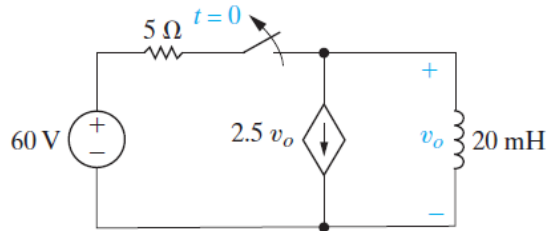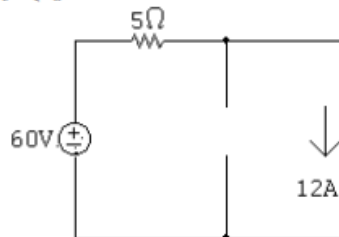# ECE222

Quiz 2 SOLUTION

The switch in the circuit shown below has been closed for a long time before opening at $t = 0$. Find $v_0(t)$, $t \geq 0^+$. (Show all your work).
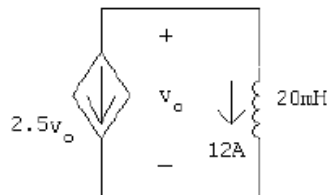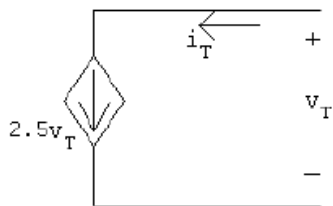

$t < 0$
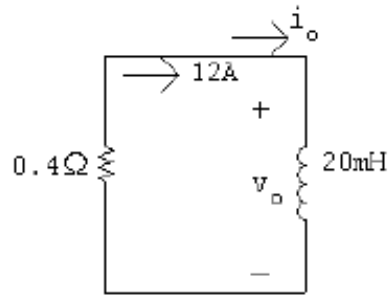

$$i_L(0^-) = i_L(0^+) = 12\,\text{A}$$

$t > 0$

Find Thévenin resistance seen by inductor:

$$i_T = 2.5 v_T; \qquad \frac{v_T}{i_T} = R_{\text{Th}} = \frac{1}{2.5} = 0.4\,\Omega$$

$$\tau = \frac{L}{R} = \frac{20 \times 10^{-3}}{0.4} = 50\,\text{ms}; \qquad 1/\tau = 20$$

$$i_o = 12e^{-20t}\,\text{A}, \qquad t \geq 0$$

$$v_o = L\frac{di_o}{dt} = (20 \times 10^{-3})(-240e^{-20t}) = -4.8e^{-20t}\,\text{V}, \quad t \geq 0^+$$