Name: Solutions (please print)

Signature: _____

ECE 2201 – Quiz #4
October 29, 2019

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

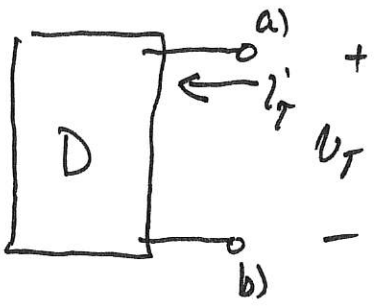
1. This quiz is closed book, closed notes. You may use one 8.5" x 11" crib sheet, or its equivalent.
2. Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order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

The device D below can be modeled by a voltage source in series with a resistance. When the resistor network shown in figure 1 is connected to the device, it is found that $v_T = -63.158$ [V]. When the voltage source in figure 2 is connected to the device, it is found that $i_T = -0.480$ [A].

i. Find the values of the model voltage source and resistance.
ii. Draw the model, and clearly label your results. Include terminals a) and b) in your drawing.



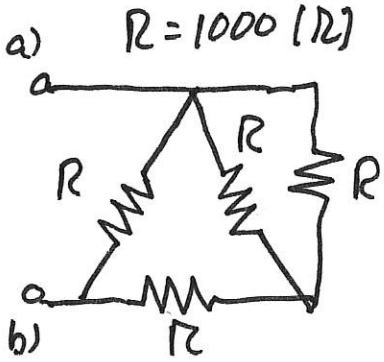


figure 1

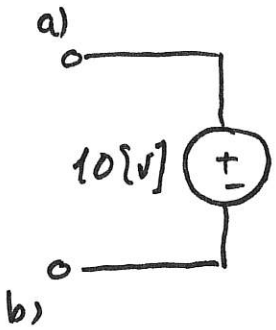


figure 2

Room for extra work

The device D below can be modeled by a voltage source in series with a resistance. When the resistor network shown in figure 1 is connected to the device, it is found that $v_T = -63.158$ [V]. When the voltage source in figure 2 is connected to the device, it is found that $i_T = -0.480$ [A].

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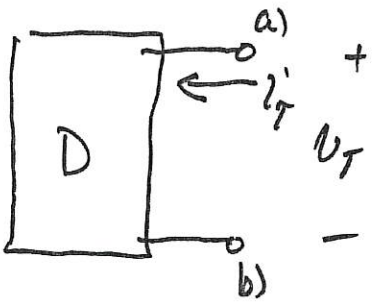


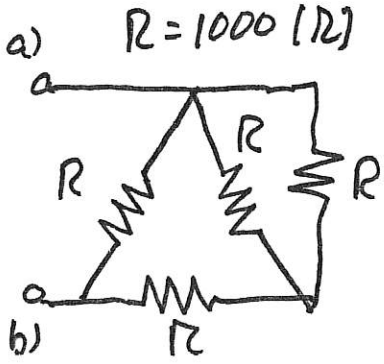


figure 1

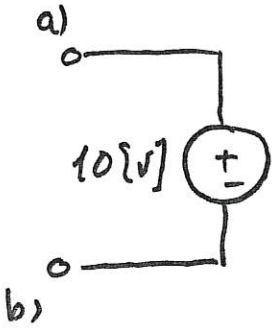
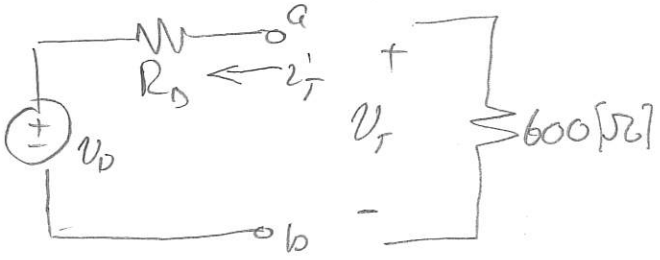


figure 2

$R_{ab} = 1.5R // R = 600\,[\Omega]$

$R // R = R/2$

$R/2 + R = 1.5R$



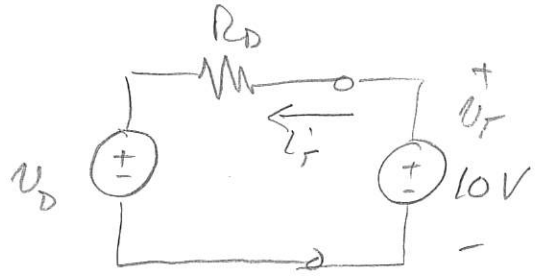
$v_T = -63.158\,V$

$\Rightarrow i_T = \frac{63.158}{600} = 0.10526\,[A]$

$-v_D - i_T R_D + v_T = 0$

$-v_D - 0.10526\,R_D - 63.158 = 0$ ①

Room for extra work



$v_T = 10\,[V] \Rightarrow i_T = -0.480\,[A]$

$-v_D - (-0.48)R_D + 10 = 0$ ②

i) ① & ② gives us $v_D = -50\,[V]$

$R_D = -125\,[\Omega]$

ii)