

M :- LIMAIR

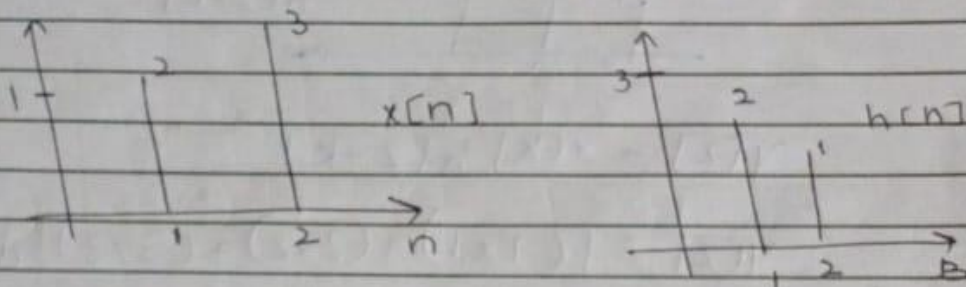
ID :- 5902

SIGNAL AND SYSTEM

Q1

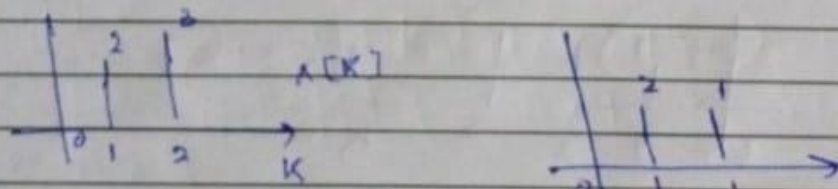
(A)

Evaluate $y[n]$ using convolution summation:

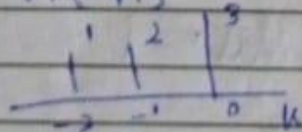


Solution

Replace n with k



Now invert $h[k]$ to get $h[-k]$



$$y[0] = (1 \times 3) \delta(n)$$

$$y[1] = 3 \delta(n)$$

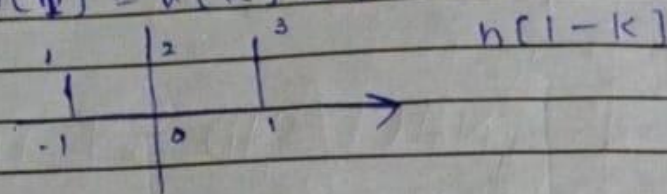
(2)

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Now convolving $x[k]$ with $h[1-k]$

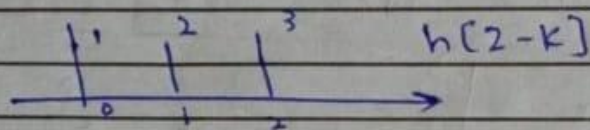
$$y[n] = x[k] h[1-k]$$



$$y[1] = [(1 \times 2) + (2 \times 3)] \delta[n-1]$$

$$y[1] = [2 + 6] \delta[n-1]$$

$$y[1] = 8 \delta[n-1]$$

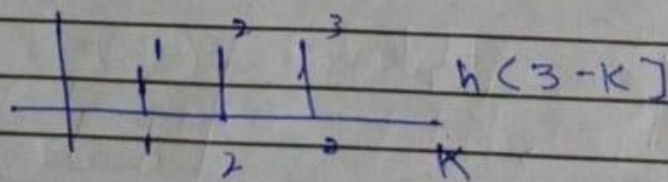


$$y[2] = x[k] h[2-k]$$

$$y[2] = [(1 \times 1) + (2 \times 2) + (3 \times 3)] \delta[n-2]$$

$$y[2] = [1 + 4 + 9] \delta[n-2]$$

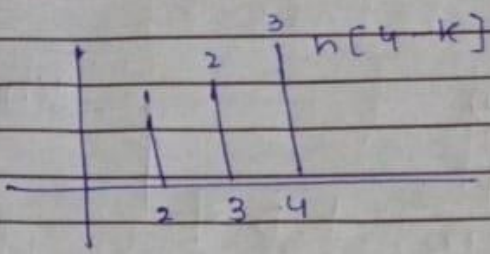
$$y[2] = 14 \delta[n-2]$$



$$y[3] = x[k] h[3-k]$$

$$y[3] = [(1 \times 2) + (2 \times 3)] \delta[n-3]$$

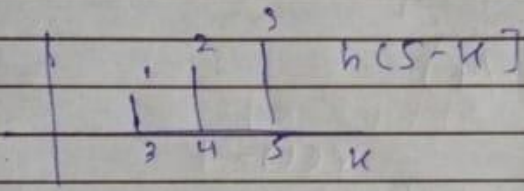
$$y[3] = 8\delta[n-3]$$



$$y[4] = x[k]h[4-k]$$

$$y[4] = [(1 \times 3)]\delta[n-4]$$

$$y[4] = 3\delta[n-4]$$



$$y[5] = x[k]h[5-k]$$

$$y[5] = [0]\delta[n-5]$$

$$y[5] = 0$$

As there is no relativity between $x[k]$ and $h[n-k]$ so $n > 4$ so $y[n] = 0$
For $n > 4$

$$\text{So } y[n] = y[1] + y[2] + y[3] + y[4]$$

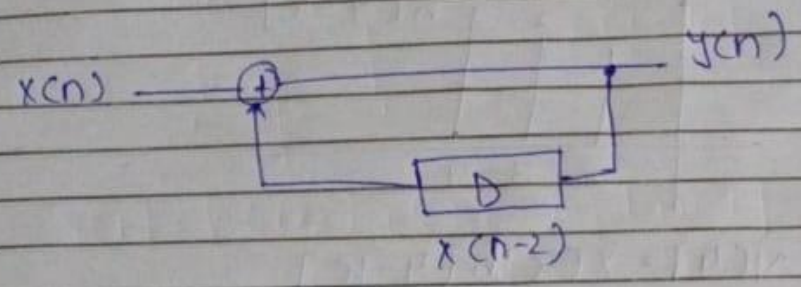
$$y[n] = 3\delta[n] + 8\delta[n-1] + 14\delta[n-2] + 8\delta[n-3] + 3\delta[n-4]$$

5

WTFB

Date: _____

Q 1 (B)



Q 2 (A)

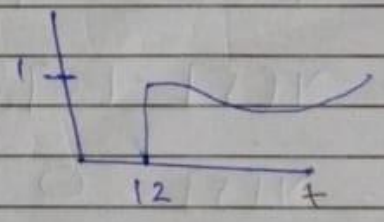
$x(t/4)$

$t = 3 \quad x(t) = 1$

$t/4 = 3$

$t = 3 \times 4$

$t = 12$



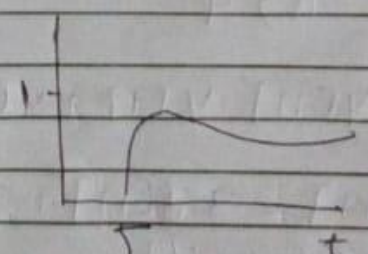
$x(t-2) \quad x(t) = 1$

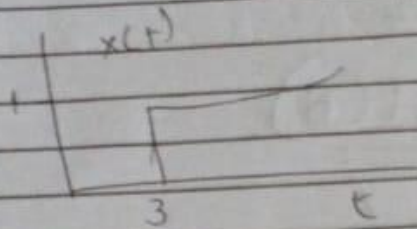
$t = 3$

$t-2 = 3$

$t = 3 + 2$

$t = 5$





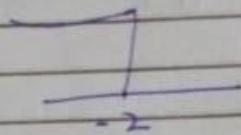
$x(t+5)$

$t = 3$

$t+5 = 3$

$t = 3 - 5$

$t = -2$



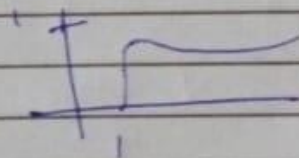
$x(3t)$

$t = 3$

$3t = 3$

$t = 3/3$

$t = 1$



Q 3

Fill in the blank

* Time Invariant