R18 Regulation *Subject code:2P3DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, December 2024

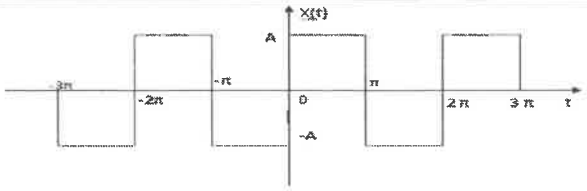
SIGNALS & SYSTEMS

(Electronics and 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	Write the expressions for total energy E and average power P of a signal.	1	L1
2	Write the significance of wave symmetry.	1	L1
3	State the conditions for the existence of Fourier transform.	2	L1
4	What are the effects of under sampling?	2	L1
5	Does the impulse response of a nonlinear system characterize the system?	3	L1
6	Define Causality of an LTI system.	3	L1
7	List out the properties of convolution.	4	L1
8	Define Cross-correlation.	4	L1
9	Why ROC cannot contain poles?	5	L1
10	Find the Z-transform of unit step function?	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	(a) Prove the power of the energy signal is zero over infinite time. [5M] (b)A rectangular function x(t) is defined by, [5M] $f(x) = \begin{cases} A, & 0 < t < \pi/2 \\ -A, & \pi/2 < t < 3\pi/2 \\ A, & 3\pi/2 < t < 2\pi \end{cases}$ Approximate the above function by a single sinusoid Acos *t* over the interval [0,2π].	1	L2
	OR		
12	Estimate the Trigonometric Fourier series for the Square wave shown below. [10M]	1	L2

			
13	Find the Fourier Transform of the following signals & plot frequency response. [5M]+[5M] a)δ(t) b)Rectangular pulse	2	L2
	OR		
14	State sampling theorem &Explain the different types of sampling techniques. [10M]	2	L2
15	Explain the classification of systems with examples each [10M]	3	L2
	OR		
16	Derive the relationship between rise time and bandwidth. [10M]	3	L2
17	a) Find the convolution of the signals $x_1(t) = \cos t\, u(t)$; $x_2(t)=u(t)$. [6M] b) State & prove time convolution theorem. [4M]	4	L2
	OR		
18	Explain about cross power spectrum density and its properties with proofs(any three properties). [10M]	4	L2
19	Analyze LTI system is described by $\frac{d^2y(t)}{dt^2}+5\frac{dy(t)}{dt}+6y(t)=x(t)$ find the impulse response of the system. [10M]	5	L4
20	Develop the inverse Z-transform of $X(z)=\frac{z}{z(z-1)(z-2)^2}$ using long division method. [10M]	5	L4