Now;

$\Rightarrow C_k = \frac{1}{6} \sum_{N=0}^{6-1} x[n] (-j)^{kn}$

$\Rightarrow C_k = \frac{1}{6} \sum_{n=0}^{5} x[n] (-j)^{kn}$

$\therefore k = 0, \quad C_0 = \frac{1}{6} \sum_{n=0}^{5} x[n] (0)$

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

$+ x[2] + x[6]]$

$C_0 = \frac{1}{6} [7 + 8 + 4 + 3 + 2 + 6] = \frac{5}{6}$

$\Rightarrow C_0 = 5.16$ DC Components;

$\Rightarrow k = 1$

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

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

$(-j)^2 x(4) + (-j)^3 x(3) + (-j)^4$

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

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$$c_1 = -\frac{1}{7} + \frac{j}{23}$$

1st Property :

$$C_k + N_0 = C_k$$

$$C_1 + 4 = C$$

2nd Property :

$$C - k = C_{N_0 - k} = C_k^*$$

$$= C_{4-1} = C_1^*$$

$$C_3 = C_1^*$$

$$\Rightarrow -\frac{1}{7} + \frac{1}{23} j = -\frac{1}{7} + \frac{1}{23} + j$$

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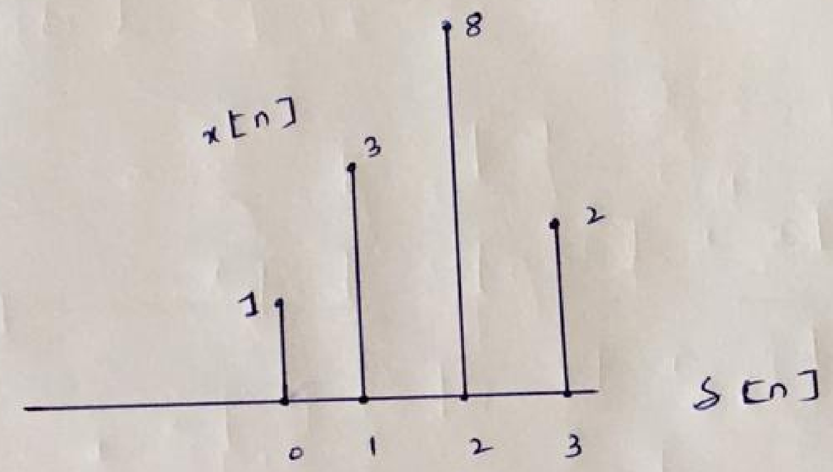
Location = $\delta[n] + \ldots$

now to plot using magnitudes.

→ Decomposed magnitudes = (1, 3, 8, 2)

0 1 2 3



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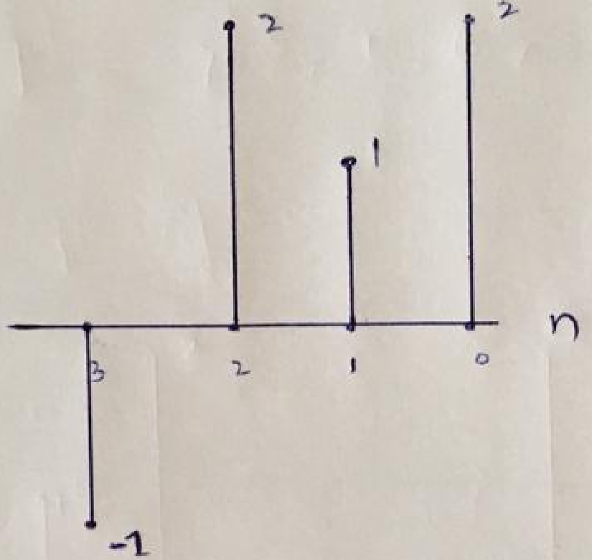
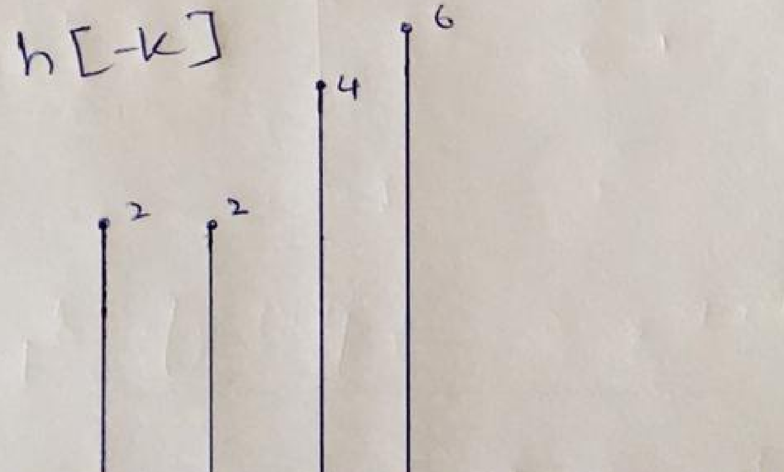
h [-k]



Now Our Product Sequence

x[n] h[-k]



Sum ⇒ $y(1) = 4 + 2 + 6 - 2 = 10$

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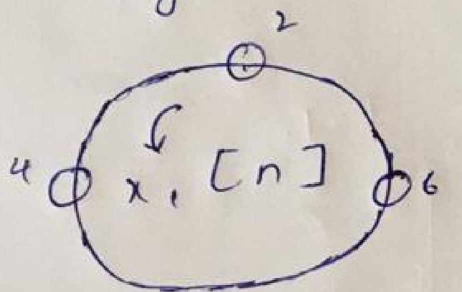
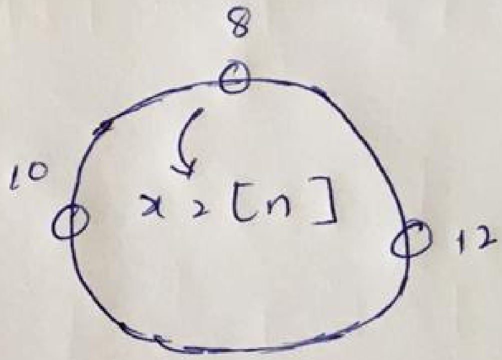
Q5 : $x_1[n] = \{\underset{\uparrow}{2}, 4, 6\}$

$x_2[n] = \{\underset{\uparrow}{8}, 10, 12\}$

Sol :

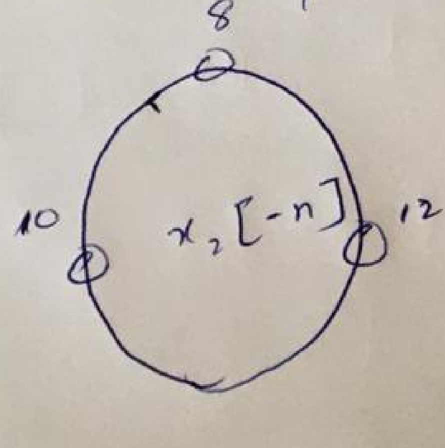
Now to make the cycles ;





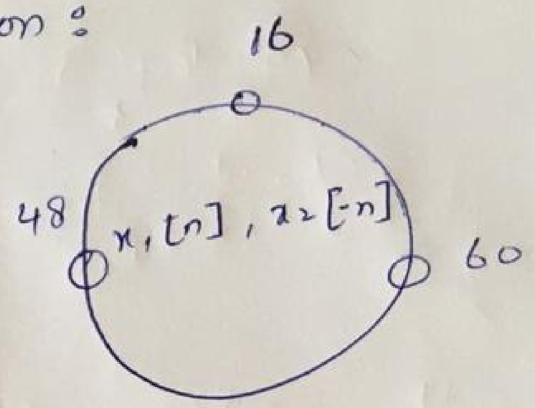
① Folding :

→ first we will take clockwise mirror image of one sequence.



Fawad 13820 (10)

(2) Multiplication:



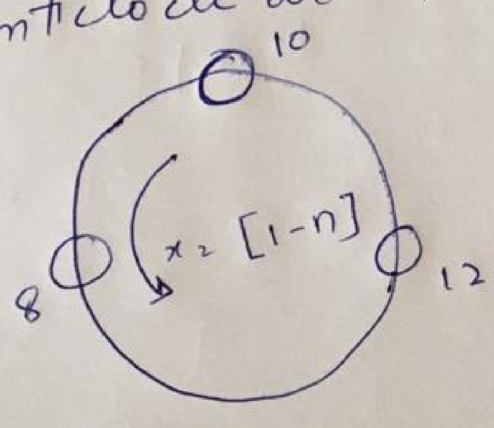
$\because$ $8 \times 2 = 16$, $4 \times 12 = 48$, $6 \times 10 = 60$

(3) Sum:

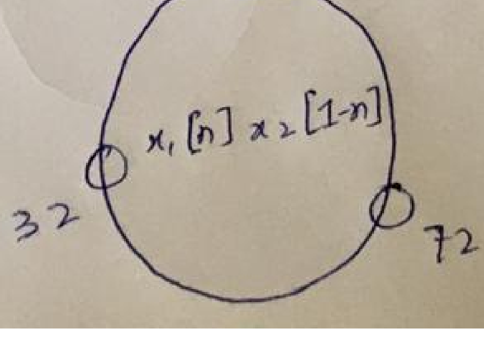
$y(0) = 124$

Now turn the folded seq

(anticlockwise)



multiplication:



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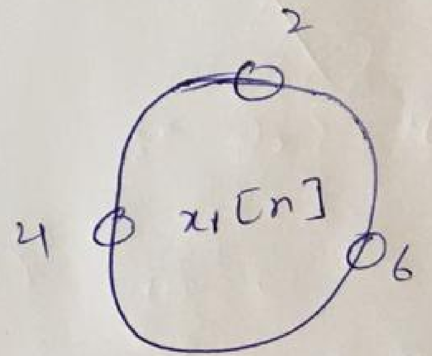
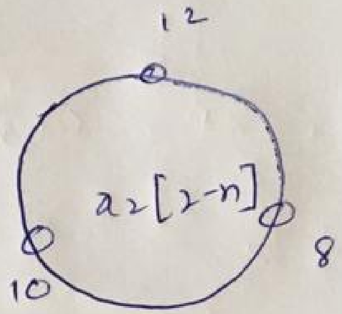
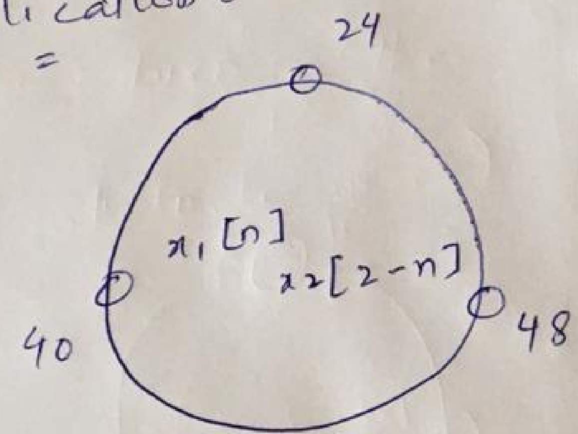
Sum: $y[1] = 124$

Second Shift:





Multiplication:



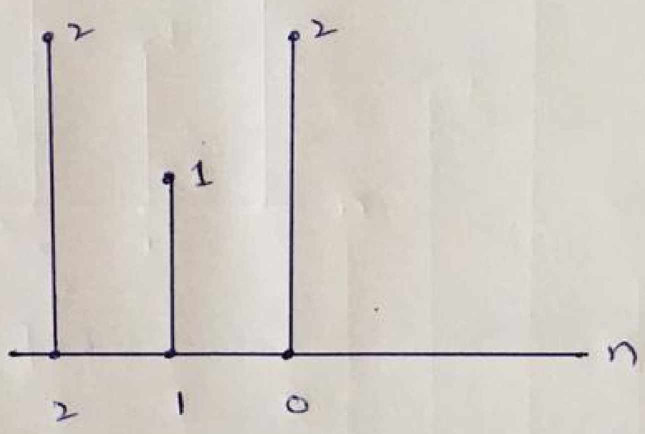
Sum:

$y[2] = 112$

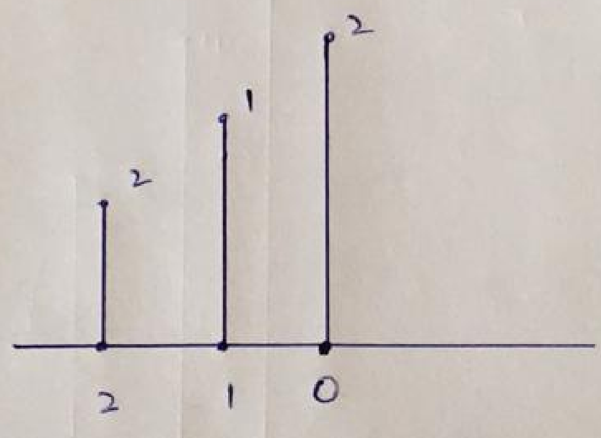
So $y[n] = [124, 124, 112]$

Shifting :

$n - 1 = 0$



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



Sum $\Rightarrow y(1) = 2 + 1 + 2 = 5$

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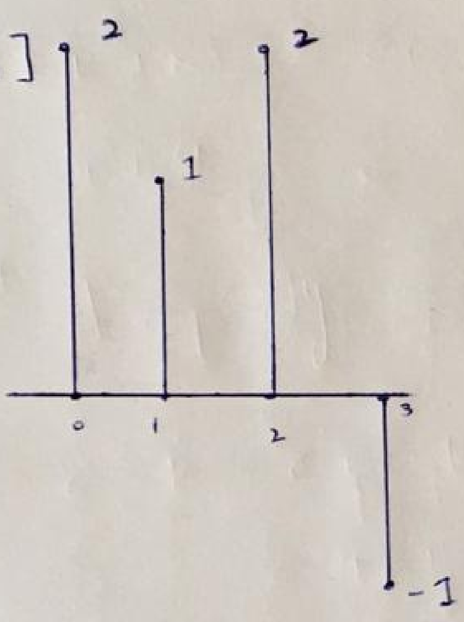
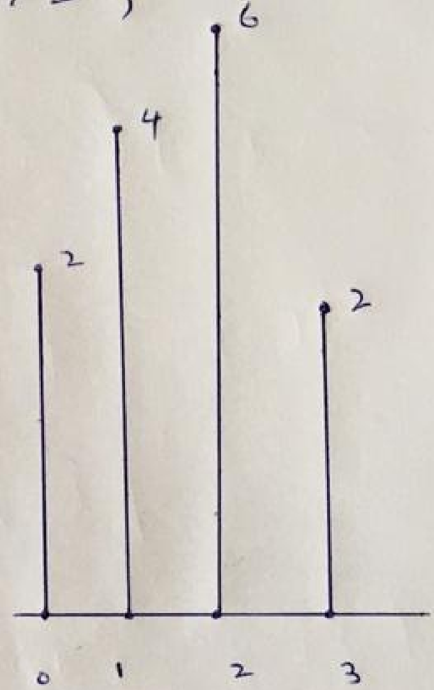
Q3: $H[n] = \{2, 1, 2, -1\}^{3}$

$x[n] = \{2, 4, 6, 2\}^{3}$

Sol:

$h[n]$





Length of Output = 2 = 4 + 4 − 1 = 7

→ We can fold anyone but lets fold impulse response

$h[-k]$

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Q2 : Taking 1D

So As we know that

$x[n] = [1, 3, 8, 2, 0]$

&

$$a[n] = \sum_{k=-\infty}^{\infty} x[k] \; \delta[n-k]$$

$$\text{So now} \quad k = [\underset{0}{1}, \underset{1}{3}, \underset{2}{8}, \underset{3}{2}, \underset{4}{0}]$$

$$\delta[n] = x[0]\,\delta[n-0] + x[1]\,\delta[n-1] + x[2]\,\delta[n-2] + x[3]\,\delta[n-3] + x[4]\,\delta[n-4]$$

putting values

$$\delta[n] = 1\,\delta[n] + 3\,\delta[n-1] + 8\,\delta[n-2] + 2\,\delta[n-3] + 0\,\cancel{\delta[n-4]}$$

0

So
magnitude = (1~~, 3, 8, 2~~)

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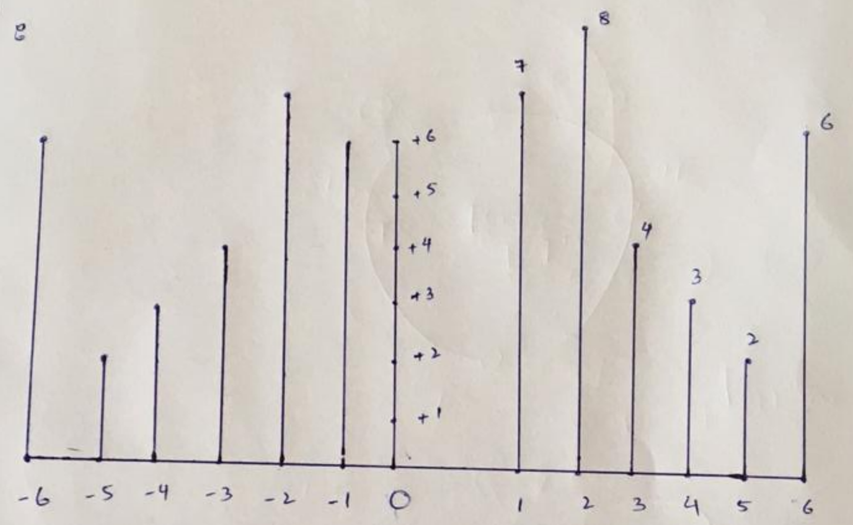
Q1: (a) $C_{k+N_0} = C_k$

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

$x[n] = \{7, 8, 4, 3, 2, 6\}$

Sol:



$$\Rightarrow C_k = \frac{1}{N_0} \sum_{n=0}^{N_0 - 1} x[n]\, e^{-j(2\pi/N_0)kn}$$

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

$$\text{so } e^{-j(\cancel{2}\pi/2\cancel{4})} = \cos(\pi/2) - j\sin(\pi/2)$$

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

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