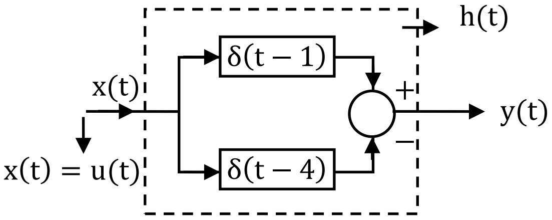
12. The system in figure is an LTI system



The $z(t) = \int_{-\infty}^{t} y(t).dt$ is

(A) Stable and Non-causal
(B) Stable and Causal
(C) Unstable and Causal
(D) Unstable and Non-Causal

13. The impulse response of the LTI system is $h(t) = u(t+2) - u(t-4)$. The step response is

(A) $(t+2)u(t+2) - (t-4)u(t-4)$
(B) $(t+2)u(t) - (t-4)u(t)$
(C) $(t+2)u(t+2) - (t-2)u(t-4)$
(D) $tu(t+2) - tu(t-4)$

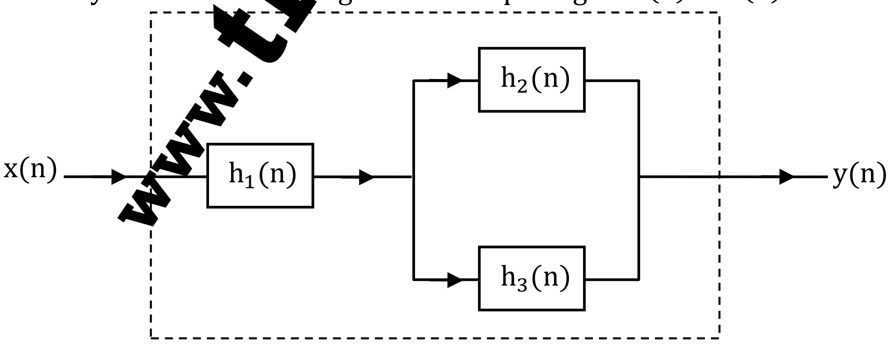
14. The impulse response of a system is $h(t) = tu(t)$. For an input $x(t) = u(t-3)$ the output is

(A) $\left(\frac{t^2}{2} + 3t\right)ut$
(B) $\frac{(t-3)^2}{2}u(t-3)$
(C) $\frac{(t-3)}{2}u(t-3)$
(D) $\frac{(t-3)^2}{2}u(t)$

15. A signal y(t) is convolution of x(t) and h(t) i.e., $y(t) = x(t) * h(t)$
If $x(t) = -3\cos 2t \quad y(t) = 3\cos 2t$
Then h(t) is

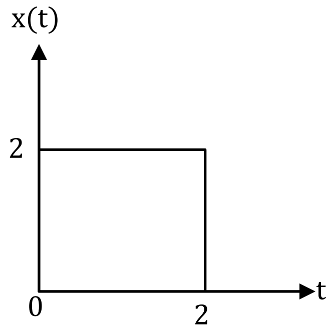
(A) $2\delta[t-\pi]$
(B) $2\delta[t-2\pi]$
(C) $2\delta[t+\frac{\pi}{2}]$
(D) $2\delta[2t-\pi]$

16. A LTI system is shown in figure. If the input signal $x(n) = \delta(n)$

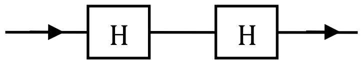


Let $h_1(n) = u(n+2)$
$h_2(n) = 2\delta(n) + \delta(n-3)$
$h_3(n) = \delta(n+1) - 2\delta(n-1)$
The output y(n) at n=0 is

17. The impulse response h (t) of a system H is shown (a) figure. The maximum value attained by the impulse response of two cascaded blocks of h as shown in figure (b) is ________.



(a)



(b)

18. Two discrete time signals x(n) and h(n) are given as

$x(n) = \delta(n) + 2\delta(n-1) + 1\delta(n-2)$

$h(n) = 3\delta(n) + a\delta(n-1) + b\delta(n-2)$

let y(n) be the linear correlation of x(n) and h(n) given that y(1)=8 and y(2)=5, the value of the expression 15y(3)+8y(4)m is _________?

19. Given a discrete time signal x (n) and corresponding output signal y(n) of an LTI system as shown below. The impulse response h(n) of the system is

$x(n) = \{1, \underset{\uparrow}{-1}, 1\}$ → h(n) → $y(n) = \{1, \underset{\uparrow}{-2}, 3, -3, 2, -1\}$

(A) $\{1, \underset{\uparrow}{-1}, -1, 1\}$

(B) $\{\underset{\uparrow}{1}, -1, 1, -1\}$

(C) $\{\underset{\uparrow}{1}, -1, -1, \}$

(D) $\{-1, \underset{\uparrow}{1}, -1\}$

20. A Control system has the following impulse response $h(t) = (2e^{-3t} - e^{-2t})u(t)$. For an input x(t)=u(t), the output is

(A) $\left(\frac{e^{-2t}}{2} + \frac{1}{6} + \frac{e^{-3t}}{3}\right)u(t)$

(B) $\left(-\frac{2}{3}e^{-3t} + \frac{1}{6} - \frac{e^{-2t}}{2}\right)u(t)$

(C) $\left(-\frac{2}{3}e^{-3t} + \frac{e^{-2t}}{2} + \frac{1}{6}\right)u(t)$

(D) $\left(-\frac{2}{3}e^{-3t} + \frac{e^{-2t}}{4}\right)u(t)$