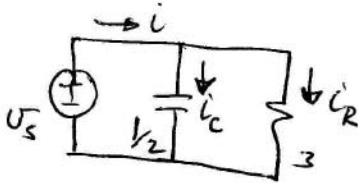


S.1-3



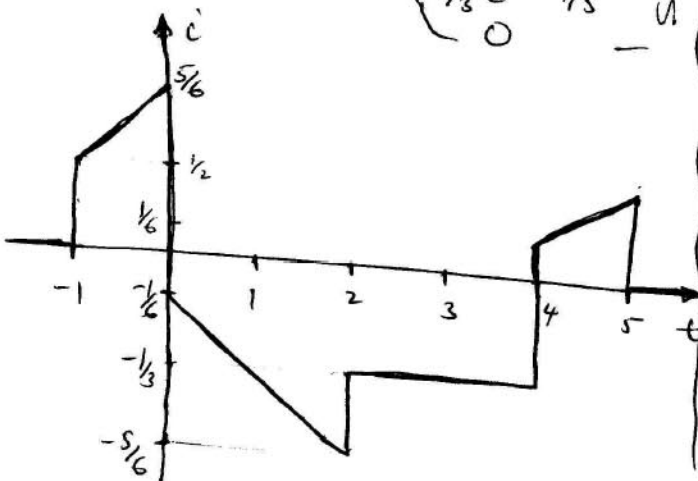
$$v_s(t) = \begin{cases} 0 & \text{for } t < -1 \\ t+1 & -1 \leq t < 0 \\ -t+1 & 0 \leq t < 2 \\ -1 & 2 \leq t < 4 \\ t-5 & 4 \leq t < 5 \\ 0 & t \geq 5 \end{cases}$$

$$i_R = \frac{v_s}{3} = \begin{cases} 0 & - \\ \frac{t+1}{3} & - \text{ Same} \\ -\frac{t+1}{3} & - \text{ interval} \\ -\frac{1}{3} & - \text{ as } v_s \\ \frac{t-5}{3} & - \\ 0 & - \end{cases}$$

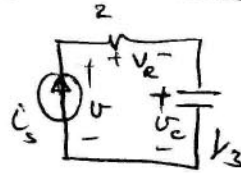
$$i_c = c \frac{dv_s}{dt} = \frac{1}{2} \frac{dv_s}{dt} = \begin{cases} 0 & - \\ \frac{1}{2} & - \text{ Same} \\ -\frac{1}{2} & - \text{ interval} \\ 0 & - \text{ as } v_s \\ \frac{1}{2} & - \\ 0 & - \end{cases}$$

by KCL

$$i = i_R + i_c = \begin{cases} 0 & - \\ \frac{1}{3}t + \frac{5}{6} & - \text{ Same interval} \\ -\frac{1}{3}t - \frac{1}{6} & - \\ -\frac{1}{3} & - \\ \frac{1}{3}t - \frac{7}{5} & - \text{ Same interval} \\ 0 & - \end{cases}$$



S.1-6



$$i_s = \begin{cases} 0 & t < 0 \\ 2 & 0 \leq t < 1 \\ -1 & 1 \leq t < 2 \\ 0 & t \geq 2 \end{cases}$$

$$v_R = 2 i_s = \begin{cases} 0 & - \text{ Same} \\ 4 & - \text{ interval} \\ -2 & - \text{ as } i_s \\ 0 & - \end{cases}$$

$$v_c = \frac{1}{2} \int_{-6}^t i_s dt = 3 \int_{-6}^t i_s dt$$

① for $t < 0$
 $v_c = 3 \int_{-6}^t 0 dt = 0$

② for $0 \leq t < 1$
 $v_c(t) = v_c(0) + 3 \int_0^t 2 dt$
 $= 3 \times 2t \Big|_0^t = 6t$

③ for $1 \leq t < 2$
 $v_c(t) = v_c(1) + 3 \int_1^t -1 dt$
 $= 6 + 3(-t) \Big|_1^t = -3t + 9$

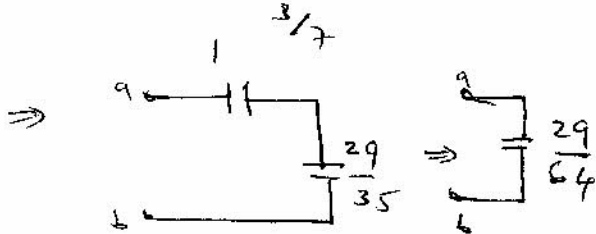
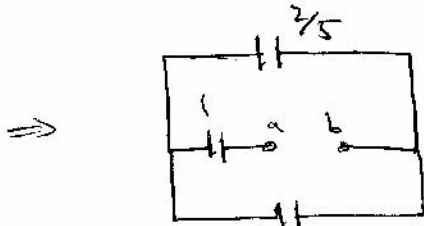
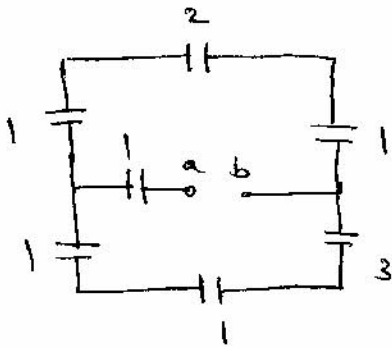
④ for $t \geq 2$
 $v_c(t) = v_c(2) + 3 \int_2^t 0 dt$
 $= -3(2) + 9 + 0 = 3$

by KVL $v = 2 i_s + v_c$

$$\Rightarrow v = \begin{cases} 0 & \text{for } t < 0 \\ 6t + 4 & 0 \leq t < 1 \\ -3t + 7 & 1 \leq t < 2 \\ 3 & t \geq 2 \end{cases}$$

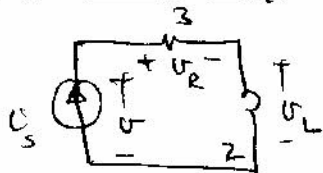
A

S.1-8



$C_{eq} = \frac{29}{64} F$

S.2-3



$$i_s = \begin{cases} 0 & t < -1 \\ 2t+2 & -1 \leq t < 0 \\ -t+2 & 0 \leq t < 3 \\ t-4 & 3 \leq t < 4 \\ 0 & t \geq 4 \end{cases}$$

$$v_R = 2i_s = \begin{cases} 0 & \text{--- Same} \\ 4t+4 & \text{--- Internal} \\ -2t+4 & \text{--- as } i_s \\ 2t-8 & \text{--- } i_s \\ 0 & \text{--- } i_s \end{cases}$$

$$v_L = L \frac{di_s}{dt} = 2 \frac{di_s}{dt} = \begin{cases} 0 & \text{---} \\ 4 & \text{---} \\ -2 & \text{---} \\ 2 & \text{---} \\ 0 & \text{---} \end{cases}$$

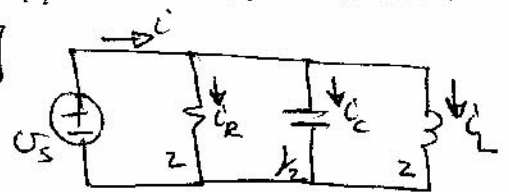
by KVL

$v = v_R + v_L$

(2/3)

$$v = \begin{cases} 0 & t < -1 \\ 4t+8 & -1 \leq t < 0 \\ -2t+2 & 0 \leq t < 3 \\ 2t-6 & 3 \leq t < 4 \\ 0 & t \geq 4 \end{cases}$$

S.2-6



$$v_s(t) = \begin{cases} 0 & t < 0 \\ 2t & 0 \leq t < 1 \\ -2t+4 & 1 \leq t < 2 \\ 0 & t \geq 2 \end{cases}$$

$$i_R = \frac{v_s}{R} = \begin{cases} 0 & \text{--- Same} \\ t & \text{--- internal} \\ -t+2 & \text{--- as } v_s \\ 0 & \text{---} \end{cases}$$

$$i_C = \frac{1}{2} \frac{dv_s}{dt} = \begin{cases} 0 & \text{--- Same} \\ 1 & \text{--- internal} \\ -1 & \text{--- as } v_s \\ 0 & \text{---} \end{cases}$$

$$i_L = \frac{1}{2} \int_{-\infty}^t v_s dt$$

① for $t < 0$

$$i_L = \frac{1}{2} \int_{-\infty}^t 0 dt = 0$$

② for $0 \leq t < 1$

$$i_L = i_L(0) + \frac{1}{2} \int_0^t 2t dt = \frac{t^2}{2} \Big|_0^t = \frac{t^2}{2}$$

③ for $1 \leq t < 2$

$$i_L = i_L(1) + \frac{1}{2} \int_1^t (-2t+4) dt = \frac{1}{2} + \frac{1}{2} (-t^2 + 4t) \Big|_1^t$$

$$\Rightarrow L_L = \boxed{-\frac{t^2}{2} + 2t - 1}$$

④ for $t \geq 2$

$$L_L = L_L(2) + \frac{1}{2} \int_2^t 0 dt$$

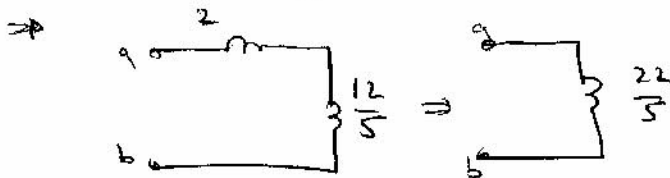
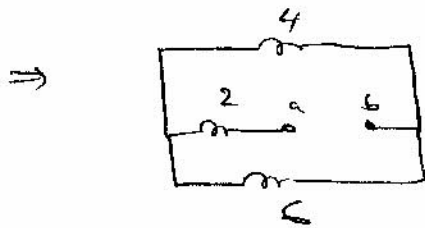
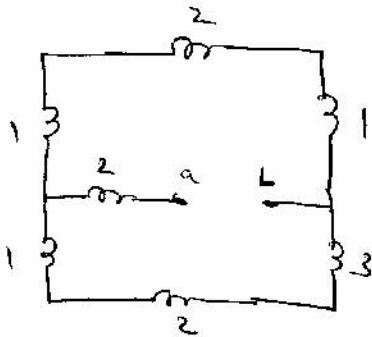
$$= -\frac{4}{2} + 2(2) - 1 = \textcircled{1}$$

$$\Rightarrow L_L = \begin{cases} 0 & t < 0 \\ \frac{t^2}{2} & 0 \leq t < 1 \\ -\frac{t^2}{2} + 2t - 1 & 1 \leq t < 2 \\ 1 & t \geq 2 \end{cases}$$

by KCL $L_S = L_R + L_C + L_L$

$$\Rightarrow L_S = \begin{cases} 0 & \text{for } t < 0 \\ \frac{t^2}{2} + t + 1 & 0 \leq t < 1 \\ -\frac{t^2}{2} + t & 1 \leq t < 2 \\ 1 & t \geq 2 \end{cases}$$

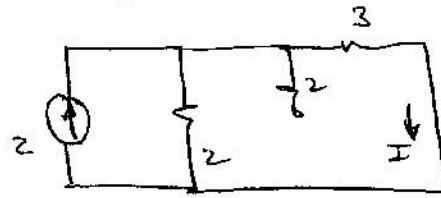
S. 2-8



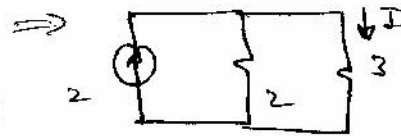
$$\Rightarrow \boxed{L_{eq} = \frac{22}{5}}$$

S. 4-2 find I

(3/3)



because the circuit is DC
 circuit \Rightarrow inductor \Rightarrow capacitor



by CDR

$$I = \frac{2}{2+3} \times 2$$

$$= \boxed{\frac{4}{5} \text{ A}}$$