Name: _____ (please print)

Signature: _____

ECE 2201 – Quiz #2
February 21, 2023

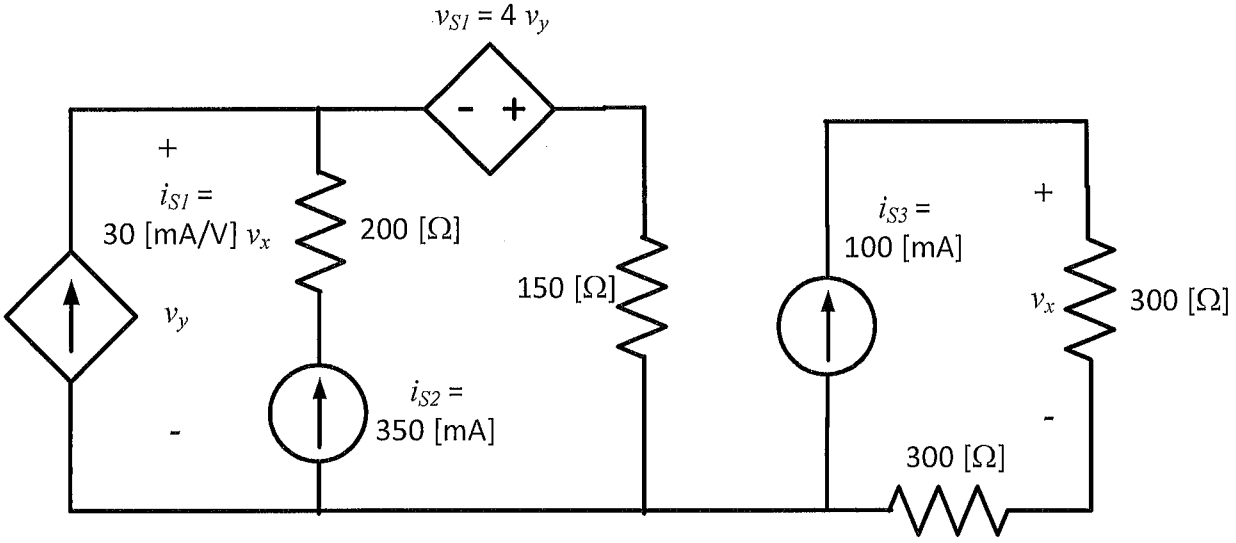
- This quiz is closed book, closed notes.
- Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
- Show all units in solutions, intermediate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

_____/20

Room for extra work

For the circuit below, do the following.

a) Find the power delivered by i_{S1}.
b) Find power delivered by i_{S2}.
c) If electrons are the charge carriers, state whether they are gaining or losing energy as they move through v_{S1}. How do you know?



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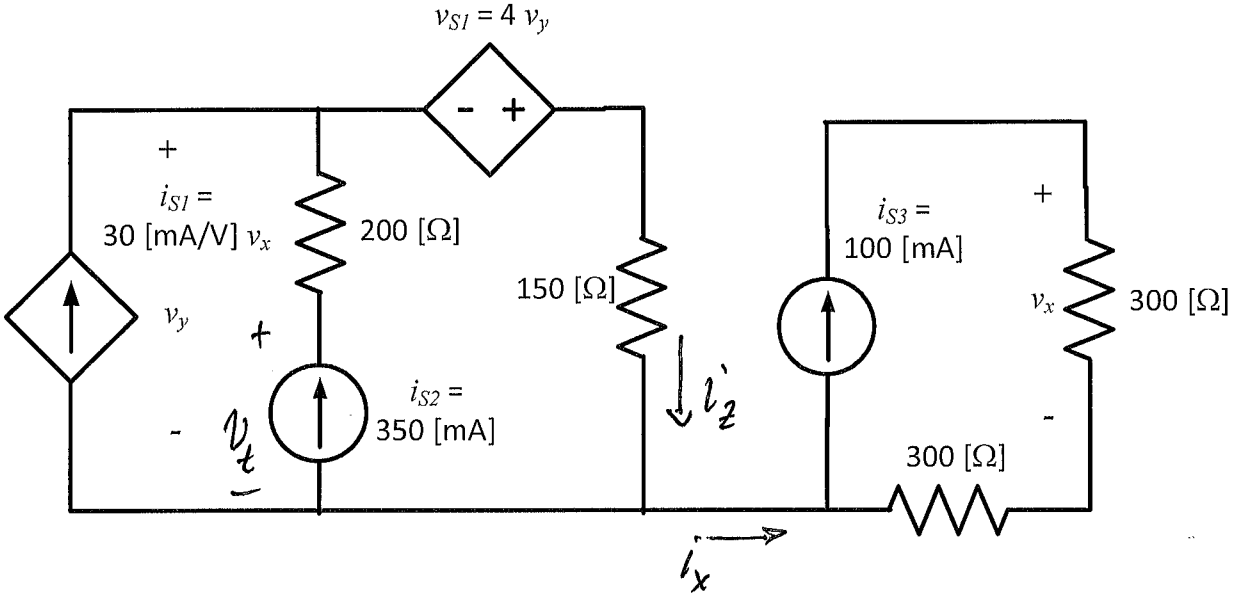

We note that the current $i_x = 0$.

We can find v_x directly: $v_x = 0.1(300) = 30\ [V]$

To find power delivered by i_{S1}, we need v_y:

KVL: $-4v_y + 150\, i_z - v_y = 0$

KCL: $i_z = 0.03\, v_x + 0.350 = 1.25\ [A]$

$\Rightarrow v_y = 37.5\ [V]$

a) Power delivered by i_{S1}:

$$P_{del\ by\ i_{S1}} = i_{S1} \cdot v_y$$
$$= 0.03\, v_x \cdot v_y$$
$$= 33.75\ [W]$$

Room for extra work

b) For power delivered by i'_{s2} we will need v_t.

KVL: $-v_t + 0.35(200) - 4v_y + 150i'_2 = 0$

$$v_t = 107.5 \text{ [V]}$$

$P_{del\ by\ i_{s2}} = i'_{s2} \cdot v_t$

$= 0.350(107.5) = 37.625 \text{ [W]}$

c) $P_{del\ by\ v_{s2}} = v_{s1} \cdot i'_2 > 0$

We don't need a value - we can see that v_{s1} delivers power, which means electrons are gaining energy.