ECE 320 - Homework #3

Ideal Diodes, LEDs, AC to DC Converters

Ideal Diodes

- 1) Determine Id and Vd for problem #4 of homework set #2 assuming ideal silicon diodes
 - Vf = 0.7V
- 2) Determine the voltages and diode currents for problem #7 of homework set #2 assuming ideal silicon diodes
 - Vf = 0.7V



Problem #2: Assume ideal silicon diodes

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

3) Design a circuit to drive these LEDs with a 5V source to produce pastel yellow:

- Red = $10,000 \mod (255/255)$
- Green = $9803 \mod (250/255)$
- Blue = $4588 \mod (117/255)$

4) Design a circuit to drive these LEDs with a 5V source producing Barbie pink:

- $\text{Red} = 10,000 \mod (255/255)$
- Green = $6392 \mod (163/255)$
- Blue = $9882 \mod (252/255)$

Other colors can be obtained from https://www.rapidtables.com/web/color/color-wheel.html

AC to DC Converters

For the circuit below:

- 5) Determine the votlages at V1 and V2 (DC and AC)
- 6) Build the circuit in CircuitLab (or similar program) and verify your calculations for problem #5
- 7) Determine C1 and C2 so that AC voltages are: V1 = 1Vpp and V2 = 100mVpp.
- 8) Build this circuit in CircuitLab (or similar program) and verify your calculations for problem #7



Circuit for problems 5 - 8