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**INTERNAL ASSESSMENT TEST – V**

Sub:	DIGITAL SIGNAL PROCESSING					Code:	18EC52
Date:	08 / 02/ 2022	Duration:	90 mins	Max Marks:	50	Sem:	V
						Branch:	ECE

Answer all questions

		Marks	CO	RBT
1	Compute the output $y[n]$ of an LTI system whose impulse response is $h[n] = [1,2,3]$ for the input $x[n] = [1,2, -1,0,1,3, -2,1,3,2, -1,2]$ using overlap-save method. Use 6 point circular convolution.	[10]	CO2	L3
2	Compute the output $y[n]$ of an LTI system whose impulse response is $h[n] = [1,2,3,1]$ for the input $x[n] = [3,2, -1,2,3, -2,1,1,2, -1,0,1]$ using overlap-add method. Use 7 point circular convolution.	[10]	CO2	L3
3	Compute the DFT of $x[n] = [1,2,3,4,4,3,2,1]$ using DIF-FFT.	[10]	CO3	L3

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		Marks	CO	RBT
4	Compute the IDFT of $X[k] = [12, -2 + 2j, -2, -2 - 2j, 8, -2 + 2j, -2, -2 - 2j]$ using DIF-IFFT.	[10]	CO3	L3
5	Compute the circular convolution of $x[n] = [1, 2, 3, 4]$ and $h[n] = [2, 1, 2, 1]$ using DIT-FFT and DIT-IFFT.	[10]	CO3	L3

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Solution

①

1 $Mh = 3, N = 6$

$$h(n) = (1, 2, 3, 0, 0, 0)$$

$$x_1(n) = (0, 0, 1, 2, -1, 0)$$

$$x_2(n) = (-1, 0, 1, 3, -2, 1)$$

$$x_3(n) = (-2, 1, 3, 2, -1, 2)$$

$$x_4(n) = (-1, 2, 0, 0, 0, 0)$$

$$y_1(n) = (-3, 0, 1, 4, 6, 4)$$

$$y_2(n) = (-5, 1, -2, 5, 7, 6)$$

$$y_3(n) = (-1, 3, -1, 11, 12, 6)$$

$$y_4(n) = (-1, 0, 1, 6, 0, 0)$$

$$y(n) = (1, 4, 6, 4, -2, 5, 7, 6, -1, 11, 12, 6, 1, 6)$$

2 $Mh = 4, N = 7$

$$h(n) = (1, 2, 3, 1)$$

$$x_1(n) = (3, 2, -1, 2, 0, 0, 0)$$

$$x_2(n) = (3, -2, 1, 1, 0, 0, 0)$$

$$x_3(n) = (2, -1, 0, 1, 0, 0, 0)$$

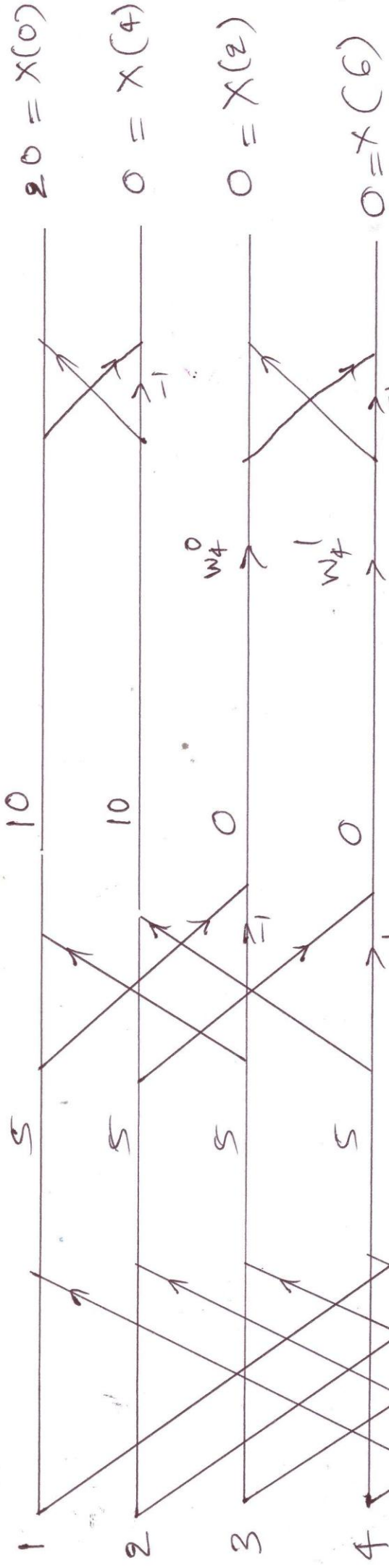
$$y_1(n) = (3, 8, 12, 9, 3, 5, 2)$$

$$y_2(n) = (3, 4, 6, 0, 3, 4, 1)$$

$$y_3(n) = (2, 3, 4, 0, 1, 3, 1)$$

$$y(n) = (3, 8, 12, 9, 6, 9, 8, 0, 5, 7, 5, 0, 1, 3, 1)$$

W



$20 = X(0)$

$0 = X(4)$

$0 = X(8)$

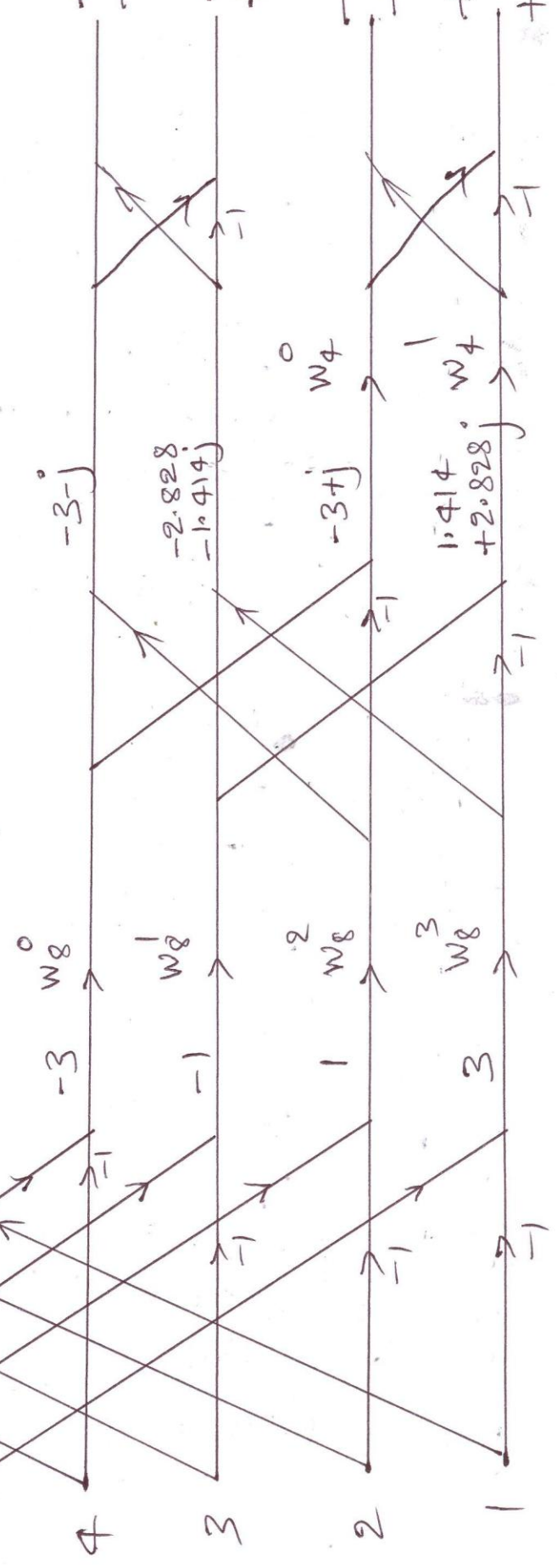
$0 = X(12)$

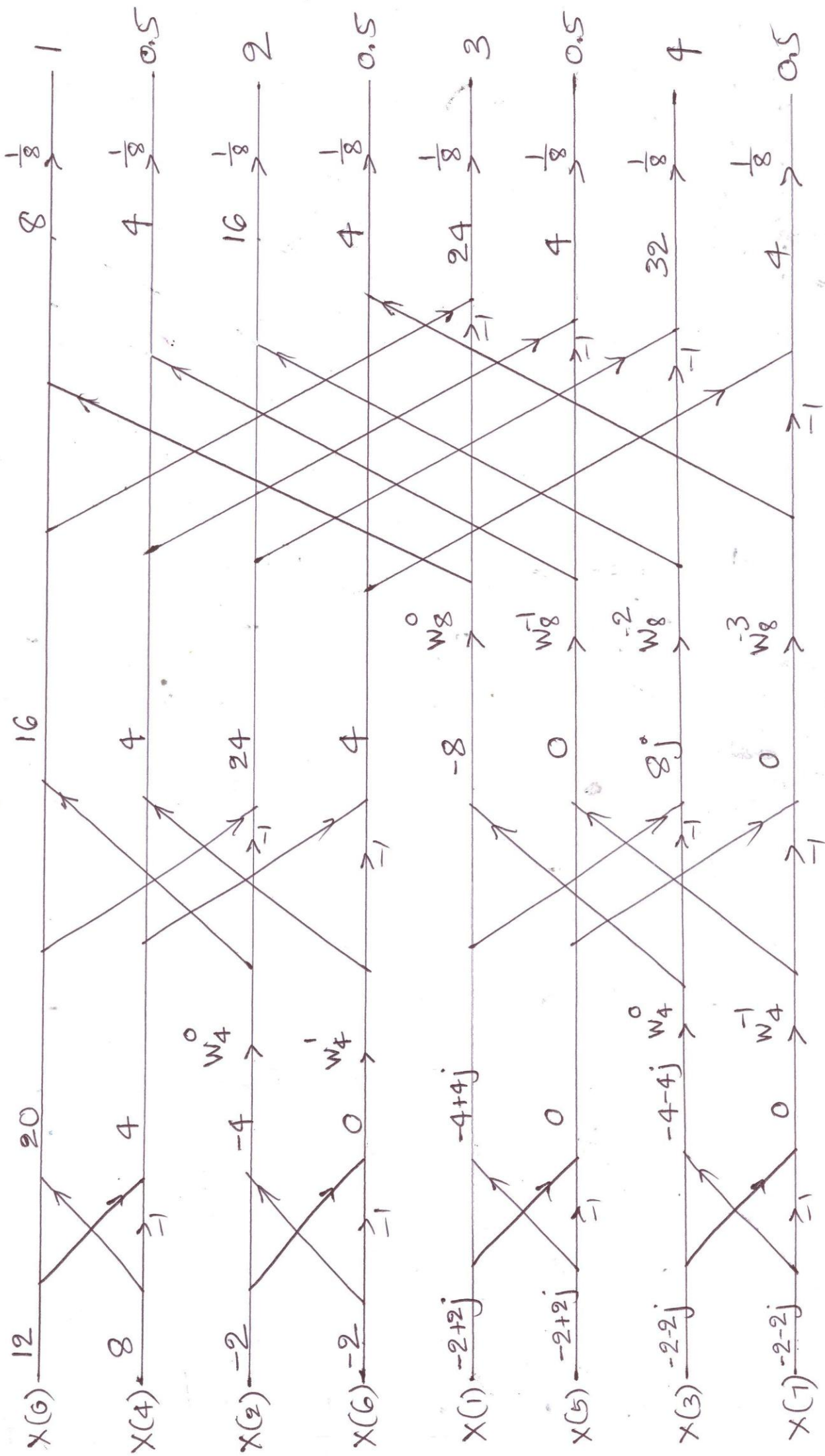
$-5.828 - 2.414j = X(1)$

$-0.172 + 0.414j = X(5)$

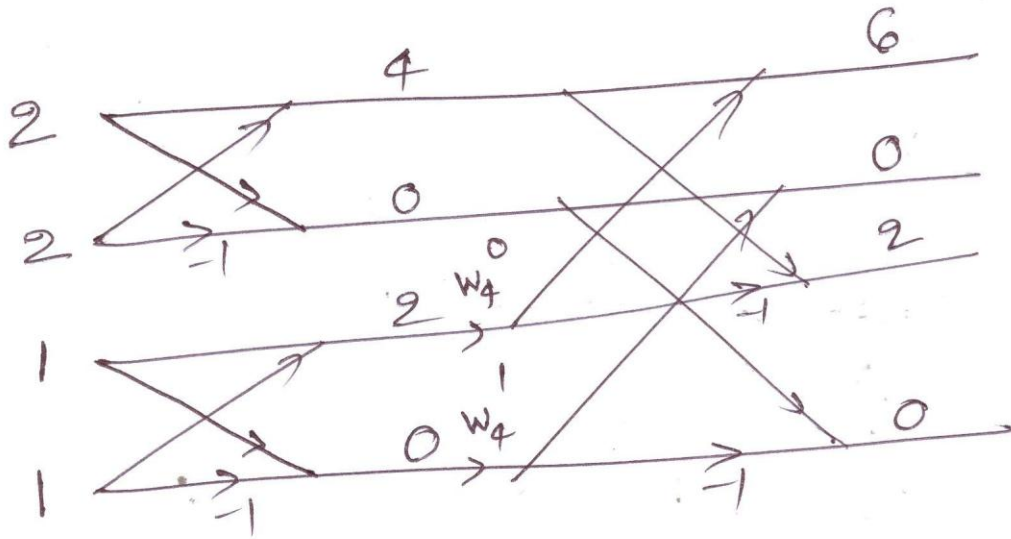
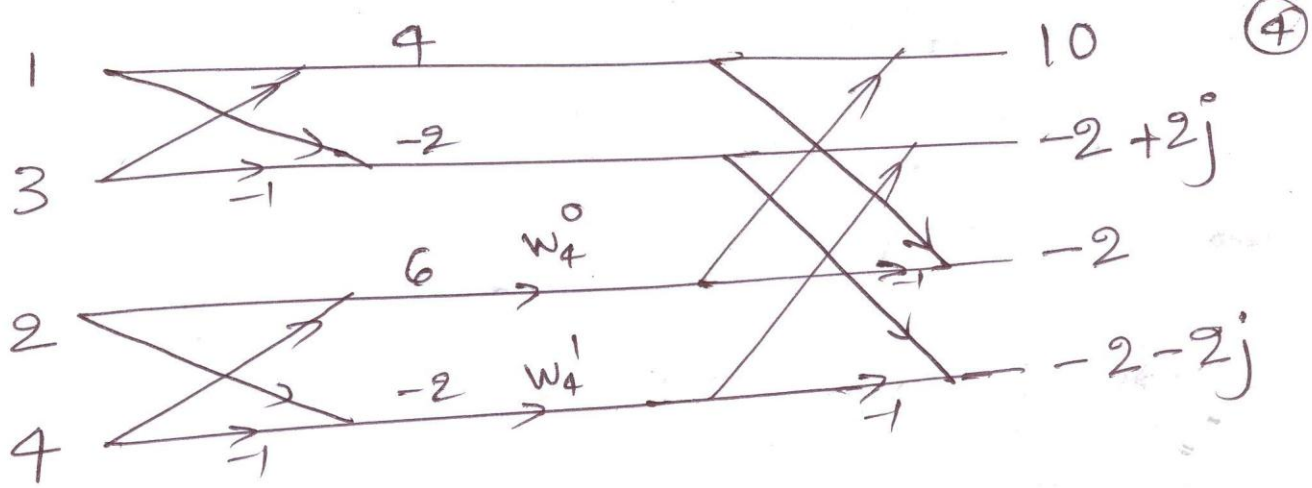
$-0.172 - 0.414j = X(9)$

$-5.828 + 2.414j = X(13)$

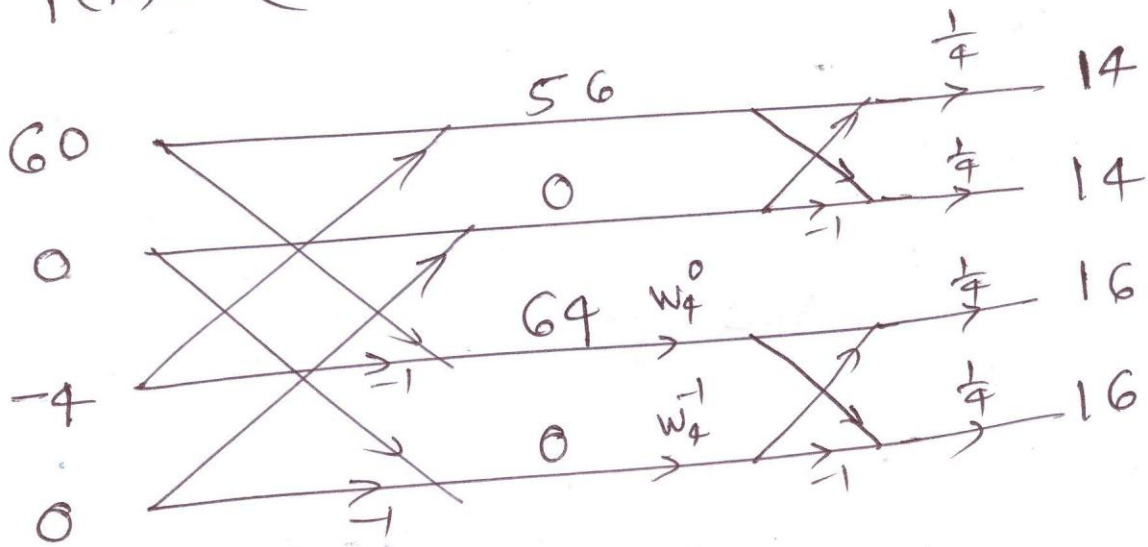




5



$$Y(k) = (60, 0, -4, 0)$$



$$y(n) = (14, 16, 14, 16)$$