ECE 320 - Quiz #2 - Name _____

Semiconductors, pn Junction, ideal diodes - Fall 2021

1a) When a silicon diode conducts current p to n, there is about a 0.7V drop across the diode. What causes this voltage drop?

1b) What are holes and electrons?

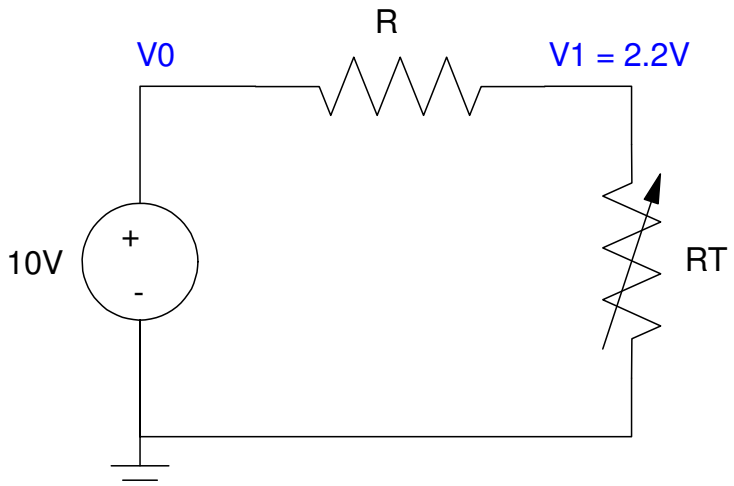
2) Thermistors: Assume the VI characteristics of a thermistor are

$$R_T = 1000 \exp\left(\frac{4200}{T+273} - \frac{4200}{298}\right)\Omega$$

where T is the temperature in degrees C. Determine RT and the temperature if V1 = 2.2V

Let R be 1000 + (your birth month) * 100 + your birthday. For example, March 14th would give R = 1514 Ohms.

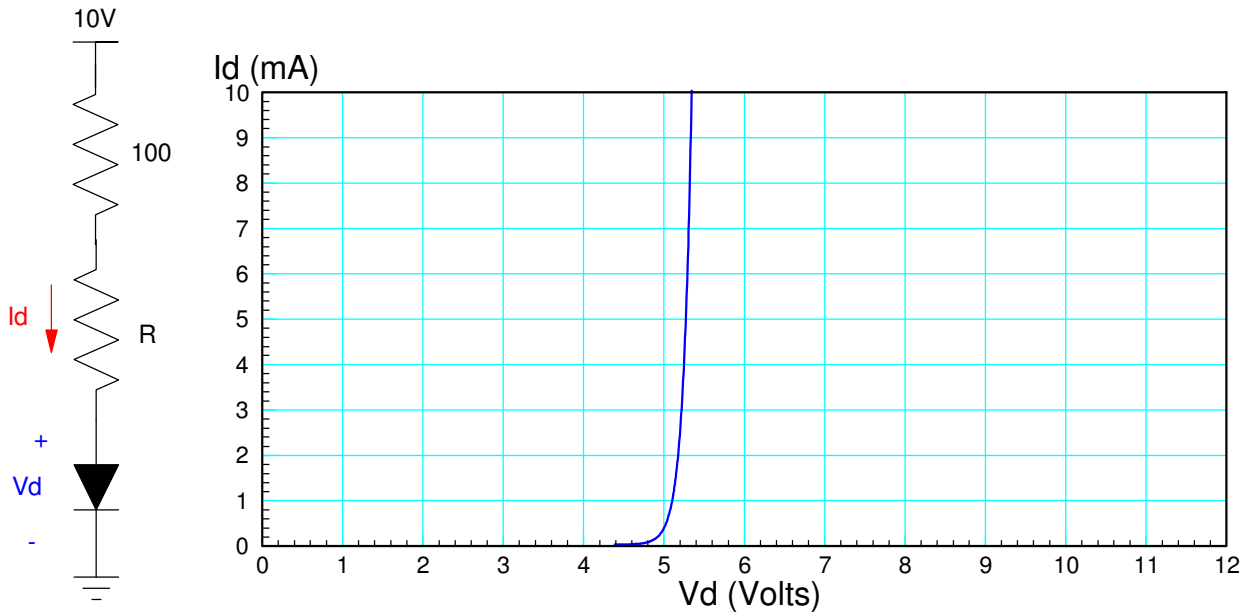
R 1000 + 100*Month + Day	RT (Ohms) Thermistor	Temperature (C)



3) Load Lines: The VI characteristic for a diode is show on the graph below. Draw the load line for the following circuit and from the graph, determine Vd and Id

- Let R be 1000 + 100*(Birth Month) + (Birthday)

R 1000 + 100*Month + Day	Load Line	Vd	Id
	show on graph		



4) Diodes (nonlinear equations): Assume

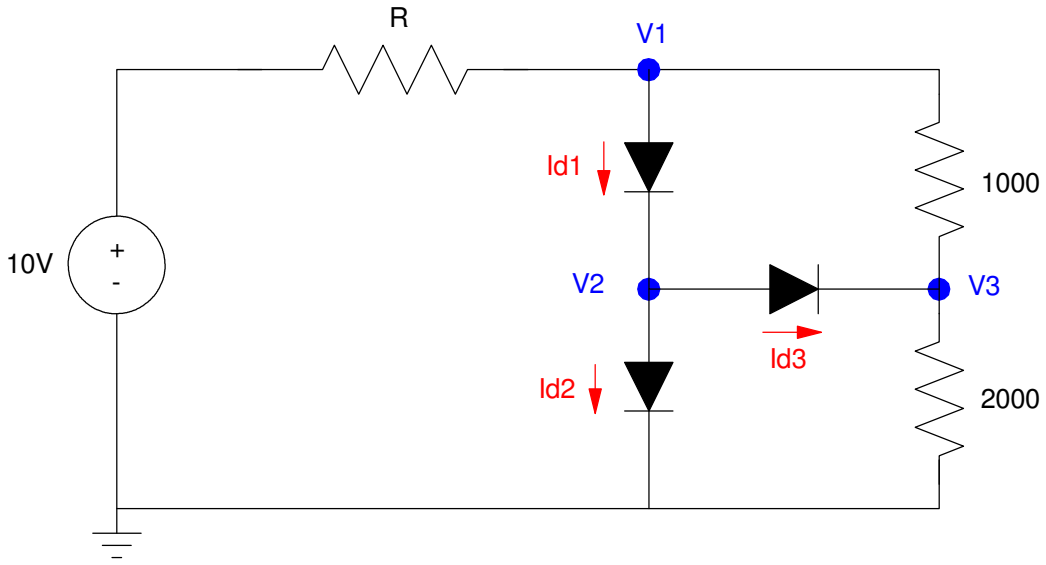
- The VI characteristics of a diode are

$$I_d = 10^{-8} \cdot \left(\exp\left(\frac{V_d}{0.052} \right) - 1 \right)$$

- R = 1000 + 100 * (your birth month) + (your birth date). For example, May 14th gives R = 1514 Ohms.

Write 6 equations so solve for {V1, V2, V3, Id1, Id2, Id3}

- note: don't solve.

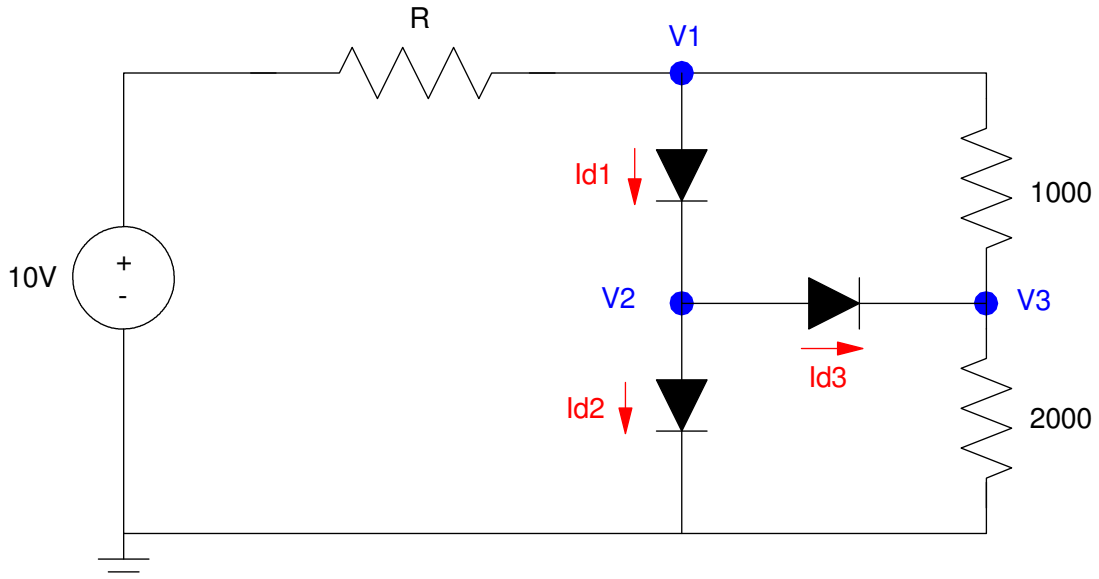


5) Assume

- R = 1000 + 100 * (your birth month) + (your birth date). For example, May 14th gives R = 1514 Ohms.
- Ideal silicon diodes (Vf = 0.7V).

Determine {V1, V2, V3, Id1, Id2, Id3}

V1	V2	V3	Id1	Id2	Id3



6) Assume

- R = 1000 + 100 * (your birth month) + (your birth date). For example, May 14th gives R = 1514 Ohms.
- Ideal silicon diodes (Vf = 0.7V).

Determine {V1, V2, V3, Id1, Id2, Id3}

V1	V2	V3	Id1	Id2	Id3