Regulation R18 *Subject code: 2P6BD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, February 2024

SIGNALS AND SYSTEMS

(EEE)

Maximum Marks: 70 Date: 22.02.2024 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.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

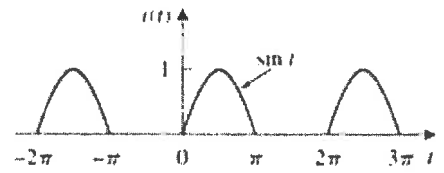
All the following questions carry equal marks (10X2M=20 Marks)

		Marks	CO	BTL
1	List the various types of sequences of the signals.	2M	CO1	L1
2	What do you mean by causality	2M	CO1	L1
3	Define impulse response & step response.	2M	CO2	L1
4	Define states space write its advantages	2M	CO2	L1
5	What is the relation between impulse response and transfer function of the system?	2M	CO3	L1
6	State and prove duality property of fourier transform.	2M	CO3	L1
7	Find laplace transform and ROC of $e^{-at}u(-t)$.	2M	CO4	L1
8	Apply Z transform on unit step signal.	2M	CO4	L2
9	Define about spectral density	2M	CO5	L1
10	Define Sampling Theorem	2M	CO5	L1

Part-B

Answer All the following questions. **(5X10M=50Marks)**

11	Analyze whether the following systems: 1.Static or dynamic 2. Linear or non-linear 3. causal or non-causal 4. Time-invaraiant or time-varaiant. $y(n)= x^2(n) + \frac{1}{x^2(n-1)}$	10M	CO1	L3
	OR			
12	Explain about the properties of the signals with suitable examples.	10M	CO1	L2
13	a) Apply the convolution of x1(t) and x2(t) , x1(t)= t u(t), x2=u(t) 14. b) Prove the convolution theorems in time domain and frequency domain.	4M 6M	CO2	L2
	OR			
14	For a particular input x(t), the system is observed to produce the output, $y(t)=e^{-3t}u(t)-e^{-4t}u(t)$, evaluate the input x(t)?	10M	CO2	L2
15	a) State and prove Parsevals theorem and time shifting property of Fourier series. b) Find the Trigonometric Fourier series of the half wave rectified sine wave as shown below.	5M 5M	CO3	L2

				
	OR			
16	a) Examine the convolution of $x(t)= e^{-t}u(t)$ and $y(t)= e^{-3t}u(t)$ using fourier transform. b) Estimate the fourier transform of the signum function.	5M 5M	CO3	L3
17	Find the Laplace transform of aperiodic signals.	10M	CO4	L2
	OR			
18	Develop the inverse Z-transform of $X(z)= \frac{z}{z(z-1)(z-2)^2}$ using long division method.	10M	CO4	L2
19	If $x(t)=e^{t}u(t)$ and $h(t)=e^{-3t}u(t)$, determine $y(t)=x(t)*h(t)$ by a) time domain b)frequency domain	5M 5M	CO5	L2
	OR			
20	a) What is over sampling and under sampling? Outline the effects of under sampling? b) Determine nyquist sampling rate and nyquist sampling interval for $x(t)=\text{sinc}(100\pi t)+3\text{sinc}^2(60\pi t)$.	5M 5M	CO5	L2