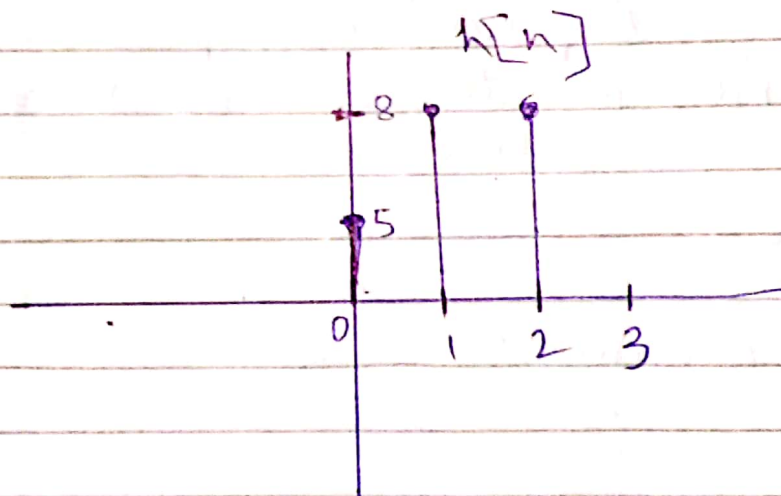
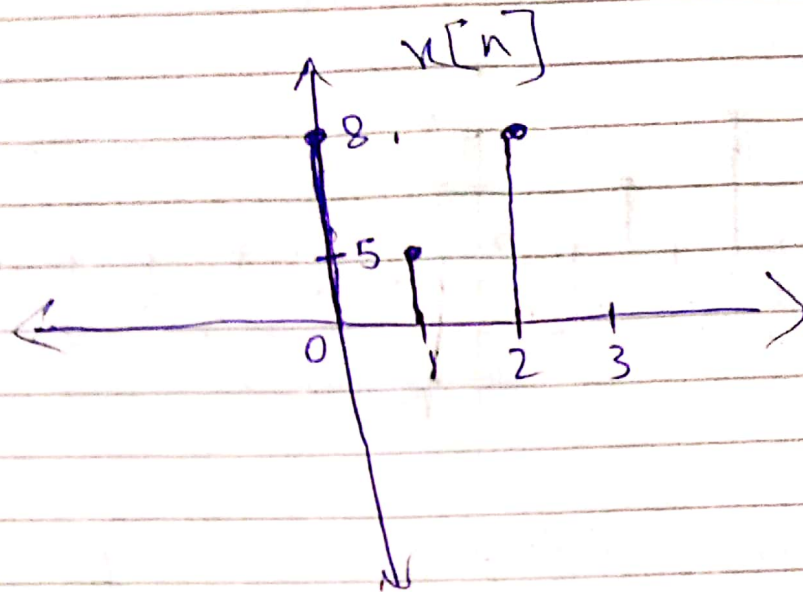


(Q3)

$$B = 8$$

$$S = 5$$



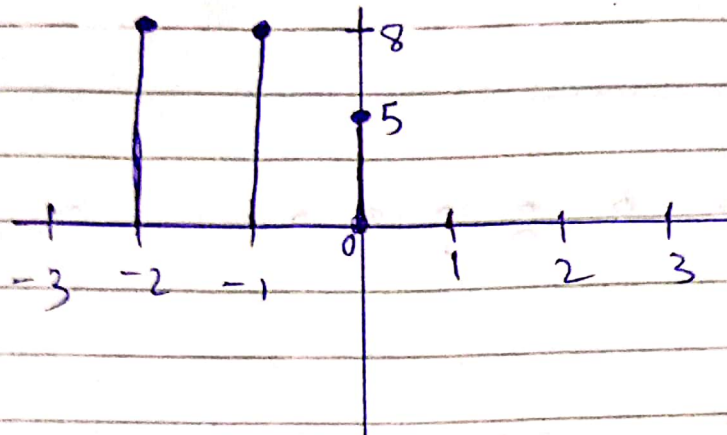
Formula for convolution sum:

$$y[n] = \sum_{k=-\infty}^{\infty} x[k] h[n-k]$$

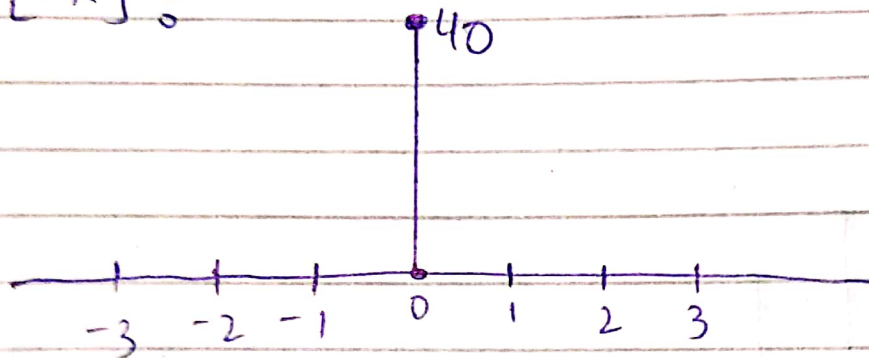
Put $n=0$:

$$y[0] = \sum_{k=-\infty}^{\infty} x[k] h[-k]$$

$h[-k] :$



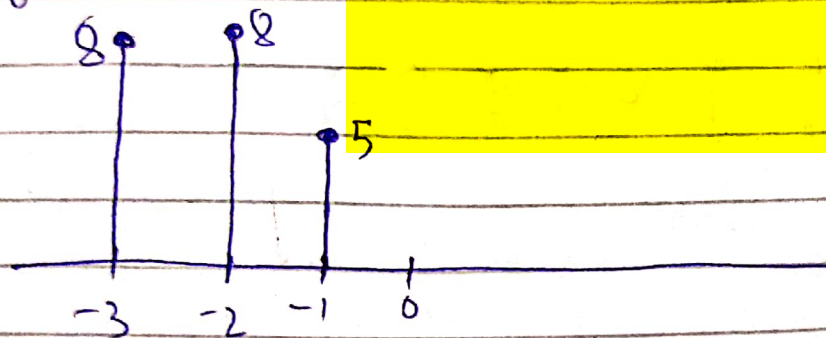
$x[k]h[-k] :$



Now put $n=1$

$$y[1] = \sum_{k=-\infty}^{\infty} x[k]h[1-k]$$

$h[1-k] :$



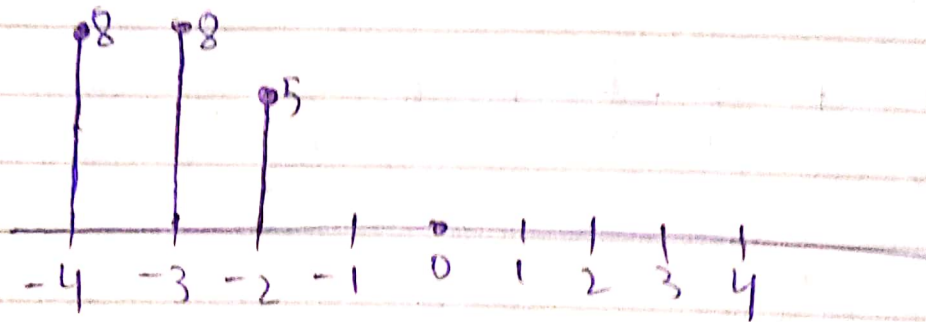
$$x[k]h[1-k]:$$



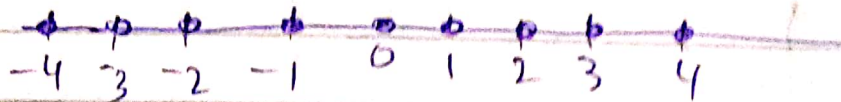
Now put $n=2$:

$$y[2] = \sum_{k=-\infty}^{\infty} x[k]h[2-k]$$

$$h[2-k]:$$



$$x[k]h[2-k]:$$



Now the sum is

$$\sum_{k=-\infty}^{\infty} x[k]h[-k] = 0 + 0 + 0 + 0 + \dots + 40 + 0 + 0 + 0 + \dots = 40$$

$$\sum_{k=-\infty}^{\infty} x[k]h[1-k] = 0 + 0 + 0 + 0 + \dots = 0$$

$$\sum_{k=-\infty}^{\infty} x[k]h[2-k] = 0 + 0 + 0 + 0 + \dots = 0$$

(4) Ans:

★ LTI systems are both Linear and time Invariant.

★ Linear systems whose outputs for a linear combination are the same as a linear combination of individual responses to those inputs.

★ Time invariant systems are independent upon time.

These properties make LTI systems easy to represent and understand graphically.