R18 Regulation *Subject code: 2P6BD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, June/July 2023

SIGNALS AND SYSTEMS

(EEE)

Maximum Marks: 70 Date:30.06.2023 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)**

1 Define the System.
2 Define a unit step.
3 Compare Fourier series and Fourier transform.
4 State the dirichilet's conditions for existence of Fourier series.
5 What is meant by of region of convergence (ROC) in Laplace transforms?
6 What is the Nyquist's Frequency for the signal $x(t) = 7\cos 500t - 11\sin 300t$?
7 What is Cross correlation?
8 List out any two properties of Auto correlation function.
9 What is the significance of state transition matrix.
10 Draw the block diagram of state model for LTIV system.

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 Discuss the various standards test signals and explain about causality and stability. 10M

OR

12 Test whether the signal $x(n) = (\frac{1}{2})^n u(n)$ energy or power signal 10M

13 (a) State and prove the convolution property of Fourier transform. 5M
(b) Find the Fourier transform of $x(t) = 100e^{-10t}$. 5M

OR

14 (a) Determine the Fourier transform of $x(t) = e^{-at}(\cos\Omega t)\, u(t)$. 5M
(b) Bring out the relationship between Trigonometric and Exponential Fourier series. 5M

15 (a) Why sampling theorem is called low pass sampling theorem? 5M
(b) The signal $g(t) = 10\cos(20\pi t)\cos(200\pi t)$ is sampled at the rate of 250 samples per second. What is the Nyquist rate for g(t) as a low-pass signal and determine the lowest permissible sampling rate for this signal? 5M

OR

16 State and prove frequency shifting and scaling property of Laplace Transform. 10M

17	Explain:	
	(a) Auto correlation	5M
	(b) Power spectral density	5M
	OR	
18	Prove that for a signal, auto correlation and PSD form a Fourier transform pair.	10M
19	(a) Formulate the relation between Laplace transform and Z-transform.	5M
	(b) Derive the Z transform for u(t).	5M
	OR	
20	(a) Derive zero order Hold.	5M
	(b) Derive the transfer function from State model.	5M