

Name :-
ALIDarvish Kayani

Instructor :-
Mujtaba Insan

ID No :-
15243

Subject :-
Signal & System.

Module :-
4th Semester.

Question 1:-

Evaluate $y[n]$ using convolution summation.

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

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

Now

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

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

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

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

for $y[n]$

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

Page 2
Question No: - 1 Part (b)

Sketch block diagram
for the given system -

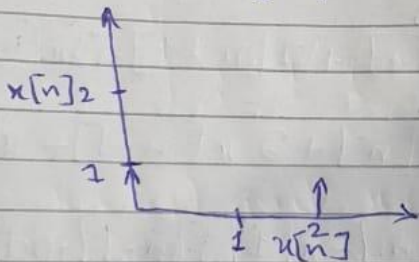
$$y[n] = x[n] + x[n-2]$$

Answer:-

Given :-

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

The graph is



Page (3)
Question No 2 Part(b)

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

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

Answer:-

① $y[n] = x^2[n]$

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

② $y[n] = x[n+2]$

This system is non-causal because its output involves future value of the input so it is non-causal.

Page ④

Compression: - $x(3t)$

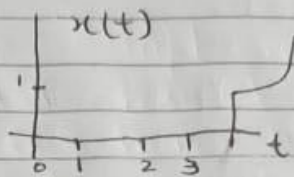
$$\text{At } t = 3, x(t) = 1$$

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

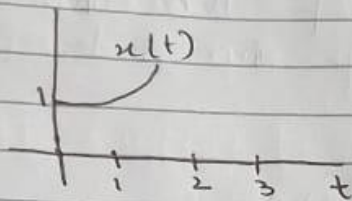
$$3t = 3$$

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

$$\boxed{t = 1}$$



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



① $x(t/4)$ and $x(t-2)$

Expansion $x(t/4)$:-

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

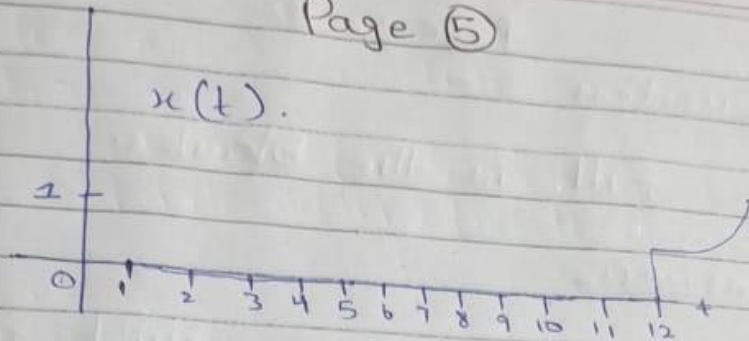
$$\text{At } \frac{t}{4} = 3, x\left(\frac{t}{4}\right) = 1$$

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

$$4$$

$$\boxed{t = 12}$$

Page ⑤



Time delay:-

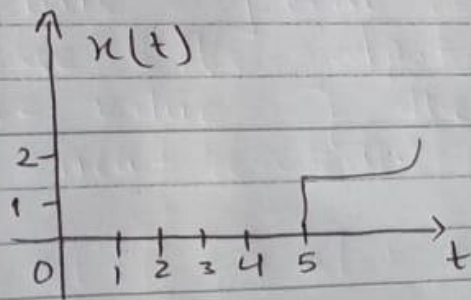
$$x(t-2)$$

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

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

$$t=2+3$$

$$t=5$$



Page :- ⑥

Question 3:-

Fill in the blanks.

Answer:-

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