Q.P. Code: 16EC403 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations August-2022

SIGNALS & SYSTEMS

(Electronics And Communication Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	**a**	What are the basic operations on signals? Illustrate with an example.	**L1**	**6M**
	b	Sketch the following signals (i) $u(-t+2)$(ii)$-4r(t)$ (iii) $r(-t+3)$.	**L3**	**6M**
		OR		
2	**a**	How are signals classified? Differentiate between them.	**L1**	**6M**
	b	State the properties of continuous time Fourier series.	**L1**	**6M**
		UNIT-II		
3	**a**	State and prove the time reversal and time scaling properties of Continuous time Fourier transform?	**L1**	**6M**
	b	Find the Fourier transform of the following signals (i) impulse function (ii) $x(t) = e^{-at}u(t)$(iii) $x(t) = e^{-jw\alpha t}u(t)$	**L4**	**6M**
		OR		
4	**a**	State and prove the differentiation in time domain and differentiation in frequency domain properties of Continuous time Fourier transform?	**L1**	**6M**
	b	Find the inverse Fourier transform of $X(\omega) = e^{-j2\omega}U(\omega)$	**L4**	**6M**
		UNIT-III		
5	**a**	Obtain the conditions for distortion less transmission through a system.	**L3**	**6M**
	b	Let the system function of an LTI system is$\frac{1}{2+j\omega}$. What is the output of the system for an input$(0.8)^t u(t)$.	**L4**	**6M**
		OR		
6	**a**	Derive the transfer function and impulse response of an LTI system.	**L3**	**6M**
	b	Find the Nyquist rate and Nyquist interval for the following signals i) $rect(300t)$ ii) $10\sin(40\pi t)\cos(300\pi t)$	**L4**	**6M**
		UNIT-IV		
7	**a**	Write the properties of convolution.	**L1**	**6M**
	b	Determine the autocorrelation function and energy spectral density of $x(t) = e^{-at}u(t)$	**L4**	**6M**
		OR		
8	**a**	State and prove the time convolution theorem with Fourier transforms.	**L1**	**6M**
	b	Explain the detection of periodic signals in the presence of noise by auto correlation.	**L1**	**6M**
		UNIT-V		
9	**a**	Find the inverse Z-transform of X(z) given $X(z) = \frac{1}{1-az^{-1}}$, ROC; z|>|a|	**L4**	**6M**
	b	Find the Laplace transform of the signal $x(t) = e^{-at}u(t) - e^{-bt}u(-t)$ and also find its ROC.	**L4**	**6M**
		OR		
10	**a**	State and prove initial and final value theorems of Z-transform.	**L1**	**6M**
	b	Find the convolution of the sequences: x1(n)=(1/2)n u(n) and (1/3)n-2 u(n-2).	**L4**	**6M**

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