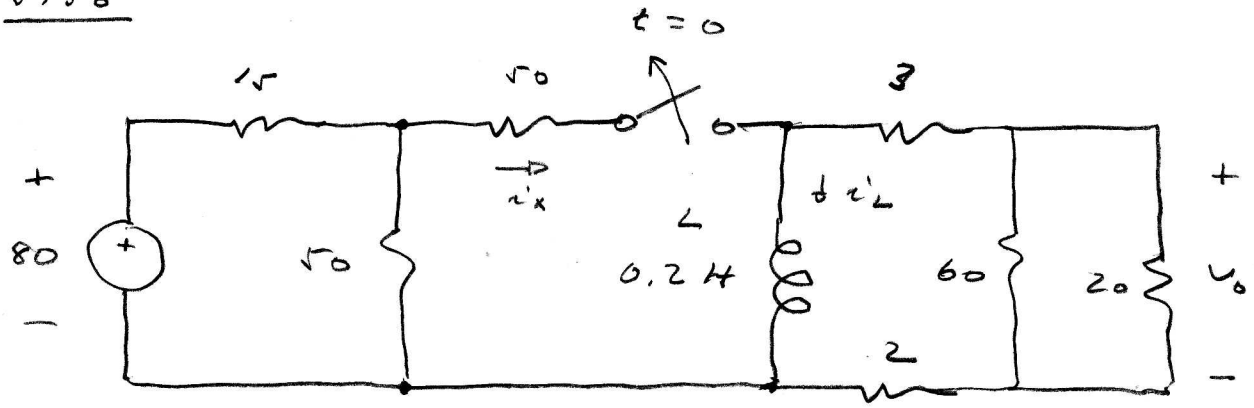
5.36

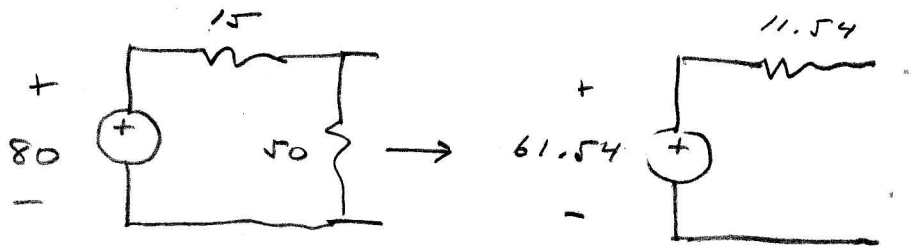


$$v_o(t) = v_o(\infty) + \left[v_o(0+) - v_o(\infty)\right] e^{\frac{-t}{\tau}}$$

$$\tau = 0.2\,H \Big/ \underbrace{\left[3 + 60 \,//\, 20 + 2\right]}_{20\,\Omega} = 10\ ms$$

$v_o(\infty) = 0$ (dead circuit)

At $t = 0-$ $\quad L \rightarrow$ short



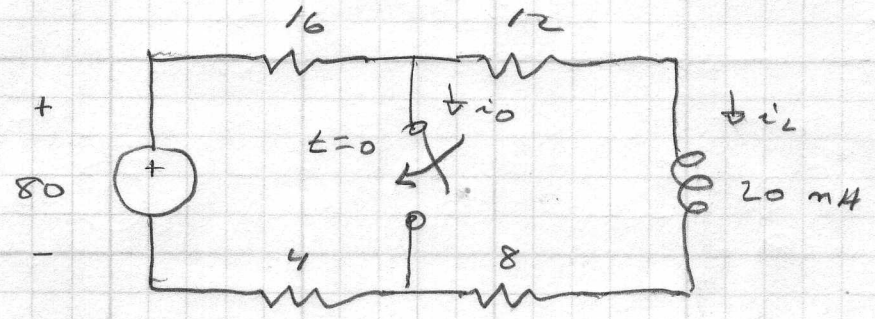
$$i_x(0-) = i_L(0-) = \frac{61.54}{11.54 + 50} = 1\ A$$

$$i_L(0+) = i_L(0-) = 1\ A$$

$$v_o(0+) = -1\,A \times 15\,\Omega = -15\ V$$

$$\rightarrow \quad v_o(t) = (-15\ V)\, e^{\frac{-t}{10\ ms}}$$

5. 43

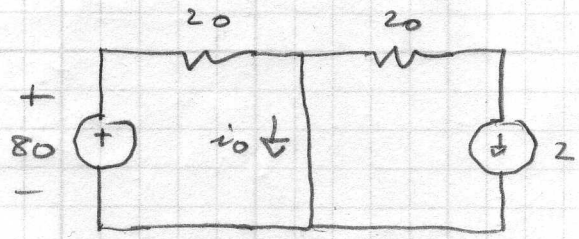


a) At $t = 0-$, $i_L = \dfrac{80}{16+12+8+4} = 2A$

$L \longrightarrow$ short

$i_L(0+) = 2A$

0+ circuit $\longrightarrow$



$i_o(0+) = \dfrac{80}{20} - 2 = 2A$

$i_o(\infty) = \dfrac{80}{20} = 4A$

b) $i_o(t) = i_o(\infty) + \left[i_L(0+) - i_L(\infty)\right] e^{-\frac{t}{\tau}}$

$\tau = \dfrac{20\ mH}{20\ \Omega} = 1\ ms$

$i_o(t) = 4 + 2e^{\frac{-t}{1\ ms}}$

c) t : $i_o = 3.8\ A$? $\longrightarrow$ $2e^{\frac{-t}{1ms}} = 0.2$

$t = 10\ ms \times \ln 10 = 23\ ms$