Name: _____ (please print)

Signature: _____

ECE 2202 – Quiz 4

October 28, 2024

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.

_____/25

Room for extra work

In the circuit shown, the switch was open for a long time, and then closed at t = 0. The switch opened again at time t_1. At time t_1, the current i_L was -184.4 mA. Find the time t_1 when the switch opened.
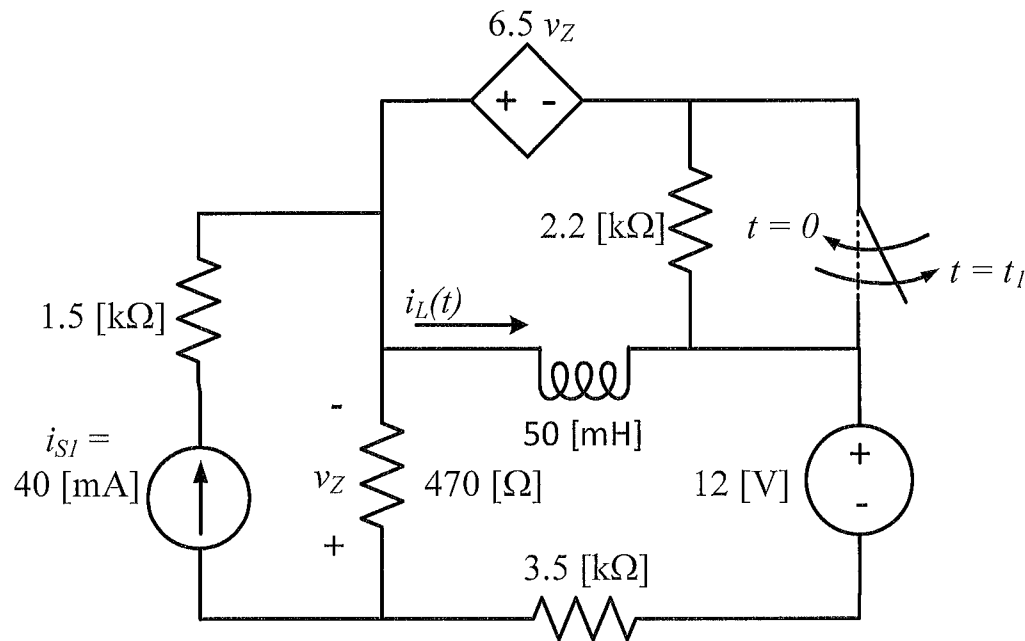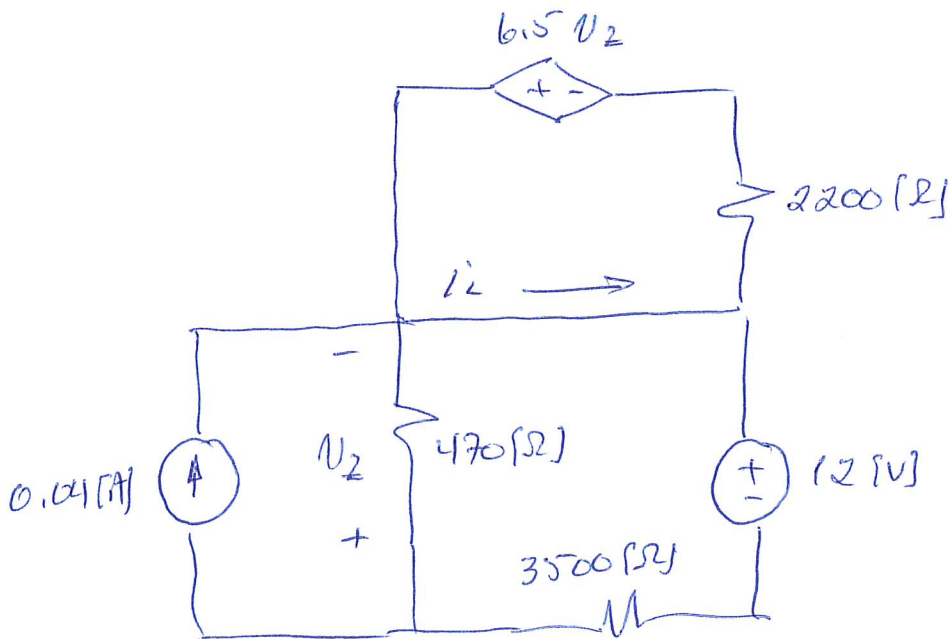
Room for extra work

In the circuit shown, the switch was open for a long time, and then closed at $t = 0$. The switch opened again at time t_1. At time t_1, the current i_L was -184.4 mA. Find the time t_1 when the switch opened.
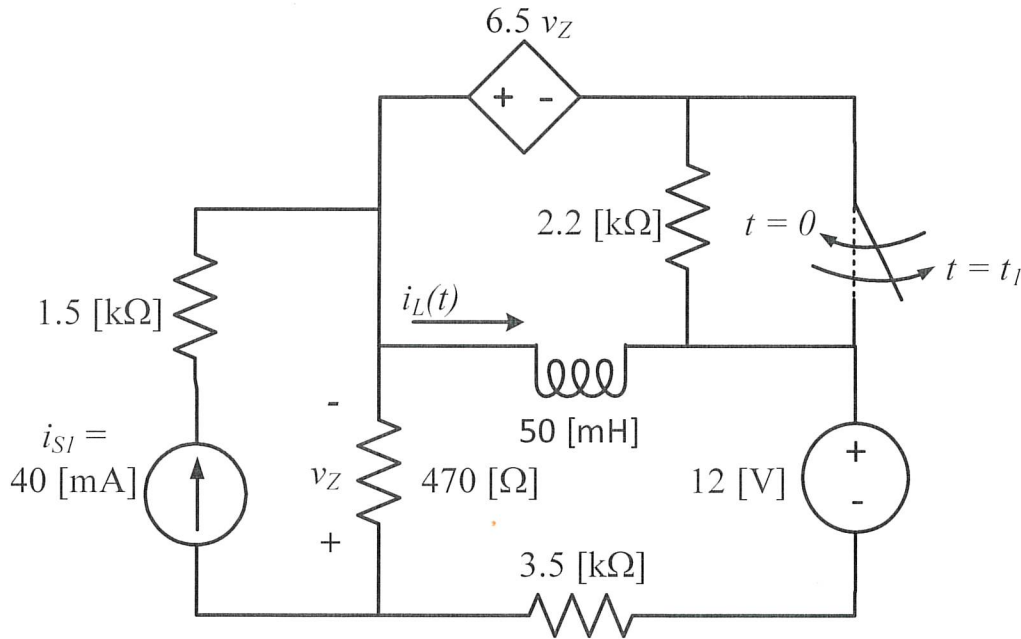
For t<0, the switch is open; $L \rightarrow$ short

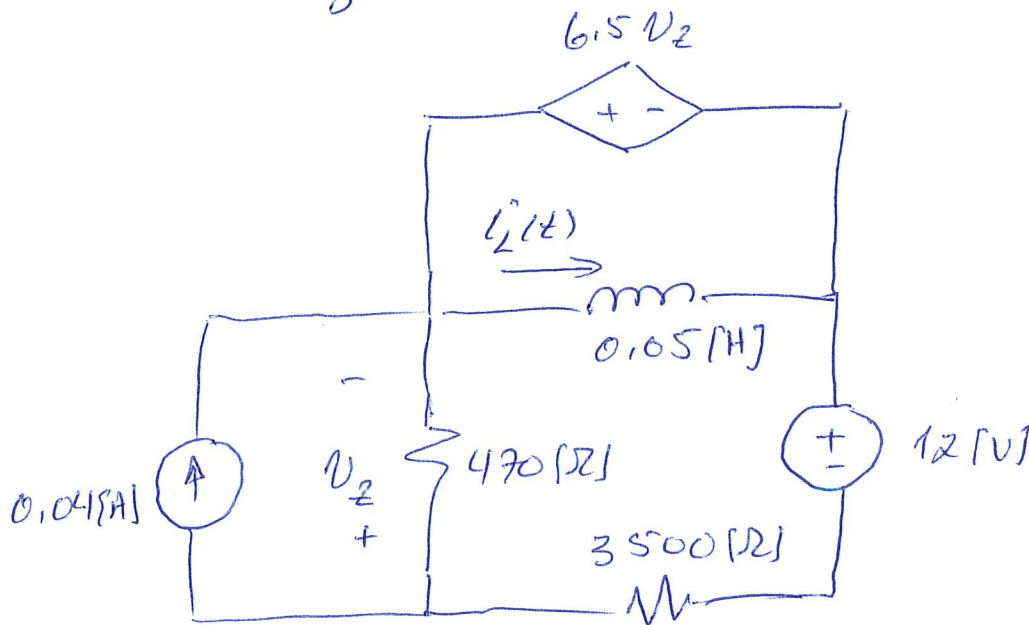$$\frac{v_z}{470} + 0.04 + \frac{v_z + 12}{3500} = 0 \qquad v_z = -17.995\ [V]$$

3

Room for extra work

$$i_L(0) = \frac{V_z}{470} + 0.04 + \frac{6.5 V_z}{2200} = -0.05145 \text{ [A]}$$

$0 < t < t_1$

  switch is closed and L is in parallel with
  a voltage source:

$$i_L(t) = \frac{1}{L} \int_0^t 6.5 V_z \, dt + i_L(0)$$

$$\frac{V_z}{4700} + 0.04 + \frac{V_z + 6.5 V_z + 12}{3500} = 0$$

$$\Rightarrow V_z = -10.1691 \text{ [V]}$$

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Pg. 2

Room for extra work

$$i_L(t) = \frac{1}{0.05} \int_0^{t_1} 6.5\,(-10.169)\,dt - 0.05145$$

$$\frac{6.5(-10.169)}{0.05}\,t_1 - 0.05145 = -0.184.4$$

$$\Rightarrow t_1 = 0.101\ [ms]$$