



B.Tech VI Semester Supplementary Examinations, July 2024

SIGNALS AND SYSTEMS
(EEE)

Maximum Marks: 70

Date: 26.07.2024 Duration: 3 hours

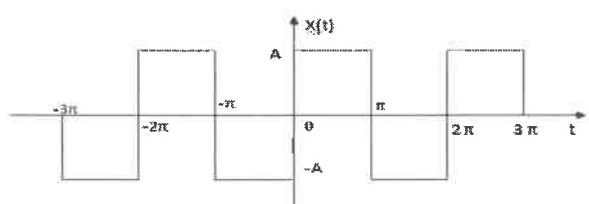
- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Prove the power of energy signal is zero over infinite time.	1	L1
2	Write a short notes on exponential fourier series.	1	L1
3	State and prove duality property of fourier transform.	2	L1
4	Define Nyquist interval.	2	L1
5	Is the system describe by the equation $y(t) = x(2t)$ Time invariant or not? Why?	3	L1
6	Define state space.	3	L1
7	Determine the convolution of the signals $x(n)=\{2,-1,3,2\}$ & $h(n)=\{1,-1,1,1\}$	4	L1
8	Define hold device.	4	L1
9	State and prove initial value theorem of Laplace transform.	5	L1
10	Apply Z transform on unit step signal.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Analyze whether the following systems are 1. Static or dynamic 2. Linear or non-linear 3. causal or non-causal 4. Time-invariant or time-variant. a) $\frac{d^3 y(t)}{dt^3} + 2 \frac{d^2 y(t)}{dt^2} + \frac{dy(t)}{dt} + 3y^2(t) = x(t+1)$ [5] b) $y(n) = x^2(n) + \frac{1}{x^2(n-1)}$ [5]	1	L3
OR			
12	a) Explain the stability with an example. [5] b) Explain odd and even functions. [5]	1	L1
13	a) Estimate the convolution of the two continuous-time functions [5] $x(t) = 3 \cos 2t$ for all t and $y(t) = e^{- t } = \begin{cases} e^t; & t < 0 \\ e^{-t}; & t \geq 0 \end{cases}$ b) Derive Impulse response for step input. [5]	2	L3

	OR		
14	Explain different types of properties of signal. [10]	2	L2
15	a) Apply the Fourier transform of triangular function of duration $(-\tau/2, \tau/2)$ and sketch the spectrum. [5] b) State and prove time reversal and time scaling properties of Fourier transform. [5]	3	L3
	OR		
16	Estimate the Trigonometric Fourier series for the square wave shown below. [10]	3	L3
			
17	a) Analyse an LTI system whose response to the input $x(t)=[2e^{-t}-e^{-3t}]u(t)$ is $y(t)=[3e^{-2t}-3e^{-4t}]u(t)$. Find the system's impulse response using Laplace transform. [5] b) Compare Laplace transform and Fourier transform. [5]	4	L3
	OR		
18	a) Define inverse Z transform. Explain in detail the different methods in finding the inverse Z transform. [5] b) Develop the inverse Z-transform of $X(z)=\frac{z}{z(z-1)(z-2)^2}$ using long division method. [5]	4	L2
19	a) State and explain the sampling theorem for band pass signals. [5] b) When does aliasing occur how can it be avoided. [5]	5	L2
	OR		
20	Derive zero order hold and first order hold. [10]	5	L2