$I = I_0 e^{-t/\tau}$

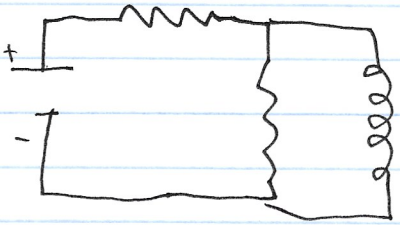
Phys Discussion 24

1 a

$I = \frac{V}{R_{eq}} = \frac{V}{R_1 + R_2}$

b.) V_L @ $t = 0^+ \rightarrow -IR_2 + V_L = 0 \quad \therefore V_L = IR_2 = \frac{VR_2}{R_1 + R_2}$

c.)



@ $t = \infty$, L acts as wire

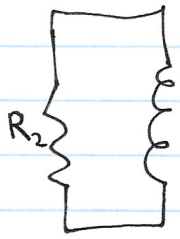
$\therefore I_1 = \frac{V}{R_1}$

$I_2 = 0$

d.) V_L @ $t = \infty$, $V_L = 0$

---

2. a.)



$I_{R_2} = \frac{V}{R_1}$

$I_{R_1} = 0$

b) $V_L + -\frac{VR_2}{R_1} = 0 \quad \therefore \frac{VR_2}{R_1} = V_L$

c) $I = I_0 e^{-t/\tau} = \frac{V}{R_1} e^{-t/L/R_2}$

d) $E_1 = \frac{1}{2} L I^2 = \frac{1}{2} L \frac{V^2}{R_1^2} e^{-\frac{2tR_2}{L}}$

$E_2 = \frac{1}{2} E_1 \qquad e^{-\frac{2tR}{L}} = \frac{1}{2}$

$t = -\frac{L \ln(\frac{1}{2})}{2R_2}$

e)