R20 Regulation *Subject code:3P3DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, December 2024

SIGNALS AND SYSTEMS

(Electronics & Communication Engineering)

Maximum Marks: 70 Date:09.12.2024 Duration: 3 hours

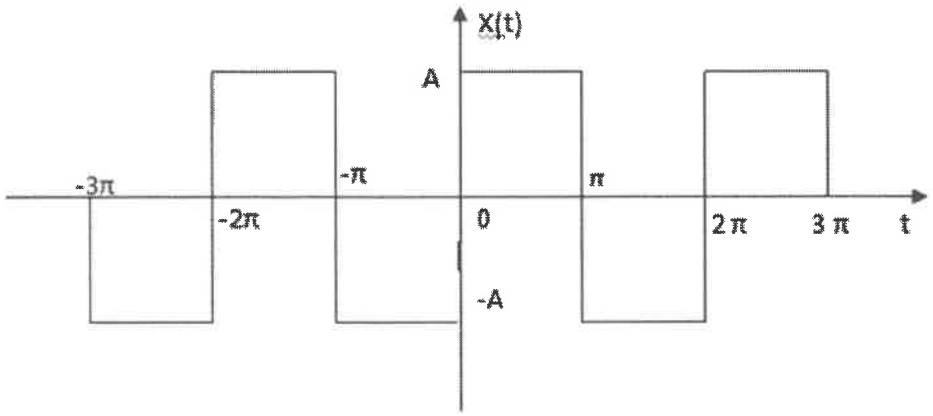
Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	Define periodic signal and non-periodic signal.	1	L1
2	Give the condition for orthogonality for signals.	1	L1
3	Write the significance of wave symmetry.	2	L1
4	State the conditions for the existence of Fourier transform.	2	L1
5	State initial value theorem of Laplace transform.	3	L1
6	What are the effects of under sampling.	3	L1
7	Write any two properties of Crosscorrelation.	4	L1
8	Define Power Spectral Density.	4	L1
9	Define the linear time-invariant system.	5	L1
10	Define a State.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	A. Explain any four operations of signals. [4M] B. Analyze the following signals $sinn\omega_0 t$ and $cosm\omega_0 t$ are orthogonal or not over the interval $(t_0, t_0 + 2\pi/\omega_0)$. [6M]	1	L2
	OR		
12	Check whether the following system $y(t)=t^2x(t)+x(t-4)$ is [10M] (a)static or dynamic (b) linear or non-linear (c) causal or non-causal (d) time variant or invariant	1	L2

13	Find the Exponential Fourier series for the Square wave shown below.[10M]  .	2	L2
	OR		
14	Find the Fourier Transform of the following signals & plot frequency response. [5+5M] a) δ(t) b) Rectangular pulse	2	L2
15	State sampling theorem & explain the different types of sampling techniques. [10M]	3	L2
	OR		
16	a) List out the relationship between Fourier Transform and Laplace Transform. [4M] b) Find the laplace transform of i)$\sin^2 3t\, u(t)$ ii)[1+sin2t cos2t]u(t) [6M]	3	L2
17	a) Write short notes on Power Spectral Density. [5M] b) State & prove properties of Auto-correlation of energy signals. [5M]	4	L2
	OR		
18	a) State & prove Frequency convolution theorem. [5M] b) Explain the detection of periodic signal in the presence of noise by Cross-correlation. [5M]	4	L2
19	a)Discuss the properties of LTI systems. [5M] b)Write notes on state space analysis and state model. [5M]	5	L2
	OR		
20	Write notes on filter characteristics of linear systems [10M]	5	L2