

ECE 320 - Homework #3

LEDs, AC to DC Converters. Due Monday, September 13th

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

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

1) Design a circuit to drive these LEDs with a 5V source to produce Kelly Green:

- Red = 2784 mcd (71/255)
- Green = 6156 mcd (157/255)
- Blue = 2039 mcd (52/255)

2) Design a circuit to drive these LEDs with a 5V source producing Cobalt Blue:

- Red = 352 mcd (9/255)
- Green = 3450 mcd (88/255)
- Blue = 9254 mcd (236/255)

Other colors can be obtained from

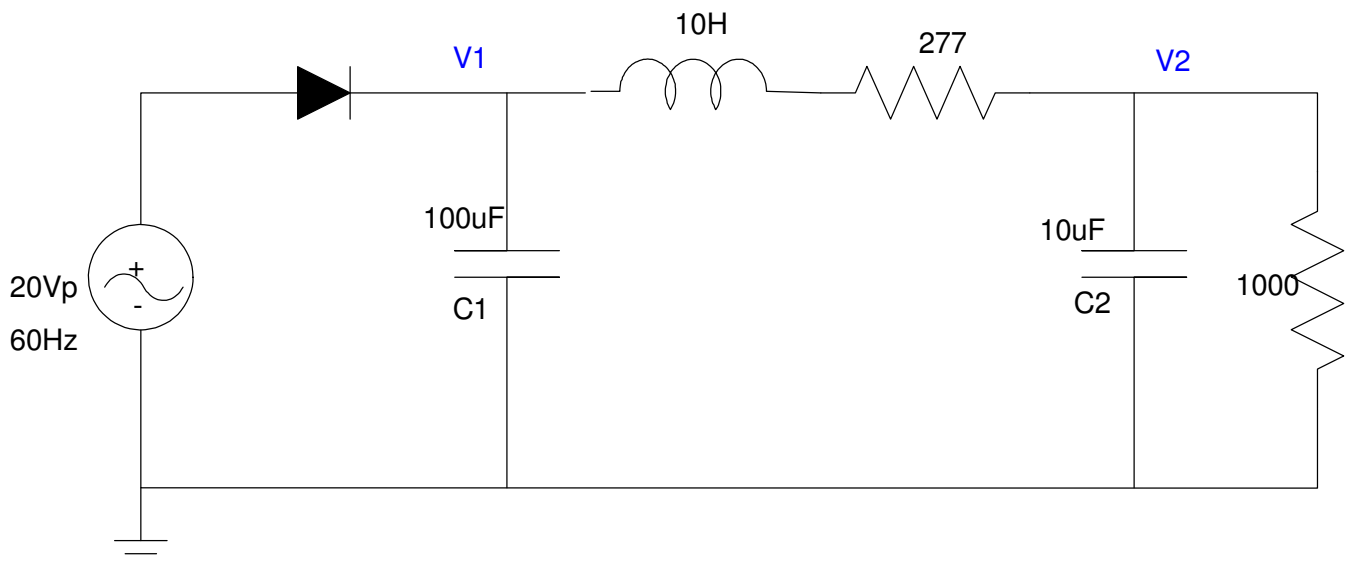
<https://www.rapidtables.com/web/color/color-wheel.html>

AC to DC Converters

For the circuit below:

- 5) Determine the voltages at V1 and V2 (DC and AC)
- 6) Build the circuit in CircuitLab (or similar program) and verify your calculations for problem #5
- 7) Build this circuit in hardware and measure the voltages V1 and V2. Note:
 - Use a 12VAC, 500mA wall transformer for the input
 - Use a 10H inductor for the 10H & 277 Ohm resistor. (You don't have to add the 277 ohm resistor to your circuit - it's the DC resistance of the 10H inductor.)

- 8) Determine C1 and C2 so that AC voltages are: $V1 = 2V_{pp}$ and $V2 = 250mV_{pp}$.
- 9) Build this circuit in CircuitLab (or similar program) and verify your calculations for problem #8



Circuit for problems 5 - 9