

Department of Computer Science & Engineering
School of Engineering Sciences & technology
JamiaHamdard
Odd Semester

Supplementary Examination: 2023

Time: 3 Hrs

Subject Name: Signals and Systems

Marks: 75

Subject Code: BTCSE 501

Note: Please do proper numbering of Attempted Question. Use of calculator is not allowed.

Section A

Note: All the Questions are Compulsory. Each question carry equal marks

[7 x 5 marks = 35 marks]

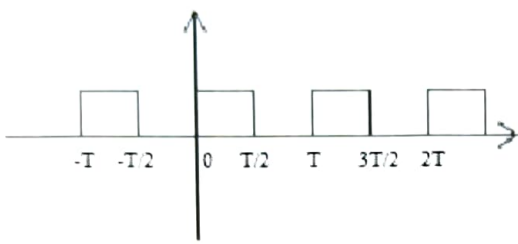
Q.No	Question	CO	BL
Q1	Discuss the different types of basic signals along with their waveform and properties wherever available	CO1	L1
Q2	Using the discrete time signals $x_1[n]$ and $x_2[n]$ shown below, perform the following functions and draw the graph. a. $y[n] = x_1[n] + x_2[n]$ b. $y[n] = 2x_1[n]$ c. $y[n] = x_1[n]x_2[n]$	CO2	L3
Q3	Consider a continuous time system with input output relation $y(t) = T\{x(t)\} = \sum_{k=-\infty}^{\infty} x(t)\delta(t - kT_s)$ Determine whether the system is (a) Linear, (b) time-invariant.	CO1	L3
Q4	a) Find the Fourier transform of the following signals : $x(t) = e^{-j\omega t}$ b) Find the Inverse Fourier Transform of $X(\omega) = \frac{1}{(a+j\omega)^2}$	CO3	L4
Q5	Discuss the initial value and final value theorem of Laplace Transform with proof. Find the IVT and FVT for the given $F[S]$ $F[S] = \frac{2(S+2)}{s(S+1)(S+3)}$	CO4	L5
Q6	Discuss the conditions should be satisfied for a function to be Fourier transformable?	CO3	L1
Q7	What is the difference between deterministic and non-deterministic signals? Discuss with the help of a suitable example for each	CO1	L1

Section B

Note: Attempt any four questions. Each question carry equal marks

[4 x 10 marks = 40 marks]

Q. No	Question	CO	BL
Q1	Show that if $x(t+T) = x(t)$, then $\int_{\alpha}^{\beta} x(t) dt = \int_{\alpha+T}^{\beta+T} x(t) dt$	CO2	L4

	$\int_0^T x(t) dt = \int_a^{a+T} x(t) dt$ For any real α, β and a		
Q2.	Discuss the concept of ROC in Z-Transform and Laplace Transform along with their properties. Find the Z-transform of the following sequences a. $x[n] = \delta[n-n_0]$ b. $x[n] = u[n-n_0]$	CO5	L3
Q3.	Find the following: a. Fourier series of the following waveform  b. Fourier transform of the $x(t) = \cos(\omega_0 t)$, and $x(t) = \sin(\omega_0 t)$	CO3	L4
Q4.	Find inverse Laplace transform of the following $X(s)$ a. $X(s) = (2S+1)/(s+2), \text{Re}(s) > -2$ b. $X(s) = (s^2+6s+7)/(s^2+3s+2), \text{Re}(s) > -1$	CO4	L5
Q5.	What is sampling and aliasing? With the help of suitable waveforms explain the comparison between Ideal, Natural and Flat top sampling	CO2	L2
Q6.	Determine and sketch the even and odd components of the following signals: a) $x(t) = \begin{cases} t; & 0 \leq t \leq 1 \\ 2-t; & 1 \leq t \leq 2 \end{cases}$ b) $x[n] = e^{-[n/4]}u[n]$	CO1	L6

BL – Bloom's Taxonomy Levels

(1- Remembering, 2- Understanding, 3- Applying, 4- Analyzing, 5- Evaluating, 6- Creating)

CO-Course Outcomes