

Operations on Discrete Signals:

(1) Amplitude scaling:-

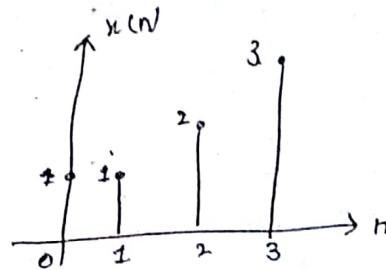
$$x(n) = \{1, 2, 3, 4\}$$

$$y(n) = 3 * x(n) = \{3, 6, 9, 12\}$$

(2) Time shifting:-

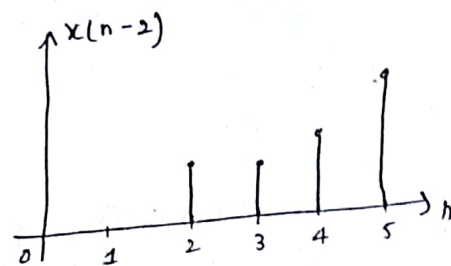
$$x(n) = \{1, 1, 2, 3\}$$

↑



$$x(n-2) = \{0, 0, 1, 1, 2, 3\}$$

↑



(3) Signal addition:-

$$x_1(n) = \{1, -1, 2, 3\}$$

↑

$$x_2(n) = \{1, 3, 3, 4\}$$

↑

$$x_1(n) + x_2(n) = \{2, 2, 5, 7\}$$

↑

(4) Signal Multiplication:-

$$x_1(n) = \{1, 4, 2, 1\}$$

↑

$$x_2(n) = \{1, 3, 4, 1\}$$

↑

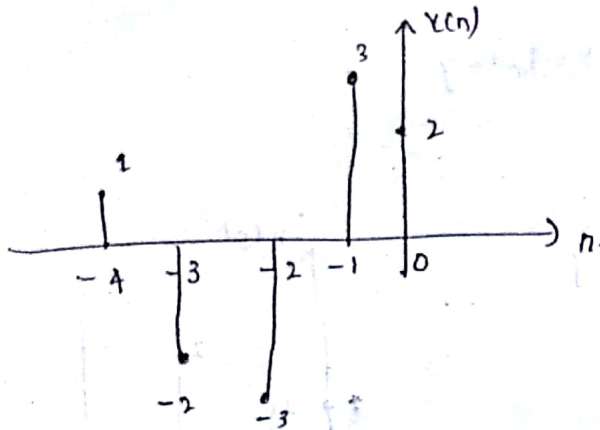
$$x_1(n) * x_2(n) = \{0, 3, 16, 2, 0\}$$

↑

(5) Time Scaling:

$$x(n) = \{1, -2, -3, 3, 2\}$$

↑



$$x(3n) = x'(n)$$

$$x'(0) = x(0) = 2$$

$$x'(-1) = x(-3) = -2$$

$$x'(-2) = x(-6) = 0$$

