

**Department of Electrical Engineering**

**Assignment**

**Date: 20/04/2020**

**Course Details**

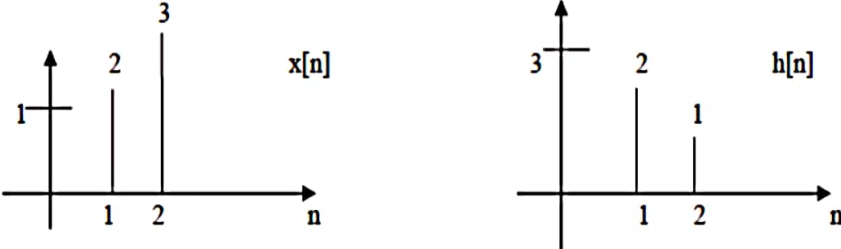
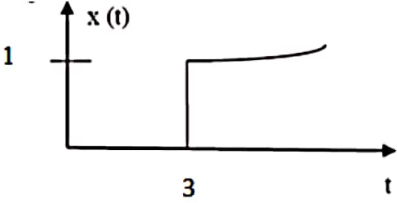
**Course Title:** Signals & Systems  
**Instructor:** \_\_\_\_\_

**Module:** 04  
**Total Marks:** 30

**Student Details**

**Name:** \_\_\_\_\_

**Student ID:** \_\_\_\_\_

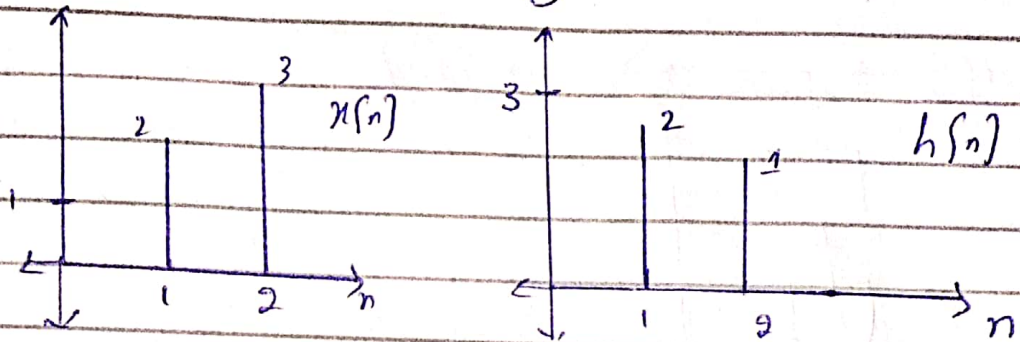
Q1.	(a)	<p><b>Evaluate</b> <math>y[n]</math> using convolution summation.</p> 	Marks 08
			CLO 2
	(b)	<p><b>Sketch</b> block diagram for the given system.  <math>y[n] = x[n] + x[n - 2]</math></p>	Marks 06
			CLO 2
Q2.	(a)	<p><b>Sketch</b> the transformed versions for the signal <math>x(t)</math> mentioned in i. and ii.</p>  <p>i. <math>x(t + 5)</math> and <math>x(3t)</math>                      ii. <math>x(t/4)</math> and <math>x(t-2)</math></p>	Marks 08
			CLO 1
	(b)	<p><b>Outline</b> the given system as invertible or non-invertible, linear or non-linear, causal or non-causal. Give the reason for your answers too.</p> <p>i. <math>y[n] = x^2[n]</math>                      ii. <math>y[n] = x[n + 2]</math></p>	Marks 06
			CLO 1
Q3.		<p>Fill in the blank.                      If a time shift in the input signal results in an identical time shift in the output signal, the system is said to be _____</p>	Marks 02
			CLO 1

①

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QNO ①

② Evaluate using convolution sum.



Solution:

$$x[n] = x[n] + 2x[n-1] + 3x[n-2]$$

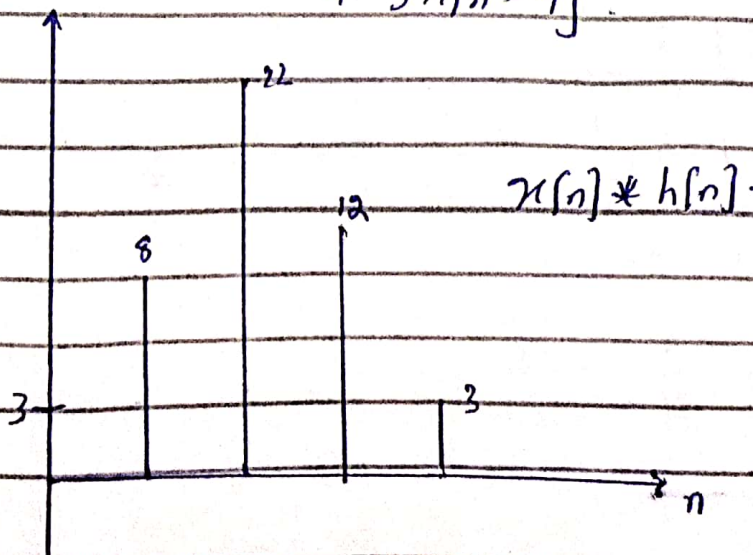
$$h[n] = x[n-2] + 2x[n-1] + 3x[n]$$

$$h[n] = 3x[n] + 2x[n-1] + x[n-2]$$

$$x[n] * h[n] = [x[n] + 2x[n-1] + 3x[n-2]] * [3x[n] + 2x[n-1] + x[n-2]]$$

$$x[n] * h[n] = 3x[n] + 6x[n-1] + 9x[n-2] + 2x[n-1] + 4x[n-2] + 6x[n-3] + 9x[n-2] + 6x[n-3] + 3x[n-4]$$

$$x[n] * h[n] = 3x[n] + 8x[n-1] + 22x[n-2] + 12x[n-3] + 3x[n-4]$$



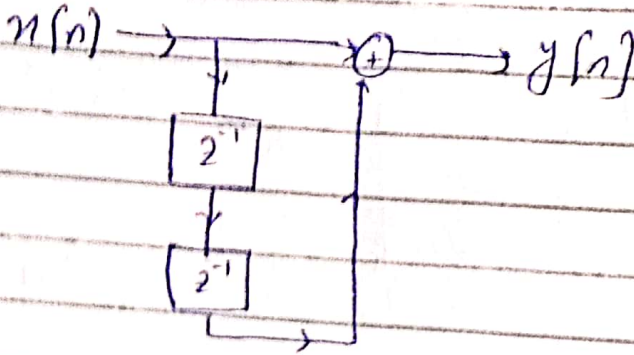
(2)

(1) No 1 (b)

Sketch block diagram.

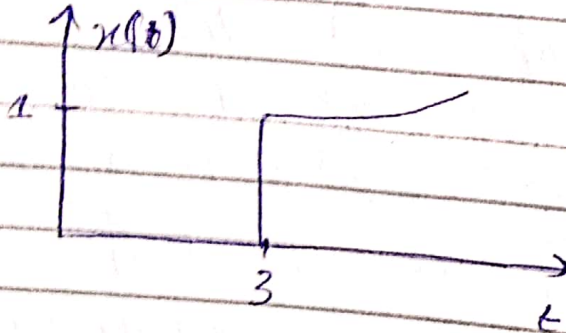
$$y[n] = x[n] + x[n-2]$$

Solution:

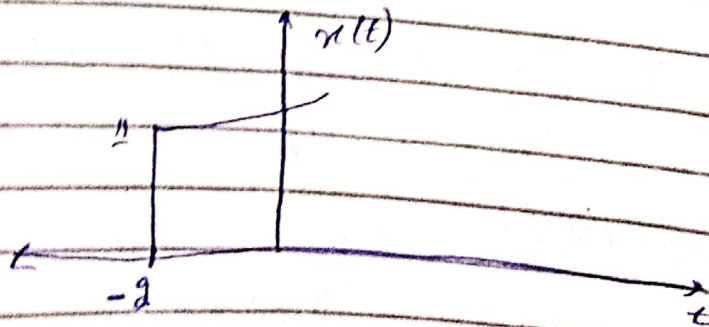


(1) No 2

(a)



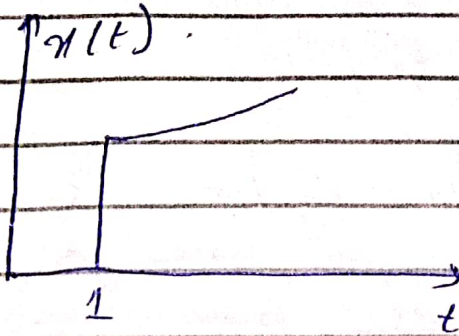
(1)  $x(t+5)$



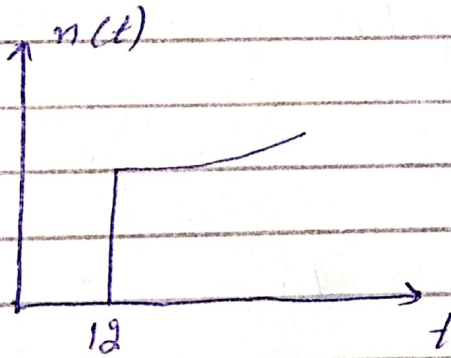
P.T.O

3

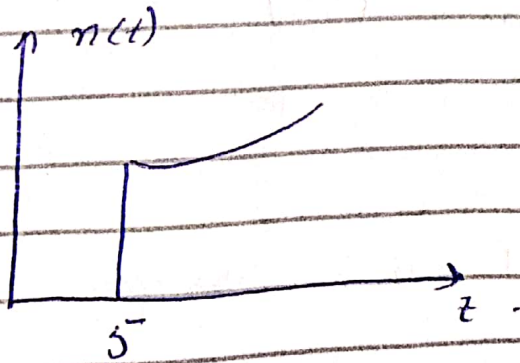
$x(3t)$



ii)  $x(t/4)$



$x(t-2)$



P.T.O

(4)

Q NO 2

(a)

$$y[n] = x^2[n]$$

Answer: The system is non invertible because for one or two input it gives more than 1 value. The system is linear and causal.

(b)  $y[n] = x[n+2]$

Ans: The system is invertible linear and non causal.

Q NO 3

fill in blanks:

if a time shift in the input results in an identical time shift in the output signal, the system is said to be Linear system.