R22

ANURAG Engineering College
(An Autonomous Institution)
II B.Tech I Semester Regular/Supplementary Examinations, December – 2024
SIGNALS AND SYSTEMS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Time: 3 Hours   **Max. Marks: 60**

Section – A (Short Answer type questions)   (10 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Differentiate between Vector and Signal	CO1	L1	1M
2.	Justify why Mean Square error criterion is preferred over Average error criterion is chosen for minimizing the error over an interval?	CO1	L5	1M
3.	Write down the trigonometric form of the Fourier series representation of a periodic signal.	CO2	L1	1M
4.	What is the Fourier transform of DC signal with amplitude 1?	CO2	L1	1M
5.	Explain with suitable example what is meant by an LTI system.	CO3	L2	1M
6.	Explain the LPF characteristics.	CO3	L2	1M
7.	State convolution property of Z transform.	CO4	L3	1M
8.	Find the L.T. of $x(t)=e^{-3t} \cos (2\pi \, 100t) \, u(t)$.	CO4	L1	1M
9.	Write the expression for cross correlation of power (periodic) signals.	CO5	L1	1M
10.	State sampling theorem for Band passes signals.	CO5	L3	1M

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

11.A)	Explain orthogonality property between two complex functions $f_1(t)$ and $f_2(t)$ for a real variable t.	CO1	L2	10M
	OR			
B)	Define the error function while approximating signals and hence derive the expression for condition for orthogonality between two waveforms $f_1(t)$ and $f_2(t)$.	CO1	L3	10M
12.A)	Obtain the relation between trigonometric Fourier series and exponential Fourier series.	CO2	L3	10M
	OR			
B)	Derive the Fourier transform of $x(t) = e^{-at} \sin(\omega t) \, u(t)$.	CO2	L3	10M
13.A)	Define time variant and shift invariant systems and given the system function of a LTI system be $1/(jw+2)$, Evaluate the output of the system for an input $(0.9) \, t \, u(t)$.	CO3	L3	10M
	OR			
B)	Differentiate between i) Linear and Non-Linear system. ii) Time-Variant and Time-Invariant.	CO3	L2	10M
14.A)	Find the Laplace Transform of i) $f(t) = \sin at \cos bt$ ii) $f(t) = t \sin at$	CO4	L3	10M
	OR			
B)	Find the Z Transform of x(n), $x[n] = (1/2)^n \, u[n]+(1/3)^n \, u[-n-1]$	CO4	L3	10M
15.A)	With the help of graphical example, explain sampling theorem for Band limited signals.	CO5	L2	10M
	OR			
B)	Find the convolution of the following signals by graphical method. $x(t)=e^{-3t}u(t)$, $h(t)=u(t+3)$	CO5	L3	10M