

Name: \_\_\_\_\_ (please print)

Signature: \_\_\_\_\_

ECE 2300 – Quiz #2  
June 18, 2015

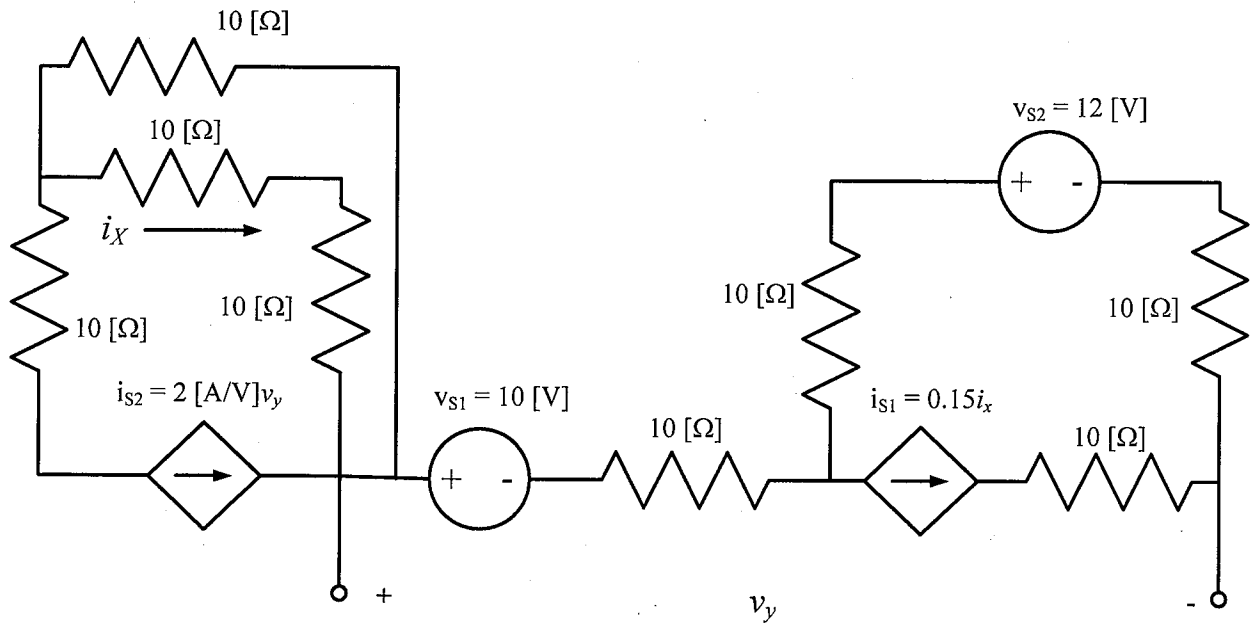
**Keep this quiz closed and  
face up until you are told to  
begin.**

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. 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

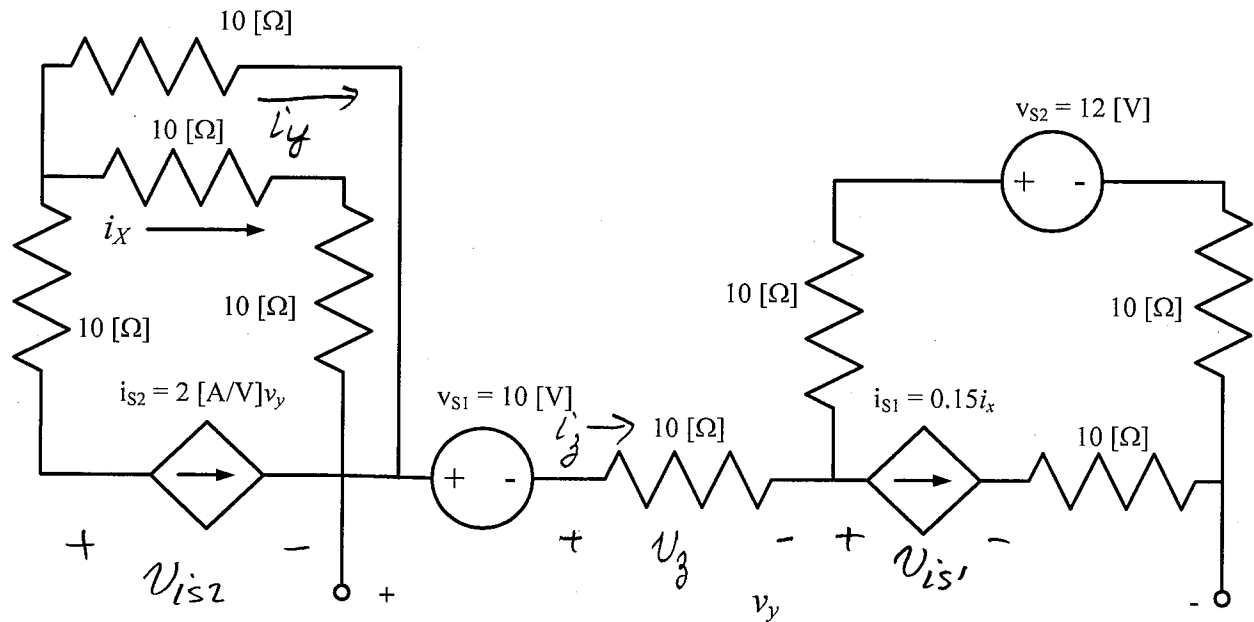
Room for extra work

For the circuit below, find the power delivered to the circuit by the current source  $i_{s2}$ .



Room for extra work

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We have defined a voltage across  $i_{s2}$  ...  $P_{del by i_{s2}} = -v_{i_{s2}} i_{s2}$

We can use CDR to find  $i_x$ :

$$\textcircled{1} \quad i_x = -i_{s2} \cdot \frac{10}{10+10+10} = -\frac{1}{3} 2 \left[ \frac{A}{V} \right] v_y$$

$$v_y = v_{s1} + v_{i_{s1}} + i_{s1} (10)$$

$$\left( i_{s1} = 0 \Rightarrow v_{s1} = 0 \right)$$

$$\textcircled{2} \quad v_y = 10 + v_{i_{s1}} + 0.15 i_x (10)$$

$$\textcircled{3} \quad v_{i_{s1}} + 0.15 i_x (10+10+10) - 12 = 0$$

Eqs.  $\textcircled{1}$ ,  $\textcircled{2}$ , &  $\textcircled{3}$  can be solved for  $i_x$ ,  $v_y$ , and  $v_{i_{s1}}$ .

$$i_x = 14.667 \text{ [A]}$$

$$v_y = -22 \text{ [V]}$$

$$v_{i_{s1}} = -54 \text{ [V]}$$

*Handwritten signature or mark*

Room for extra work

$$\text{Now } v_{i's_2} - i'_x (10+10) + i'_{s_2} (10) = 0$$

$$v_{i's_2} = (14.667)(20) - 2(-22)(10) = 733.34 \text{ [V]}$$

$$P_{del \text{ by } i's_2} = - (733.34)(2)(-22) = 32.267 \text{ [kw]}$$

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If we had not used CDR to find  $i'_x$ , we would have done...

$$\text{KCL: } 2v_y + i'_x + i'_y = 0$$

$$\text{KVL: } 20i'_x - 10i'_y = 0 \Rightarrow i'_y = 2i'_x$$

$$\Rightarrow 2v_y + i'_x + 2i'_x = 0 \Rightarrow i'_x = -\frac{1}{3} 2v_y$$

which is of course our eqn (1).