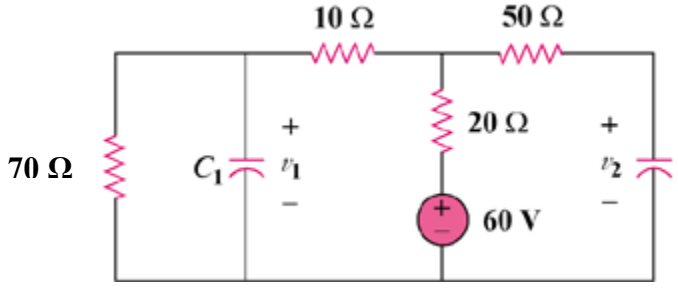
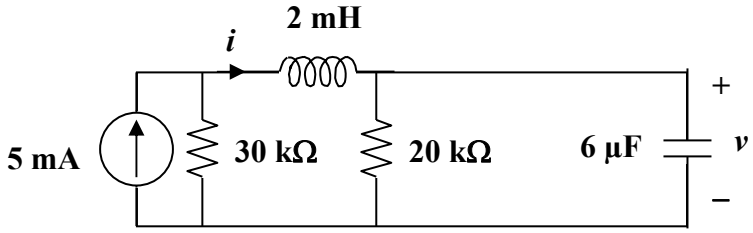
EE1002 Tutorial 8

(Questions from Alexander & Sadiku, 7th edition, Problems 6.13, 6.48, & 6.61)

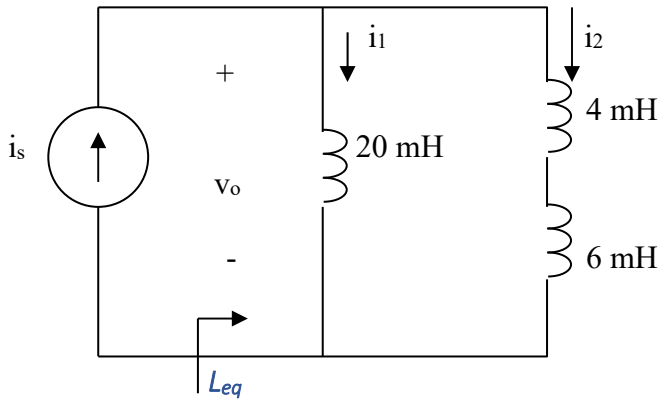
1. Find the voltage across the capacitors in the following circuit under dc conditions.



2. Under steady-state dc conditions, find i and v in the following circuit.



3. Consider the following circuit. Find: (a) L_{eq}, $i_1(t)$ and $i_2(t)$ if $i_s = 3e^{-t}$ mA, (b) $v_o(t)$, (c) energy stored in the 20-mH inductor at t=1s.
[Hint: the energy stored in an inductor is given by $W = (1/2)Li^2$, where L and i are the inductance and inductor current, respectively. Similarly, the energy stored in a capacitor is given by $W = (1/2)Cv^2$, where C and v are the capacitance and capacitor voltage, respectively.]



Answers

1. $v_1 = 42$ V, $v_2 = 48$ V.
2. $i = 3$ mA, $v = 60$ V
3. (a) $L_{eq} = 6.667$ mH, $i_1(t) = e^{-t}$ mA, $i_2(t) = 2e^{-t}$ mA.
   (b) $v_0 = -20e^{-t}$ μV.
   (c) $w = 1.3534$ nJ