Q.6.

1. $x(t) = \dfrac{1}{1 - \frac{1}{4}e^{-jt}}$, $T = 2\pi, \omega_0 = 1$.

$$x(e^{j\omega}) = \frac{1}{1 - \frac{1}{4}e^{-j\omega}}.$$

≡.

$$X(e^{j\omega}) = \sum_{n=-\infty}^{\infty} x[n]\, e^{-j\omega n}$$

$$x(t) = \sum_{k=-\infty}^{\infty} a_k\, e^{j\omega_0 k t}.$$

ω replaced with t.
n replace with (-k).

$$= \sum_{k=-\infty}^{\infty} a_k\, e^{jkt}.$$

$$= \sum_{k=-\infty}^{\infty} a_{-k}\, e^{-j\omega n}$$

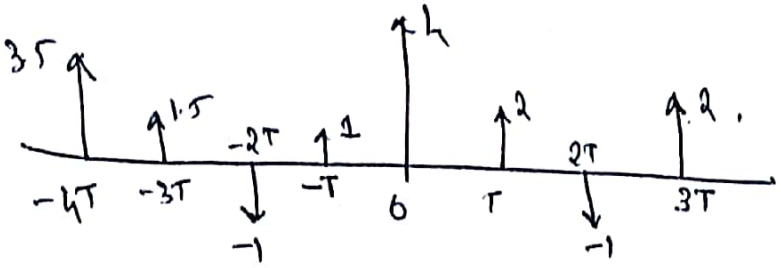
$\Rightarrow x[n] = a_{-n}$.

$\Rightarrow a_{-k} = \left(\frac{1}{4}\right)^{k} u[k]$.

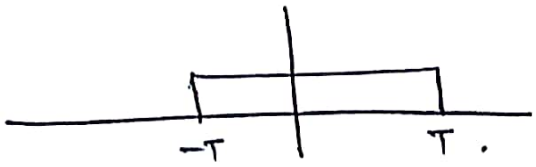
or $a_k = \left(\frac{1}{4}\right)^{-k} u[-k]$.

Problem. 2.

$x(t)$.



$h(t)$.



$x(t) * h(t)$.