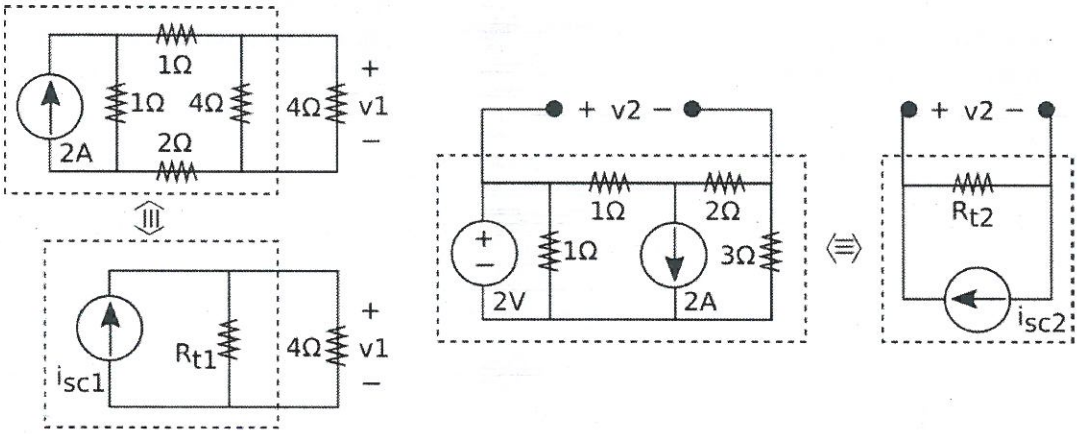
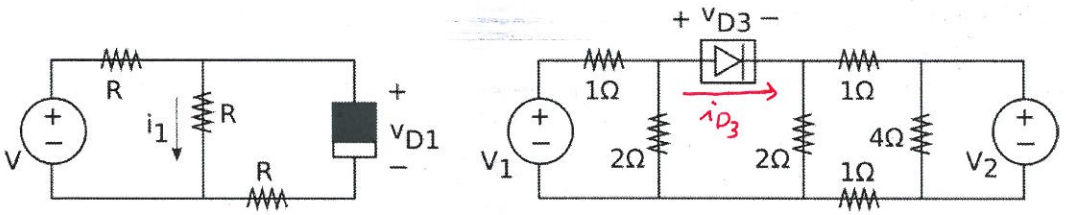
CSU0007 Basic Electronics, Homework 3

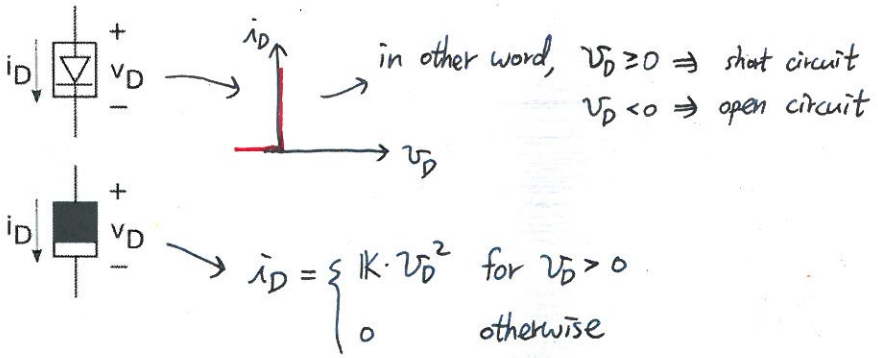
- **IMPORTANT!!** Submit your work via Moodle **before 9AM, Nov 10th, 2020.** We will have a review session on Nov 10th in class. The midterm exam will be on Nov 13th in class.
- Four questions in total. Please clearly label your answer for each question, and clearly state your calculation steps.

1. (42 points) Use Norton's Theorem to find $\{i_{sc1}, R_{t1}, v_1\}$ and $\{i_{sc2}, R_{t2}, v_2\}$. 7 points for each variable.

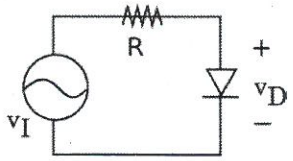


2. (40 points) For the following nonlinear circuits,
   1. (20 points) use the analytical method to determine v_D and i_1 (the method is covered in class and is described in Section 4.2 in the textbook);
   2. (20 points) if $0 < 2V_2 < V_1$, what would be the value of i_{D3}? Use the piecewise analysis method.





3. (10 points) Use the graphical analysis method to explain the following property: Let $v_{I1} > 0$ and $v_{I2} > 0$, and such that v_{I1} caused v_{D1} and v_{I2} caused v_{D2}. Then we have $\Delta v_I > \Delta v_D$ where $\Delta v_I = |v_{I1} - v_{I2}|$ and $\Delta v_D = |v_{D1} - v_{D2}|$. Illustrate and use your own word to explain why $\Delta v_I > \Delta v_D$.



4. (8 points) In class we've talked about an approach to determine R_{TH} in Thevenin's Theorem by using a potentiometer (i.e., a variable resistor 可變電阻). Now, with the additional help of Norton's Theorem, we may determine R_{TH} without using any potentiometer. Think about it and describe an approach to determine R_{TH} by only using a multimeter (i.e., a volt-ohm-milliammeter 三用電表).