(Q1) Find the even & odd parts of the following signals.

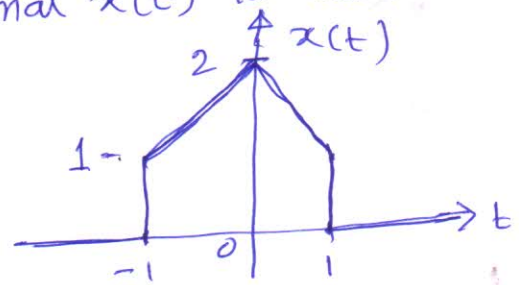
(i) $\sin\left(2t+\frac{\pi}{2}\right)$ (ii) $1-2t+3t^3$

(iii) $\sin 2t + \sin 2t \cos 2t + \cos 2t$ (iv) e^{j2t}

(Q2) Check whether the following signals are even or odd. Also sketch them.

(i) e^{4t} (ii) $u(t+2)-u(t-2)$ (c) $e^{-|t|}$

(Q3) The signal $x(t)$ is as shown:-



Now get and sketch

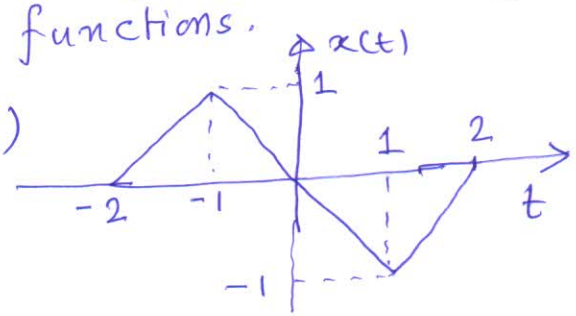
(i) $x(2t+2)$ (ii) $x\left(\frac{1}{2}t-2\right)$ (iii) $x(-t-2)$

(iv) $3x(5t)$

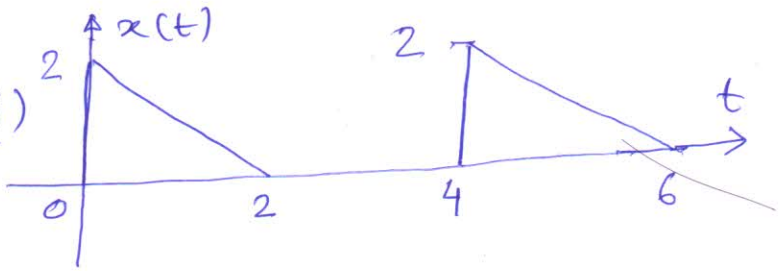
(v) Also sketch $\frac{dx}{dt}$.

(Q4) Express the following signals as sum of singular functions.

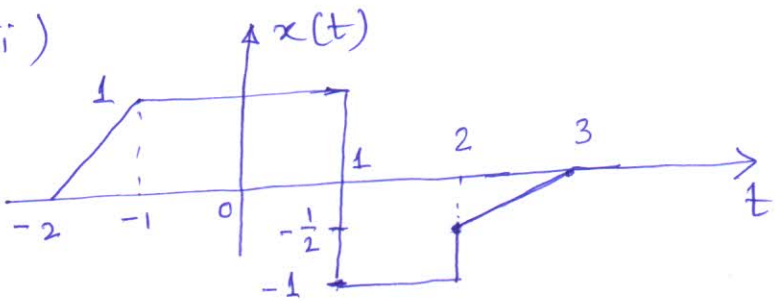
(i)



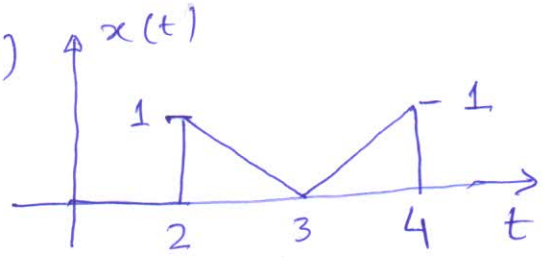
(ii)



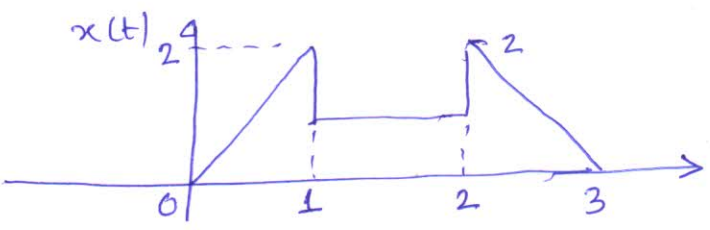
(iii)



(iv)



(v)



(Q5) Sketch the following signals

(i) $u(-t+4)$ (ii) $r(-t+4)$ (iii) $-2r(t-2)$

(iv) $r(t)\,u(-t+3)$ (v) $r(t) - 2r(t-2) + r(t-4)$

(Q6) Evaluate the following integrals

(i) $\int_{-\infty}^{\infty} e^{-t^2}\,\delta(t-3)\,dt$ (ii) $\int_{-\infty}^{\infty} \delta(t+3)\,e^{-2t}\,dt$

(iii) $\int_{0}^{3} \delta(t)\,\sin 5\pi t\,dt$ (iv) $\int_{-\infty}^{\infty} [\delta(t)\cos 2t + \delta(t-2)\sin 2t]\,dt$

(v) $\int_{-\infty}^{\infty} \delta(4t)\,e^{-t}\,dt$ (vi) $\int_{-\infty}^{\infty} \delta(2t+3)\,t^2\,dt$

(vii) $\int_{-\infty}^{\infty} \delta(t^2+t-6)\cos t\,dt$ (viii) $\int_{-\infty}^{\infty} e^{-t}\left(\frac{d\delta}{dt}\right)dt$

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Additional Question :- Tut-1

Q. Get the total soln of the equation:

$$2\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + y(t) = x(t)$$

B.C. : $y(0^-) = 0$ and $\frac{dy}{dt}(0^-) = 1$

a) If $x(t) = 5$

i) If $x(t) = t^2$

ii) If $x(t) = \cos\left(2t + \pi/6\right)$

(iii) If $x(t) = s(t)$