# Course Details

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|---|---|
| Course Tittle | Signal & System |
| Modul | 4th |
| Instructor | Sir Mujtaba ihsan |

# Student Details

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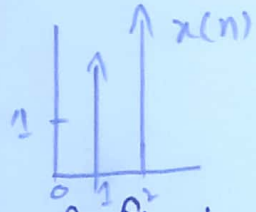
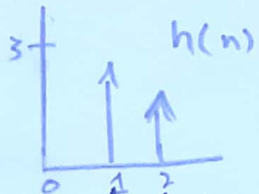
Q No 1

Part (a) Evaluate $y[n]$ using convolution summation.

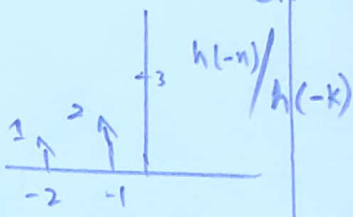



Sol: The Reflect signal is $h(x)$ to $h(-x)$

$h(-k) = h(0-k)$.

OR




Case 1:

$n = 0$

$y[0] = x[k]\ h[0-k] = 1 \times 3 = 3$

Case 2:

$n < 0$

$y[n] = 0$

Case 3:

For $n = 1$


$Y(n) = x[k] \cdot h[1-k]$

$\Rightarrow 1 \times 2 + 2 \times 3$

$\Rightarrow 8$

Case 4:

$n = 2$

$Y[n] = x[n]\ h[n-k]$

$\Rightarrow 1 \times 1 + 2 \times 2 + 3 \times 3$

$\Rightarrow 1 + 4 + 9$

$\Rightarrow 14$

Case 5 $n = 3$

$$y[n] = x[k] \cdot h[n-k]$$

$$\Rightarrow 1 \times 2 + 2 \times 3$$

$$\Rightarrow 8$$

Case 6 $n = 4$

$$y[n] = x[k]\, h[3-k]$$

$$= 3 \times 1 \Rightarrow 3$$

$$\Rightarrow 3$$

Case 7 $= n > 4$

$$y[n] = 0$$

Q NO 1

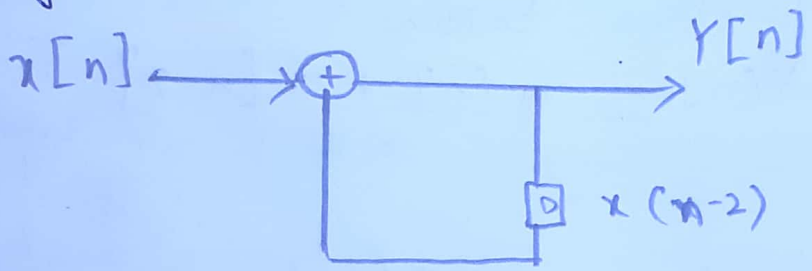
Part b sketch the block diagram

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

Sol:

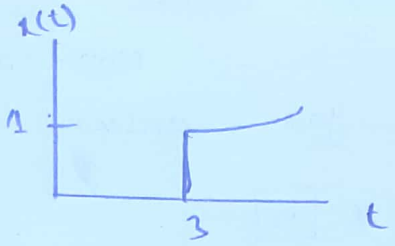
$$Y[n] = x[n] + x[n-2]$$

Block Diagram : The block diagram of the given system is




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

Q No 2 Part (a) Sketch the transformed version for the signal $x(t)$ mentioned in i & ii.




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

Sol: $x(t+5)$

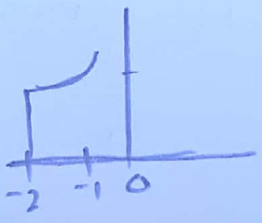
At $t = 3$, $x(t) = 1$

$\Rightarrow$ $t+5 = 3$ $\quad x(t+5) = 1$

$\Rightarrow$ $t + 5 = 3$

$\Rightarrow$ $t = -5+3$

$\Rightarrow$ $\boxed{t = -2}$




The signal is generated is to be zero for $t < -2$

& Now $x(3t)$

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

$\Rightarrow$ $3t = 3$, $x(3t) = 1$

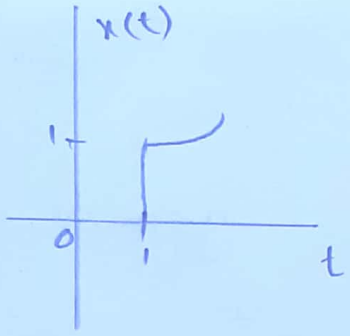
P-To

$\Rightarrow 3t = 3 \quad \rightarrow (E)$

dividing both side in Equation by 3

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

$\Rightarrow \boxed{t = 1}$




The signal is generated is to be zero for $t < 1$.

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

Sol:

$x(t/4)$

$t = 3$ And $x(t) = 1$

Then

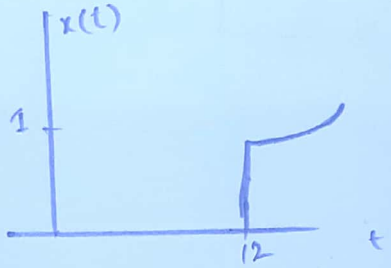
$\frac{t}{4} = 3$ $\quad x\left(\frac{t}{4}\right) = 1$

$\frac{t}{4} = 3$ -> Equ

xing both side of this equ by 4

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

$$\boxed{t = 12}$$




Then the signal general to zero for $t < 12$

And Now $x(t-2)$

so $t = 3$

And $x(1) = 1$

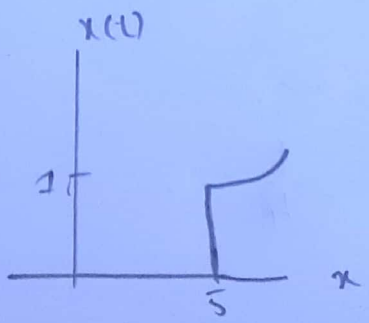
Then

$t - 2 = 3$ & $x(t-2) = 1$

$\Rightarrow t - 2 = 3$

$\Rightarrow t = 2 + 3$

$\Rightarrow \boxed{t = 5}$



Q No 2

Part b

Outline the Given system as invertable ------ Non-causal. Give the reason for you answer two

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

is nonlinear and not invertible

This system is non-invertible because we can not determine the signature of the input from knowledge of the output.

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

is non-causal

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

Q No 3



Fill in the blanks.

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