

National Institute of Technology, Delhi

Name of the Examination: B.Tech.

Re-Mid-Semester Examination (November 2023)

Branch : Electrical Engineering

Semester : 3rd

Title of the Course : Signal and Systems

Course Code : EELB 203

Time: 1.5 Hours

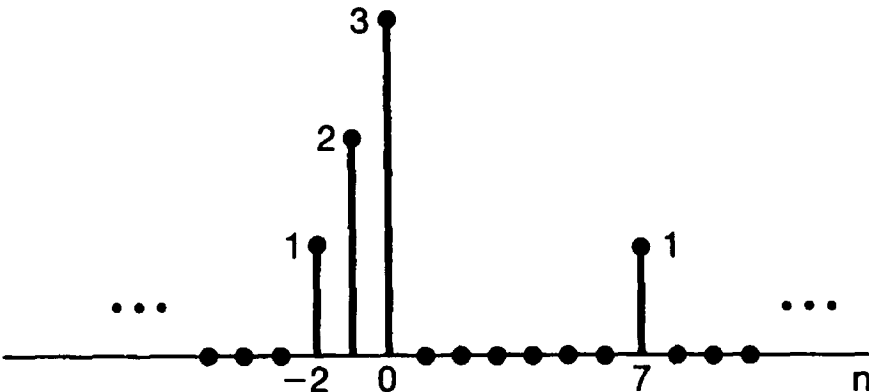
Maximum Marks: 25

Note : 1. All the 05 questions are compulsory

2. All the symbols have their usual meaning. Assume any data suitably if found missing.

CO – Course Outcomes; **BL** – Bloom's Taxonomy Levels

Q. No.	Questions	Marks	CO	BL
1	<p>Consider the following information about a linear system S:</p> <p>(i) If the input $x(t) = e^{j2t}$, the corresponding output of S is $y(t) = e^{j3t}$.</p> <p>(ii) If the input $x(t) = e^{-j2t}$, the corresponding output of S is $y(t) = e^{-j3t}$.</p> <p>Compute the output of the system S if the input to the system is $\cos\left(2\left(t - \frac{1}{2}\right)\right)$</p>	5	CO1	L3
2	<p>Consider a discrete-time system described by</p> $y[n] = x[n - 2] x[n]$ <p>(a) Determine whether the system is memoryless?</p> <p>(b) Determine the output of the system when the input is $K \delta[n]$, where K is a any number.</p> <p>(c) Is the system invertible?</p>	5	CO1	L4
3	<p>A causal LTI system is described by the following difference equation</p> $y[n] = \frac{1}{4} y[n - 1] + x[n]$ <p>Compute the output $y[n]$ if the input $x[n] = \delta[n - 1]$.</p>	5	CO2	L3

4	<p>Compute the output of the discrete-time system if the input is given by</p> $x[n] = \left(\frac{1}{3}\right)^{-n} u[-n - 1]$ <p>and the impulse response of the system is given by</p> $h[n] = u[n - 1].$	5	CO2	L3
5	<p>Determine and sketch the even and odd parts of the signal shown below.</p> 	5	CO1	L4