Department of Electrical Engineering
Assignment
Date: 20/04/2020

Course Details

Course Title: Signals & Systems **Module:** 04

Instructor: **Total Marks:** 30

Student Details

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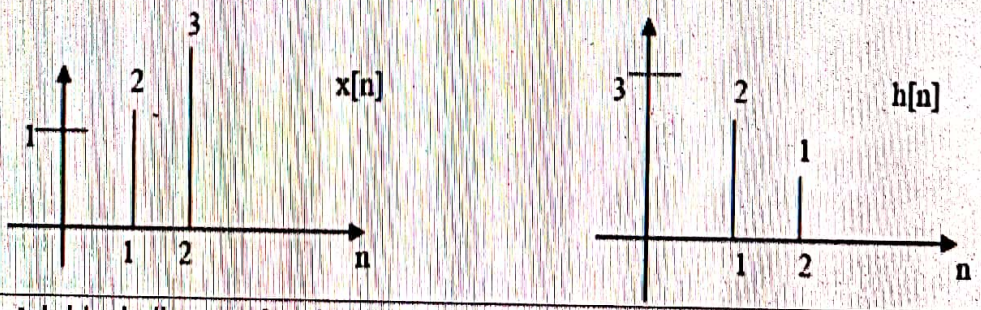
Q1.	(a)	**Evaluate** y[n] using convolution summation. 	Marks 08	CLO 2
	(b)	**Sketch** block diagram for the given system. $y[n] = x[n] + x[n-2]$	Marks 06	CLO 2
Q2.	(a)	**Sketch** the transformed versions for the signal x (t) mentioned in i. and ii.	Marks	

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Question 1 (a)

Answer:- The summation is called the convolution sum of the sequence $x[n]$ and $h[n]$ and represented compactly as

$$y[n] = x[n] * h[n]$$

As we know

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

and

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

$$x[n] = x[0]\,\delta[n] + x[1]\,\delta[n-1] + x[2]\,\delta[n-2]$$

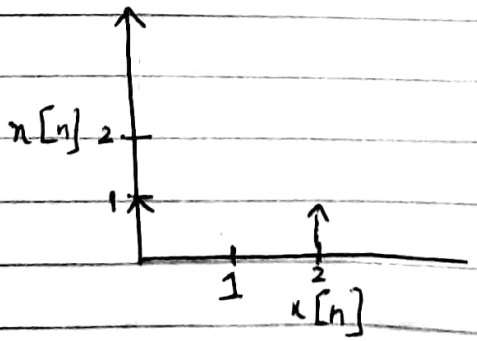
$$y[n] = x[0]\,\delta[n] + x[1]\,\delta[n-1] + x[2]\,\delta[n-2]$$

$$x[n] = \sum_{k=0}^{2} x[m]\,\delta[n-k]$$

for $y[n] = \sum_{k=0}^{2} x[m]\,\delta[n-k]$

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

The graph is



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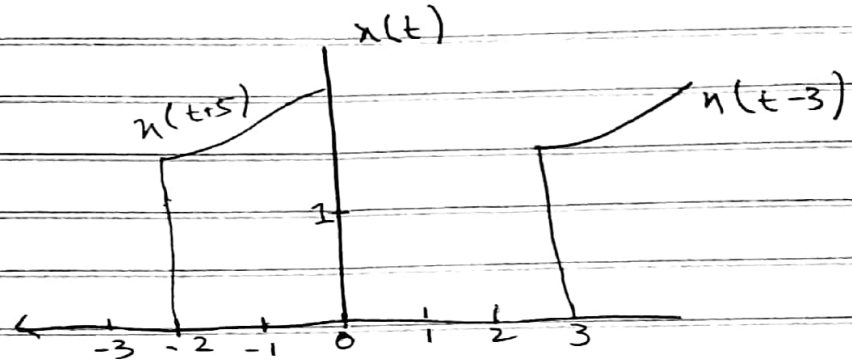
Question 2 (a)

Answer:-

$y(t) = x(t-3)$, $z(t) = x(t+5)$



The above figure shows translation which is from right to left.

At $t = 3$, $u(t) = 1$

At $t+5 = 3$, $u(t) = 1$

$t = -5 + 3$

$t = -2$

Compression :- $x(3t)$

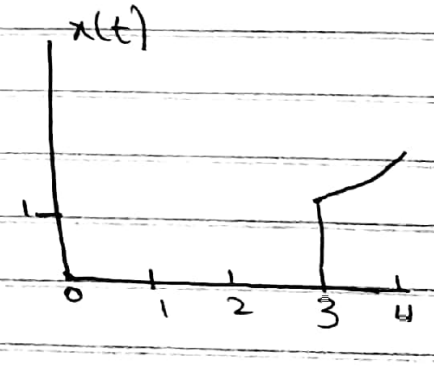
At $t = 3$, $u(t) = 1$

At $3t = 3$, $x(3t) = 1$

$3t = 3$

$t = 3/3$

$t = 1$



So $y(t) = x(t-3)$, $z(t) = x(3t)$

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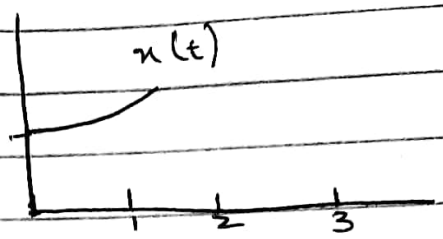
(3)



(ii) $x(t/4)$ & $x(t-2)$

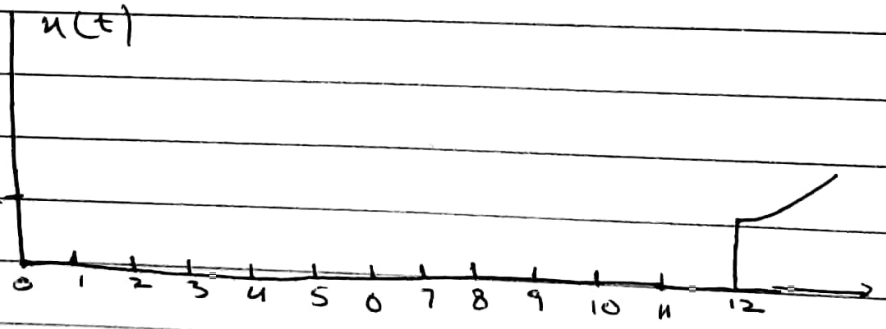
Expansion $x(t/4)$:-

At $t=3$, $x(t)=1$

At $t/4=3$, $x(t/4)=1$

$\frac{t}{4}=3$

$t=12$



Time delay :-

$x(t-2)$

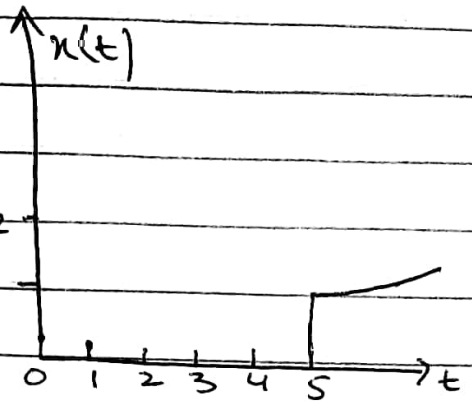
At $t=3$, $u(t)=1$

At $t-2=3$, $u(t)=1$

$t=2+3$

$t=5$

So



Question No 3:-

Fill in the blanks.

If a time shift in the input signal result in an identical time shift in the output signal, The system is said to be EVEN.

Question 2 (b)

(i) This system is non-invertible because we cannot determine the sign of the input from knowledge of output.

(ii) This system is non-casual because its output involves future value of the input so its non-casual.