

Name: _____ (please print)

Signature: _____

ECE 2201 – Quiz #2
September 26, 2017

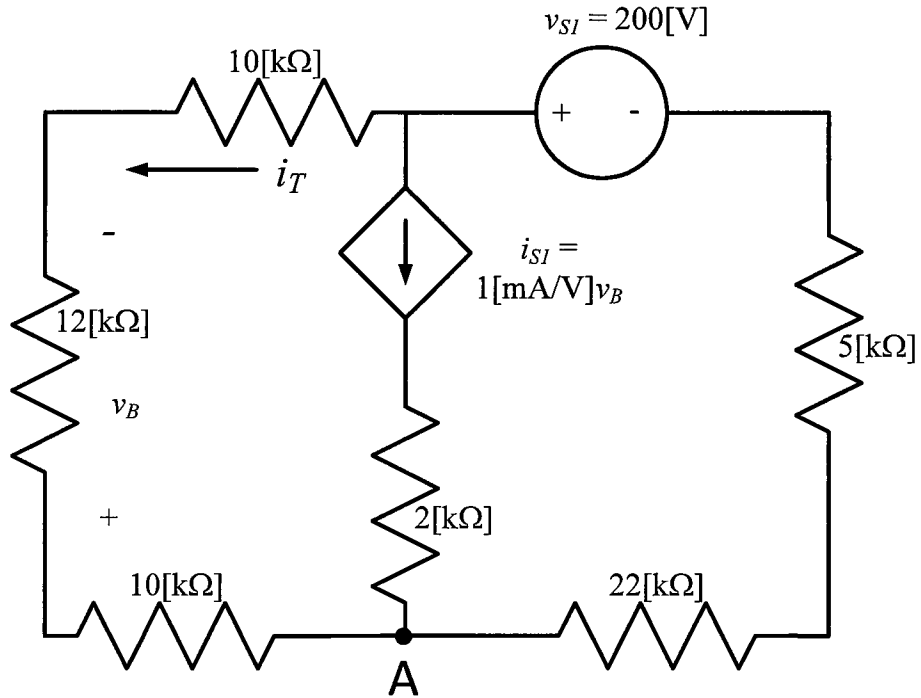
**Keep this quiz closed and
face up until you are told to
begin.**

1. This quiz is closed book, closed notes. You may use one 8.5" x 11" crib sheet, or its equivalent.
2. Show all work on these pages. 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. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**
4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
5. Do not use red ink. Do not use red pencil.
6. You will have 20 minutes to work on this quiz.

Room for extra work

For the circuit below, do the following.

- Write a KCL at node A.
- Three KVLs can be written for this circuit, but only two are independent. Write two independent KVLs for this circuit. Write your KVLs in terms of the branch currents and the resistor values, not in terms of resistor voltages.
- Given $i_T = -754.7 \text{ } [\mu\text{A}]$, find the power delivered by the dependent current source.



Room for extra work

Name: _____ (please print)

Signature: _____

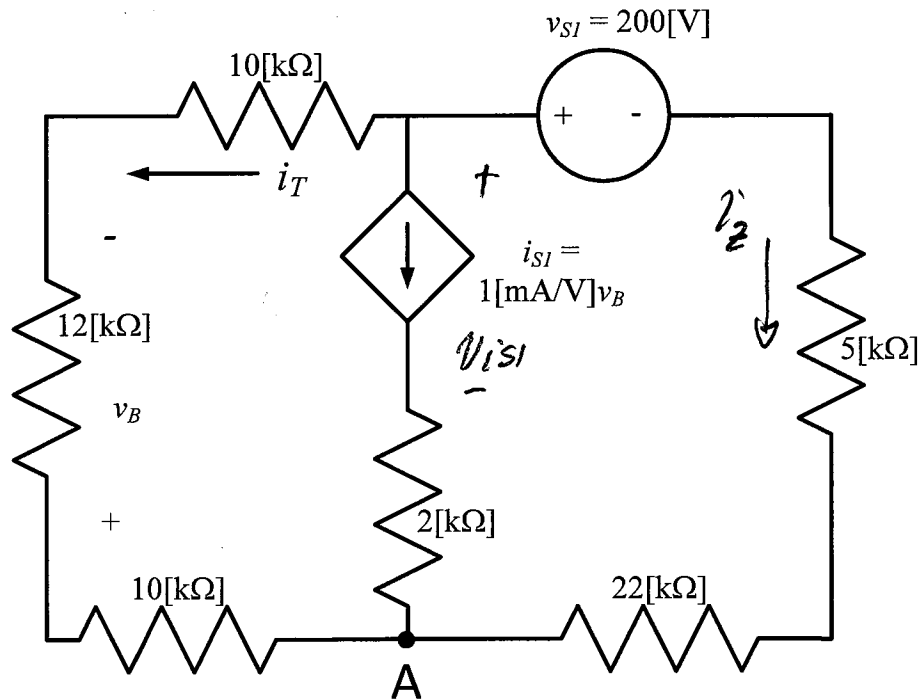
ECE 2201 – Quiz #2
September 26, 2017

**Keep this quiz closed and
face up until you are told to
begin.**

1. This quiz is closed book, closed notes. You may use one 8.5" x 11" crib sheet, or its equivalent.
2. Show all work on these pages. 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. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**
4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
5. Do not use red ink. Do not use red pencil.
6. You will have 20 minutes to work on this quiz.

For the circuit below, do the following.

- Write a KCL at node A.
- Three KVLs can be written for this circuit, but only two are independent. Write two independent KVLs for this circuit. Write your KVLs in terms of the branch currents and the resistor values, not in terms of resistor voltages.
- Given $i_T = -754.7 \text{ } [\mu\text{A}]$, find the power delivered by the dependent current source.



a)

we have labelled the current i_2 . Then

KCL at A:
$$-i_T - i_{SI} - i_2 = 0$$

b) we will show all three:

KVL ①
$$10000 i_T + 12000 i_T + 10000 i_T - 22000 i_2 - 5000 i_2 - 200 = 0$$

$$\Rightarrow 32000 i_T - 27000 i_2 - 200 = 0$$



Room for extra work

$$\textcircled{2} \quad 32000 i_T' - 2000 i_{S1}' - V_{i_{S1}} = 0$$

↑ I have to label a voltage
across this source and include it in KVL.
↓

$$\textcircled{3} \quad 200 + 27000 i_2' - 2000 i_{S1}' - V_{i_{S1}} = 0$$

While these are technically correct, I would not be able to solve these equations without noting one more:

$$\boxed{i_{S1}' = 10^{-3} V_B = -12 i_T'}$$

$$c) \quad i_T' = -0.7547 \text{ [mA]}$$

$$V_B = -12000 i_T' = 9.056 \text{ [V]}$$

$$\Rightarrow i_{S1}' = 9.056 \text{ [mA]}$$

Using KVL $\textcircled{2}$ above,

$$V_{i_{S1}} = 32000 i_T' - 2000 i_{S1}' = -42.26 \text{ [V]}$$

$$\therefore \boxed{P_{del \text{ by } i_{S1}} = -V_{i_{S1}} \cdot i_{S1}' = 382.7 \text{ [mW]}}$$