Code No: R1922026 **R19** SET - 1

II B. Tech II Semester Regular Examinations, August/September - 2021
SIGNALS AND SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Define various elementary continuous-time signals. Indicate them graphically.	[8M]
	b)	What are the properties of the Dirac delta function?	[7M]
		Or	
2	a)	Analyze the following signals and find the periodicity of the signals and its fundamental period. a) $x(t)= \sin 10\pi t+\cos 15\pi t+20\cos(20\pi t+\pi/4)$ b) $x[n]= \sin (3\pi/5)n$	[8M]
	b)	Write Short notes on (a) Unit step (b) Unit Impulse and (c) Signum.	[7M]
3	a)	Obtain the Fourier series coefficients for $x(t) = A \sin \omega_0 t$ and $B \cos \omega_0 t$.	[8M]
	b)	List out the properties of Fourier series	[7M]
		Or	
4	a)	State the dirichilet's conditions for existence of Fourier series	[8M]
	b)	Derive the expression for Exponential Fourier series co-efficients.	[7M]
5	a)	Determine the Nyquist sampling rate and Nyquist sampling interval for the signals : i) $x(t) = \text{sinc}^2(200\pi t)$ ii) $x(t) = 1+ 20 \cos 500\pi t + 40 \sin 1000\pi t$.	[8M]
	b)	State and prove sampling theorem.	[7M]
		Or	
6	a)	Compare various sampling methods.	[8M]
	b)	How to reconstruct a signal from its samples using interpolation. Explain.	[7M]
7	a)	Discuss properties of LTI systems.	[8M]
	b)	Write short notes on (a) signal bandwidth (b) system bandwidth	[7M]
		Or	
8	a)	Write the properties of convolution.	[8M]
	b)	Compare and conclude ESD and PSD functions.	[7M]
9	a)	State the properties of ROC of Laplace Transform.	[8M]
	b)	Find the Laplace transform of the following signals i) Impulse function ii) unit step function iii) $A \sin w_0 t\, u(t)$	[7M]
		Or	
10	a)	Distinguish between Fourier transform, Laplace transform and z transforms.	[8M]
	b)	Prove that the sequences $x_1(n)=a^n u(n)$ and $x_2(n)= -a^n u(-n-1)$ have the same X(z) and differ only in ROC's. Plot their ROC's	[7M]
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