Assignment 1

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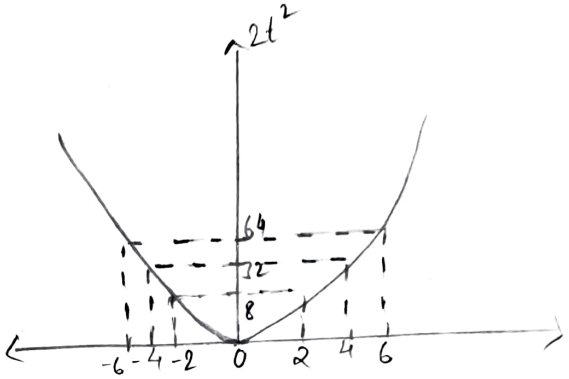
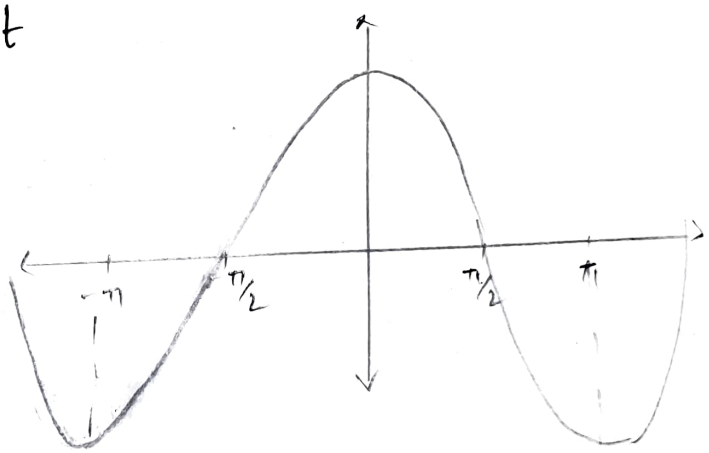
CSE 'B'

1. (a)

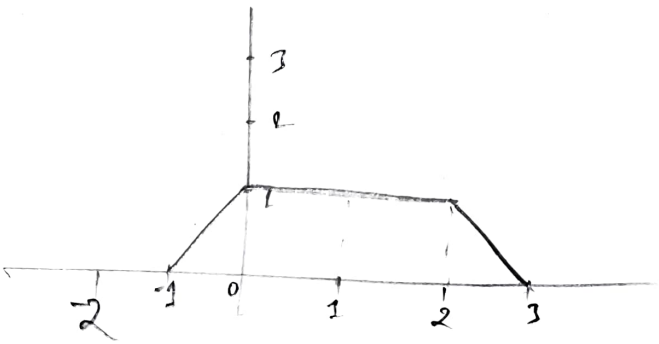
$x_1(t) = 2t^2$



(b) $x_2(t) = \cos t$

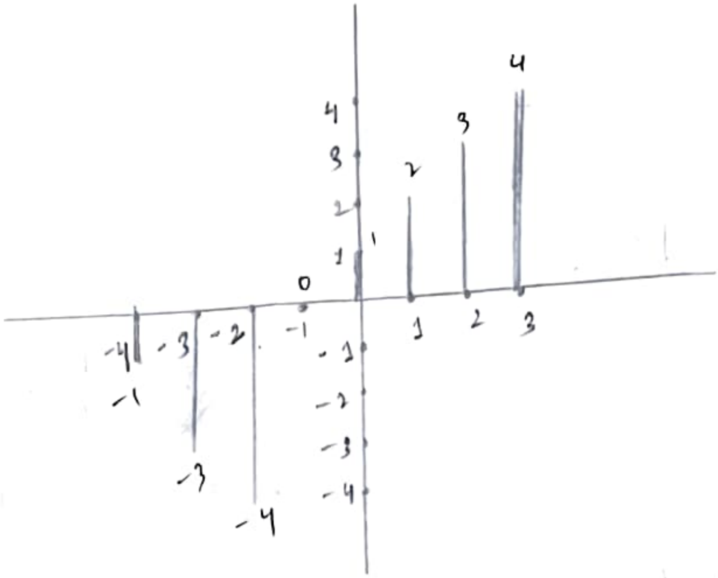


(c) $x_3(t) = \begin{cases} t+1 & -1 \le t \le 0 \\ 1 & 0 < t < 2 \\ -t & 2 < t \le 3 \\ 0 & \text{otherwise} \end{cases}$

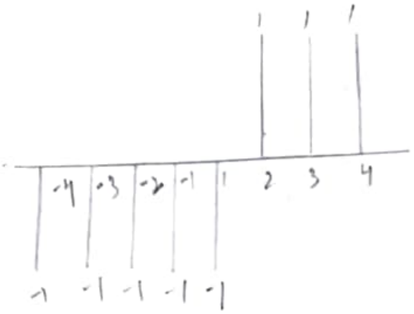


(d) $x_4[n] = \{-1, -3, -4, 0, 1, 2, 3, 4\}$ (↑ under 1)

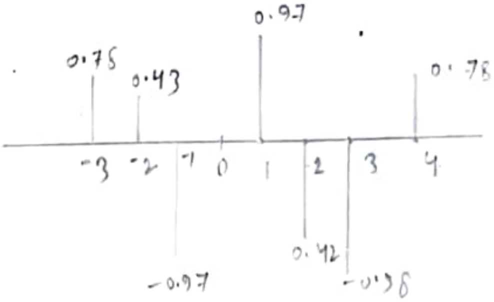
$-4 \quad -3 \quad -2 \quad -1 \; : \; 1 \quad 2 \quad 3$



(e) $x_5[n] = \begin{cases} 1 & n > 1 \\ -1 & n \leq 1 \end{cases}$



(f) $x_6[n] = \sin\left(\frac{4\pi n}{7}\right)$



(2) $x(t) = 1 + 3t$

(a) $x(2) \Rightarrow t = 2$

$x(t) \Rightarrow x(2) = 1 + 3(2) = 7$

(b) $x(-t) \Rightarrow t = -t$

$x(t) = 1 + 3(-t) = 1 - 3t$

(c) $x(3-t) \Rightarrow t = 3 - t$

$\Rightarrow x(t) = x(3-t) = 1 + 3(3-t) = 1 + 9 - 3t$

$= 10 - 3t$

③ $x(t) = 2\sin(10\pi t + \pi/2)$

$x(0.01) = ?$

$\Rightarrow t = 0.01$

$\Rightarrow x(0.01) = 2\sin(10\pi \times 0.01 \times \pi/2)$

$= 2\sin(\pi/10 + \pi/2)$

$= 2\sin(3\pi/5)$

$= 2 \times 0.95 = 1.90$

④ $x[n] = 12 - 4n + 2n^2$

Total: $x[n]$ where $2 < n < 7$

$x[n] \forall \; 2 < n < 7$

$\Rightarrow n = \{3, 4, 5, 6\}$

$x[3] = 12 - 4\times 3 + 2\times 9 = 18$

$x[4] = 12 - 4\times 4 + 2\times 16 = 28$

$x[5] = 12 - 4\times 5 + 2\times 25 = 42$

$x[6] = 12 - 4\times 6 + 2\times 36 = 60$

⑤ $x(t) = \begin{cases} 1 - |t| & -1 \le t < 1 \\ 0 & \text{otherwise} \end{cases}$

$T_s = 1/2$