Question Paper Code: R18A32EC04

R18

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech II Semester Regular Examinations, June/July-2024

SIGNALS AND SYSTEMS

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

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

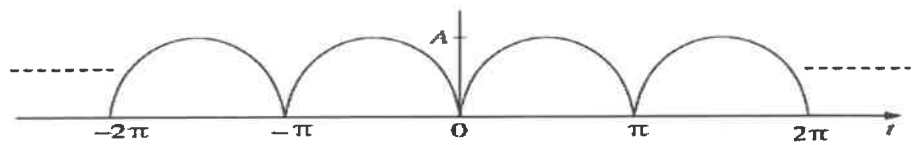
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	What is the condition for orthogonality	CO1	L1	2M
2.	Write short notes on Impulse function, Unit Step function, Signum function.	CO1	L1	3M
3.	Determine the Fundamental Period of sin(10t+2)-cos(5t-1)	CO2	L1	2M
4.	What is the affect of aliasing.	CO2	L2	3M
5.	Define Hilbert Transform	CO3	L1	2M
6.	Discuss the Poly-wiener criterion for physical realization of systems.	CO3	L1	3M
7.	What is the relation between correlation and convolution	CO4	L2	2M
8.	Write any three properties of cross correlation	CO4	L2	3M
9.	Determine Laplace transform of Impulse Signal	CO5	L3	2M
10.	What is the condition for causality of a system in terms of Z-transform.	CO5	L2	3M

Section B (Essay Questions)

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

11. A)	Show that the functions sin $n\omega_0 t$ and sin $m\omega_0 t$ are orthogonal over any interval $(t_0, t_0+\frac{2\pi}{\omega 0})$ for integer values of n and m.	CO1	L2	10M
	OR			
B)	Find the exponential Fourier series for the full wave rectified sine wave given in below figure	CO1	L3	10M



12. A)	Obtain the Fourier transform of the following functions i) Impulse function δ(t) ii) Unit step function u(t) iii) Gate function	CO2	L2	10M
	OR			
B)	State and prove the Sampling theorem for Band limited signals with graphical interpretation.	CO2	L3	10M
13. A)	Obtain the relationship between the bandwidth and rise time of ideal low pass filter.	CO3	L3	10M
	OR			
B)	Consider a stable LTI system characterized by the differential equation dy(t)/dt+2y(t)=x(t). Find its impulse response.	CO3	L3	10M

14. A)	Find the convolution of the following signals using Fourier transform $x(t)=e^{-at}u(t)$ and $x(t)=-e^{-bt}u(-t)$	CO4	L3	10M
	OR			
B)	Define auto correlation and cross correlation and state any three properties each	CO4	L2	10M
15. A)	Find the Inverse Laplace transform of $X(s) = \frac{1}{(s+4)(s-2)}$ if the ROC is i) ROC: Re(s)<-4, ii) ROC: Re(S)>2 iii) ROC: -4<Re(s)<2	CO5	L3	10M
	OR			
B)	State and prove initial and final theorem of Z-Transform.	CO5	L3	10M