

Name: _____ (please print)

Signature: _____

ECE 2202 – Quiz 1

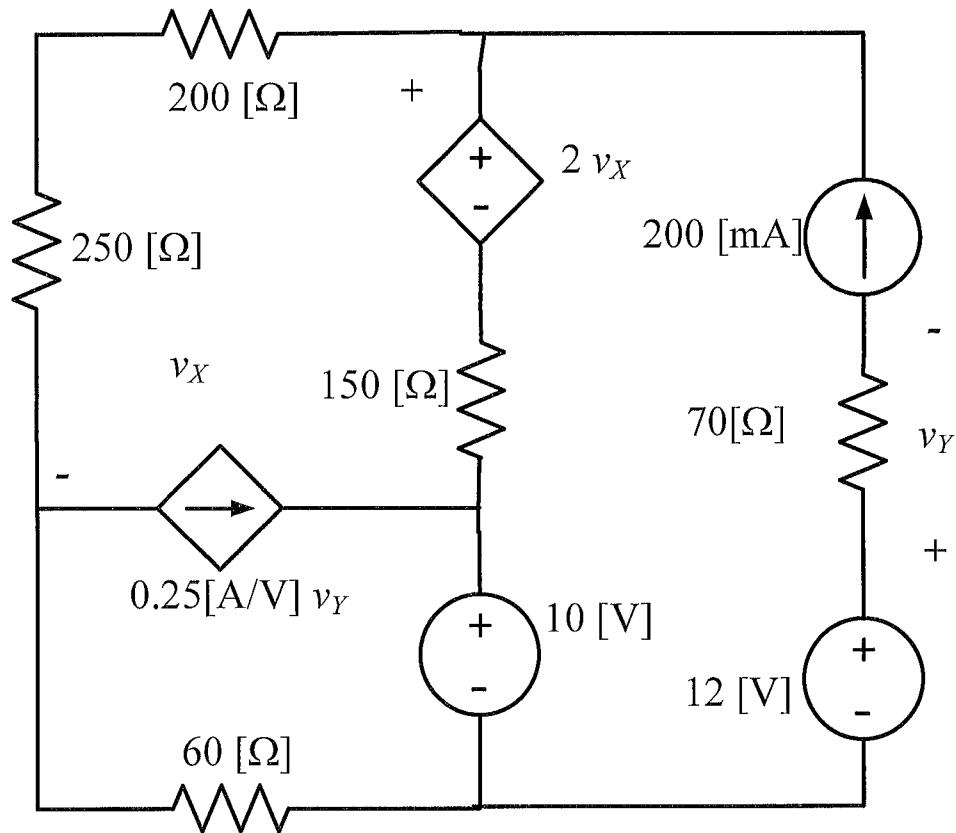
August 31, 2023

1. This quiz is closed book, closed notes. You may have one 8.5 x 11" crib sheet.
2. 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.

_____ /20

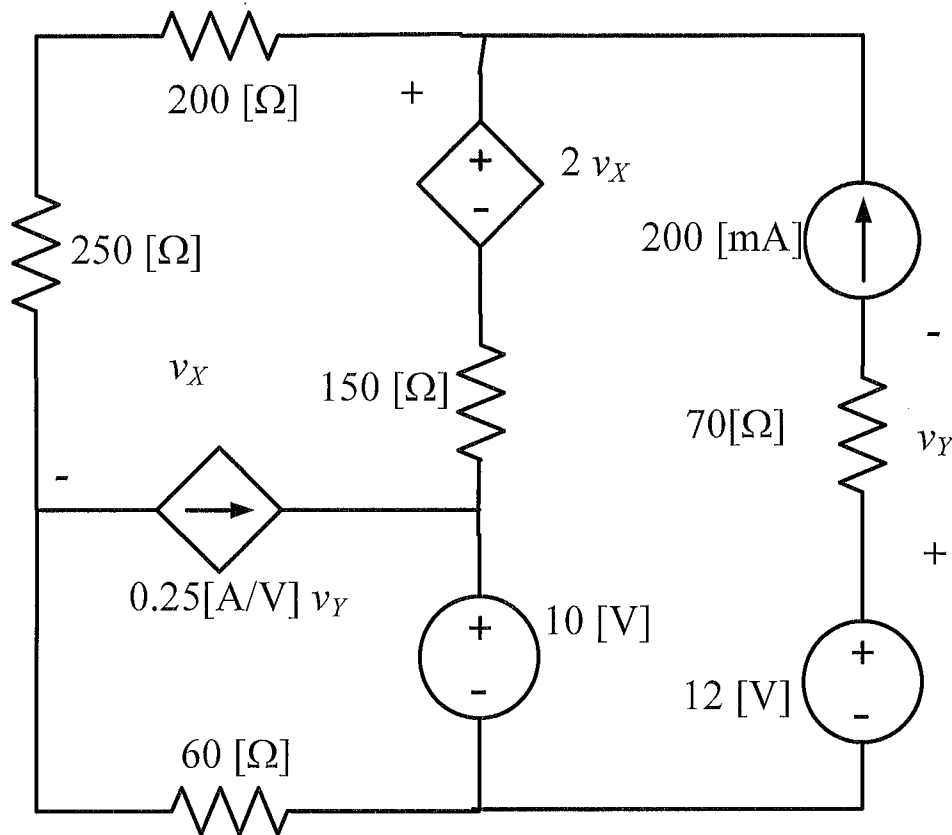
Room for extra work

Find the Thevenin equivalent of the circuit shown below, as seen by the source v_{SI} . Draw the Thevenin equivalent circuit, carefully labeling the Thevenin parameters.



Room for extra work

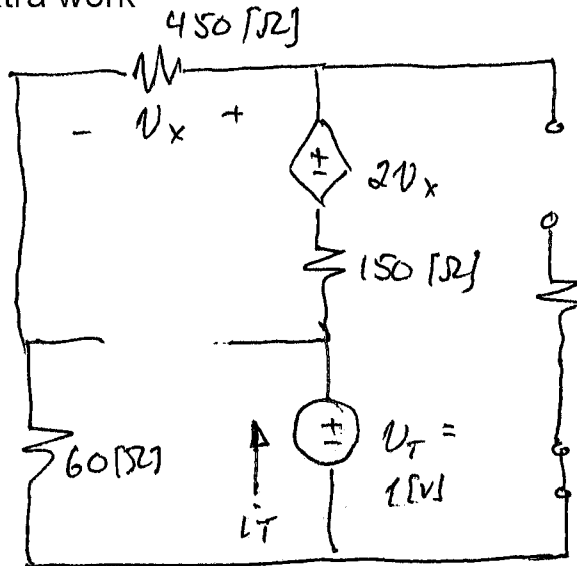
Find the Thevenin equivalent of the circuit shown below, as seen by the source v_{S1} . Draw the Thevenin equivalent circuit, carefully labeling the Thevenin parameters.



Clearly, a test source offers a big simplification. Open-circuit voltage is simpler than short-circuit current, so these are the best choices. But we will do all three...

Room for extra work

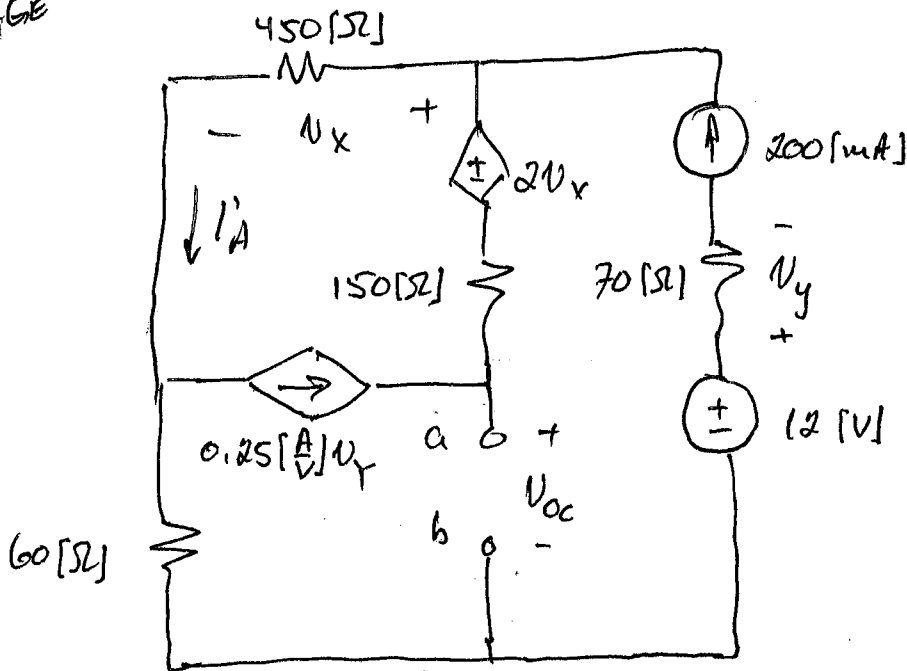
TEST SOURCE



$V_y = 0 \Rightarrow$ dependent current source is open-circuit

$$\left. \begin{aligned} -V_T + i_T \cdot 660 - 2V_x &= 0 \\ V_x &= 450 i_T \end{aligned} \right\} V_T = 1 \text{ [V]} \Rightarrow i_T = \frac{-1}{240} \text{ [A]} \Rightarrow R_{TH} = -240 \text{ [}\Omega\text{]}$$

OPEN-CIRCUIT VOLTAGE



pg 4a.

Room for extra work

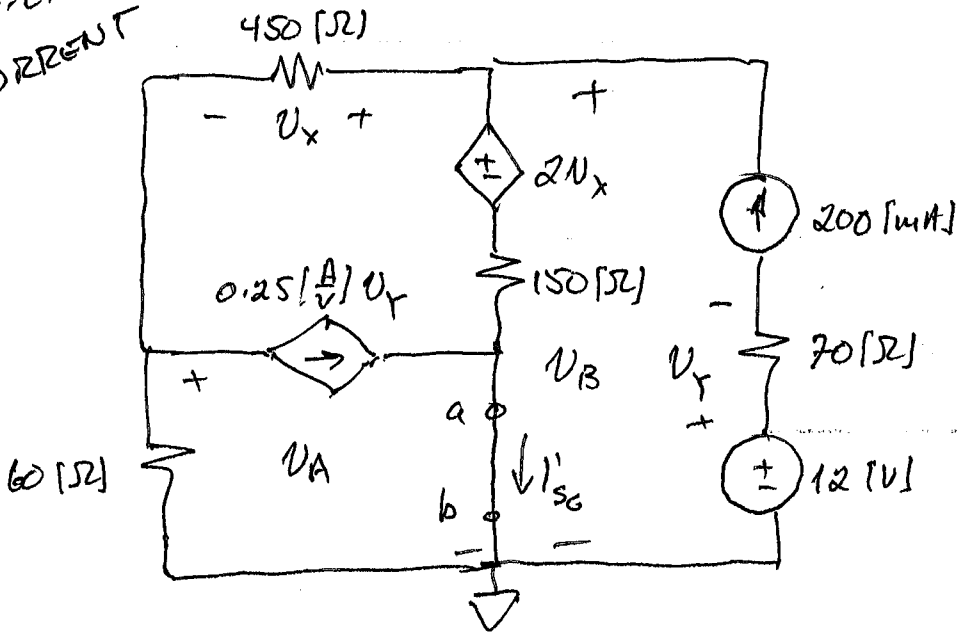
$$i'_A = 0.2 + 0.25 V_Y \quad V_Y = 0.2(70) = 14 \text{ [V]}$$

$$\Rightarrow i'_A = 3.7 \text{ [A]} \quad V_x = 450 i'_A = 1665 \text{ [V]}$$

$$-V_{oc} + 150(0.25 V_Y) + 450 i'_A + 60(0.2) - 2V_x = 0$$

$$V_{oc} = V_{TH} = -1128 \text{ [V]}$$

SHORT-CIRCUIT CURRENT



$$\frac{V_B - 2V_x}{150} - 0.2 + \frac{V_x}{450} = 0$$

$$V_x = V_B - V_A$$

$$\frac{V_A}{60} + 0.25 V_Y + \frac{V_A - V_B}{450} = 0$$

$$V_Y = 14 \text{ [V]}$$

$$\Rightarrow V_A = -450 \text{ [V]} \quad V_B = -270 \text{ [V]}$$

$$-i'_{sc} + 0.2 - \frac{V_A}{60} = 0 \Rightarrow i'_{sc} = 4.7 \text{ [A]}$$

$$\Rightarrow V_{oc} = i'_{sc} \cdot R_{TH} = -1128 \text{ [V]}$$

THEVENIN:

