



R18 Regulation

Subject code:2P6BD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, December 2024**SIGNALS AND SYSTEMS****(EEE)****Maximum Marks: 70****Date:04.01.2025****Duration: 3 hours**

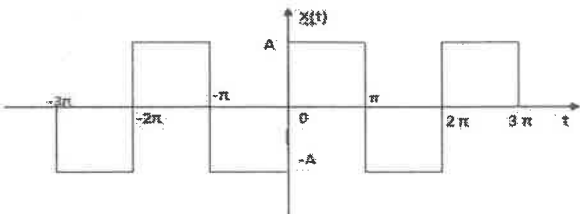
- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	Prove the power of energy signal is zero over infinite time.	1	L1
2	Write a short notes on exponential fourier series.	1	L1
3	Define Parseval's theorem.	2	L1
4	State sampling theorem.	2	L1
5	Does the impulse response of a nonlinear system characterize the system?	3	L1
6	State the conditions for stability and causality.	3	L1
7	Find the convolution of two sequences $x(n)=\{1,1,1,1\}$ and $h(n)=\{2,2\}$?	4	L1
8	What is first order hold?	4	L1
9	Find laplace transform and ROC of $e^{-at}u(-t)$.	5	L1
10	Apply Z transform on unit step signal.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	A) Develop the error function while approximating signals and hence derive the expression for condition for orthogonality between two waveforms $f_1(t)$ and $f_2(t)$. [5M] B) Show that $x(t)=2, y(t)=1-2t$ are orthogonal over the interval $[0,1]$. [5M]	1	L2
OR			
12	Analyze whether the following systems are 1.Static or dynamic 2.Linear or non-linear 3. causal or non-causal 4.Time-invariant or time-variant. A) $\frac{d^3 y(t)}{dt^3} + 2\frac{d^2 y(t)}{dt^2} + \frac{dy(t)}{dt} + 3y^2(t) = x(t+1)$ [5M] B) $y(n) = x^2(n) + \frac{1}{x^2(n-1)}$ [5M]	1	L2
13	Explain state transition matrix role in state space. [10M]	2	L2
OR			
14	Explain impulse response and step response. [10M]	2	L2

15	Estimate the Trigonometric Fourier series for the square wave shown below. [10M] 	3	L2
OR			
16	A) Apply the fourier transform of triangular function of duration $(-\tau/2, \tau/2)$ and sketch the spectrum. [5M] B) State and prove time reversal and time scaling properties of Fourier transform. [5M]	3	L2
17	A) What is ROC? Propose ROCs of various classes of signals. [5M] B) Determine the inverse laplace transform with all possible ROC's for $X(s) = \frac{1}{s(s+1)(s+2)(s+3)}$ [5M]	4	L2
OR			
18	Using the power series expansion technique, Interpret the inverse z-transform of the following. [10M] $X(z) = \frac{z}{2z^2 - 3z + 1}$ i) $z < 1/2$ ii) $z > 1$	4	L2
19	A) State and explain the sampling theorem for band pass signals. [5M] B) When does aliasing occur how can it be avoided. [5M]	5	L2
OR			
20	Derive zero order hold. [10M]	5	L2