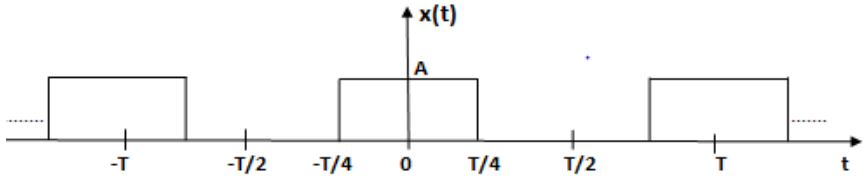
Code No: P21ECT01

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR EXAMINATIONS, JAN - 2023
SIGNALS AND SYSTEMS
(ECE BRANCH)

Time: 3 hours Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
1.	a)	With an example explain the following operations on signals: (i) time-shifting and (ii) amplitude-shifting	[7M]	1	
	b)	Determine whether or not each of the following signals is periodic. If a signal is periodic, specify its fundamental period. i. $x(t)=5\cos(5t+2)-\sin(2t-2)$ ii. $x(t)=2e^{j\left(t+\frac{\pi}{4}\right)}x(t)$	[7M]	1	
		OR			
2.	a)	Find the signal energy of these signals: $(i)\,x(t)=u(t)\,(ii)\,x(t)=tu(t)$	[7M]	1	
	b)	Test whether the following systems are static, causal, time invariant, linear, stable: $y(t)=x\left(\frac{t}{7}\right)$	[7M]	1	
		UNIT-II			
3.	a)	Discuss the analogy between vectors and signals with suitable examples.	[7M]	2	
	b)	Compute the trigonometric Fourier series expansion of the signal shown below: 	[7M]	2	
		OR			
4.	a)	With necessary examples explain the signal approximation using orthogonal functions.	[7M]	2	
	b)	Discuss the Fourier series representation of continuous time periodic signals.	[7M]	2	
		UNIT-III			
5.	a)	Determine the Fourier transform of a two-sided exponential pulse $x(t) = e^{-\lvert t\rvert}$	[7M]	3	
	b)	Explain the reconstruction of signal from its samples with neat diagrams.	[7M]	3	
		OR			
6.	a)	State and prove any two properties of Fourier Transform.	[7M]	3	
	b)	determine the Nyquist rate for the signal $x(t)=4\sin 50\pi t+2\cos 100\pi t+5\cos 150\pi t$.	[7M]	3	
		UNIT-IV			
7.	a)	Find the Convolution of the following signals: $x_1(t) = u(t)$, $x_2(t) = e^{-2t}\,u(t)$.	[7M]	4	

	b)	With an example explain the relation between convolution and correlation.	[7M]	4	
		OR			
8.	a)	Find the Convolution of the following signals using graphical convolution method: $x(t)=tu(t) \wedge h(t)=t\,u(t)$	[7M]	4	
	b)	Discuss the cross and auto correlation of functions. Also list the properties of correlation function.	[7M]	4	
		UNIT-V			
9.	a)	State and prove the time scaling and linearity properties of Laplace transform.	[7M]	5	
	b)	Determine the z-transform and the ROC of the signal: $x[n]=¿\,2(2^n)u[n]$.	[7M]	5	
		OR			
10.	a)	Find the Laplace transform X(s) and ROC of the following signal: $x(t)=\frac{1}{(s+1)(s+2)}$	[7M]	5	
	b)	State and prove any two properties of Z-transforms.	[7M]	5	

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