# EE 112 (MBP): HW 4 (February 13, 2017)

1. Shown in the figure is a simple voltage regulator which is meant to maintain a constant voltage at the output, irrespective of the load resistance value (as long as it falls in a certain range). The Zener diode has $V_Z = 5.6\,\text{V}$.

   (a) For $R_L = 150\,\Omega$, what is the current through the Zener diode?

   (b) What is the minimum value of R_L for which the circuit will work as desired?
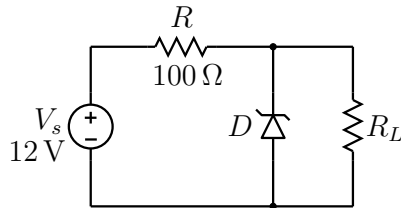
2. For the circuit shown in the figure, plot i versus V_i for $-5\,\text{V} < V_i < 5\,\text{V}$. ($V_{\text{on}} = 0.7\,\text{V}$ for the diode.)
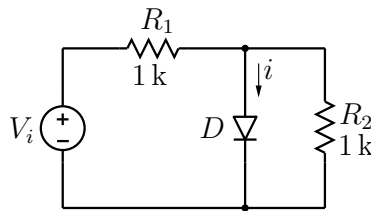
3. Assume that the diodes in the following circuit are ideal (with $V_{\text{on}} = 0\,\text{V}$).

   (a) What is the condition on V_i for D_2 to be on and D_1 to be off?

   (b) What is the condition on V_i for D_1 to be on and D_2 to be off?

   (c) Plot i versus V_i for $0\,\text{V} < V_i < 25\,\text{V}$.

   (d) Repeat for $V_{\text{on}} = 0.7\,\text{V}$.

   (Source: Millman)
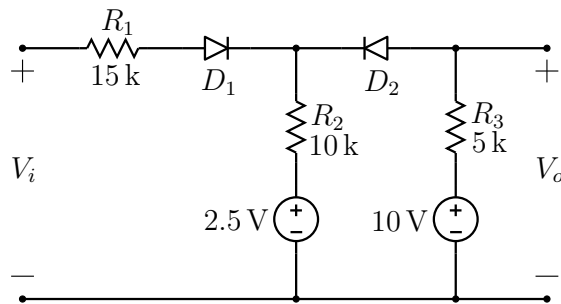
4. The V_o versus V_i relationship for a circuit is given in the figure. The circuit has one diode with $V_{on} = 0.7\,\text{V}$, and two resistors R_1 and R_2. One of the resistances is $1\,\text{k}\Omega$. Draw the circuit and find the other resistance.