Name: _____ (please print)

Signature: _____

ECE 2202 – Quiz 2
September 20, 2022

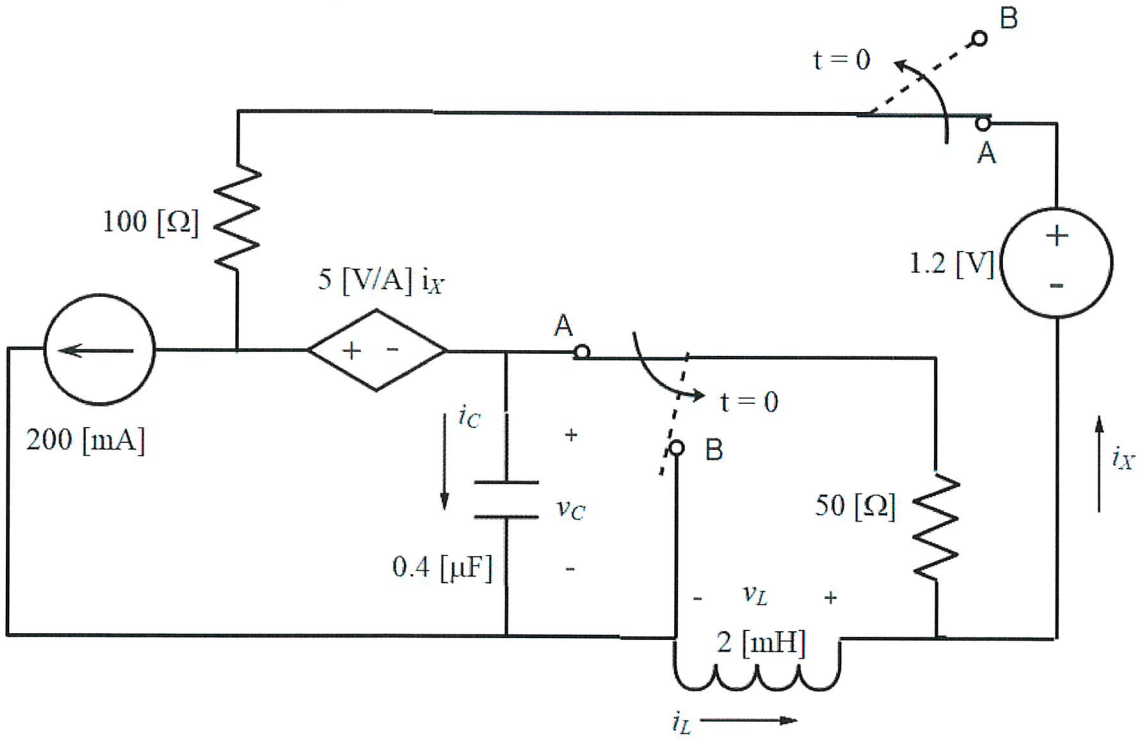
1. This quiz is closed book, closed notes. You may have one 8.5 x 11" crib sheet.
2. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
3. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
4. If the grader has difficulty following your work because it is messy or disorganized, you will lose credit.
5. Do not use red ink. Do not use red pencil.
6. You will have 30 minutes to work on this quiz.

_____/20

Room for extra work

In the circuit below, both switches were in position 'A' for a long time, and then moved to position 'B' at t = 0.

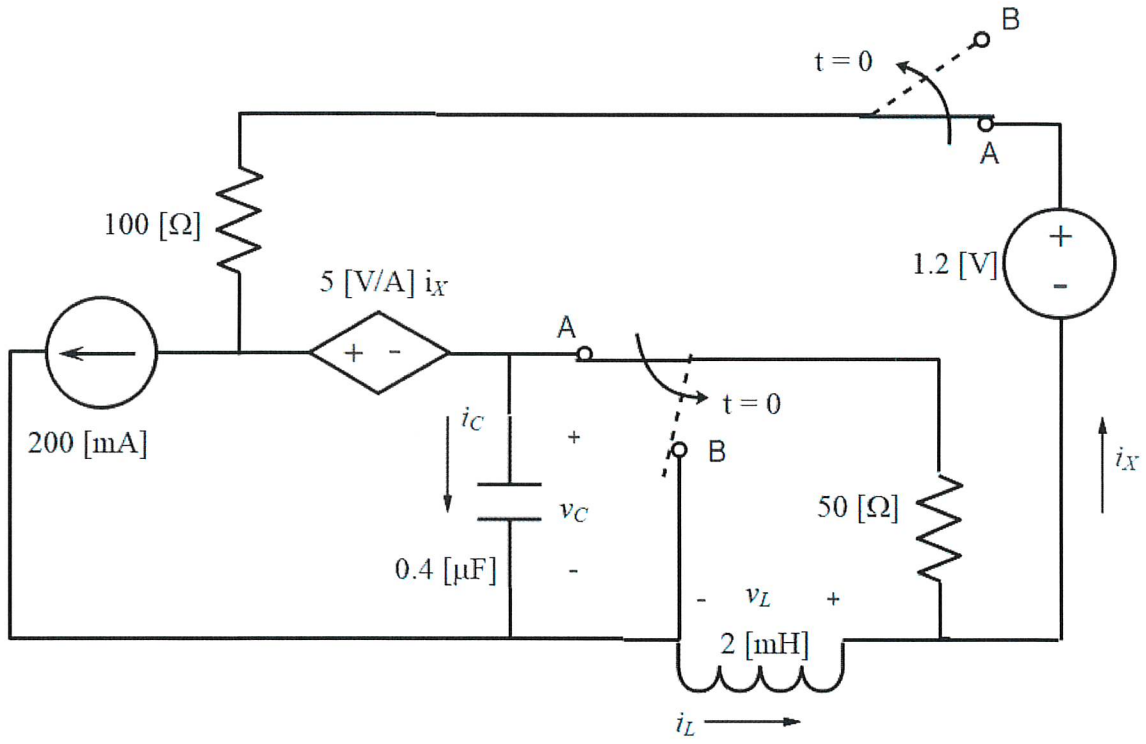
a) Find $i_C\,(0^+)$ and $v_L\,(0^+)$.
b) Find $v_C\,(3[\text{ms}])$.



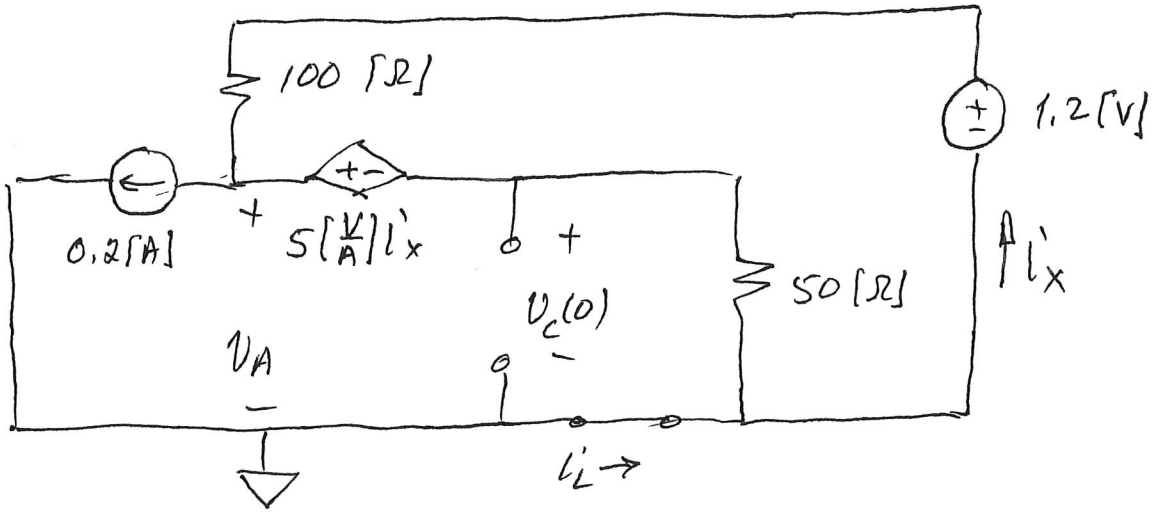
Room for extra work

In the circuit below, both switches were in position 'A' for a long time, and then moved to position 'B' at t = 0.

a) Find $i_C\,(0^+)$ and $v_L\,(0^+)$.
b) Find $v_C\,(3[\text{ms}])$.



Begin by drawing the circuit for $t<0$. In steady state, C → open and L → short.



pg. 2

Room for extra work

$$\frac{V_A - 5i'_x}{50} + 0.2 + \frac{V_A - 1.2}{100} = 0 \qquad i'_x = -\frac{V_A - 1.2}{100}$$

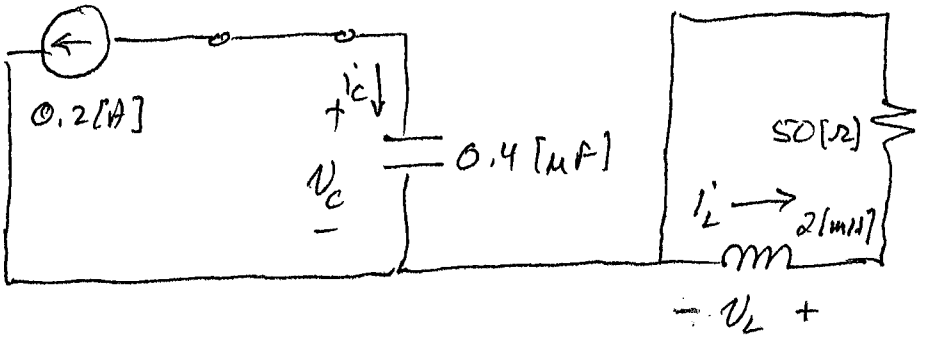
$$V_A = -6.0258 \text{ [V]} \qquad i'_x = 72.258 \text{ [mA]}$$

We will need $i'_L(0)$ and $v_c(0)$ for the next step.

$$i'_L(0) = 0.2 \text{ [A]}$$

$$v_c(0) = V_A - 5i'_x = -6.3871 \text{ [V]}$$

Re-draw for $t > 0$.



$i'_x = 0 \Rightarrow 5[\Omega]\, i'_x = 0 \Rightarrow$ short.

So... $\boxed{i'_L(0^+) = -0.2 \text{ [A]}}$

$\boxed{v_L(0^+) = 50\, i'_L(0) = 10 \text{ [V]}}$

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Room for extra work

$$v_C(3[ms]) = -\frac{1}{C}\int_0^{0.003[s]} 0.2\,dt + v_C(0)$$

$$= \frac{-1}{0.4\times10^{-6}}(0.2)(0.003) - 6.3871 \quad [V]$$

$$\boxed{v_C(3[ms]) = -1506.4\ [V]}$$