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INTERNAL ASSESSMENT TEST – II

Sub:	DIGITAL SIGNAL PROCESSING						Code:	17EC52	
Date:	12 / 10 / 2019	Duration:	90 mins	Max Marks:	50	Sem:	V	Branch:	ECE(D)/TCE

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

		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

Solution

①

1 $\Delta h = 3, N = 6$

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

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

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

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

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

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

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

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

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

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

2 $\Delta h = 4, N = 7$

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

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

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

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

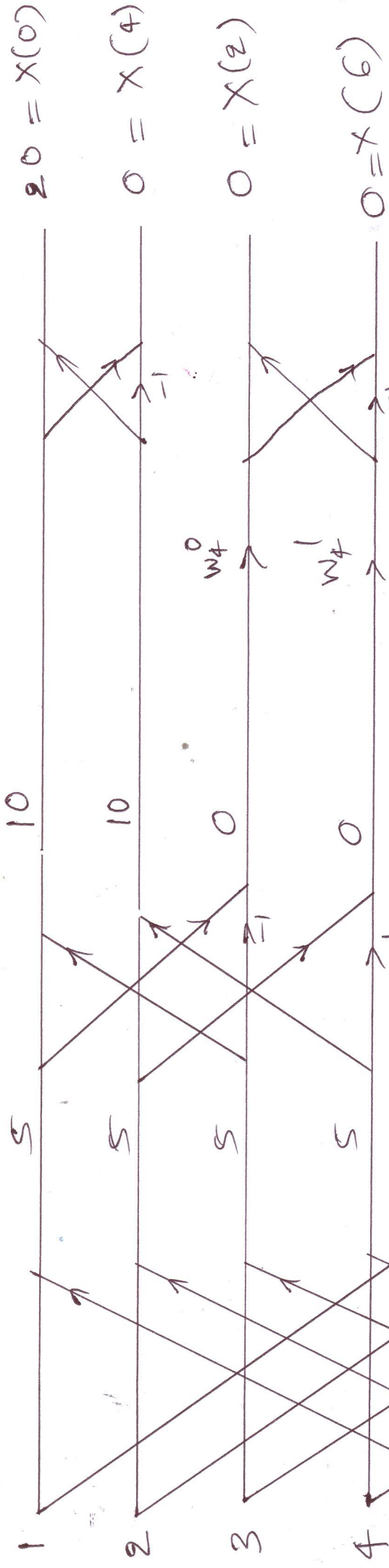
$$y_1(n) = (3, 8, 12, 9, 3, 5, 2)$$

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

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

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

W



$20 = X(0)$

$0 = X(4)$

$0 = X(2)$

$0 = X(6)$

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

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

$-0.172 - 0.414j = X(3)$

$-5.828 + 2.414j = X(7)$

10

10

0

0

$-3-j$

$-2.828 - 1.414j$

$-3+j$

$1.414 + 2.828j$

5

5

5

5

$-3 w_8^0$

$-1 w_8^1$

$1 w_8^2$

$3 w_8^3$

1

2

3

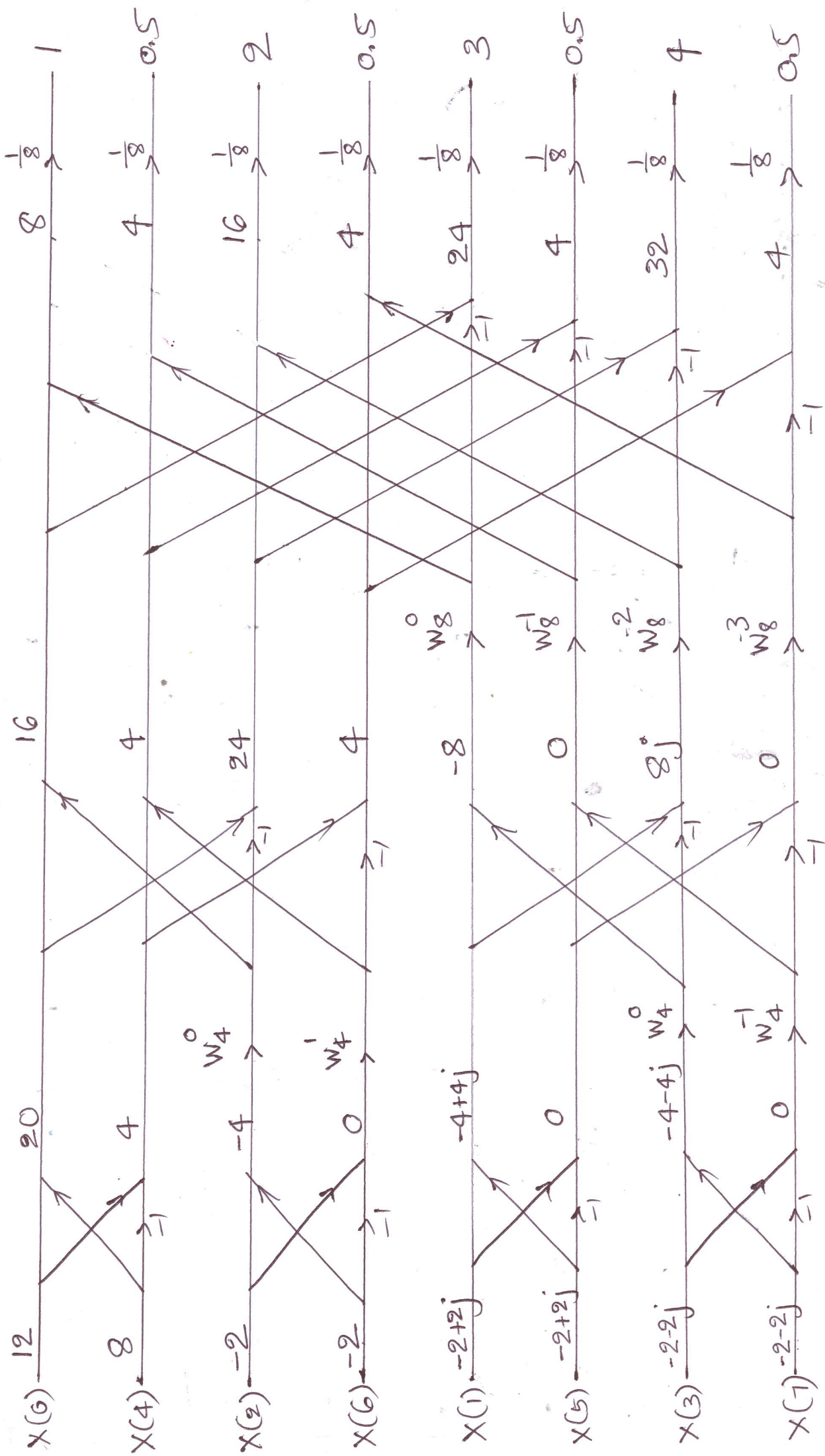
4

4

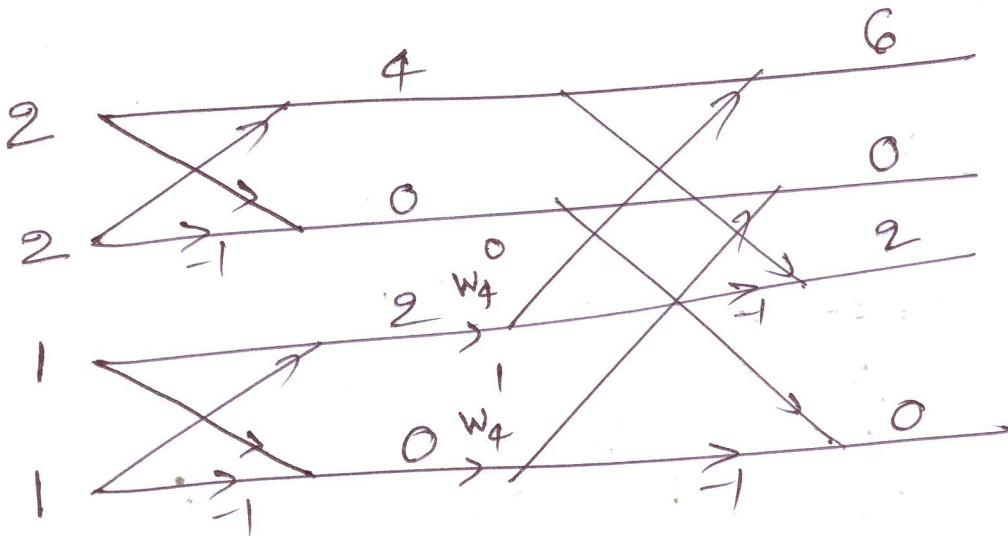
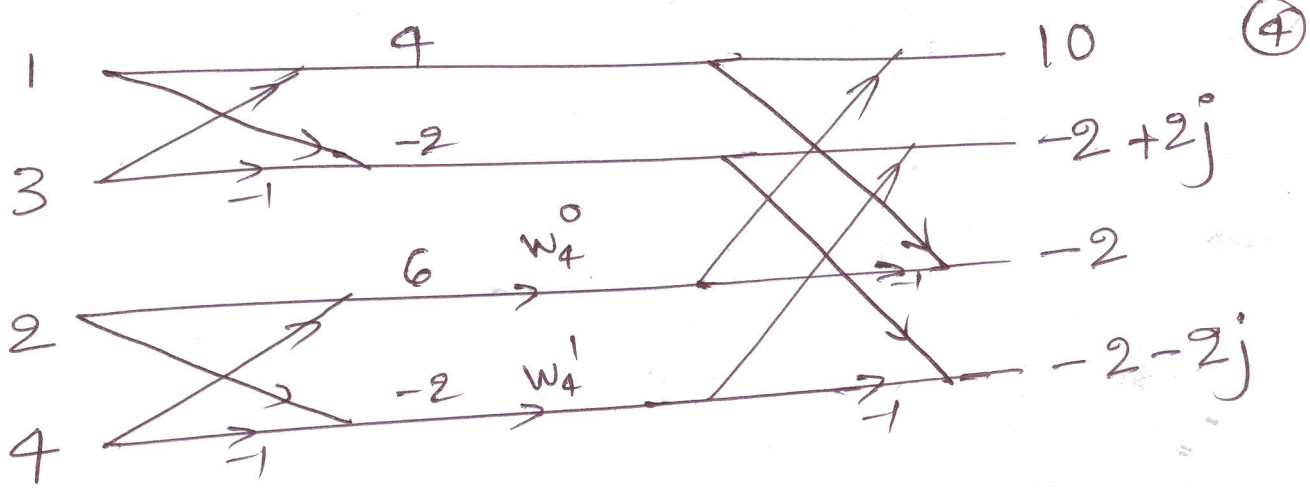
3

2

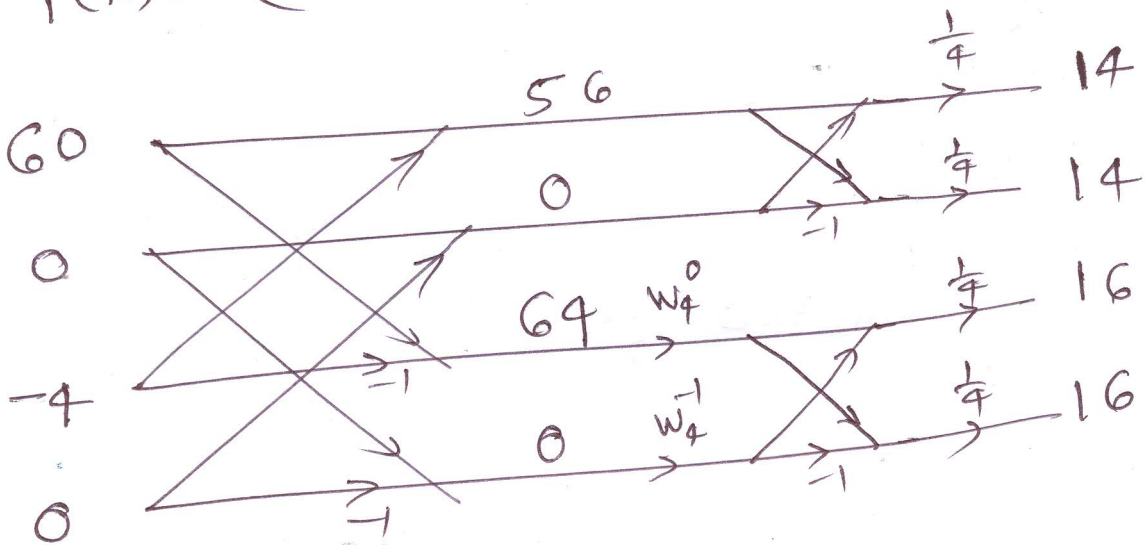
1



5



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



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