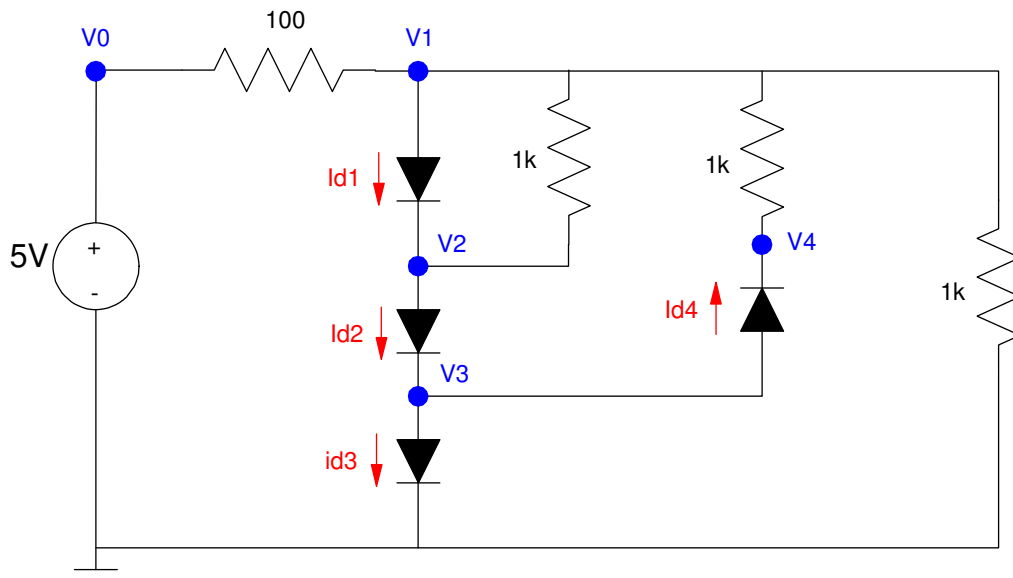# ECE 320 - Homework #3

Ideal Diodes, LEDs, AC to DC Converters. Due Monday, February 3rd

Please make the subject "ECE 320 HW#3" if submitting homework electronically to Jacob_Glower@yahoo.com (or on blackboard)

1) Assume ideal silicon didoes (Vf = 0.7V). Determine {V1, V2, V3} and {Id1, Id2, Id3}

2) Change Vin to 2.0V. Determine {V1, V2, V3} and {Id1, Id2, Id3} assuming ideal silicon diodes

3) Assume ideal silicon didoes (Vf = 0.7V). Determine {V1, V2, V3} and {Id1, Id2, Id3}
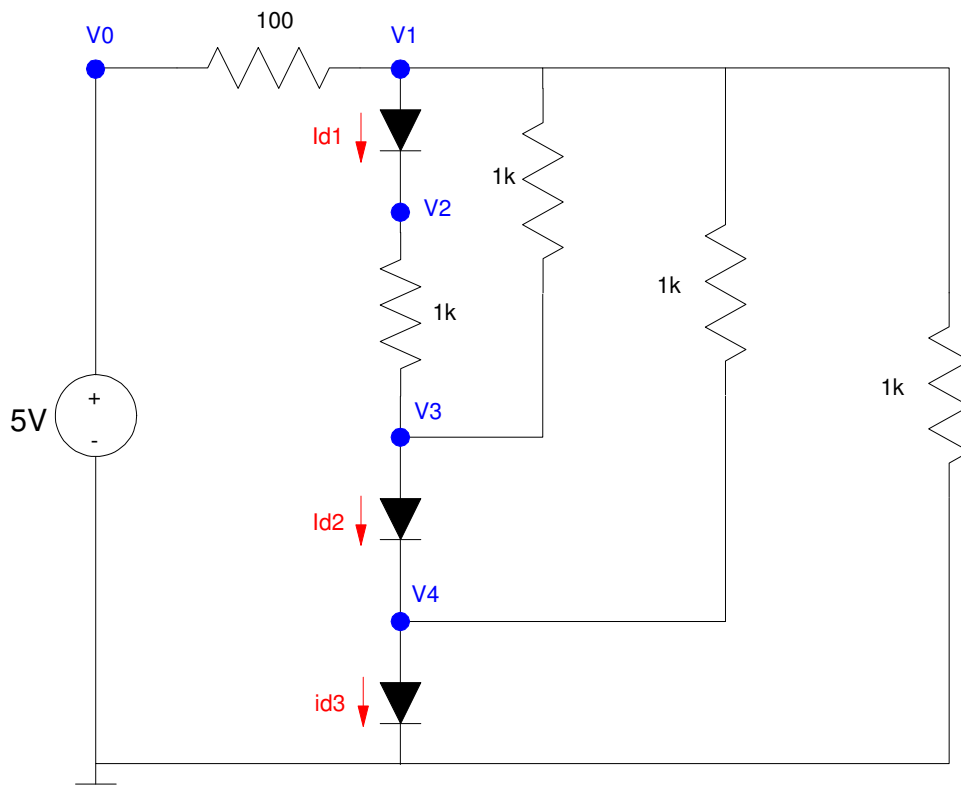
LEDs

The specifications for a Piranah RGB LED are

Color	Vf @ 20mA	mcd @ 20mA
red	2.0V	10,000
green	3.2V	10,000
blue	3.2V	10,000

4) Design a circuit to drive these LEDs with a 10V source to produce baby blue:

- Red = 7803 mcd (199/255)
- Green = 9568 mcd (244/255)
- Blue = 9411 mcd (240/255)

5) Design a circuit to drive these LEDs with a 10V source producing olive green:

- Red = 2509 mcd (64/255)
- Green = 3647 mcd (93/255)
- Blue = 1960 mcd (50/255)

Other colors can be obtained from

https://www.rapidtables.com/web/color/color-wheel.html

AC to DC Converters

6) Assume C1 = 100uF and C2 = 10uF. Determine the votlages at V1 and V2 (DC and AC)

7) Simuate this circuit and verity your calculations (V1 and V2, both DC and AC)

8) Lab: Build this circuit in lab and measure the voltages at V1 and V2 (both DC and AC). Note that you don't need to add a 277 Ohm resistor - that is the resistance of the 10H inductors we have in stock (approx).

9) Find C1 and C2 so that the ripple at V1 is 2Vpp and the ripple at V2 is 250mVpp.

V1

277   10H

V2

20 sin(377t)   +   −

C1

C2

1000

12VAC Wall
Transformer
500mA