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

Course Details

Course Title: Signals & Systems **Module:** 04
Instructor: Engr.Mujtaba ihsan sir **Total Marks:** 30

Student Details

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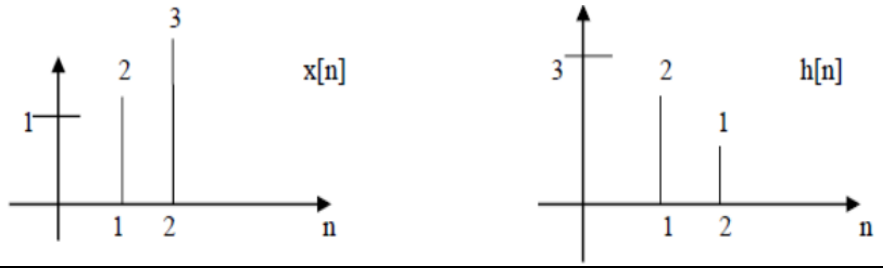
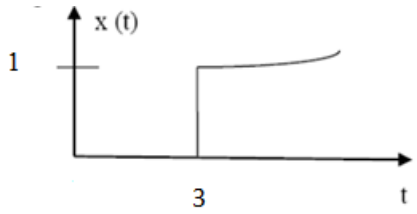
Q1.	(a)	**Evaluate** y[n] using convolution summation. 	Marks 08 CLO 2
	(b)	**Sketch** block diagram for the given system. $y[n] = x[n] + x[n-2]$	Marks 06 CLO 2
Q2.	(a)	**Sketch** the transformed versions for the signal x (t) mentioned in i. and ii.  i. $x(t+5)$ and $x(3t)$ Marks 08 ii.	Marks 08 CLO 1
	(b)	**Outline** the given system as invertible or non-invertible, linear or non-linear, causal or non-causal. Give the reason for you answers too. i. $y[n] = x^2[n]$ ii. $y[n] = x[n+2]$	Marks 06 CLO 1
Q3.		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 _____	Marks 02 CLO 1

Question #01 Part (a)

Evaluate $y[n]$ using Convolution Summation:

Answer:-

The Summation is called the convolution Sum of the sequance $x[n]$ and $h[n]$ and represented compactly as.

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

is we known

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

and

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

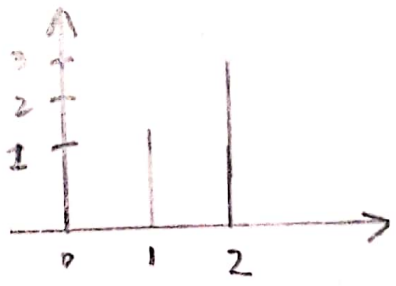
$$x[n] = x[0]\,\delta[n] + x[1]\,\delta[n-1] + x[2]\,\delta[n-2]$$

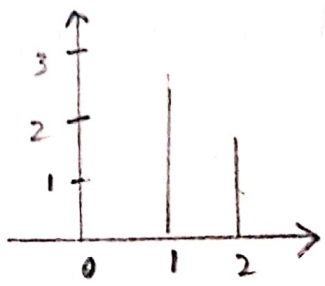
$$y[n] = x[0]\,\delta[n] + x[1]\,\delta[n-1] + x[2]\,\delta[n-2]$$

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

for $y[n]$

$$y[n] = \sum_{K=0}^{1} x[m]\,\delta[n+k]$$





Question # 01 part (b)

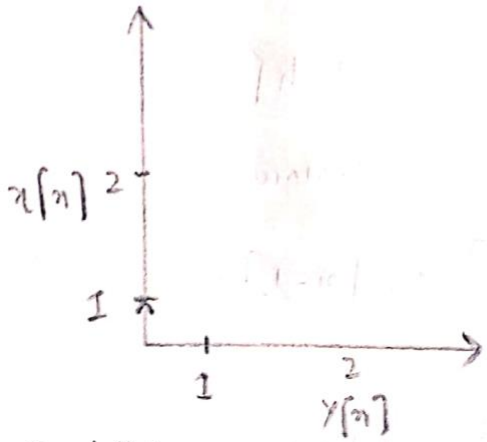
Sketch block diagram for the given system.

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

Answer:-

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

The graph is.



Question (2) part (b)

Outline the given system as invertible or non-invertible linear or non-linear causal or non-causal Given reason.

(i) $y[n] = x^2[n]$

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

Answer:-

The system is non-invertible, because we cannot determine the sign of the input from knowledge of output.

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

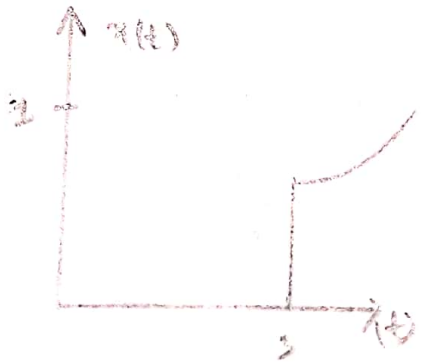
This system is non-causal because $y[n]$ $x[n+1]$ it output involves future value of the input so its non-causal.

Question #02 part (a)

Sketch the transform version for signal $x(t)$ in

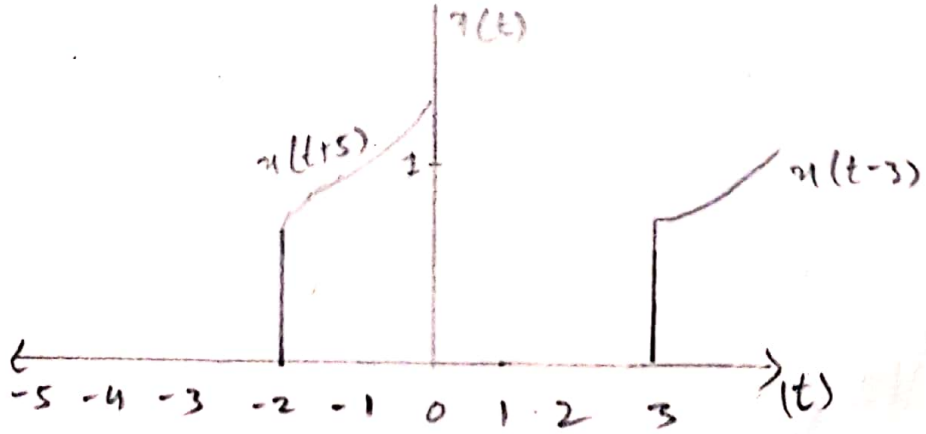
(i) $x(t+5)$ and $x(3t)$

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



Answer:- (i) $x(t+5)$ and $x(3t)$

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



Translation:-

above figure show translation which is from right to left.

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

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

$t=-5+3$

$\boxed{t=-2}$

Compression:- $x(3t)$

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

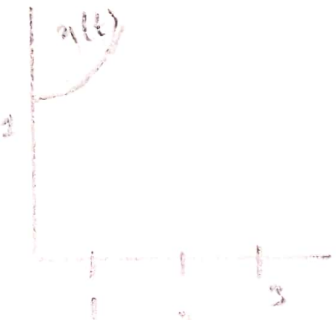
At $3t=3$, $x(3t)=1$

$3t=3$

$t=3/3$

$\boxed{t=1}$

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



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

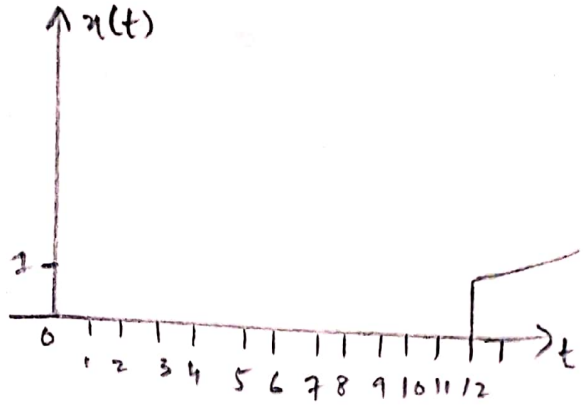
Expansion $x(t/4)$:-

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

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

$t_4 = 3$

$\boxed{t = 12}$



Time delay:-

$x(t-2)$

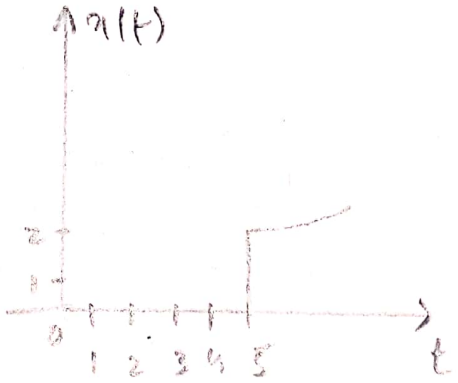
At $t=3$, $x(t) = 1$

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

$t = 2+3$

$\boxed{t = 5}$

So



Question #3:-

Fill in the blanks:-

Answer:-

If a time shift in the input signal result in on identical time shift in the output signal the system is said to be Even.