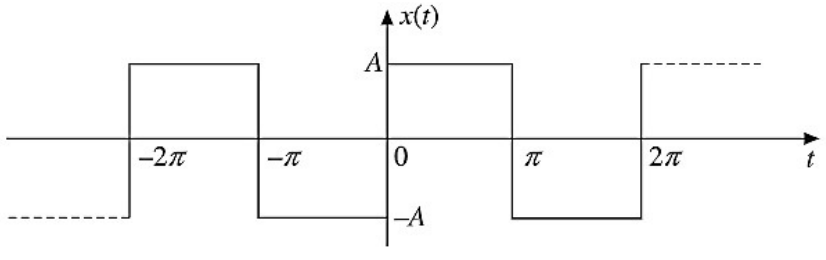
Code No: P21ECT01

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 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)	Determine whether the corresponding system is linear, time invariant or both. (i) $y(t)=t^2 x(t-3)$(ii) $y[n]=x^2[n-1]$	[7M]	1	
	b)	Discuss about various classification of signals and systems.	[7M]	1	
		OR			
2.	a)	List and explain the various operations on signals with suitable examples.	[7M]	1	
	b)	Determine whether the following systems are time-invariant or time-variant: $(i)\, y(t)=2t^2 x(t) \wedge (ii)\, y(t)=3e^3 x(t)$	[7M]	1	
		UNIT-II			
3.	a)	Explain about the signal approximation using orthogonal functions and Mean square error function.	[7M]	2	
	b)	Discuss the Fourier series representation of continuous time periodic signals. Also, list the Dirichlet's conditions.	[7M]	2	
		OR			
4.	a)	Explain the orthogonality in complex functions with suitable expressions and examples.	[7M]	2	
	b)	Determine the trigonometric Fourier series expansion for signal shown below. 	[7M]	2	
		UNIT-III			
5.	a)	Compute the Fourier Transform of the following signals. $i¿x1(t)=t\,e^{-at}u(t)$ $ii¿x2(t)=e^{at}u(-t)$	[7M]	3	
	b)	With neat sketches, illustrate the effect aliasing on signal reconstruction.	[7M]	3	
		OR			
6.	a)	Compute the Fourier Transform of $x(t)=sgn(t)$	[7M]	3	
	b)	State and prove the sampling theorem for band-limited signals.	[7M]	3	
		UNIT-IV			
7.	a)	Find the convolution of the following signals: $x(t)=r(t) \wedge h(t)=e^{-2t}u(t)$ using graphical method	[7M]	4	
	b)	State and prove Parseval's theorem for energy signals.	[7M]	4	

		OR			
8.	a)	Illustrate the response of a linear system with suitable expressions.	[7M]	4	
	b)	Explain the relation between auto correlation function and energy/power spectral density function.	[7M]	4	
		UNIT-V			
9.	a)	State and prove any two properties of Laplace transform.	[7M]	5	
	b)	Determine the z-transform of the signal $x[n]=a^n u[n] + b^n u[-n-1]$ and find its ROC.	[7M]	5	
		OR			
10.	a)	Find the inverse Laplace transform for the following signal: $X(s) = \frac{2s+1}{(s+1)(s^2+2s+2)}$	[7M]	5	
	b)	State and prove the convolution and time scaling properties of Z-transform.	[7M]	5	

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