Sub Code: R2021043 **R20** **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY- GURAJADA VIZIANAGARAM
II B. Tech I Semester Supplementary Examinations, November – 2024
SIGNALS AND SYSTEMS
(ECE)

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

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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1	a)	Test whether the following signals are periodic or Not. If so find the fundamental Period (i) $x(t)= \cos(\frac{\pi}{4} t) + \sin(\frac{\pi}{8} t)$ (ii) $\cos(t + \frac{\pi}{8})$.	[7]
	b)	Sketch the following signals (i) x(t)=u(t)+2u(t-1)+u(t-2) (ii) y(t)=u(t+1)-u(t-1)	[7]
		(OR)	
2	a)	Explain the following standard signals with neat sketches (i) Unit ramp (ii) Unit step (iii) Exponential	[7]
	b)	Find whether the following signals are periodic or not? If periodic determine the fundamental Period. i. sin(10πt) ii. 5sin(100πt)+3cos(200t) iii. sin(20πt)+cos(20πt)	[7]
3	a)	Bring out the relationship between Trigonometric and Exponential Fourier series	[7]
	b)	Find the Fourier Transform of (i) sgn(t) and (ii) u(t). Comment whether these signals satisfy Dirchlet's conditions are not?	[7]
		(OR)	
4	a)	Explain any two properties of Continuous Time Fourier Series	[7]
	b)	Find the Fourier transform of the following signals (i) $e^{-3t}u(t-2)$ (ii) u(t)	[7]
5	a)	Derive the relation between ESD and autocorrelation function	[7]
	b)	Explain the following properties of system. (i) Linearity (ii) Causality (iii) Stability	[7]
		(OR)	
6	a)	What is an LTI system? Explain its properties. Derive an expression for the transfer function of a Distortion less transmission through LTI system.	[7]
	b)	Explain the characteristics of an ideal LPF and HPF.	[7]
7	a)	Find the convolution of a following signals x(t)= [u(t+2)-u(t-2)], h(t) = u(t)	[7]
	b)	Determine the autocorrelation function of a signal $x(t) = e^{-at} u(t)$	[7]

(OR)

8 a) Determine the autocorrelation function of $x(t)= e^{-at}u(t)$ [7]

b) Discover the conditions for distortion less transmission through a system. [7]

9 a) State and prove ideal sampling with neat sketches. [7]

b) Find the Laplace transform of the following signal [7]

$$e^{-at}\sin(\omega_0 t)\,u(t)$$

(OR)

10 a) Illustrate the concept of Z transform [7]

b) Write the difference between Laplace and z transform [7]

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