

Name :- Syed Muhammad Raza

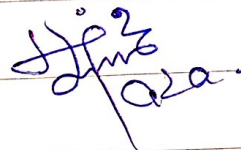
ID :- 14620

Instructor :- Mujtaba Iksan

Department :- BE (E)

Subject :- Signal and System
assignment Paper.

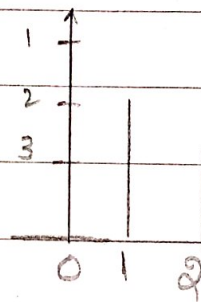
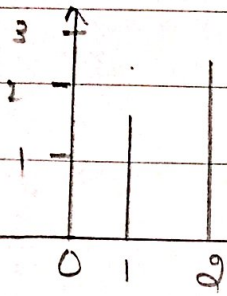
Signature :-

A handwritten signature in blue ink, appearing to read 'Syed Muhammad Raza' with a stylized flourish above the name.

Q No :- 1
Part :- (a)

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Evaluate $y[n]$ using Convolution
Summation ::



Answer :-

The summation is called the Convolution Sum of the square $x[n]$ and $h[n]$ and represented the compactly as,

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

As we know

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

and

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

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

$$y[n] = x[0] f[n] + x[1] f[n-1] + x[2] f[n-2]$$

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

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

Part :- (b)

Sketch block diagram for the given system.

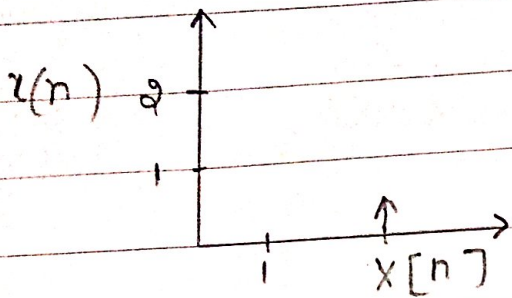
$$y[n] = x[n] + x[n-2]$$

Answer :-

Given

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

the graph is



Q NO :- 2
Part :- (b)

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

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

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

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

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

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This system is non-causal, because its output involves future value of the input. So it's non-causal.

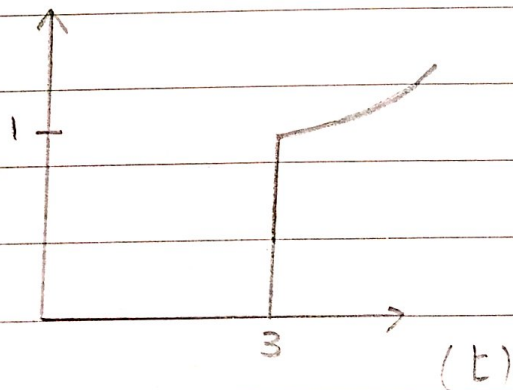
Q NO :- 2

Part :- (a)

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

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

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

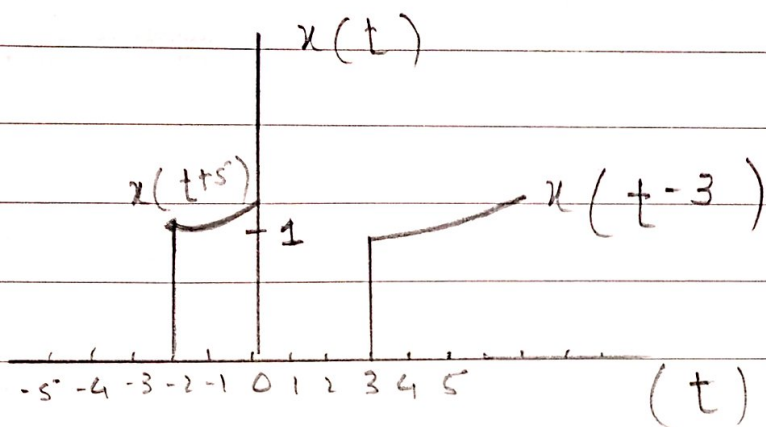


Answer :-

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

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



Translation :-

Above figure shows translation which is from right to left.

$$\text{At } t = 3, \quad x(t) = 1$$

$$\text{At } t + 5 = 3, \quad x(t) = 1$$

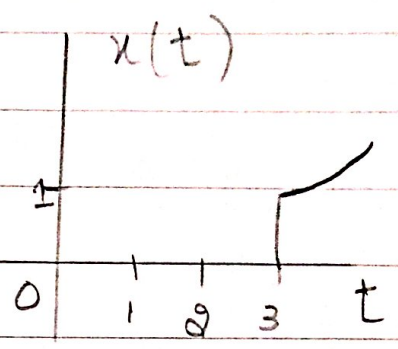
$$t = -5 + 3$$

$$t = -2$$

Compression :: $x(3t)$

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

$t = 1$



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

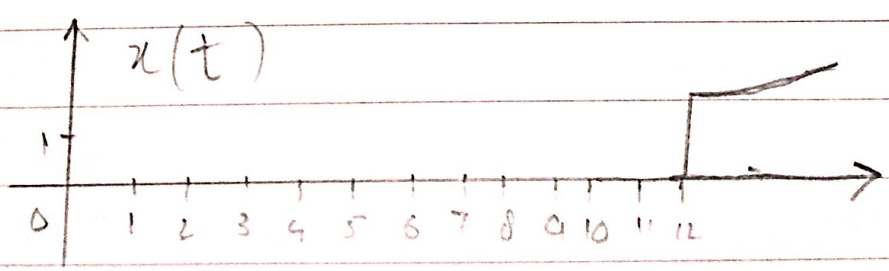
(ii) $x(t/4)$ and $(t-2)$

Expansion $x(t/4) :-$

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

$t/4 = 3$

$t = 12$



time delay :-

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$$x(t-2)$$

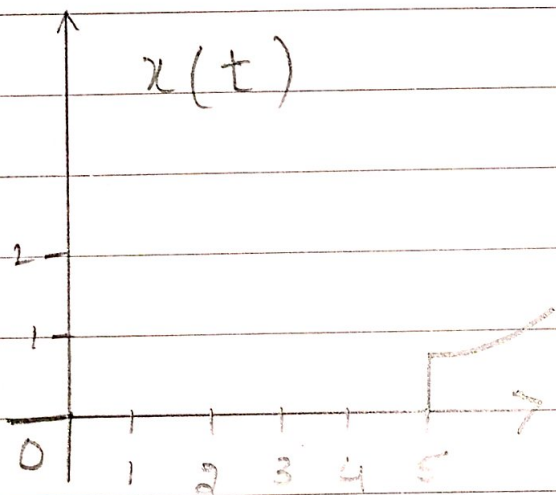
$$\text{At } t=3, x(t) = 1$$

$$\text{At } t-2=3, x(t) = 1$$

$$t = 2 + 3$$

$$t = 5$$

So



Q NO :- 3

Fill in the blanks :-

Answer :-

If a time shift in the input signal results in an identical time shift

in the system is said to be the output signal, the even.