

ASSIGNMENT NO 2

Name :

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Reg no :

18PWCE1658

Section :

B

Department :

Computer System Engineering

Date :

2 - January - 2022

Submitted to :

Dr. Nasir Ahmed

1

$$x[n] = h[n]$$

$$x[n] = h[n]$$

Day: M T W T F S

Date: / /

Qn Compute and plot the convolution

a) $x[n] * h[n]$ and $h[n] * x[n]$

SOLUTION:

$$x[n] * h[n]$$

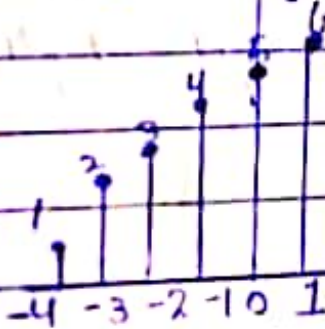
$$h[-k]$$

$$x[k]h[-k] = 6$$



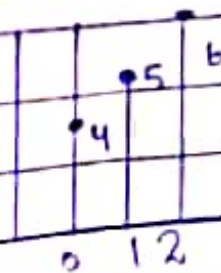
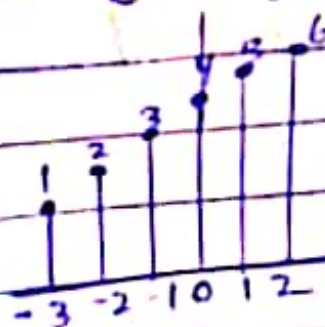
$$h[1-k]$$

$$x[k]h[1-k] = 6 + 5 = 11$$



$$h[2-k]$$

$$x[k]h[2-k] = 6 + 5 + 4 = 15$$



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Parents:

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Good

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Day: M T W T F S

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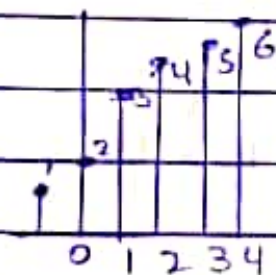
$$h[3-k]$$



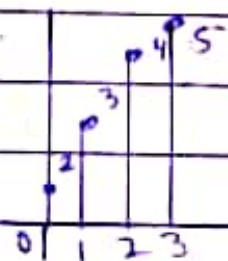
$$x[k]h[3-k] = 6 + 5 + 4 + 3 = 18$$



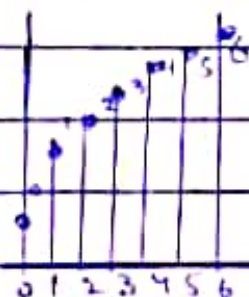
$$h[4-k]$$



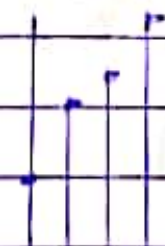
$$x[k]h[4-k] = 14$$



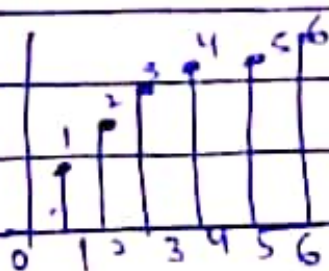
$$h[5-k]$$



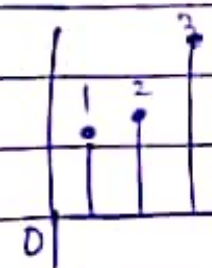
$$x[k]h[5-k] = 10$$



$$h[6-k]$$



$$x[k]h[6-k] = 6$$



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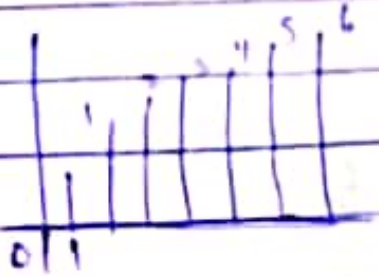
3

Day: MTWTFSS

Date: ___/___/___

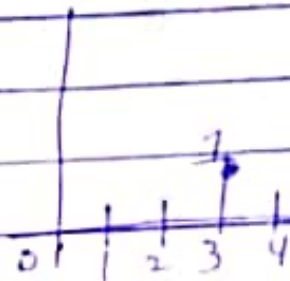
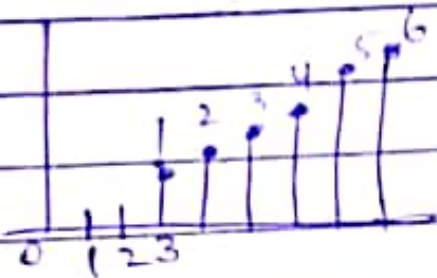
$$h(7-k)$$

$$x(k)h(7-k) = 3$$



$$h(8-k)$$

$$x(k)h(8-k) = 1$$

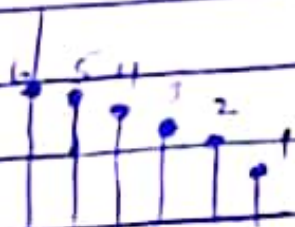


$$y(n) = \{6, 11, 15, 18, 14, 10, 6, 3, 1\}$$

$$\text{Now } h(n) \neq x(n)$$

$$x(k)$$

$$h(k)$$



Parents:

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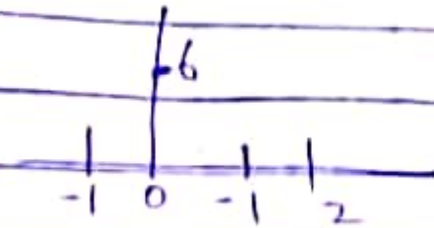
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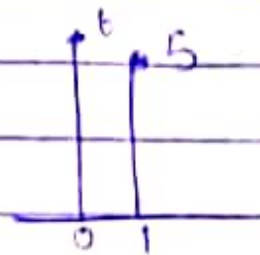
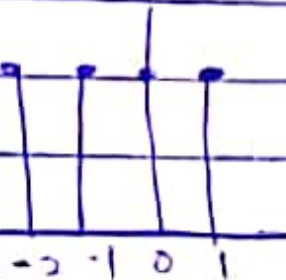
~~$x(-k)$~~

$$h(k) a(-k) = 6$$



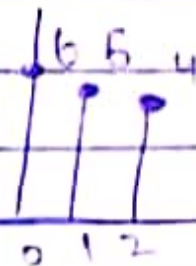
$$x(1-k)$$

$$h(k) \cdot a(1-k) = 11$$



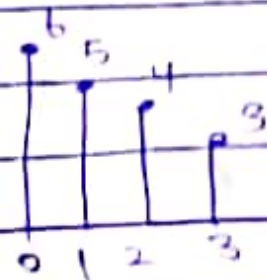
$$x(2-k)$$

$$h(k) \cdot x(2-k) = 15$$



$$x(3-k)$$

$$h(k) \cdot x(3-k) = 18$$



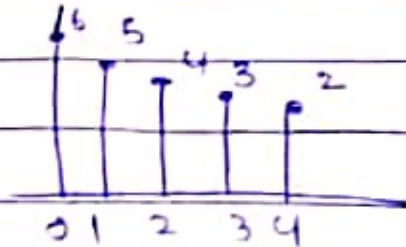
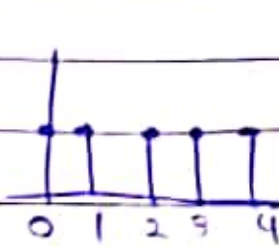
5

Day: MTWTFs

Date: ___/___/___

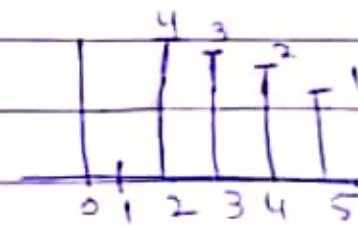
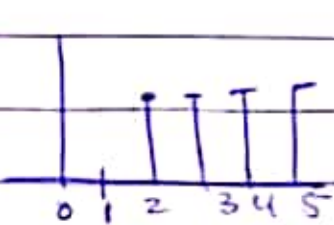
$$x(4-k)$$

$$h(k)x(4-k) = 14$$



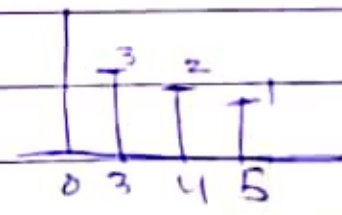
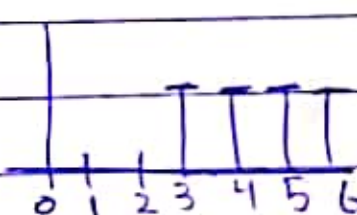
$$x(5-k)$$

$$h(k)x(5-k) = 0$$



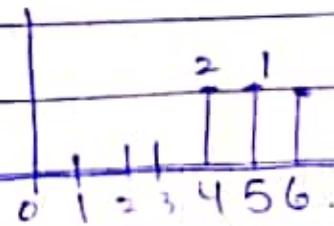
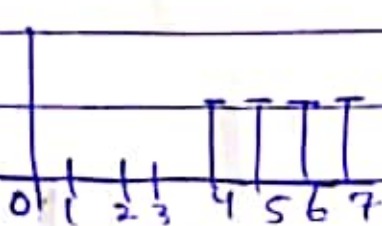
$$x(6-k)$$

$$x(6-k)h(k) = 6$$



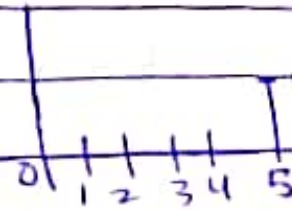
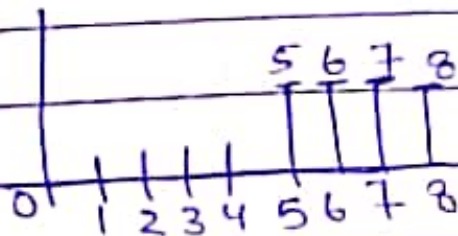
$$x(7-k)$$

$$x(7-k)h(k) = 3$$



$$x(8-k)$$

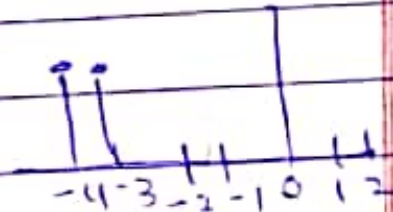
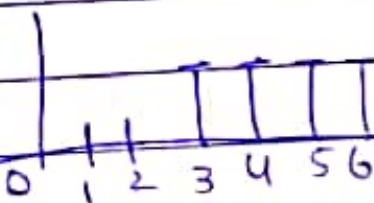
$$x(8-k)h(k) = 1$$



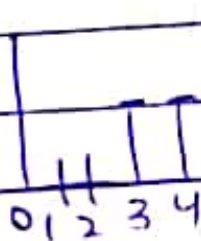
$$y(n) = \{6, 11, 15, 18, 14, 10, 6, 3, 1\}$$

$$x(k)$$

$$h(k)$$

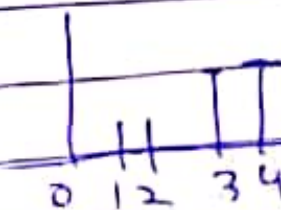
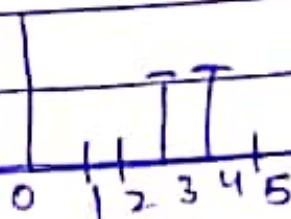


$$h(-k) \quad h(-1)(-k) \quad x(k)h(-1-k) = 1$$



$$h(k)$$

$$x(k)h(-k) = 2$$



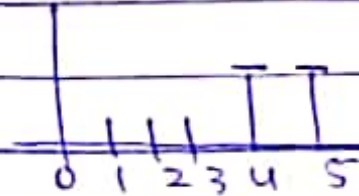
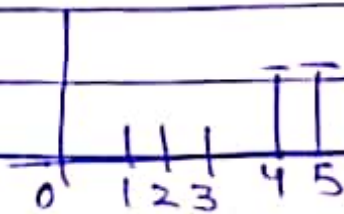
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Day: MTWTF S

Date: ___/___/___

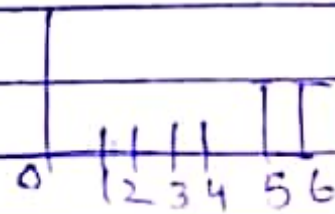
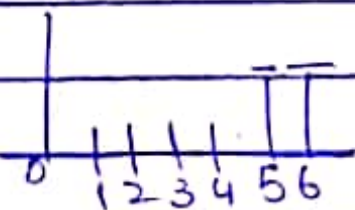
$$h(1-k)$$

$$x(k)h(1-k) = 2$$



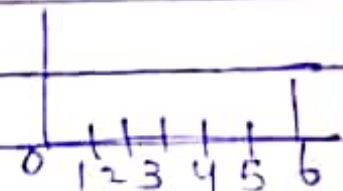
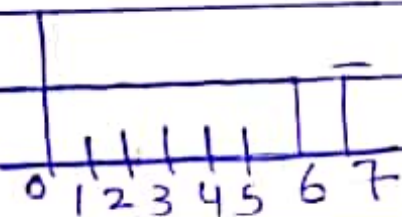
$$h(2-k)$$

$$x(k)h(2-k) = 2$$



$$h(3-k)$$

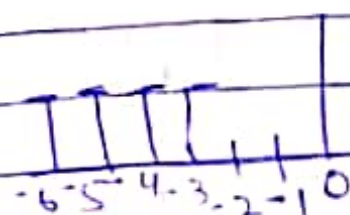
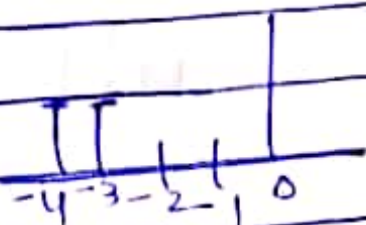
$$x(k)h(3-k) = 1$$



$$y(h) = \{1, 2, 2, 2, 1\}$$

$$h(k)$$

$$x(-k)$$



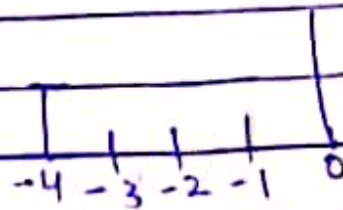
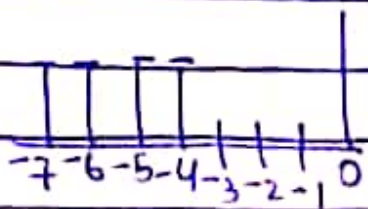
Parents: _____

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$$x[-1-k]$$

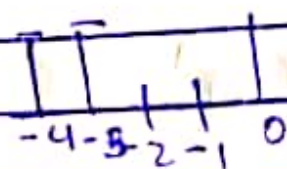
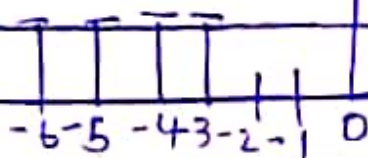
$$h[k]x[-1-k] = 1$$



$$x[-k]$$

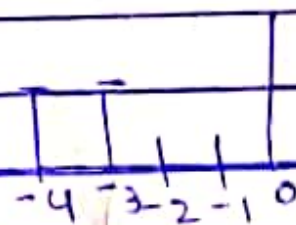
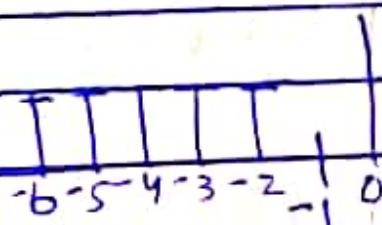
$$h[k]x[-k] = 2$$

~ 0 0 0 0



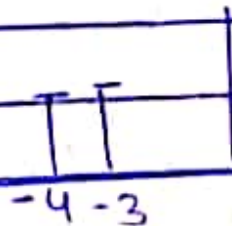
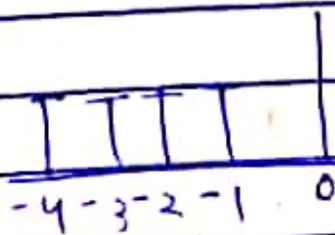
$$x[1-k]$$

$$h[k]x[1-k] = 2$$



$$x[2-k]$$

$$h[k]x[2-k] = 2$$



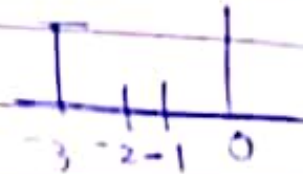
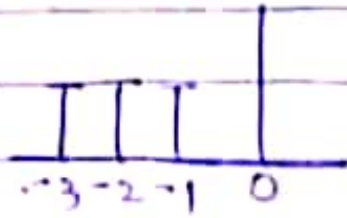
[9]

Day. MONTH

Date: / /

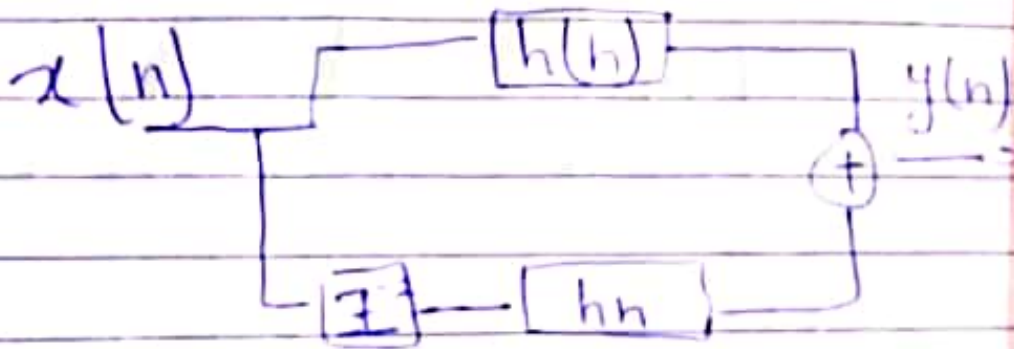
$$x(3-k)$$

$$h(k) \cdot x(3-k) = 1$$



$$y(n) = \{1, 2, 2, 2, 1\}$$

Q2) $h(n) = a^n u(n)$



$$y(n) = x(n) * h(n) + x(n-2) * h(n)$$

As:

$$S(n) = U(n) * h(n)$$

$$= \sum_{k=0}^{\infty} U(k) h(n-k)$$

$$= \sum_{k=0}^{\infty} h(n-k)$$

$$= (a^n + a^{n-1} + a^{n-2} + \dots)$$

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MIWTF5

Date: ___/___/___

$$= (a^n + a^{n-1} + a^{n-2} + \dots)$$

$$= a \left[\frac{a^{n+1} - 1}{a - 1} \right]$$

$$r = \frac{a^{n-2}}{a^{n-1}}$$

$$n-1 - n+2$$

$$r = a \cdot a$$

$$= \left[\frac{a^{n+1} - 1}{a - 1} \right]$$

$$r = a$$

$$x(n) = u(n+5) - u(n-10)$$

$$s(n+5) - s(n-10) = \frac{a^{n+5+1} - 1}{a-1} u(n+5)$$

$$a-1$$

$$n+1-10$$

$$= \frac{a-1}{a-1} u(n-10)$$

$$a-1$$

As from the given that
 $y(n) = x(n) * h(n)$ & $h(n) = x(n) * h(n-2)$

$$y(n) = \frac{n+6}{a-1} u(n+5) - \frac{n-9}{a-1} u(n-10)$$

$$= \frac{n+4}{a-1} u(n+3) + \frac{n+1}{a-1} u(n-12)$$