

Name: SOLUTION (please print)

Signature: _____

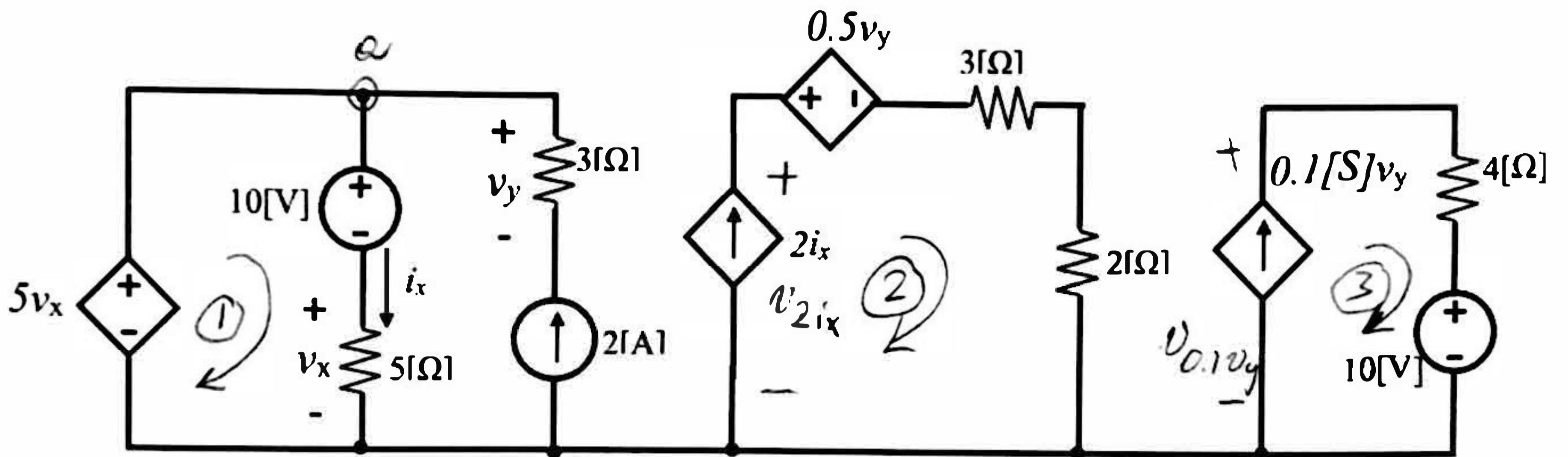
ECE 2201 – Quiz #2
February 20, 2019

**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 30 minutes to work on this quiz.

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For the circuit shown below find the power delivered by the dependent voltage source $0.5v_y$ and by both dependent current sources $2i_x$ and $0.1[S]v_y$.



We need the current in $0.5v_y$ source, voltage on $2i_x$ source and voltage on $0.1v_y$ source.

Find i_x : from KVL in Loop ① and Ohm's Law from v_x .

$$\text{KVL } \textcircled{1} - 5v_x + 10 + v_x = 0 \rightarrow v_x = 2.5 \text{ [V]}$$

$$\text{O.L. } i_x = \frac{v_x}{5} = 0.5 \text{ [A]}$$

Find v_y from Ohm's Law \rightarrow please note the voltage sign vs. 2A
 $v_y = -2 \cdot 3 = -6 \text{ [V]}$

Find the voltage on $(2i_x)$ source (KVL ②)

$$\text{KVL } \textcircled{2} - v_{2i_x} + 0.5v_y + 2i_x \cdot 3 + 2i_x \cdot 2 = 0$$

$$v_{2i_x} = -3 \text{ [V]} + 3 \text{ [V]} + 2 \text{ [V]} = 2 \text{ [V]}$$

Find the voltage on $(0.1v_y)$ source

Room for extra work

KVL (3)

$$10[V] - v_{0.1v_y} + 0.1v_y \cdot 4 = 0$$

$$v_{0.1v_y} = 10[V] - 0.6[A] \cdot 4[\Omega] = 7.6[V]$$

Power delivered by sources:

$$0.5v_y, z_{ix}, 0.1v_y$$

$$P_{DEL, 0.5v_y} = -z_{ix} \cdot 0.5v_y = +3[W] \quad \text{DELIVERS}$$

$$P_{DEL, z_{ix}} = z_{ix} \cdot v_{z_{ix}} = 2[W] \quad \text{DELIVERS}$$

$$P_{DEL, 0.1v_y} = 0.1v_y \cdot v_{0.1v_y} = -0.6 \cdot 7.6 = -4.56[W] \quad \text{ABSORBS}$$