

Name / M. Hilal Ichan

ID / 6966

Subject / Signal & System.

Semester / 06

Submitted to Engr. Amir Aman.

Assignment = 01.

Q1

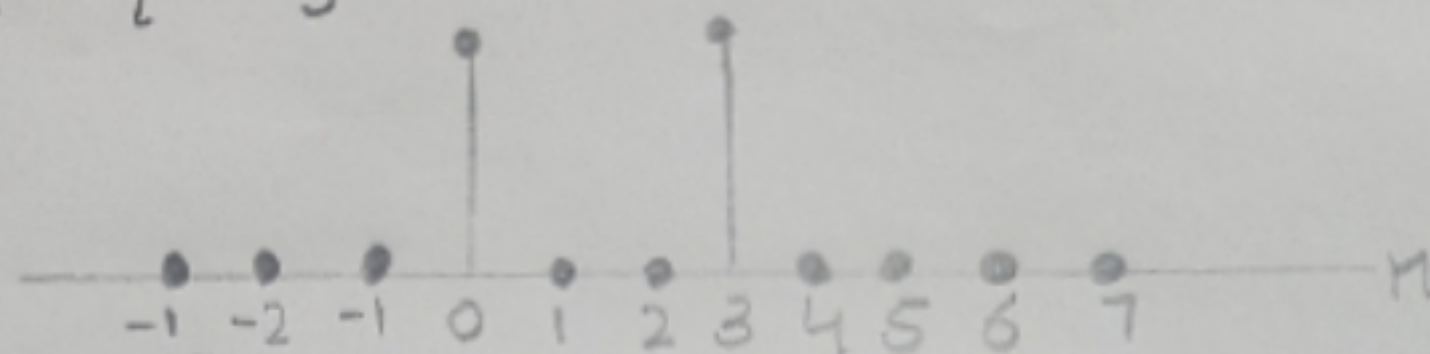
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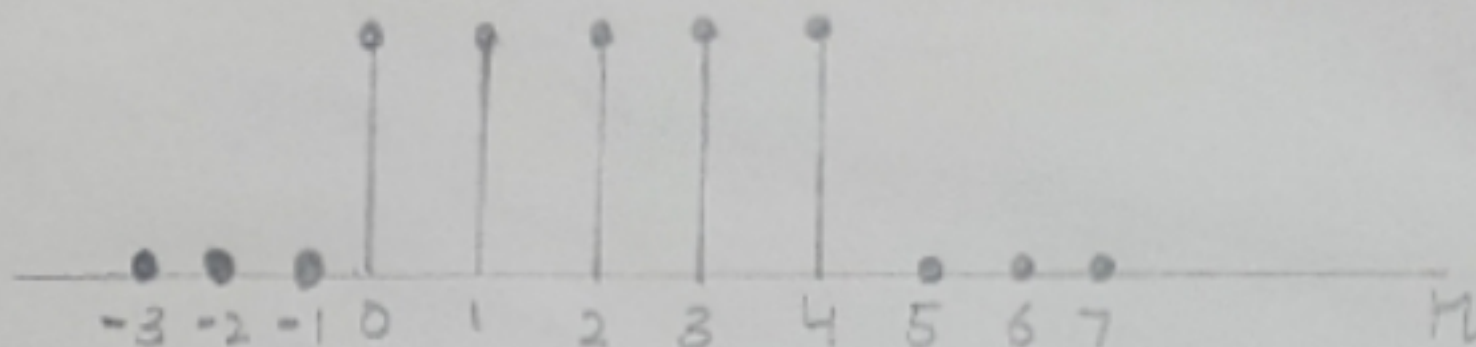
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$$\Rightarrow x[n] = \delta[n] + \delta[n-3]$$

(a)

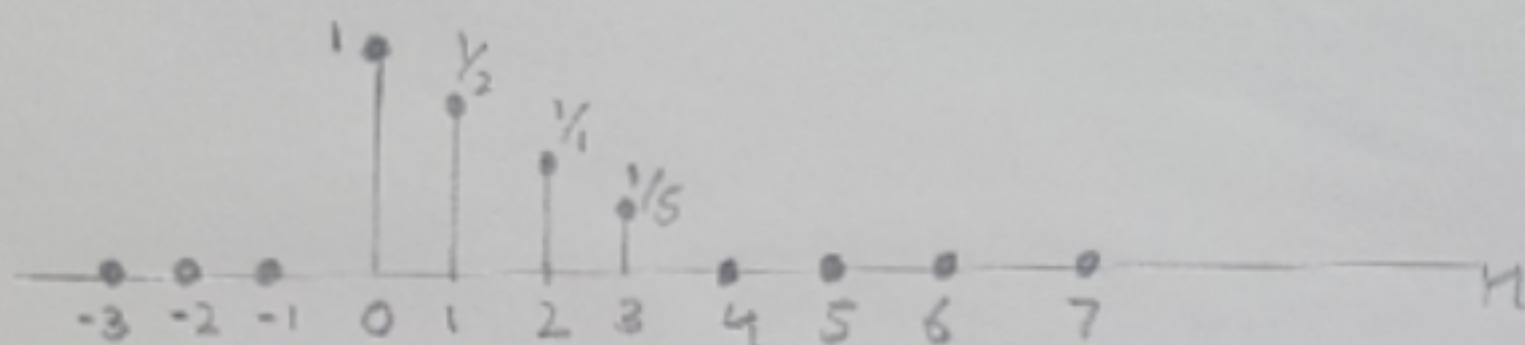


$$\Rightarrow x[n] = U[n] - U[n-5]$$



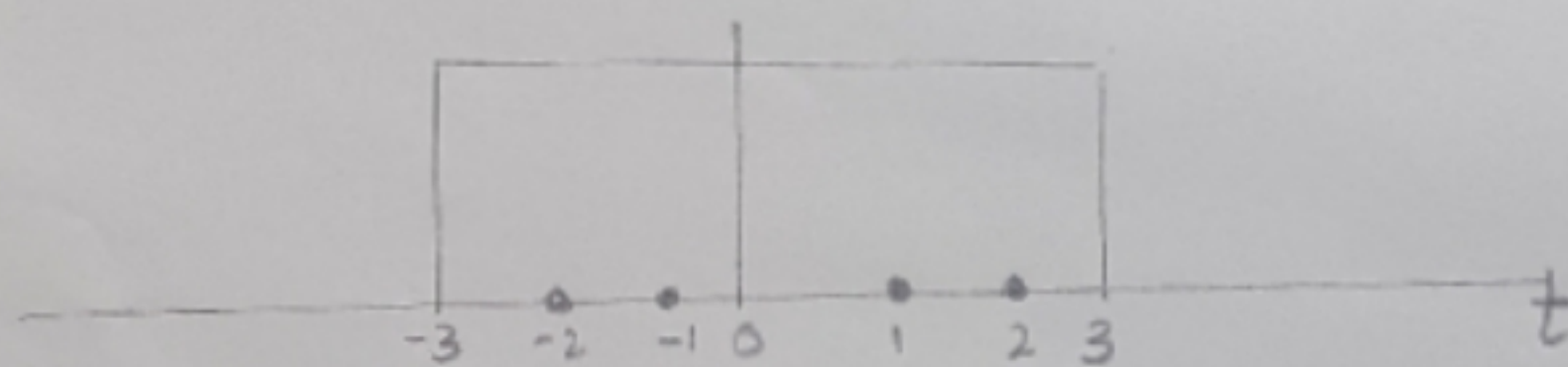
(c)

$$\Rightarrow x[n] = \delta[n] \frac{1}{2} \delta[n-1] + \left(\frac{1}{2}\right)^2 \delta[n-2] + \left(\frac{1}{2}\right)^3 \delta[n-3]$$



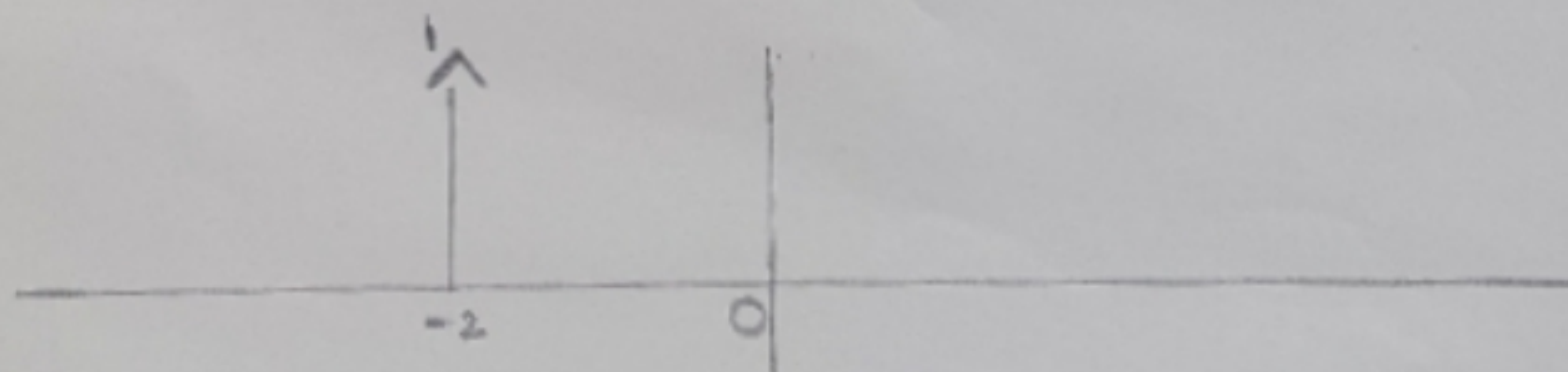
(d)

$$\Rightarrow x[t] = U[t+3] - U[t-3]$$



(e)

$$\Rightarrow x[t] = \delta[t+2]$$

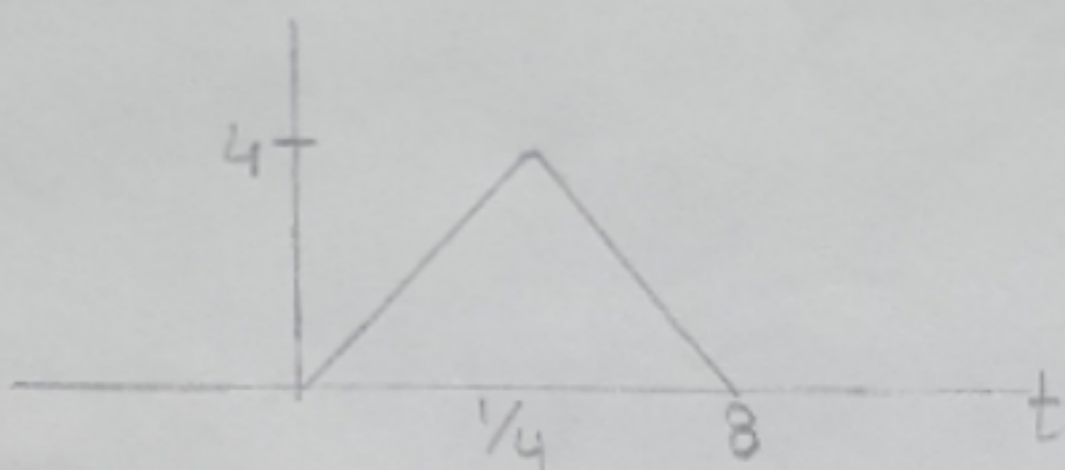
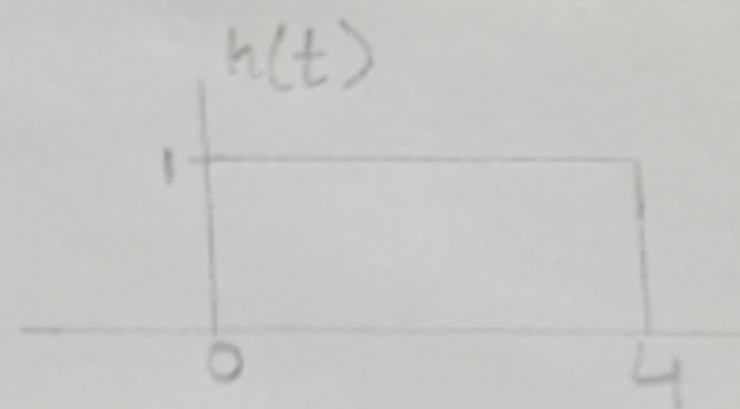
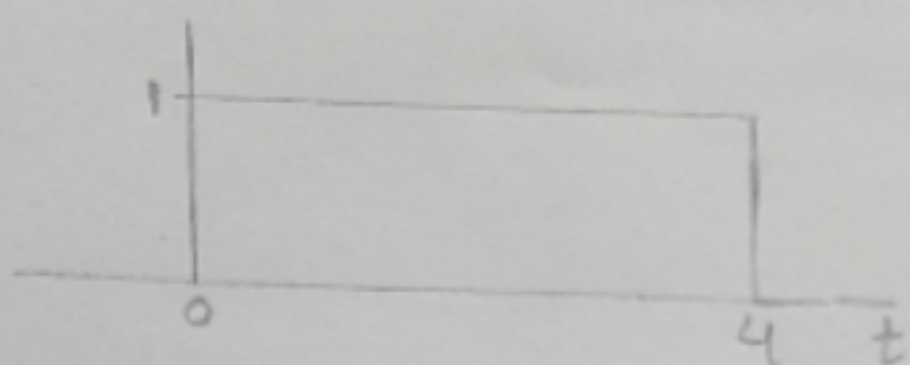
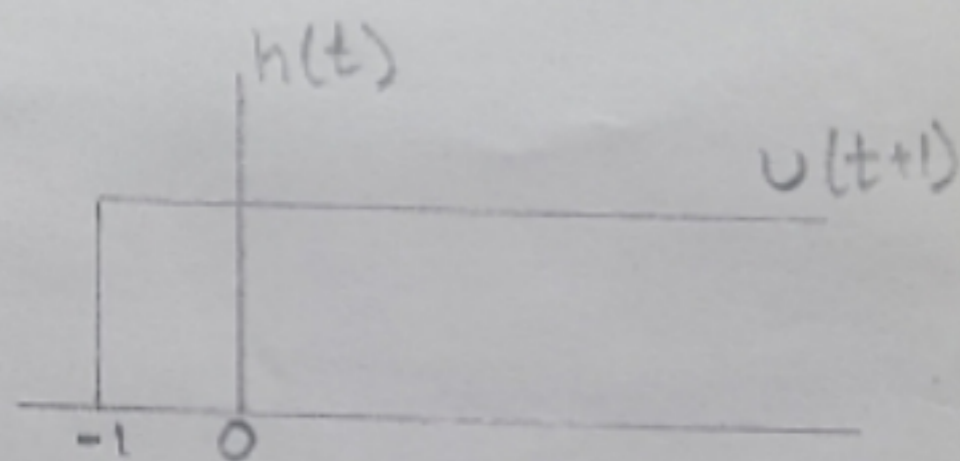
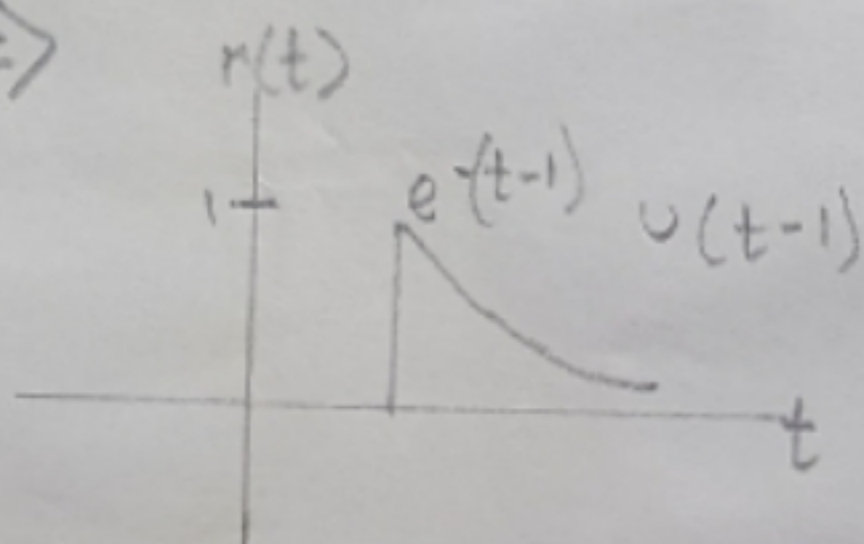


Q4:

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(a) \Rightarrow (b) \Rightarrow 

The limit can be verified by graphically visualizing the convolution

$$y(t) = \int_{-\infty}^{\infty} x(\tau) h(t-\tau) d\tau$$

$$= \int_{-\infty}^{\infty} e^{-(\tau-1)} u(\tau-1) u(t-\tau+1) d\tau$$

$$= \begin{cases} \int_0^{t-1} e^{-(\tau-1)} d\tau, & t > 0, \\ 0, & t < 0. \end{cases}$$

Let $\tau' = \tau - 1$, then

$$y(t) = \begin{cases} \int_0^t e^{-\tau'} d\tau' = 1 - e^{-t}, & t > 0 \\ 0, & t < 0 \end{cases}$$