



R18 Regulation

Subject code: 2P6BD

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, November 2025

## SIGNALS AND SYSTEMS

(EEE)

Maximum Marks: 70

Date: 13.11.2025

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.
  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	Prove the power of energy signal is zero over infinite time.	2M	1	L1
2	Write a short notes on exponential Fourier series.	2M	1	L1
3	Define state space.	2M	2	L1
4	State sampling theorem.	2M	2	L1
5	Does the impulse response of a nonlinear system characterize the system?	2M	3	L1
6	State the conditions for stability and causality.	2M	3	L1
7	Find the convolution of two sequences $x(n)=\{1,1,1,1\}$ and $h(n)=\{2,2\}$ ?	2M	4	L1
8	Explain about spectral density.	2M	4	L1
9	Estimate final value of laplace transform $X(s)=2/(s^2+4s-2)$	2M	5	L1
10	Determine Z transform of $x(n)=\{1, 2, 3, -1, 3, -2\}$	2M	5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Develop the expression for mean square error when functions is approximated in set of mutually orthogonal functions. b) Define a signal .What are different type of signals.	5M 5M	1	L2
OR				
12	State and prove time convolution and time differentiation properties of Fourier series.	10M	1	L2
13	a) Evaluate fourier transform of non periodic signal from the fourier series of a periodic signal b) Find the fourier transform of symmetrical gate pulse of duration $(-\tau/2, \tau/2)$ and sketch the spectrum.	5M 5M	2	L2
OR				
14	a) With the help of graphical example analyze sampling theorem for low pass signals : b) Explain the signal recovery from its sampled signals.	5M 5M	2	L2
15	a) A system is excited by $x(t)=e^{-3t} u(t)$ , the impulse response is $h(t)=e^{-2t} u(t)+e^{-2t} u(t)$ .Measure the output for the system.	5M	3	L2

	b) Derive the Parsevals theorem.	5M		
	OR			
16	a) Discuss the classification of systems. b) Measure the systems stability, causality and linearity i) $y(t)=e^{x(t)}$ ; $ x(t)  < 10$ ii) $y(t)=x(t^2)$ iii) $y(t) = \int_{\tau=0}^{\infty} x(t-\tau) d\tau$	6M 4M	3	L2
17	a) Determine the convolution of two functions $x(t)=a e^{-at}$ ; $y(t)=u(t)$ . b) Obtain relation between convolution and correlation.	5M 5M	4	L2
	OR			
18	a) Explain the Fourier transform of standard test signal. b) What is the necessary and sufficient condition on impulse response for stability?	5M 5M	4	L2
19	a) What is ROC? Propose ROCs of various classes of signals. b) Determine the inverse laplace transform with all possible ROC's for $X(s)=\frac{1}{s(s+1)(s+2)(s+3)}$	5M 5M	5	L2
	OR			
20	a) Define inverse Z transform. Explain in detail the different methods in finding the inverse Z transform. b) Develop the inverse Z-transform of $X(z)=\frac{z}{z(z-1)(z-2)^2}$ using long division method.	5M 5M	5	L2