3y(t)/dt^3 + 4d^2y(t)/dt^2 + 5dy(t)/dt + 2y^2(t) = x(t)$.	7M	4	3
5	a)	Find the Exponential Fourier series for the rectified Sine wave as shown in figure.	7M	4	4



	b)	Define the Rise Time, Bandwidth, causality and derive the relation between Bandwidth and Rise Time.	7M	3	3

6	a)	The unilateral Laplace transform of f (t) is $1/s^2+s+1$. What is the unilateral Laplace Transform of tf(t)?	7M	4	4
	b)	Find the inverse Z-transform and ROC for the given $X(z)= \log(1/1-az^{-1})$	7M	4	4
7	a)	State the properties of the ROC of Laplace Transform and its existences.	7M	1	4
	b)	State and prove parsavel's energy theorem. And Examine the close connection between the convolution and correlation.	7M	2	4
8	a)	Define cross power density spectrum and write its properties.	7M	2	2
	b)	Define sampling process and explain impulse, natural and flat top sampling processes in detail.	7M	2	2

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