Question Paper Code: R18A32EC04

R18

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech II Semester Supplementary Examinations, December-2024

SIGNALS AND SYSTEMS

(ELECTRICAL AND ELECTRONICS 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.	Write short notes on orthogonal vector space	CO1	L1	2M
2.	Find the energy of $x(n)=(1/2)^n\ u(n)$.	CO1	L1	3M
3.	State Dirichilet conditions for existence of Fourier Transform	CO2	L1	2M
4.	What is Duality property in FT.	CO2	L2	3M
5.	Write the condition for causality and stability in terms of impulse response of a system h(t).	CO3	L1	2M
6.	Write short notes on Signal bandwidth and System Bandwidth	CO3	L1	3M
7.	Differentiate between convolution and correlation	CO4	L2	2M
8.	Write any three properties of ESD	CO4	L2	3M
9.	What is the relation between DTFT and ZT?	CO5	L3	2M
10.	Prove that for causal sequences of infinite duration ROC is exterior of circle of radius r.	CO5	L2	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Approximate the function described below by a wave form sin(t) over the interval $(0, 2\pi)$. The function is $f(t)=\begin{cases} 1; 0 < t < \pi \\ -1; \pi < t < 2\pi \end{cases}$	CO1	L2	10M
	OR			
B)	Derive the Trigonometric Fourier Series for full wave rectified sinewave	CO1	L2	10M
12. A)	State and prove the Time shifting Property & Time integration property of Fourier Transform.	CO2	L2	10M
	OR			
B)	State and prove the Sampling theorem for Band limited signals with graphical interpretation.	CO2	L3	10M
13. A)	What are the conditions for distortion less transmission through a system and sketch the frequency response of ideal LPF, HPF.BPF & BRF.	CO3	L3	10M
	OR			
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)	Find the convolution of the following signals by graphical method. $x(t) = e^{-3t}u(t),\ h(t) = u(t+3)$	CO4	L3	10M
	OR			
B)	Derive the relation between autocorrelation function $R(\tau)$ and power spectral density S(w).	CO4	L2	10M

15. A)	Prove that the signals $x(t)=e^{-at}u(t)$ and $x(t)=-e^{-bt}u(-t)$ have the same LT but differ only in ROC.	CO5	L3	10M
	OR			
B)	Find the inverse Z-transform of $X(z) = z / (z(z-1)(z-2))$; $\|z\|>2$	CO5	L3	10M