R18

ANURAG Engineering College
(An Autonomous Institution)
II B.Tech I Semester Supplementary Examinations, June/July-2024
SIGNALS AND SYSTEMS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours   Max. Marks: 75

Section – A (Short Answer type questions)   (25 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Define and sketch the following elementary signals i) Unit impulse signal ii) Signum Function	CO1	L1	2M
2.	Explain the dirichlet's conditions?	CO1	L1	3M
3.	Find the Fourier transform of Eternal Exponential Signal	CO2	L1	2M
4.	Compare Various Sampling Types?	CO2	L1	3M
5.	Classify the Systems	CO3	L1	2M
6.	Define the terms: i) Signal Bandwidth ii) System Bandwidth	CO3	L1	3M
7.	Define Parsvel's theorem	CO4	L1	2M
8.	Explain the Graphical representation of Convolution with Examples	CO4	L1	3M
9.	Define One sided & Two Sided Laplace Transforms.	CO5	L1	2M
10.	Find x (0) if X (z) is given by	CO5	L1	3M

$$X(z) = \frac{z^2+2z+2}{(z+1)(z+0.5)} \text{ (ii) } X(z) = \frac{z+3}{(z+1)(z+2)}$$

Section B (Essay Questions)
Answer all questions, each question carries equal marks.   (5 X 10M = 50M)

			Course Outcome	B.T Level	Marks
11.	A)	Explain the concept of signal estimation using orthogonal function and find mean square error?	CO1	L3	10M

OR

			Course Outcome	B.T Level	Marks
	B)	Compute the Exponential Fourier series for the full wave rectified sine wave	CO1	L3	10M

$$v(t) = V_m \sin\left(\frac{\pi}{T}\right)t \quad for \ 0 \le t \le T$$

			Course Outcome	B.T Level	Marks
12.	A)	Compute the Fourier transform of symmetrical triangular pulse from t = -1 to 1 with amplitude 1 and sketch the Spectrum.	CO2	L3	10M

OR

			Course Outcome	B.T Level	Marks
	B)	Demonstrate and prove the Sampling theorem for Band limited signals with graphical interpretation.	CO2	L3	10M

			Course Outcome	B.T Level	Marks
13.	A)	Check whether the following systems are linear, time invariant, causal and stable are not. i) $y(n)=x(n^2)$ ii) $y(n)=e^{x(n)}$	CO3	L3	10M

OR

			Course Outcome	B.T Level	Marks
	B)	The input voltage to the RC circuit is $x(t)=e^{(-t/RC)}u(t)$ and impulse response is $h(t)=(1/RC) e^{(-t/RC)}u(t)$, find the response of the system	CO3	L3	10M

14.	A)	Show that auto correlation and PSD form Fourier transform pair.	CO4	L3	10M
		OR			
	B)	i) Derive the relationship between convolution and correlation	CO4	L3	5M
		ii) Explain the relation between ACF and power spectral density function			5M
15.	A)	i) Distinguish between Fourier, Laplace and Z-transform	CO5	L3	3M
		ii) Compute the Inverse Laplace transform of			7M

$$X(s) = \frac{1}{(s+4)(s-2)} \text{ if the ROC is}$$

ROC: Re(s)<-4

<div align="center">OR</div>

	B)	Compute the Z- Transform and ROC of the Sequences	CO5	L3	10M

(i) x(n) = {2,1,-3,2,5,7} (ii) x(n)= a^{-n} u(-n)