Code No: R2021043 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July - 2022
SIGNALS AND SYSTEMS
(Com to ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Find whether the following signals are even or odd : (i) e^{4t} (ii) $u(t+2)-u(t-2)$ (iii) $u(-n+2)u(n+2)$	[7M]
	b)	Define orthogonal signal space and explain clearly its application in representing a signal.	[7M]
		Or	
2	a)	Distinguish between (i) Continuous-time and discrete-time systems (ii) Static and dynamic systems (iii) Causal and Non-Causal systems	[7M]
	b)	Verify whether $x(t) = Ae^{-\alpha(t}$. $u(t)$., $\alpha > 0$ is an energy signal or not.	[7M]
3	a)	Obtain the Fourier transform of the following functions. (i) Unit step function,(ii) Unit impulse function.	[7M]
	b)	Find the complex exponential Fourier series coefficient of the signal $x(t) = sin3\pi t + 2cos4\pi t$	[7M]
		Or	
4	a)	Explain the Fourier transform of signum function and also sketch. It s magnitude and phase spectra.	[7M]
	b)	What is the Significance of Hilbert Transform? Explain in detail.	[7M]
5	a)	Explain the characteristics of an ideal LPF? All ideal filters are physically not realizable: justify.	[7M]
	b)	What is an LTI system? Explain the properties involved. Check whether an ideal differentiator is LTI or not.	[7M]
		Or	
6	a)	Prove that the Transmission of a pulse through a Low Pass Filter causes the dispersion of the pulse.	[7M]
	b)	Derive the relation between bandwidth and rise time.	[7M]
7	a)	State and prove the sampling theorem for low pass signals.	[7M]
	b)	Explain the detection of periodic signals in the presence of noise by cross-correlation.	[7M]
		Or	
8	a)	Compare various sampling methods.	[7M]
	b)	Verify Parseval's theorem for the energy of the signal $x(t) = e^{-3t}u(t)$.	[7M]
9	a)	State and prove time convolution property of Laplace Transform.	[7M]
	b)	Find the Z transform of $x[n] = a^{n+1}\, u[n+1]$.	[7M]
		Or	
10	a)	Obtain the Laplace transform of $x(t) = e^{-at} \cos(\omega_o t)\, u(-t)$ and indicate its ROC.	[7M]
	b)	Find the Z Transform of $x[n] = na^{n-1}\, u[n]$.	[7M]

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