

Homework 5

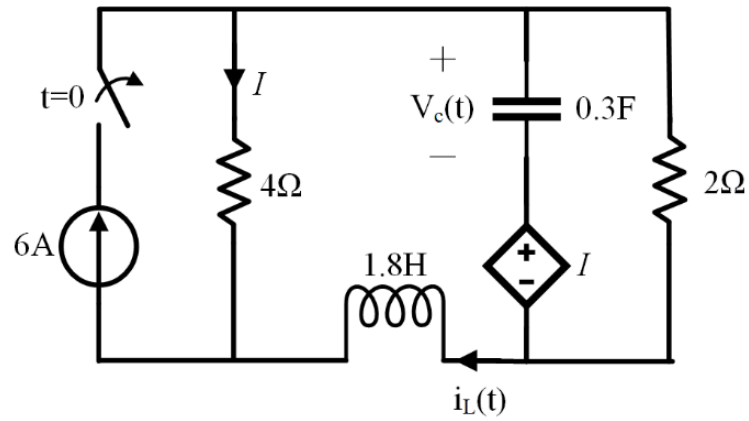
Due date: Dec. 7th, 2023

Turn in your hard-copy hand-writing homework in class

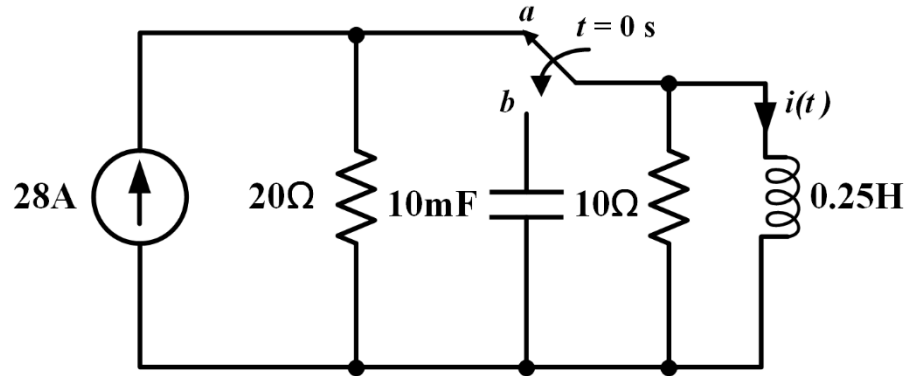
Rules:

- 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.

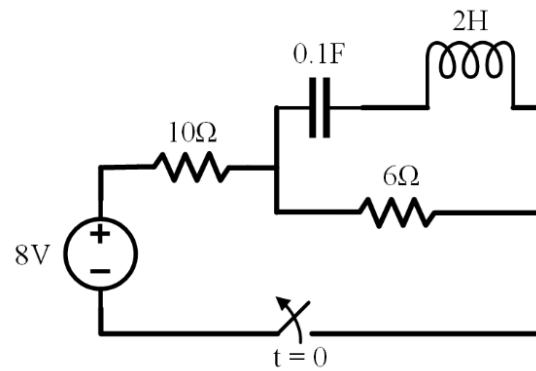
1. Assume the circuit has reached steady state at $t < 0$, find $v_c(0^+)$, $dv_c(0^+)/dt$, $i_L(0^+)$, $di_L(0^+)/dt$.



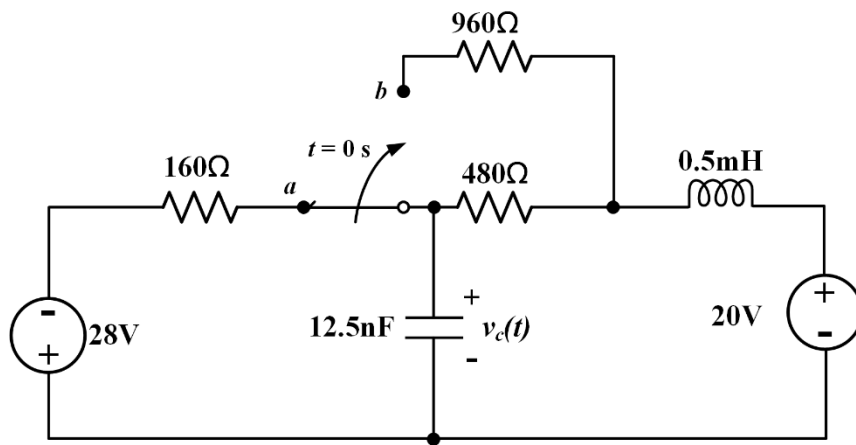
2. When $t < 0$, no energy is stored in the capacitor, the switch has been placed at node **a** for a long time. The switch moves from node **a** to node **b** at $t = 0$ immediately. Determine $i(t)$ for $t \geq 0$.



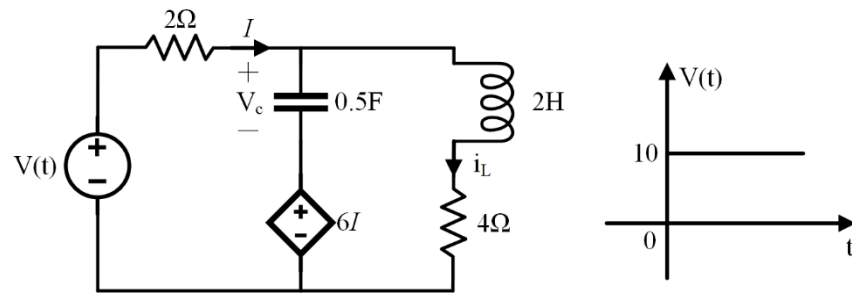
3. Assume the circuit has reached steady state at $t < 0$, calculate the current of a 6ohm resistor for $t > 0.6$.



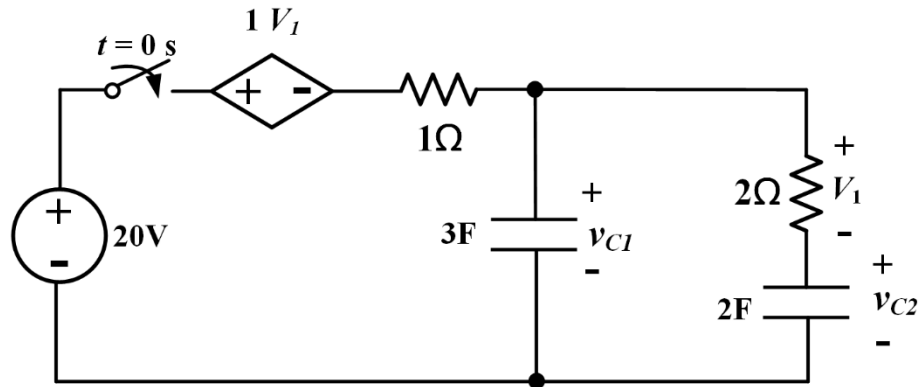
4. For the following circuit, the switch has been placed at node **a** for a long time. At $t=0$ s, the switch is switched from **a** to **b** immediately. Please find the voltage on the capacitor $v_c(t)$ for $t \geq 0$ s.



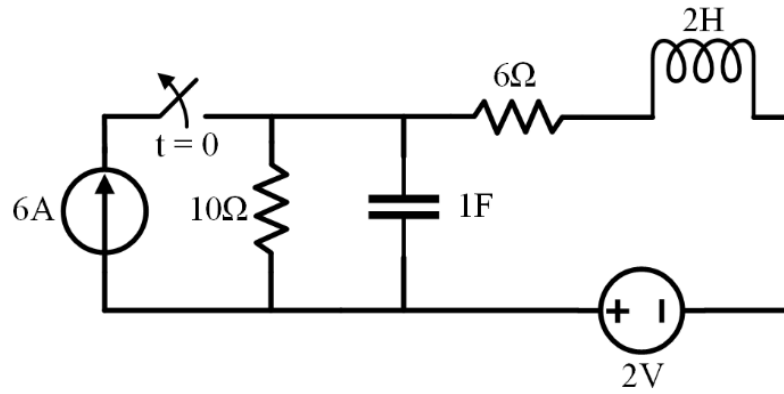
5. Assume $V_c(0^+) = 4V$, $i_L(0^+) = 0A$. find $V_c(t)$ and $i_L(t)$.



6. For the following circuit, the switch closes at $t = 0$ s immediately. Please find the voltage on the capacitors $v_{C1}(t)$ and $v_{C2}(t)$ for $t > 0$ s, respectively. Note that the switch has been open for a long time before $t = 0$ s.



7. Assume the circuit has reached steady state at $t < 0$, calculate the current of a 6ohm resistor for $t > 0$ for $t > 0$.



8. The waveform of voltage source v_g as shown and the initial value of the capacitance are 0, find $v_o(t)$ for $t \geq 0$.

