Name: _____ (please print)

Signature: _____

ECE 2300 – Quiz #2
June 19, 2014

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

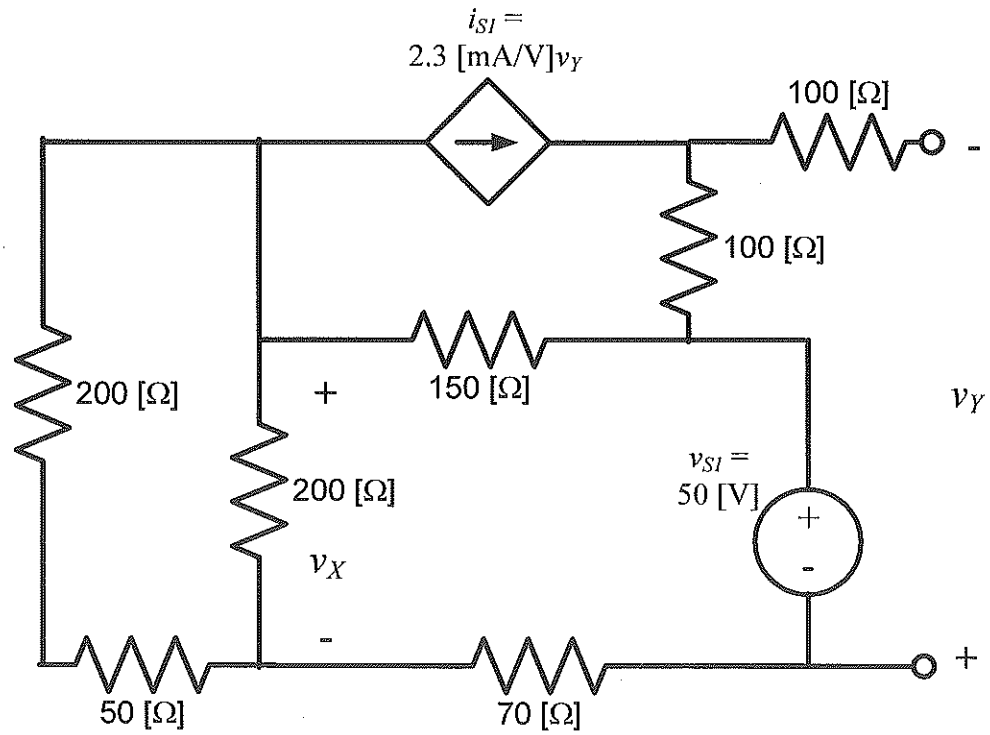
1. This quiz is closed book, closed notes. You may use one 8.5" x 11" crib sheet, or its equivalent.
2. Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order 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, do the following.

a) Find the power delivered by the dependent current source i_{S1};
b) Find v_X.



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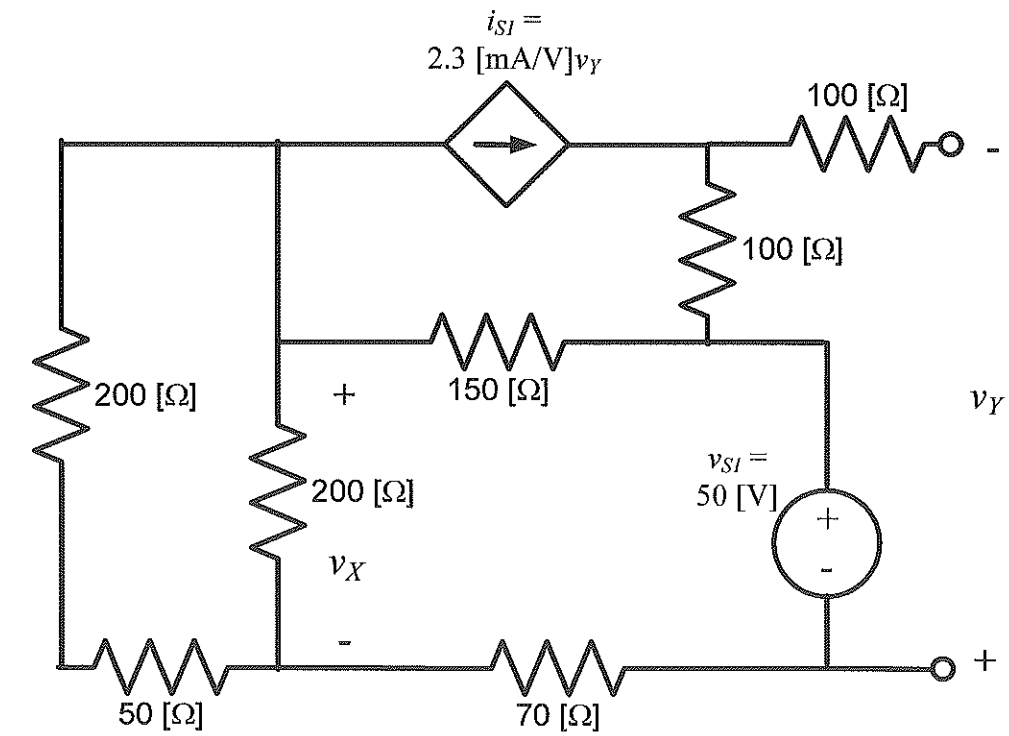
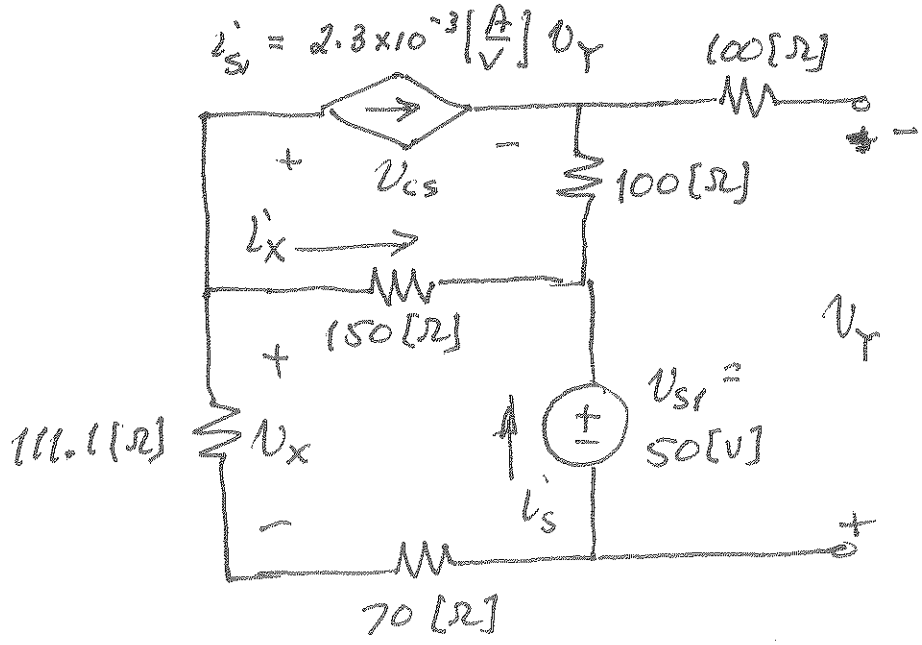


we can combine these resistances and then redraw:

$R_{eq} = (200+50) \,//\, 200 = 111.1\ [\Omega]$



Room for extra work

We have defined two unknown branch currents i'_x, i'_s.

KCL $\quad -2.3\times10^{-3} v_Y - i'_x - i'_s = 0$

KVL $\quad 150\, i'_x + 50 - i'_s(70 + 111.1) = 0$

KVL for v_Y: $\quad -v_Y - 50 - (2.3\times10^{-3} v_Y)(100) = 0$

We can solve the last equation for v_Y:

$$-v_Y - 50 - 0.23 v_Y = 0 \Rightarrow v_Y = -40.65\ [V]$$

Solving the first two equations gives

$$i'_x = -99.87\ [mA] \qquad i'_s = 193.37\ [mA]$$

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a) KVL for v_{cs}: $\quad v_{cs} + (2.3\times10^{-3})(-40.65)(100) - 150 i'_x = 0$

$$v_{cs} = -(0.23)(-40.65) + 150(-0.09987)$$

$$= -5.631\ [V]$$

$$P_{del\ by\ i_{s1}} = -v_{cs} \cdot i'_{s1} = -(-5.631)(2.3\times10^{-3})(-40.65)$$

$$\boxed{P_{del\ by\ i_{s1}} = -0.5265\ [W]}$$

b) $\quad v_x = i'_s \cdot R_{eq} = (0.19337)(111.1)$

$$\boxed{v_x = 21.48\ [V]}$$