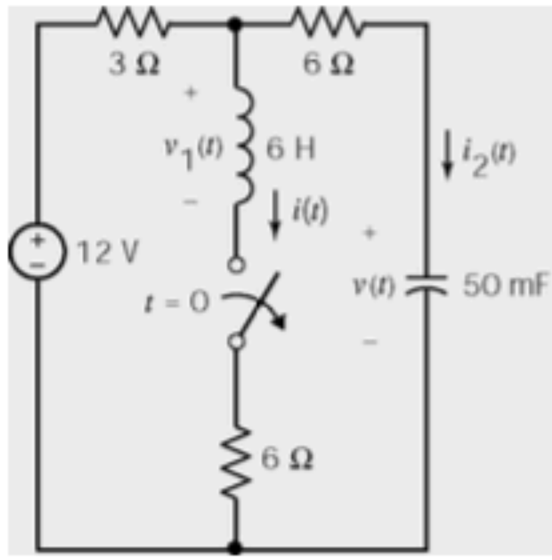
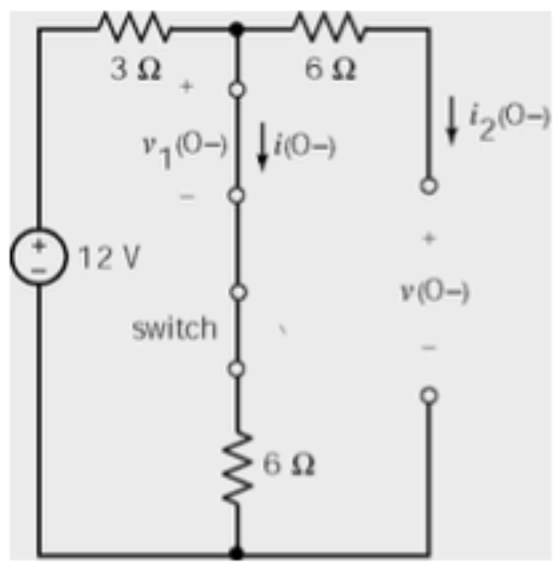
Solution:

The capacitor voltage and inductor current don't change instantaneously and so are the keys to solving this problem.

Label the capacitor voltage and inductor current as shown.



Before $t = 0$, with the switch closed and the circuit at steady state, the inductor acts like a short circuit and the capacitor acts like an open circuit.



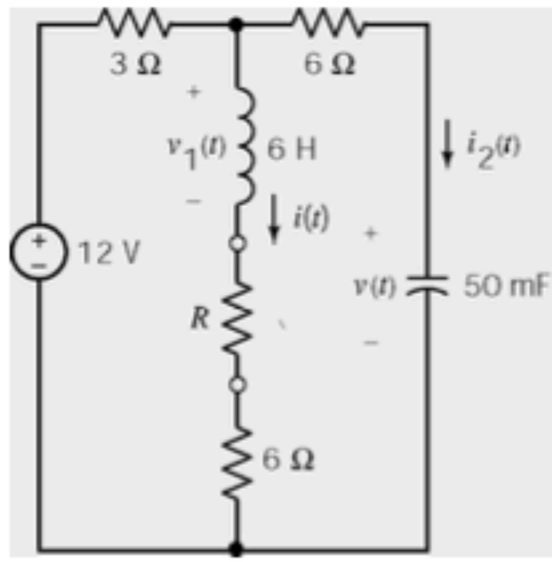
$$i_2(0-) = 0$$

$$i(0-) = \frac{12}{9} = 1.333 \text{ A}$$

$$v_1(0-) = 0 \text{ V}$$

$$v(0-) = 6\,i(0-) = 8 \text{ V}$$

After the switch opens we model the open switch as a large resistance, R.



From KVL:

$$12 = 3\left(i(t)+i_2(t)\right)+v_1(t)+(R+6)\,i(t)$$

and

$$v_1(t)+(R+6)\,i(t) = 6\,i_2(t)+v(t)$$

The capacitor voltage and inductor current don't change instantaneously so

$$v(0+) = v(0-) = 8 \text{ V}$$

and

$$i(0+) = i(0-) = 1.333 \text{ A}$$

At $t = 0+$

$$\left.\begin{aligned} 12 = 3\left(i(0+)+i_2(0+)\right)+v_1(0+)+(R+6)\,i(0+) \\ v_1(0+)+(R+6)\,i(0+) = 6\,i_2(0+)+v(0+) \end{aligned}\right\} \Rightarrow \; v_1(0+) = \frac{4}{3}R \text{ and } i_2(0+) = 0$$

As expected $\lim_{R\to\infty} v_1(0+) = \infty$.