No.: Date:

Signal practice Questions.

1(a) $x[n] \rightarrow \boxed{h[n]} \rightarrow y[n]$

$x[n] = [4, -2, -2, 2]$ $n = -4$ to -1, $x[n] = 0$, otherwise.

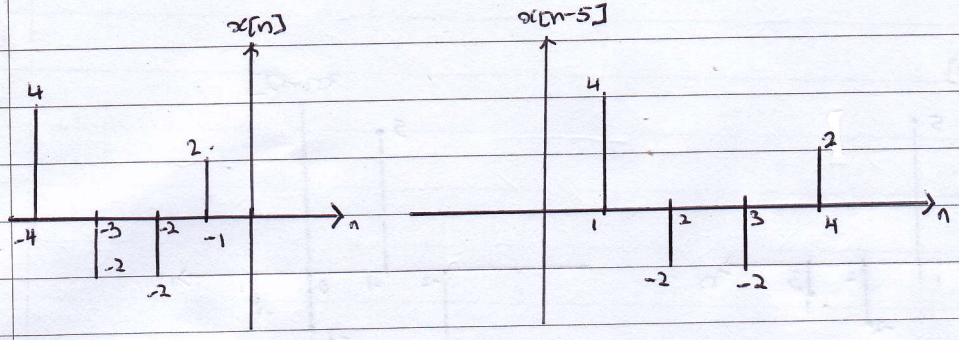
$h[n] = [2, -2, -2, 4]$ $n = 0$ to 3, $h[n] = 0$ / otherwise

$$E_x = \sum_{n=-\infty}^{\infty} |x[n]|^2$$

$$= 4^2 + (-2)^2 + (-2)^2 + 2^2$$

$$= 28 \text{ //}$$

b)



c) $y[n] = x[n] * h[n] = \sum_{m=-\infty}^{\infty} x[m]\,h[n-m]$

m	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	
x[m]						4	-2	-2	2					
h[m]										2	-2	-2	4	
h[-m]							4	-2	-2	2				
h[4-m]			4	-2	-2	2								y[-4] = 8
h[3-m]				4	-2	-2	2							y[-3] = -12
h[2-m]					4	-2	-2	2						y[-2] = -8
h[1-m]						4	-2	-2	2					y[-1] = 28
h[-m]							4	-2	-2	2				y[0] = -8
h[1-m]								4	-2	-2	2			y[1] = -12
h[2-m]									4	-2	-2	2		y[2] = 8

$$E_y = \sum_{n=-\infty}^{\infty} |y[n]|^2$$

$$= 8^2 + (-12)^2 + (-8)^2 + 28^2 + (-8)^2 + (-12)^2 + 8^2$$

$$= 1328$$

d)