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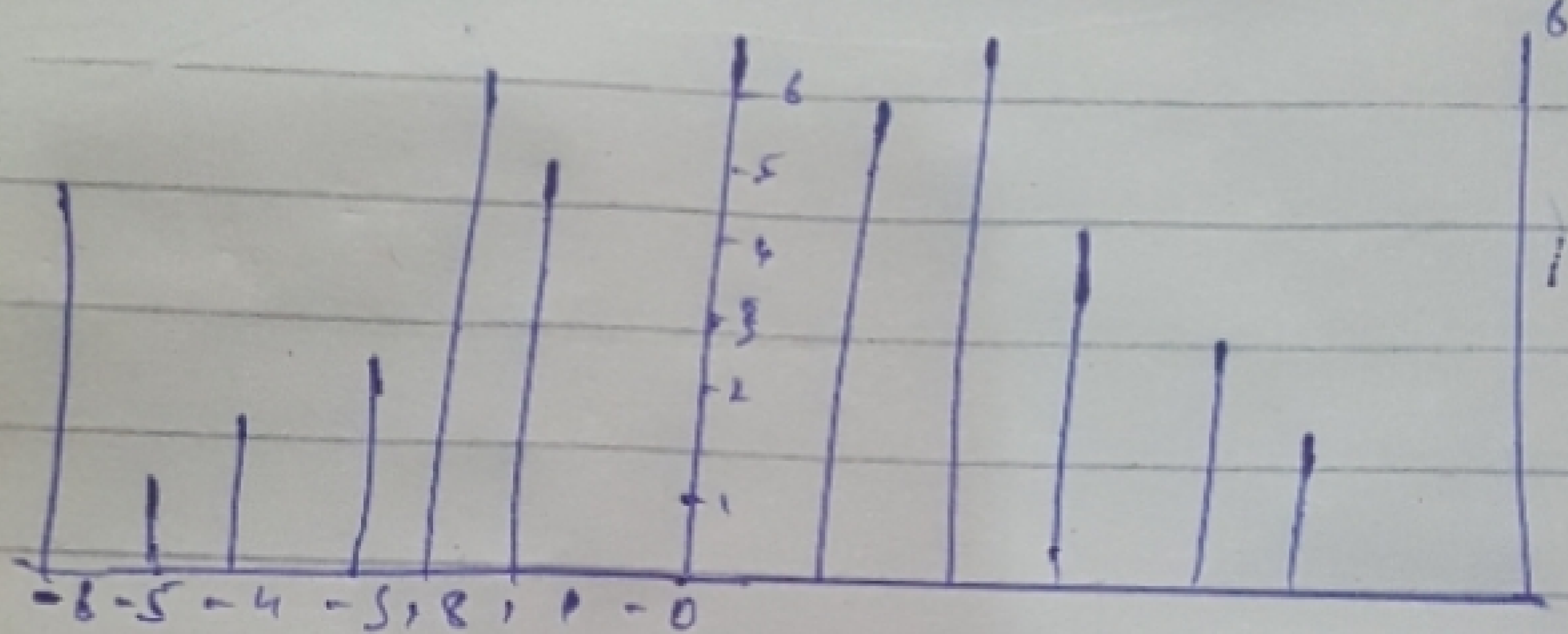
Ans no 1 Question: 01

(A) $C_{k+N_0} = C_k$

(b) $C_k = C_{N_0-k} = C_k^*$

$x(n) = [7, 8, 4, 3, 2, 6]$



$\Rightarrow C_k = \frac{1}{N_0} \sum_{n=0}^{N_0-1} x(n) e^{-j\left(\frac{2\pi}{N_0}\right)kn}$

$e^{j\theta} = \cos\theta + j\sin\theta$

So $e^{-j\left(\frac{2\pi}{2\pi}\right)} = \cos(\pi/2)\, j \sin(\pi/2)$

Or $e^{-j(\pi/2)} = \cos(\pi/2) - j\sin(\pi/2)$

$= \boxed{-j}$

$C_k = \frac{1}{6} \sum^{6-1} x(n)(-j)^{kn}$

$k=0 \quad C_0 = \frac{1}{6} \cdot \sum_{n=0}^{5} x(n)(1)$

$C_0 = \frac{1}{6}[x(7) + x(8) + x(4) + x(3) + x(2) + x(6)]$

$C_0 = \frac{1}{6}(7+8+4+3+2+6) = \frac{31}{6}$

$\Rightarrow \boxed{C_0 = 5/6}$ Dc. companent

Now at $k = 1$

$C_1 = \frac{1}{6} \sum_{n=0}^{5} x(n)(-j)^n$

$C_1 = \frac{1}{4}(-j)^0 x(7) + (-j)^1 x(8)$

$+ -j^2 x(4) + (-j)^3 x(3) + -j^4 x(2)$
$+ -j^5 x(6)]$

$\Rightarrow C_1 = 1/6(-2-7+23j)$

$C_1 = \frac{-1}{7}, \frac{j}{23}$

Also solve for C_2 & C_3 & jc
find coffient as to time range.

$C_2 = \frac{-1}{4} + \frac{5}{23}$

1st Property

$C_{k+N_0} = C_k$

$C_{1+4} = C_1$

2nd property

and Property.

$$C - k = C_{no} - k = C^{k t}$$

$$= C_{n3} = C_i$$

$$C_3 = C_i^{o}$$

$$\frac{-1}{7} - \frac{1}{23}, \quad 2 \; \frac{-1}{7} + \frac{1}{25} \; d$$

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Question . 02.

Solution

I $x[n] = \sum_{k=-\infty}^{\infty} x[k]\, \delta[n-k]$

$x[n] = \left[\underset{0}{6}, \underset{1}{9}, \underset{2}{6}, \underset{3}{6}\right]$

$k = 6966$

$\Rightarrow x[0]\, \delta[n-6] + x[9']\, \delta[n-9]$

$= x[2]\, \delta[n-9] + x[3-][n-6]$

$= \delta n = 6\delta(n) + 9\delta[n-1] +$

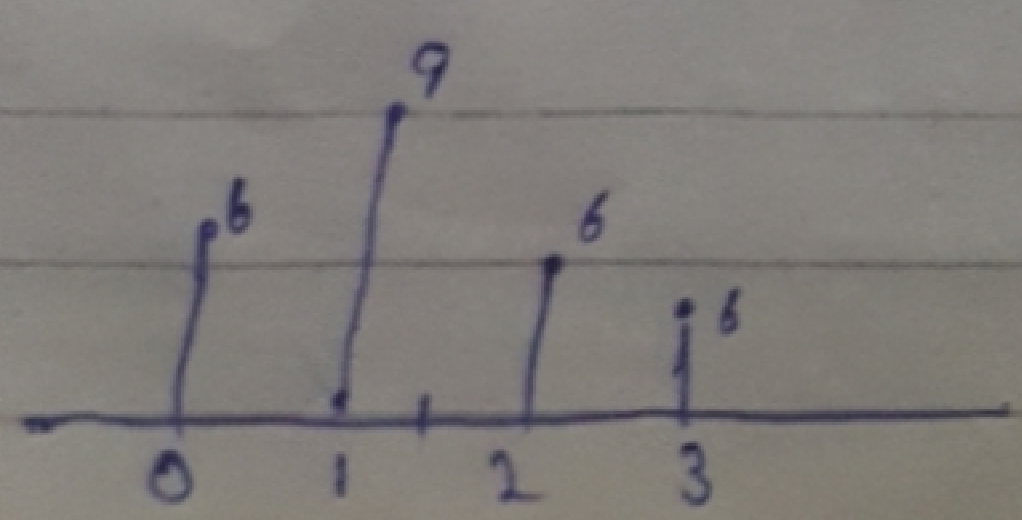
$+$

$+ 6\delta[n-2] + 6\delta[n-3]$

Magnitude :

$[\overset{0}{6}, \overset{1}{9}, \overset{2}{6}, \overset{3}{6}$

Location : $\delta[n]$

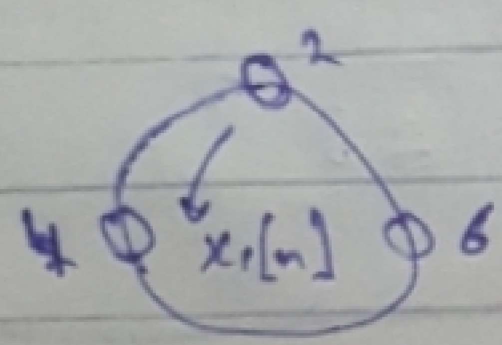


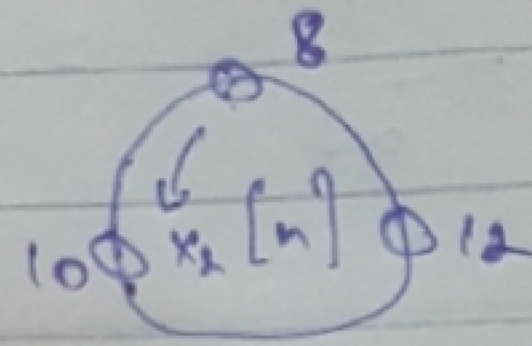
Question = 05

Solution #

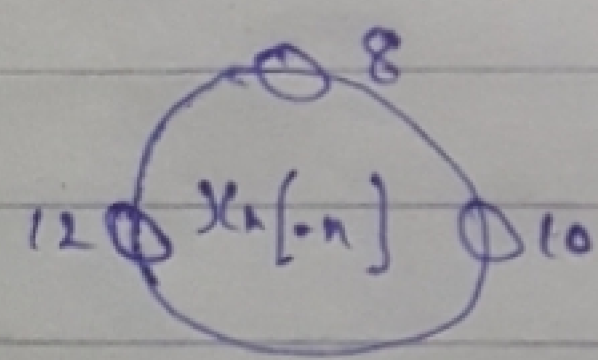
$x_1[n] = [2, 4, 6]$

$x_2[n] = [8, 10, 12]$

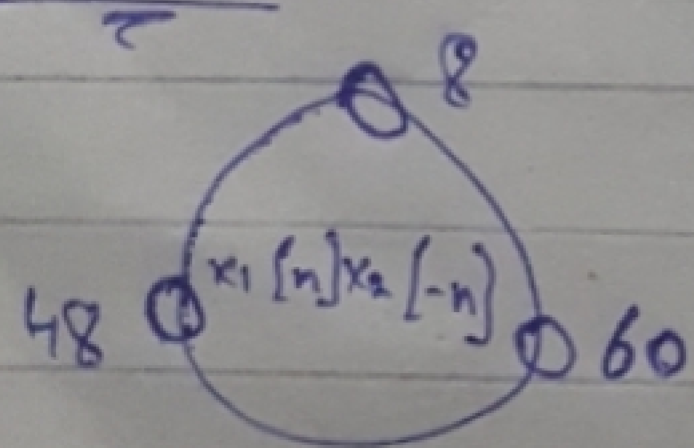




(*) folding: In this we take clock wise mirror image of one square.



(*) Multiplication #.



(3) Sum $y(1) = 116$

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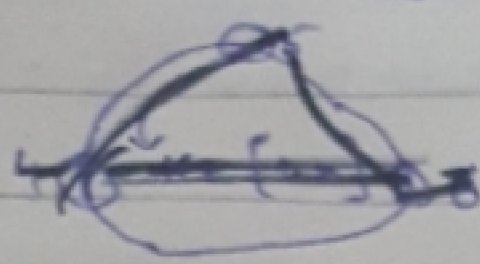
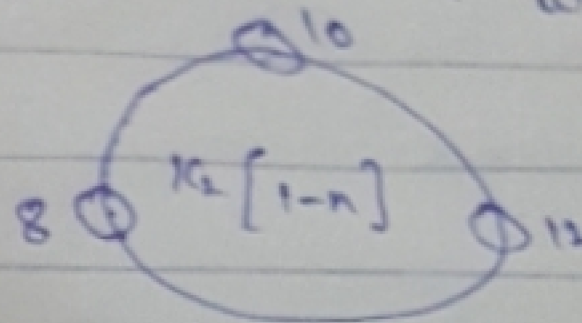
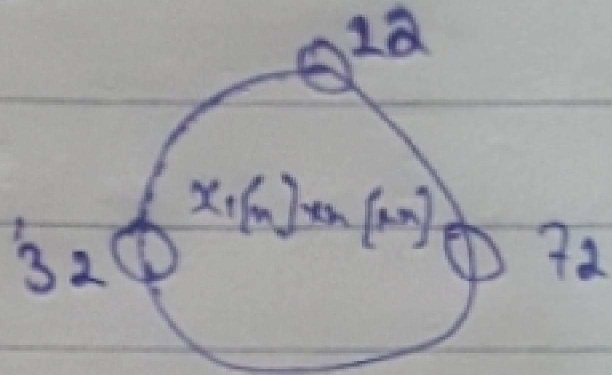
* Shift the folded ~~series~~ (Anticlock wise)



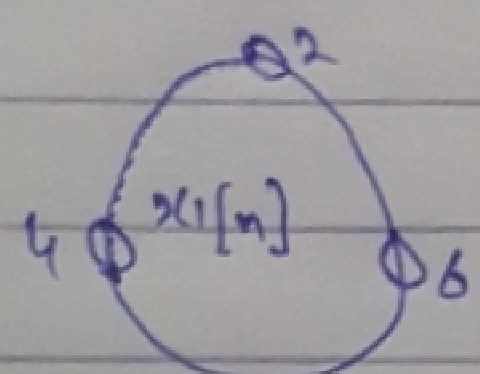


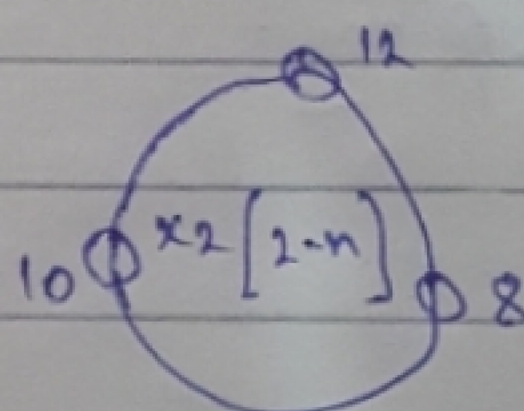
* Multiplication #



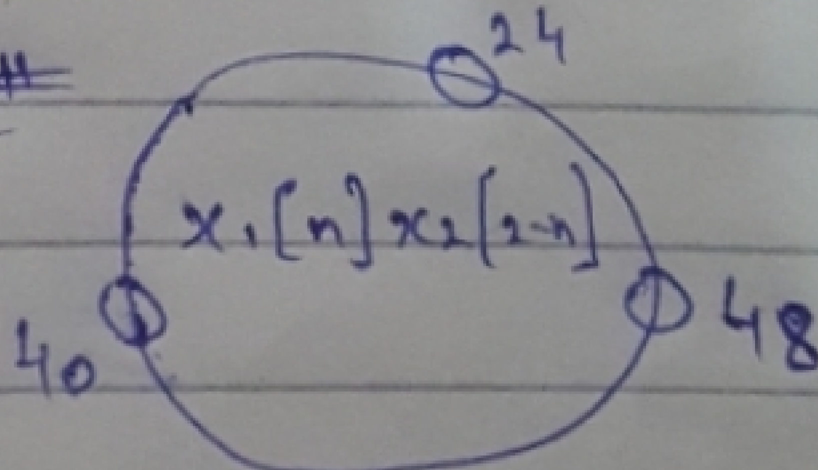
Sum = $y(1) = 116$

* Second shift #





* Multiplication #



* Sum = $\boxed{y(2) = 112}$

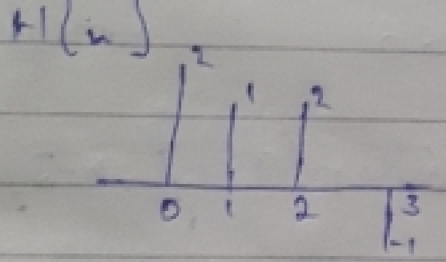
So $y[n] = \{116, 116, 112\}$ Ans

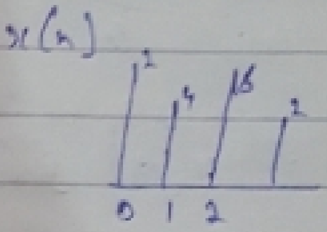
Question : 03

Solution:

Graphical Method.

$h[n] = \{2, 1, 2, -2\}$ $x[n] = \{2, 4, 6, 2\}$

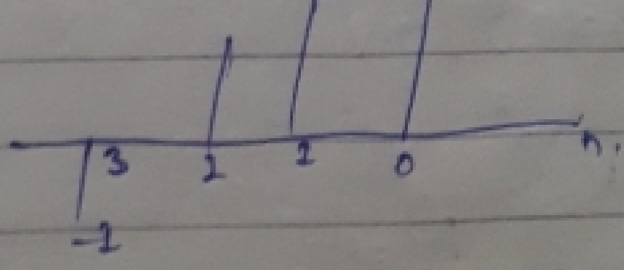




Lenght of output = $4+4-1 = 7$

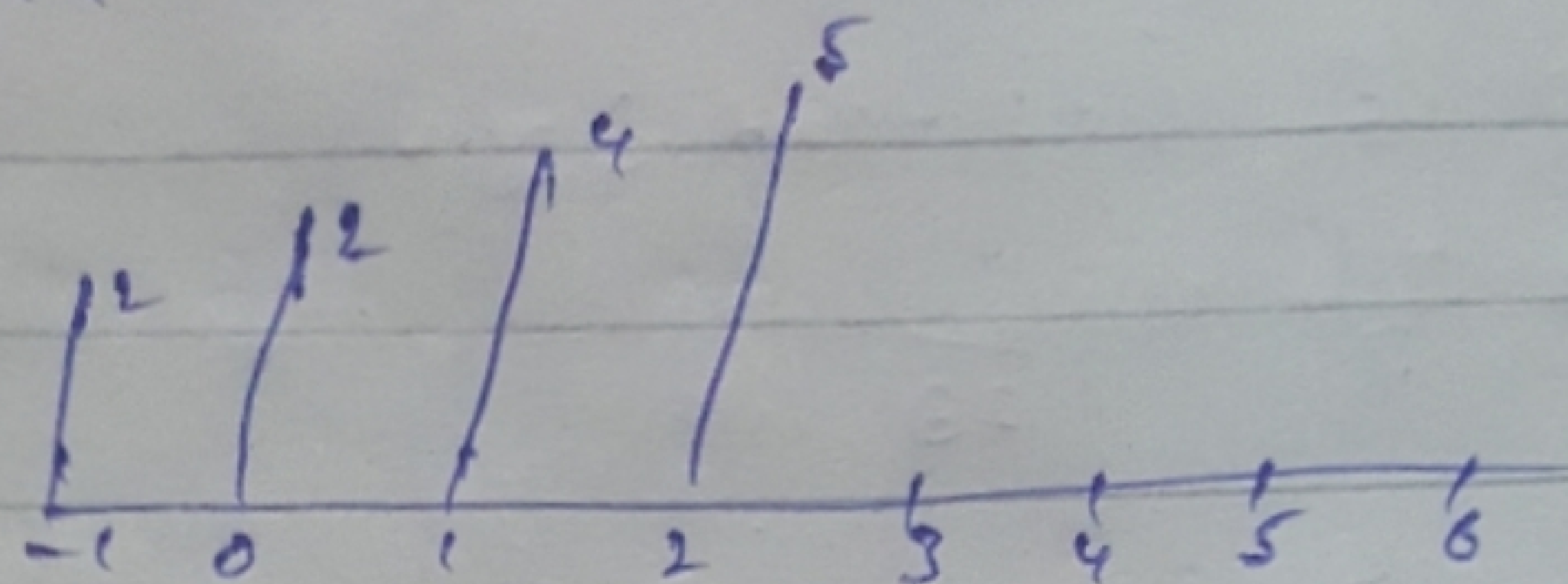
Folding any one but we fold impulse response

$h[-k]$



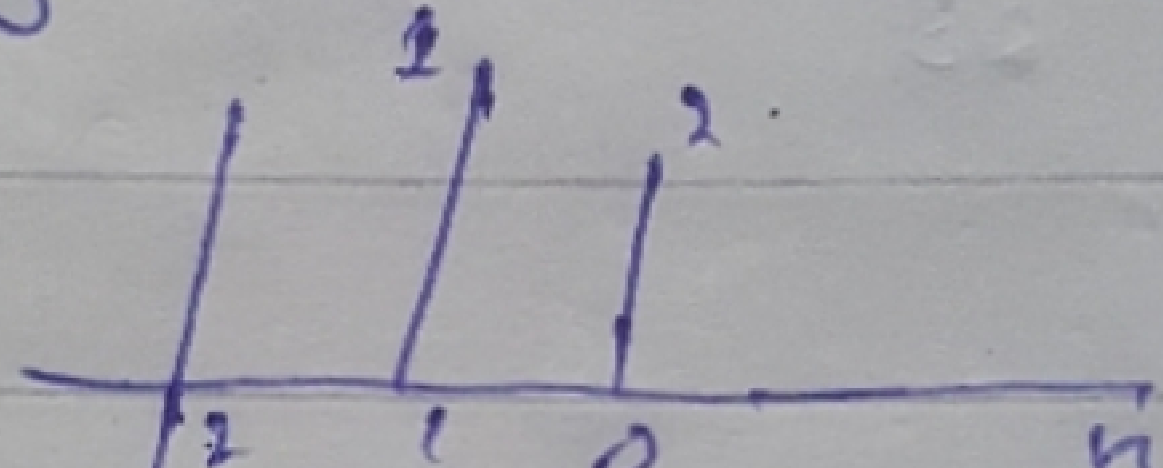
Now Product Sequence

$x[n]\,h[-k]$

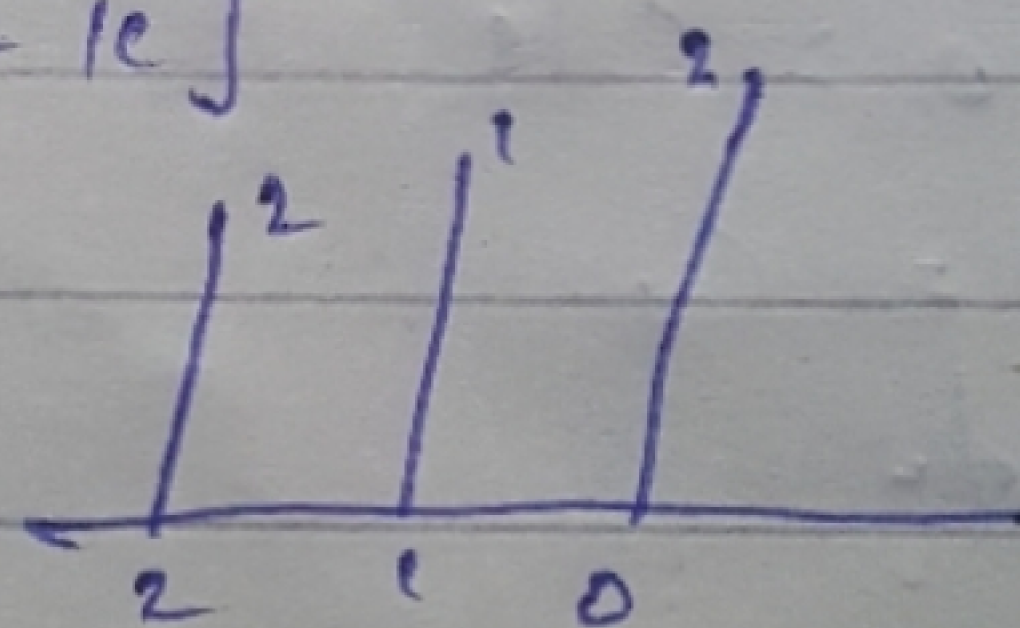


Sum $y(0) = 4+2+6-2 = 10$

Shifting $= n-1 = 0$



$x[n]\,h[1-k]$



$y(1) = 2+1+2 = 5.$

Q-04:

6966 (09)

Solution:

a) $x[n] = (1/2)^{n-1} u(n-1]$

b) $x[n] = \delta[n] + \delta[n-1] + \delta$

a) $X(e^{jw}) = \sum_{n=-\infty}^{n-1=\infty} e[1/2]^{n-1} u(e^{-jw}$

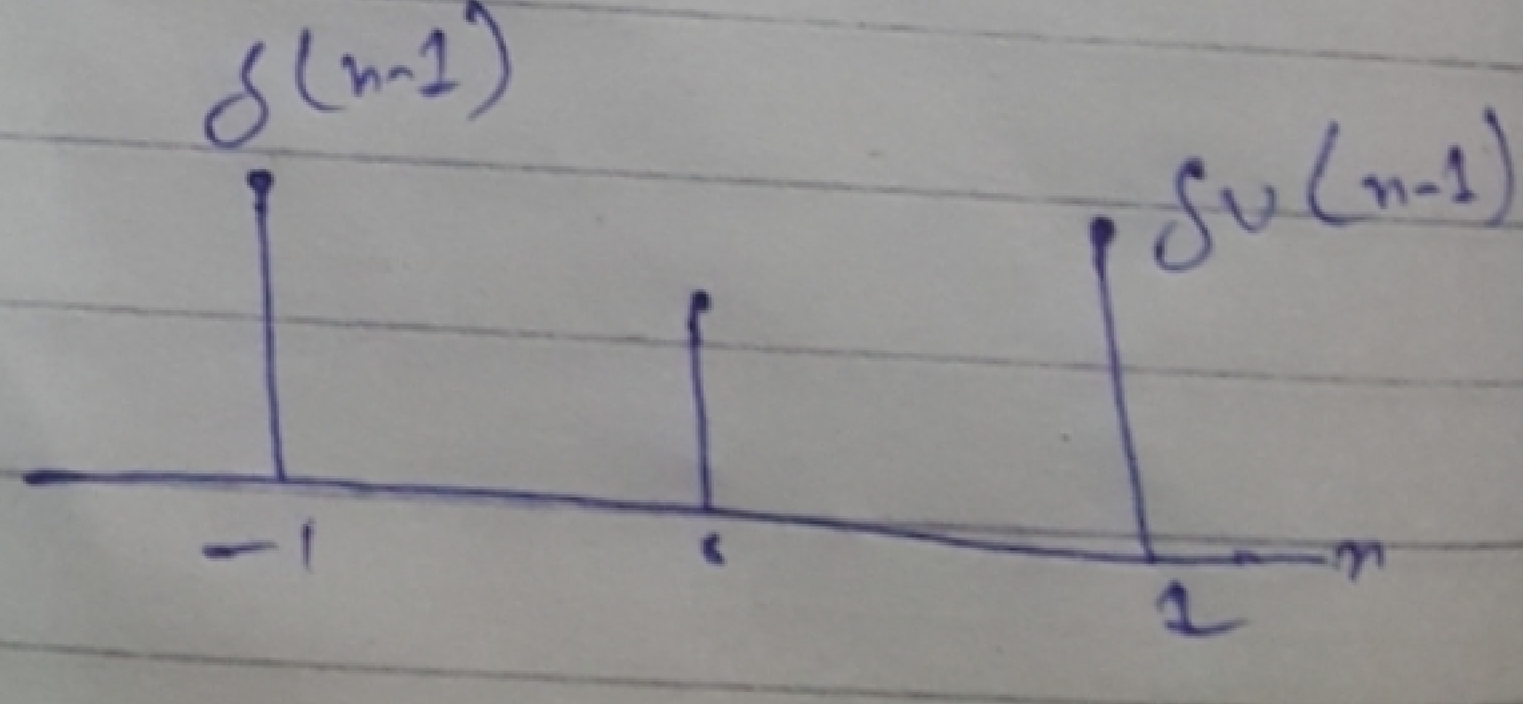
$n=0$ $\sum_{n=\infty}^{n-1=\infty} (1/2)^{n-1} u(e^{-jw})^n$

$= \sum_{n=-\infty}^{n-1=\infty} n(1/2 e^{-jw})^{n-1} u(n-1]$

$x(e^{jw}) = \frac{1}{1-(1/2 \, n-1 \, jw)}$

Draw with Spectrum:

A) =>



Hilal = 6966 (10)

B) =>