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Q1.	Using the following Discrete Time Signal, Prove the two important properties in Discrete Fourier Series i.e. a) $C_{K+N0} = C_K$ b) $C_{-K} = C_{N0-K} = C_K^*$ Find Fourier coefficient and DC component while the time period $N_0 = 4$ for the following Discrete Time Signal $X[n] = \{7, 8, 4, 3, 2, 6\}$ Also plot a) Magnitude Spectrum b) Phase Spectrum	Mark CLO
Q2.	Take your own ID # as a sequence X[n] and decompose this sequence into Impulses. Plot the decomposed sequence using their magnitudes and locations.	Mark CLO
Q3.	Flip and drag the following sequences by using graphical convolution method until unless their products become zero. Then plot the convoluted signal. $H[n] = \{2, 1, 2, -1\}$ $X[n] = \{2, 4, 6, 2\}$	Mark CLO
Q4.	By using a method of your own choice, find the frequency domain representation of the following Discrete Time Signal a) $X[n] = (1/2)^{n-1}\, U[n-1]$ b) $X[n] = \delta[n] + \delta[n-1] + \delta[n-2]$	Mark CLO
Q5.	By using zero padding find the multiplication of Discrete Fourier Transform of the following sequences;	Mark CLO

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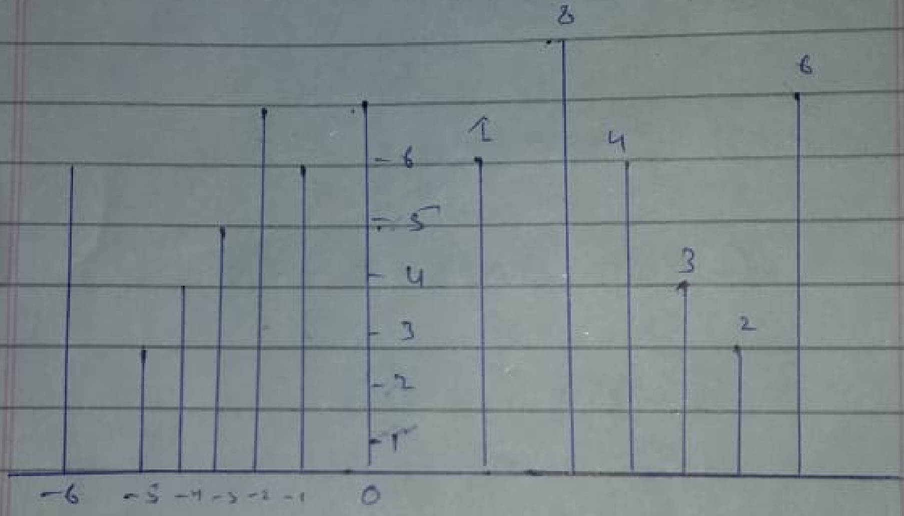
Q1 (a) $C_K + N_0 = C_K$

(b) $C_K = C_{N_0 - K} = C_K$

$x(n) = \{7, 8, 4, 3, 2, 6\}$



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

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

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

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

$= \boxed{-j}$

Q2 $x(n) = [1,3,8,8,0]$

Sol :-> $K = 1,3,8,8,0$

$\Rightarrow x(0)\,\delta[n-0] + x[1]\,\delta[n-1]$

$+ x(2]\,\delta(n-2] + x[3]\,\delta[n-3]$

$+ x[4]\,\delta[n-4]$

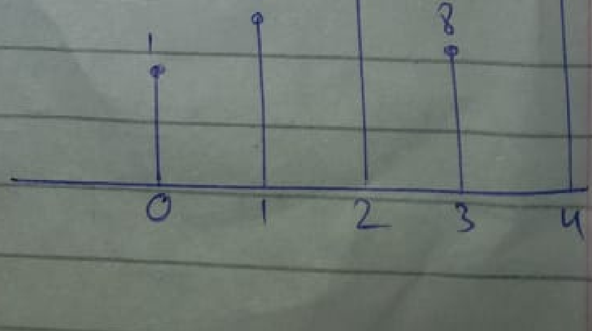
$\delta(n] \Rightarrow 1\,\delta[n] + 3\,\delta[n-1]$

$+ 8\,\delta[n-2] + 8\,\delta[n-3]$

$+ 0\,\delta[n-4]$

Magnitude = 1, 3, 8, 8, 0

Location $\delta[n]$



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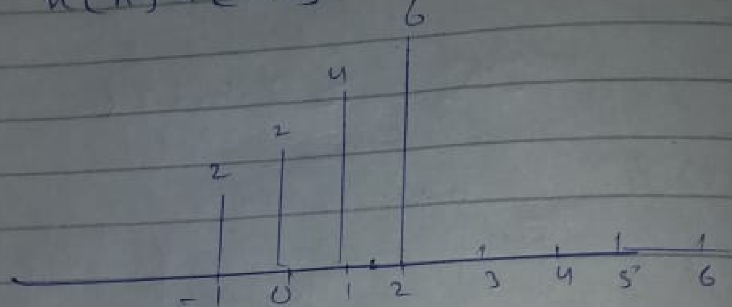
Now For product Sequence

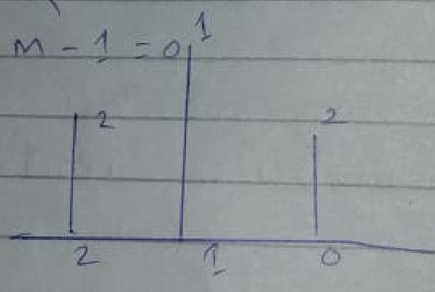
$x(n)\,h[-k]$



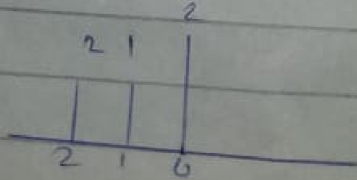
Sum $y(1) = 4 + 2 + 6 - 2 = 10$

* Shifting

$M - 1 = 0$



$x(n)\,h(1-k)$



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

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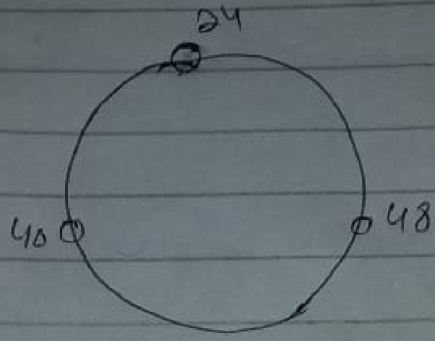
Multiplication :=>



Sum $= y[2] = 112$

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

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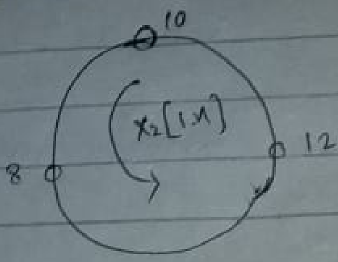
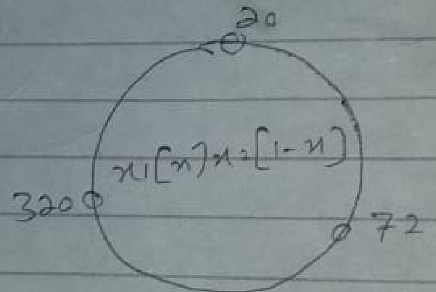
(3) Sum $y = 124$

Now we Shift the folded Seauences Anti Clock wise

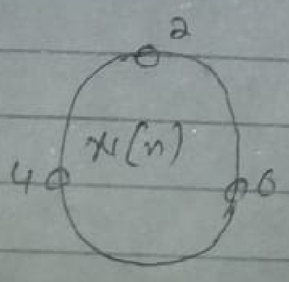


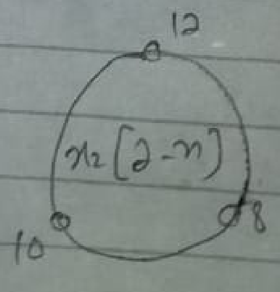
(4) Multiplication :->



Sum $y(1) = 124$

Second Shift





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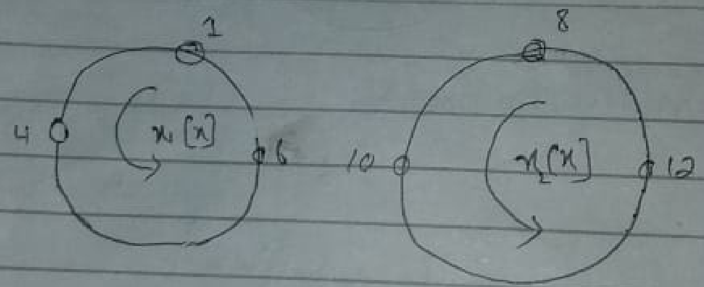
Q5 By using zero Padding find the multiplication of Discrete fourier Transform of The following.

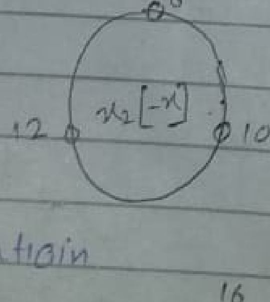
Sol:=> $x_1[n] = \{2, 4, 6\}$

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

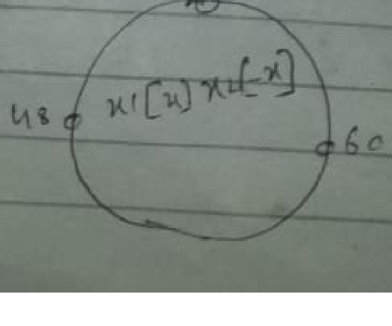
Now we make an cycle



① Folding = in this method we make clockwise image of one Sequence



(2) Multiplication



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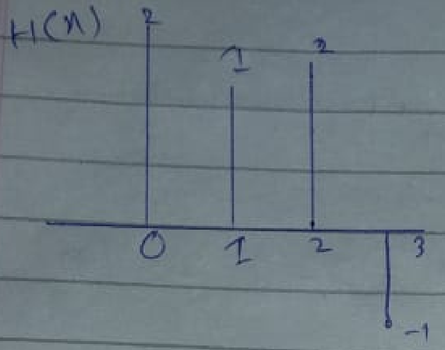
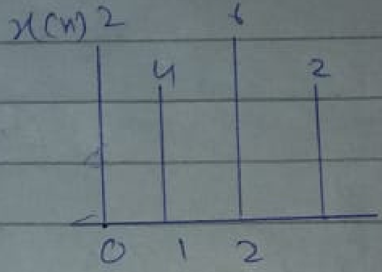
Q3

Solution $H(n) = \{2, 1, 2, -1\}$

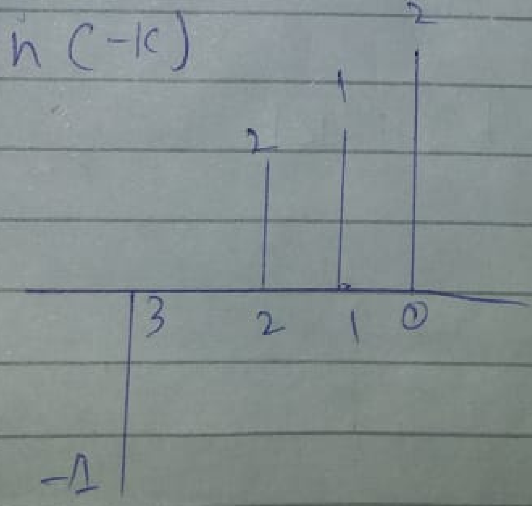
$x[n] = \{2, 4, 6, 2\}$





Length of output = 2 4+4-1 = 7

Folding any one but we fold impulse response



$C_2 = \frac{-1}{7} \mp \frac{j}{23}$

1st property

$Ck + No = Ck$

$C_1 + 4 = C1$

2nd property

$C - k \; CNO - k = Ck$

$= C4 - 1 \; C_1^*$

$C3 = C_1^*$

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

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$Ck = \frac{1}{6} \sum_{n=0}^{6-1} x(n)\, (-j)^{kn}$

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

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

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

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

$= C_0 = 5.16$ DC Components

$\Rightarrow K = 1$

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

$C_1 = \frac{1}{4} \, (-j)^0 x(7) + (-j)^1 x(8)$
$+ -j^2 x[4] + (-j)^3 x[3] +$
$-j^4 x(2) + -j^5 x(6)$

$\Rightarrow C = \frac{1}{6} [-j - 7 + 23j]$

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