

HALL TICKET NUMBER

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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: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.	Questions	Marks	CO	KL
1	a) Define causal and non causal signal. Give some examples.	[2M]	1	
	b) State the condition for convergence of Fourier series	[2M]	2	
	c) Define Nyquist rate.	[2M]	3	
	d) What is the condition for stability of an LTI system?	[2M]	4	
	e) How is Z-transform obtained from Laplace transform	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
2.	A rectangular function defined by $f(t) = 1; 0 < t < -1; \pi < t < 2\pi$, approximate the above function by a single sinusoid $\sin t$, Evaluate mean square error in this approximation. Also show what happens when more number of sinusoidal are used for approximations	[10M]	1	
OR				
3.	a) Explain how a function can be approximated by a set of orthogonal functions.	[5M]	1	
	b) Discuss the concept of trigonometric Fourier series and derive the expressions for coefficients	[5M]	1	
UNIT-II				
4.	a) Obtain the Fourier transform of the following functions. i) Impulse function ii) DC signal iii) Unit step function	[5M]	2	
	b) Define Fourier series and derive the relationship between trigonometric Fourier series and exponential Fourier series	[5M]	2	
OR				
5.	a) Find the Fourier transform of the following functions. i) A single symmetrical triangular pulse. ii) A single symmetrical gate pulse	[5M]	2	
	b) State the conditions for the existence of Fourier transform of a signal.	[5M]	2	
UNIT-III				
6.	a) What is aliasing? Explain its effect on sampling.	[5M]	3	
	b) Explain the terms Natural and Flat top Sampling in detail	[5M]	3	
OR				
7.	State and prove sampling theorem for band limited signals using graphical approach	[5M]	3	
UNIT-IV				

8.	a)	What is an ideal filter and Find impulse response of an ideal Low Pass Filter?	[5M]	4	
	b)	Obtain the relationship between the bandwidth and rise time of ideal low pass filter	[5M]	4	
OR					
9.	a)	Derive the relation between PSDs of input and output for an LTI system	[5M]	4	
	b)	Prove that the Transmission of a pulse through a Low Pass Filter causes the dispersion of the pulse	[5M]	4	
UNIT-V					
10.	a)	State the properties of ROC of Laplace Transform.	[5M]	5	
	b)	Find the Laplace transform of the following signals i) Impulse function ii) unit step function iii) $A \sin \omega_0 t u(t)$	[5M]	5	
OR					
11.	a)	Distinguish between Fourier transform, Laplace transform and z transforms.	[5M]	5	
	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.	[5M]	5	
