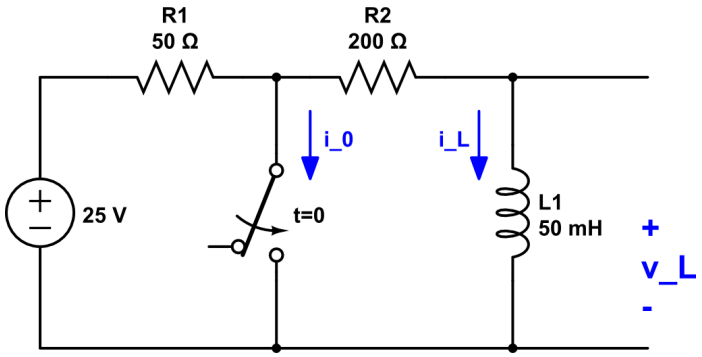
Question 1 [4]
The switch in the circuit below has been open for a long time before closing at $t = 0$:



(a) Find $i_0(0^-)$, $i_L(0^-)$, and $v_L(0^-)$.

(b) Find $i_0(0^+)$, $i_L(0^+)$, and $v_L(0^+)$.

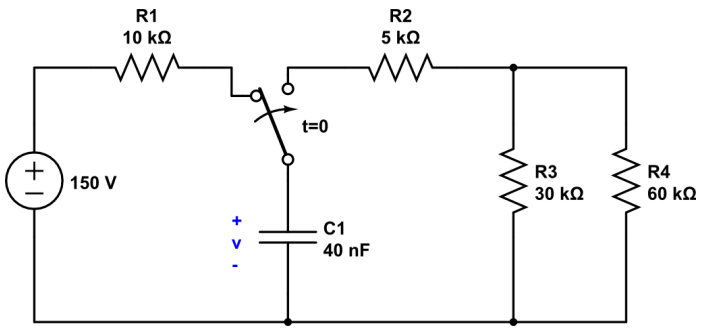
(c) Find $i_0(\infty)$, $i_L(\infty)$, and $v_L(\infty)$.

(d) Write the expression for $i_L(t)$ for $t \geq 0$.

(e) Write the expression for $i_0(t)$ for $t \geq 0^+$.

(f) Write the expression for $v_L(t)$ for $t \geq 0^+$.

Question 2 [4]
The switch in the circuit below has been in the left for a long time before moving right $t = 0$ and staying there:



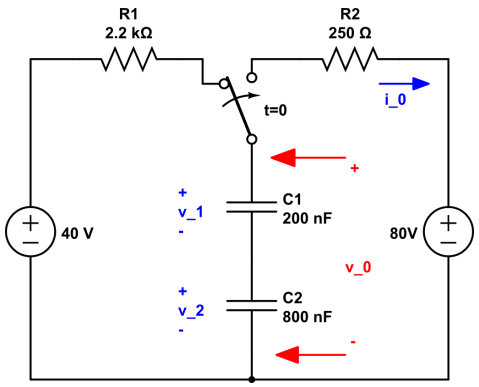
(a) Find the initial voltage across the capacitor.

(b) Find the initial energy stored in the capacitor.

(c) FInd the time constant for the circuit at $t > 0$.

(d) Write the expresion for the capacitor voltage $v(t)$ for $t \geq 0$.

Question 3 [4]
The switch in the circuit below has been in the left for a long time before moving right $t = 0$ and staying there:



Find

(a) $v_0(t)$

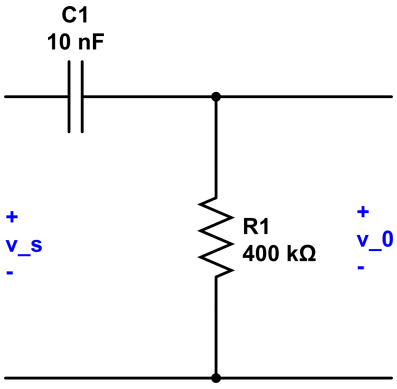
(b) $i_0(t)$

(c) $v_1(t)$

(d) $v_2(t)$

(e) The energy trapped in the capacitors at $t \to \infty$.

Question 4 [4]
The circuit below is given a v_s of $50V$ from time $0ms$ to $1ms$. At $1ms$, v_s is returned to zero, where it stays.



(a) Calculate $v_0(t)$

(b) Make a sketch of $v_o(t)$ versus t.

Question 5 [4]
For the circuit below, the energy stored in the capacitor is zero at the instant the switch is closed. The ideal operational amplifier reaches saturation in 15ms. What is the numerical value of R?