R20 Regulation *Subject code: 3P3DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, June 2026

SIGNALS & SYSTEMS

(ECE)

Maximum Marks: 70 Date: 18.06.2026 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	Define Energy and Power signals.	2M	1	L1
2	Define Mean square error of a signal.	2M	1	L1
3	Define Hilbert transform of a signal.	2M	2	L1
4	Define the trigonometric Fourier series.	2M	2	L1
5	State initial value theorem of Laplace transforms.	2M	3	L1
6	State sampling theorem.	2M	3	L1
7	Write the differences between Auto correlation and Cross correlation.	2M	4	L1
8	What are incoherent signals?	2M	4	L1
9	Define LTI system.	2M	5	L1
10	What is the need of state space analysis.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Explain any four basic operations of signals. b) Analyze the following signals $sin n\omega_0 t$ and $cos m\omega_0 t$ are orthogonal or not over the interval $(t_0, t_0 + 2\pi/\omega_0)$.	5M 5M	1	L2
	OR			
12	Check whether the following system $y(t)=t^2x(t)+x(t-4)$ is (a) static or dynamic (b) linear or non-linear (c) causal or non-causal (d) time variant or invariant	10M	1	L2
13	Find the Fourier Transform of the signals a) signum function b) $e^{-a\|t\|}$	5M 5M	2	L2
	OR			
14	a) Explain how to obtain Trigonometric Fourier series from Exponential Fourier series. b) Explain how to obtain Exponential Fourier series from Trigonometric Fourier series.	5M 5M	2	L2

15	a) write the properties of ROC for Laplace transform. b) Find the Inverse Laplace transform of X(S)=$\frac{s+1}{s(s+1)(s+2)}$	5M 5M	3	L2
	OR			
16	Explain a) Ideal sampling b) Natural sampling techniques	5M 5M	3	L2
17	a) Write short notes on Power Spectral Density. b) State & prove properties of Auto-correlation of energy signals.	5M 5M	4	L2
	OR			
18	a) State & prove Frequency convolution theorem. b) Explain the detection of periodic signal in the presence of noise by Cross-correlation.	5M 5M	4	L2
19	a) State Paley-wiener criterion for physical realization of a system. b) What conclusions can be drawn from the paley-wiener criterion.	5M 5M	5	L2
	OR			
20	Obtain the conditions for distortion less transmission through a system.	10M	5	L2