Homework 4

Due date: Nov. 9th, 2021

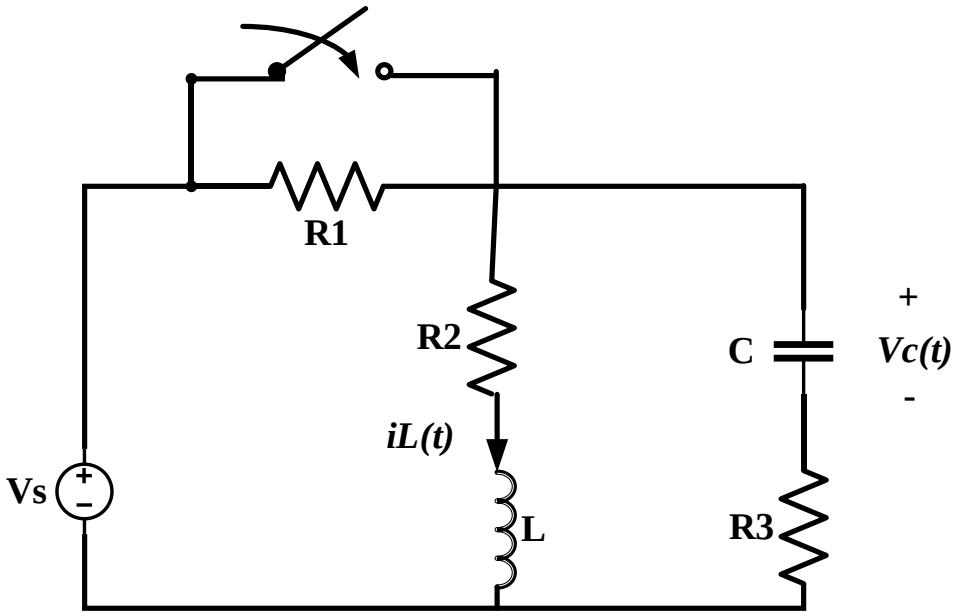
Turn in your homework in class

Rules:

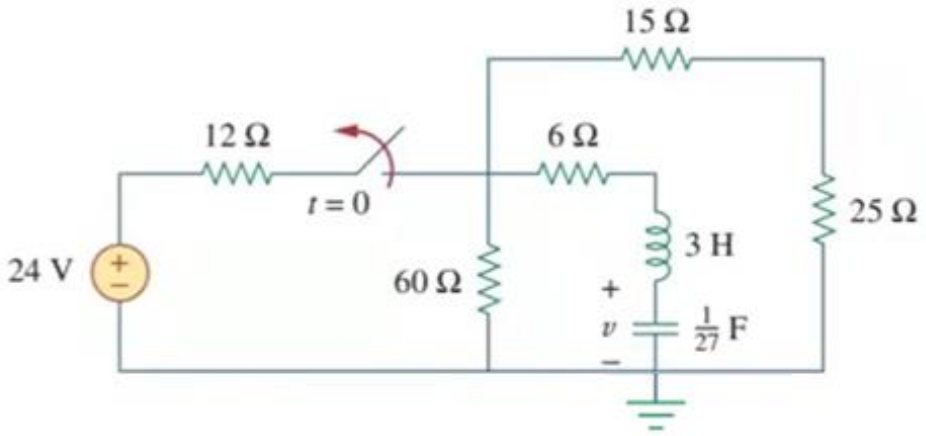
- Work on your own. Discussion is permissible, but extremely similar submissions will be judged as plagiarism.
- Please show all intermediate steps: a correct solution without an explanation will get zero credit.
- Please submit on time. No late submission will be accepted.
- Please prepare your submission in English only. No Chinese submission will be accepted.
- If needed, round the number to the nearest hundredths, i.e., rounding it to 2 decimal places.

1. For the circuit below, the switch has been open for a long time. At t=0, the switch was closed. Given Vs=10V, R1=2Ω, R2=3Ω, R3=1Ω, L=4H, C=2F

   find $Vc(0+)$, $\frac{dVc(0+)}{dt}$, $iL(0+)$, $\frac{diL(0+)}{dt}$.

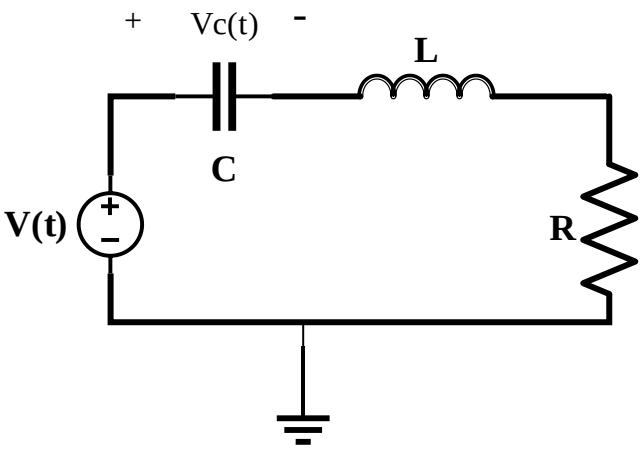


2. For the circuit below. The switch has been closed for a long time. At t=0, the switch was opened. Calculate *v(t)* for t >0.

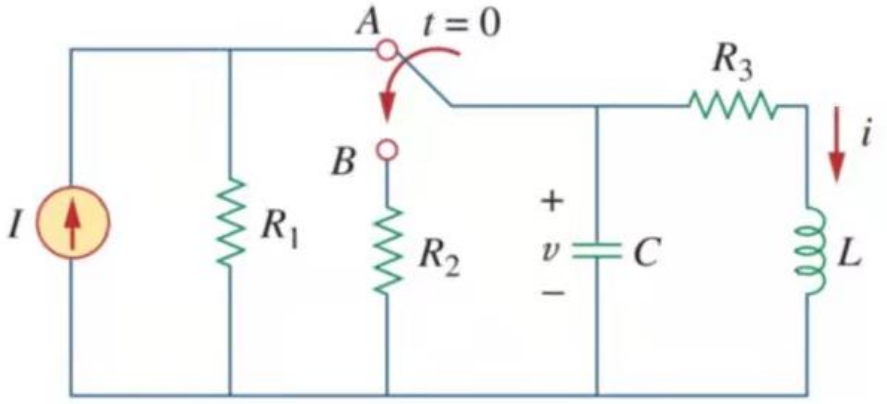


3. For the circuit below: R=100Ω, L=0.25H, C=$\frac{1}{7500}$ F. $V(t)=\begin{cases}0, & t<0\\ 10e^{-10t}, & t>0\end{cases}$

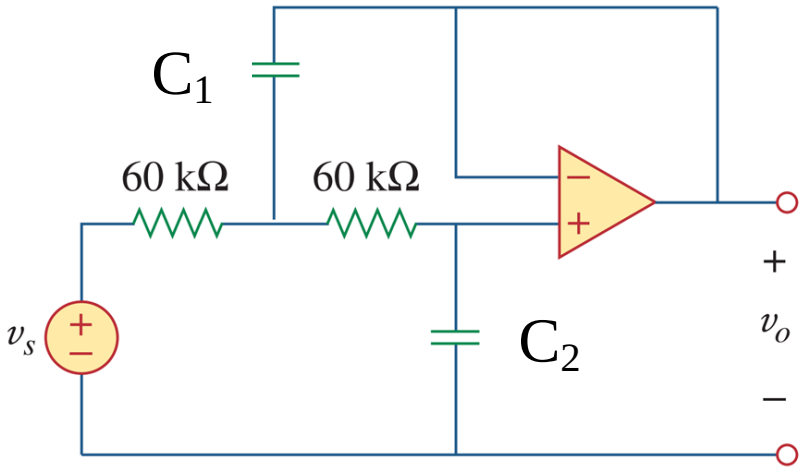
   Find the expression of Vc(t) for *t > 0*



4. In the circuit below, we assume that the switch is at Position A for a long time, but moved to Position B at $t = 0$. Given that I=1A, R_1=10Ω, R_2=10Ω, R_3=10Ω, C=1F, L=2H; *calculate i(t) for t > 0*.



5. For the circuit below. The operational amplifier is working in the linear mode. Given $V_s = u(t)$ V; C_1=C_2=60μF and no initial energy stored in both capacitors. find expression of $v_0(t)$ *for* $0 < t < 0.5$ *sec.*



6. For the circuit below. The switch has been open for a long time. At t = 0 the switch is closed. There is no energy stored in inductors L1 and L2. Given R1 = 10Ω, R2 = 5Ω, L1 = 1H, L2 = 2H, Vs = 3V, find $i_L(t)$ *for t >0*.