



B.Tech III Semester Regular/Supplementary Examinations, December 2024
SIGNALS AND SYSTEMS
 (ECE)

Maximum Marks: 60

Dte: 11.12.2024

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 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		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	Sketch the unit step function and signum function	1	L1
b)	What is an orthogonal function?	1	L1
c)	Compare Fourier series and Fourier transform.	2	L1
d)	Define Hilbert transform of a signal $x(t)$.	2	L1
e)	Define Laplace transforms.	3	L1
f)	Define Nyquist rate.	3	L2
g)	Define convolution integral.	4	L1
h)	Distinguish between the Autocorrelation and Crosscorrelation of signals	4	L2
i)	What is system band width?	5	L1
j)	What is state space analysis?	5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
2	Compute whether the given signals $\sin(n\omega_0 t)$ & $\cos(m\omega_0 t)$ are orthogonal are not over the interval $(t_0, t_0 + (2\pi/\omega_0))$. [10M]	1	L3
OR			
3	a) Determine energy and power of signal $x(t) = tU(t)$ [3M] b) Explain any two types of classification of signals with examples. [7M]	1	L3
4	Estimate the Fourier transform of the following functions: a) Impulse signal [5M] b) Single symmetrical gate pulse. [5M]	2	L4
OR			
5	Evaluate the Fourier series representation of the signal. [10M]	2	L4

6	Analyze the Laplace transform following signal and its ROC. [10M] $x(t) = \delta(t) - \frac{4}{3}e^{-t}u(t) + \frac{1}{3}e^{2t}u(t)$	3	L4
	OR		
7	State and evaluate Sampling theorem. [10M]	3	L4
8	Explain the graphical approach for computing the convolution integral with an example? [10M]	4	L4
	OR		
9	State and prove the properties of auto correlation function also analyze. [10M]	4	L4
10	a) Explain linear time invariant (LTI) system? Derive an expression for the transfer function of LTI system. [5M] b) Explain various Ideal filter characteristics. [5M]	5	L3
	OR		
11	Develop the relationship between band width and rise time? [10M]	5	L3