

Signature

Name (print, please)

ECE 2300 Circuit Analysis

Summer 2011

Quiz 4

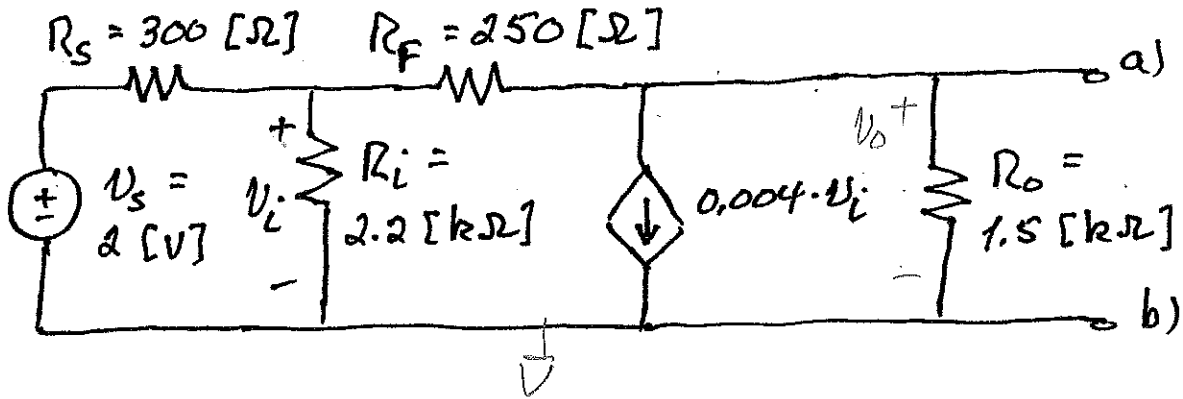
**DO NOT OPEN THIS QUIZ BOOKLET UNTIL INSTRUCTED
TO DO SO**

This quiz has 3 pages including this cover page. If you are missing any pages, raise your hand. You have 30 minutes to complete the quiz.

Notes

1. Be sure your name and signature appear above.
2. The quiz is closed-book. You may have a calculator and one 8 ½ " x 11" crib sheet.
3. To receive full credit for a problem, you must:
 - Show all work necessary to solve the problem;
 - Define all variables and parameters and label them on circuit diagrams;
 - Use the proper notation for all variables.
 - Show all units explicitly in intermediate and final results;
 - Indicate clearly whether power being calculated is absorbed or delivered;

Find the Thevenin equivalent for the circuit below at the terminals a), b). Be sure to draw the Thevenin equivalent, with labels for the terminals a), b).



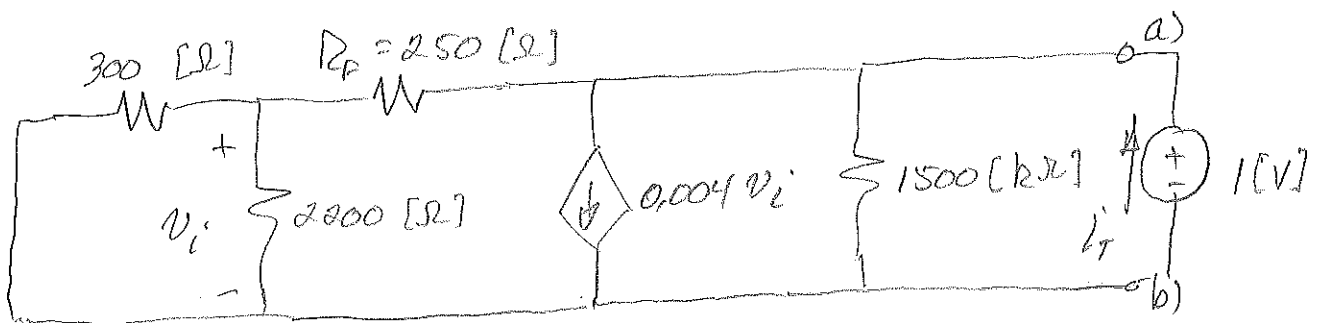
We define V_o and use node-voltage:

$$\frac{V_i}{2200} + \frac{V_i - 2}{300} + \frac{V_i - V_o}{250} = 0 \Rightarrow V_i = 0.8563 \text{ [V]}$$

$$\frac{V_o}{1500} + 0.004 V_i + \frac{V_o - V_i}{250} = 0 \Rightarrow V_o = 0 \text{ !}$$

$$\Rightarrow V_{Th} = 0$$

So $V_{Th} = 0$ [V]. This means that I_{sc} will also be 0. We will check that later. For now, we use a test source to find R_{Th} :



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Room for Extra Work

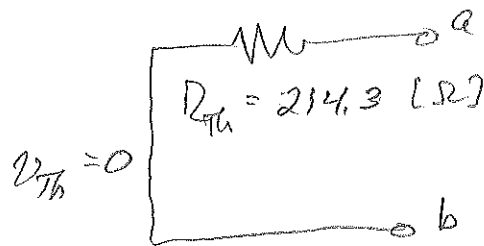
$$2200 // 300 = 264 \text{ } [\Omega]$$

$$V_i^- = 1 \cdot \frac{264}{264 + 250} \quad (\text{VDR})$$

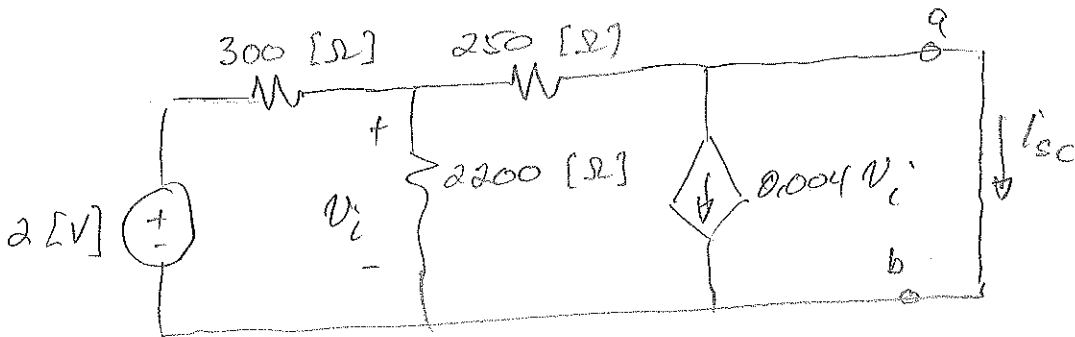
$$= 0.51362 \text{ } [V]$$

$$I_T = \frac{1}{1500} + 0.004 V_i + \frac{1 - V_i}{250} = 4.667 \text{ } [mA]$$

$$\therefore R_{Th} = \frac{V_T}{I_T} = 214.3 \text{ } [\Omega]$$



I_{sc} : (just to check...)



$$\frac{V_i}{2200} + \frac{V_i - 2}{300} + \frac{V_i}{250} = 0 \Rightarrow V_i^- = 0.8573 \text{ } [V]$$

(same as before because $V_o = 0$)

$$I_{sc} = \frac{V_i}{250} - 0.004 V_i = 0 !$$