Regulation R20 Subject code: 3P3DD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, July 2 022

Signals & Systems

(Electronics and Communication Engineering)

Maximum Marks: 70 Date: 27.07.2022 **Duration: 3 Hours**

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 10 questions. Answer any 5 questions which carries 12M.
4. Each question carries 12marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10x2M=20 Marks)**

1 Define analog and digital Signal.
2 Define Causal and non-causal system.
3 Define Hilbert transform of a signal.
4 What is the need of Fourier series.
5 State initial value theorem of Laplace transforms.
6 State sampling theorem.
7 Define the Correlation of the signals.
8 What are incoherent signals?
9 Define LTI system.
10 What is the need of state space analysis?

Part-B

Answer All the Questions **(5X 10M=50Marks)**

11 a) Develop the expression for mean square error when a function is approximated in set of mutually orthogonal functions.
b) Define a signal and explain its classification. [5+5]M

OR

12 Check whether the following system $y(t)=t^2x(t)+x(t-4)$ is [10]M
(a) static or dynamic (b) linear or non-linear
(c) causal or non-causal (d) time variant or invariant

13 Find the Fourier Transform of the signals [5+5]M
a) signum function b) $e^{-a|t|}$

OR

14 Define Fourier Series? Explain its classification [10] M

15 a) Write the properties of ROC in Laplace transform. [4+6]M
b) Find the L.T and ROC of the right sided signal.
$x(t) = 4e^{-2t}u(t) + 3e^{-3t}u(t)$

OR

16 Prove that the signals $x(t) = e^{-a\,t}u(t)$ and $x(t) = -e^{-at}u(-t)$ have the same X(s) and differ only in ROC. [10]M

17 a) Compare ESD & PSD
b) State & prove properties of Cross-correlation of power signals.[5+5]M

OR

18 a) State & prove Frequency convolution theorem.[5+5]M

b) Explain the detection of periodic signal in the presence of noise by Cross-correlation.

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.[10]M

OR

20 a) Define System Bandwidth and Signal Bandwidth. [4+6]M
b) Derive the relationship between Rise time and Bandwidth.