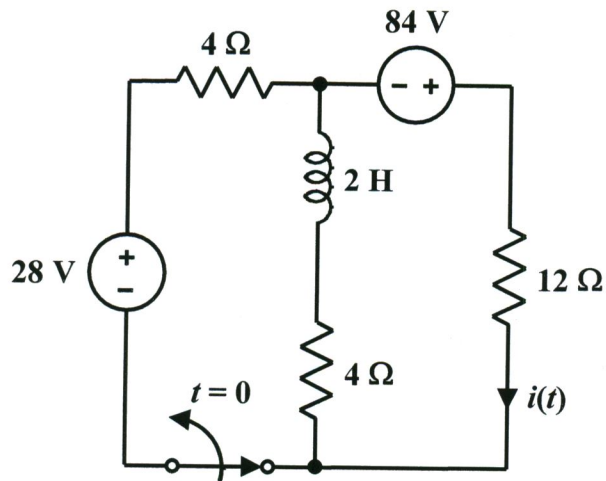
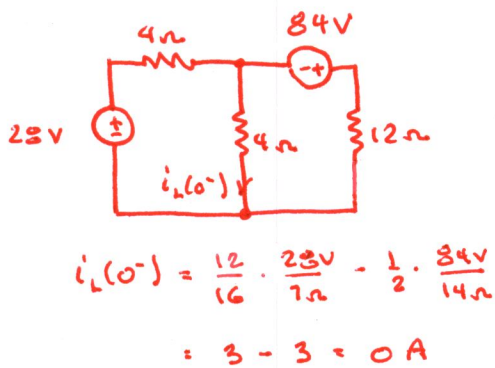


EE 2240
Problem #05

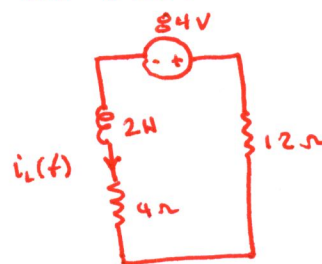
The circuit has reached the DC steady state prior to $t = 0$. Find $i(t)$ for $t \geq 0$.



For $t = 0^-$:



For $t \geq 0$:



$$i_L(0) = 0A$$

$$L = 2H$$

$$R = 12 + 4 = 16\Omega$$

$$\tau = \frac{L}{R} = \frac{1}{8}s$$

$$i_L(\infty) = -\frac{84V}{16\Omega} = -\frac{21}{4}A$$

$$i_L(t) = [i_L(0) - i_L(\infty)] e^{-t/\tau} + i_L(\infty)$$

$$= \left(\frac{21}{4} e^{-8t} - \frac{21}{4} \right) A, t \geq 0$$

$$i(t) = -i_L(t) = \frac{21}{4} (1 - e^{-8t}) A, t \geq 0$$