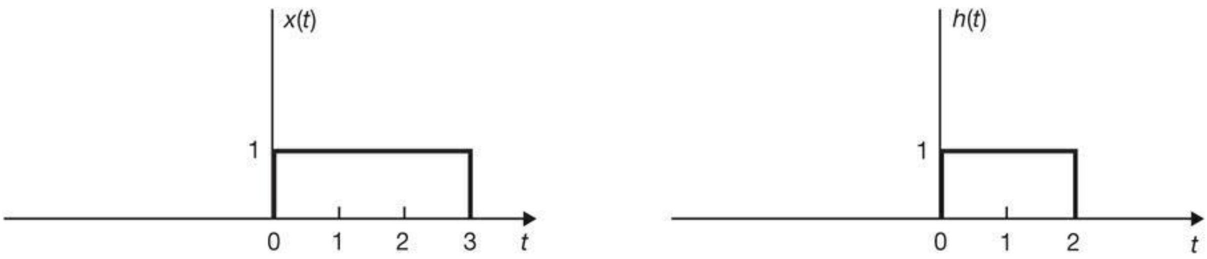
**1-03-d tutorial**

**Question 1**

2.6 Evaluate y(t) = x(t) * h(t), where x(t) and h(t) are shown in Fig. 2-6, (a) by an analytical technique, and (b) by a graphical method.

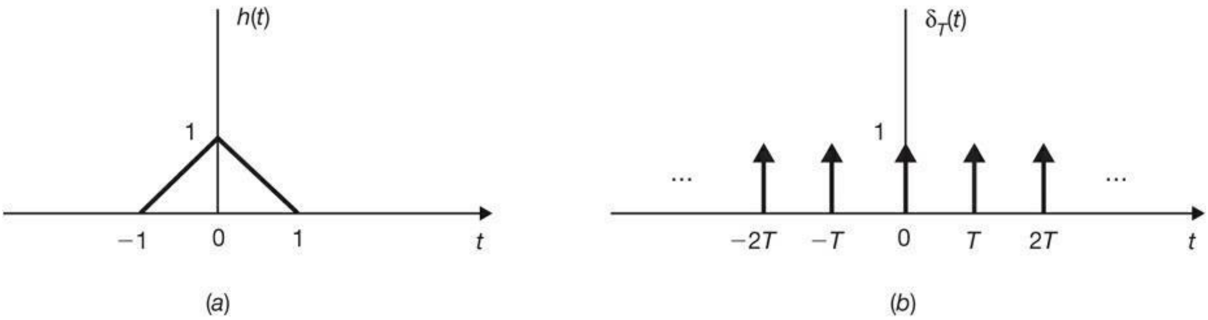



**Question 2**

Let h(t) be the triangular pulse shown in Fig. 2-10(a) and let x(t) be the unit impulse train [Fig. 2-10(b)] expressed as

$$x(t) = \delta_T(t) = \sum_{n=-\infty}^{\infty} \delta(t - nT) \tag{2.68}$$

Determine and sketch y(t) = h(t) * x(t) for the following values of T: (a)T = 3, (b) T = 2, (c) T = 1.5.



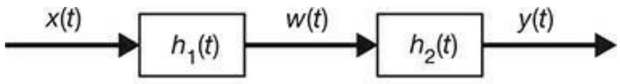

**Question 3**

2.14. The system shown in Fig. 2-17(a) is formed by connecting two systems in cascade. The impulse responses of the systems are given by h1(t) and h2(t), respectively, and

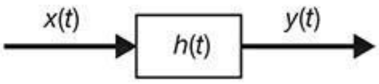
$h1(t)= e^{-2t} u(t)$ $h2(t) = 2e^{-t} u(t)$

(a) Find the impulse response h(t) of the overall system shown in Fig. 2-17(b).

(b) Determine if the overall system is BIBO stable.




(a)




(b)

**Question 4**

2.15. Consider a continuous-time LTI system with the input-output relation given by

$$y(t) = \int_{-\infty}^{t} e^{-(t-\tau)} x(\tau)\, d\tau \qquad (2.82)$$

(a) Find the impulse response h(t) of this system.

(b) Show that the complex exponential function $e^{st}$ is an eigenfunction of the system.

(c) Find the eigenvalue of the system corresponding to $e^{st}$ by using the impulse response h(t) obtained in part (a).