ECE 320 - Homework #3

Ideal Diodes, LEDs, AC to DC Converters. Due Monday, January 28th, 2019

Ideal Diodes

1) Assume an ideal silicon diode (Vf = 0.7V). Determine the voltages and currents



2) Assume an ideal silicon diode (Vf = 0.7V). Determine the voltages and currents



LED's

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

3) Design a circuit to drive these LEDs with a 10V source to produce lavender:

- Red = $9647 \mod (246/255)$
- Green = $8117 \mod (207/255)$
- Blue = $9882 \mod (252/255)$

4) Design a circuit to drive these LEDs with a 10V source producing steel blue:

- Red = $4745 \mod (121/255)$
- Green = $6078 \mod (155/255)$
- Blue = $8235 \mod (210/255)$

Other colors can be obtained from

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

AC to DC Converters

- 5) Determine the voltage (DC and AC) at V1 and V2
- 6) Simulate this circuit in PartSim and check the voltages at V1 and V2 (DC and AC)
- 7) Lab: Build this circuit in lab and check the voltages at V1 and V2 (DC and AC)
- 8) Modify this circuit (change the capacitors) so that
 - The AC voltage at V1 is 2Vpp
 - The AC voltage at V2 is 0.2Vpp



Problem 5 - 8.

Note: Use a wall transformer for the AC source (12VAC wall transformers output about 20V peak) Use a 10H inductor for the 278 Ohm resistor and 10H inductor (the resitance of the inductor is about 278 Ohms)