Reg. No: ☐☐☐☐☐☐☐☐☐☐

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

SIGNALS AND SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1	a	Write short notes on i). Unit step iib). Unit impulse iii).Unit ramp signals.	6M
	b	Check whether the following systems are causal or not?	6M
		(i) $y(t) = x^2(t) + x(t-3)$ (ii) y(t)=x(t+2) (iii) y(t)=x(-2t)	

OR

2	a	Check whether the following system is (i) static or dynamic (ii) linear or non- linear (iii) causal or non- causal $d^2 y(t)/dt^2$ +2y(t) dy(t)/dt+3ty(t)=x(t)	6M
	b	Define time-variant and time –invariant systems?	6M

UNIT-II

3	a	State and prove the time shifting and frequency shifting properties of Continuous time Fourier transform?	6M
	b	State and prove the convolution and multiplication properties of Continuous time Fourier transform?	6M

OR

4	a	State and prove the time reversal and time scaling properties of Discrete time Fourier transform?	6M
	b	Find the Fourier transform of the following signals (i) x(t)=e-3tu(t) (ii) x(t)=te-at u(t)	6M

UNIT-III

5	a	Explain clearly about ideal filter characteristics.	6M
	b	Filter characteristics of linear systems explain with neat diagrams	6M

OR

6	a	Find the Nyquist rate and Nyquist interval for the following signals i) rect(300t) ii) 10 sin 40πt cos 300πt	6M
	b	What is Aliasing? Explain in detail with spectral details of a sample data.	6M

UNIT-IV

7	a	Derive the relation between convolution and correlation.	6M
	b	State and prove the Parseval's theorem for energy signal.	6M

OR

8	a	Show that $R(\tau)$ and PSD $S(\omega)$form Fourier transform pair	6M
	b	Explain the detection of periodic signals in the presence of noise by cross correlation	6M

UNIT-V

9	a	Find the inverse Laplace transform of: X(s) = 1/ s(s+1) (s+2) (s+3)	6M
	b	Derive the relationship between Laplace transform and Z-transform.	6M

OR

10	a	Find the inverse Z-transform of X(z)= z-1 /(3-4z-1 +z-2), ROC: |z|>1	6M
	b	List out the various properties of ROC.	6M

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