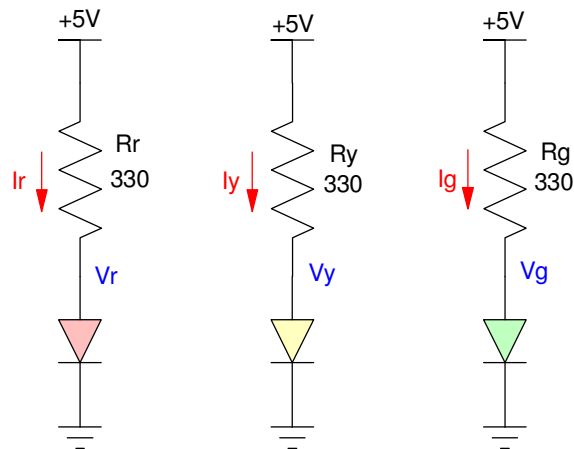


ECE 320 - Homework #3

LEDs, AC to DC Converter, Max/Min, Clippers

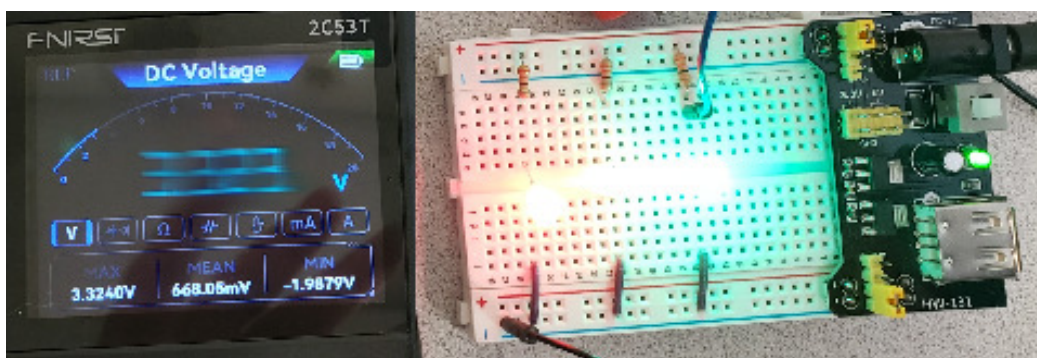
LEDs (Lab)

- 1) Using your lab kit, build the following circuits using a red, yellow, and green LED. When powered from +5V
 - Using your multimeter, measure the voltage drop across each diode
 - Compute the current through each LED
- 2) Change the resistors to 1k
 - Measure the voltage drop across each LED
 - If the current drops to 1/3rd of its previous value (R is 3x larger), does the voltage also drop to 1/3rd?
 - Why or why not?
- 3) Determine the values of the resistors so that the current in each diode is 20mA



Problem 1-3

	R = 330		R = 1000	
	Vx	Ix	Vx	Ix
red				
yellow				
green				

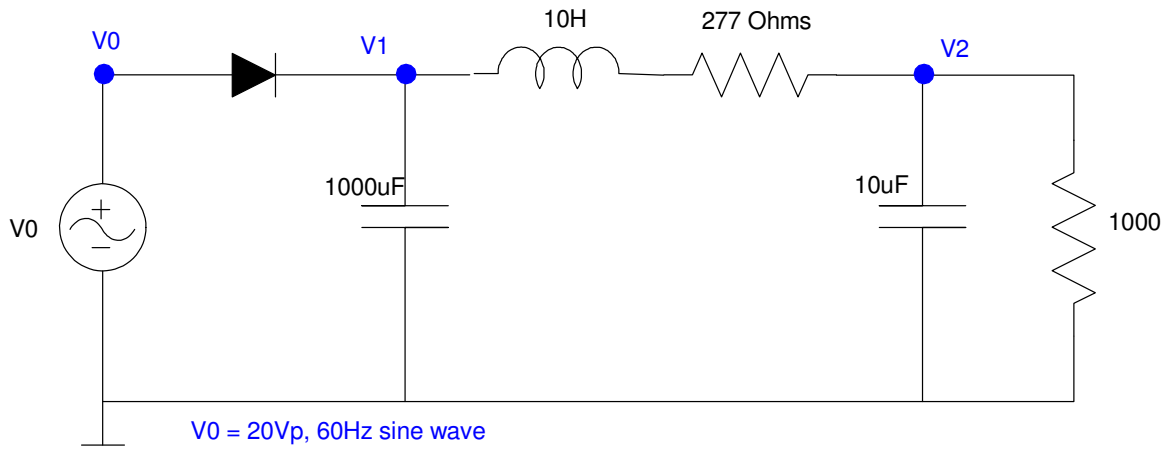


Sample circuit: Color code your wires, keep your circuit neat

AC to DC Converters

For the circuit below, assume V_0 is a 20Vp, 60Hz sine wave.

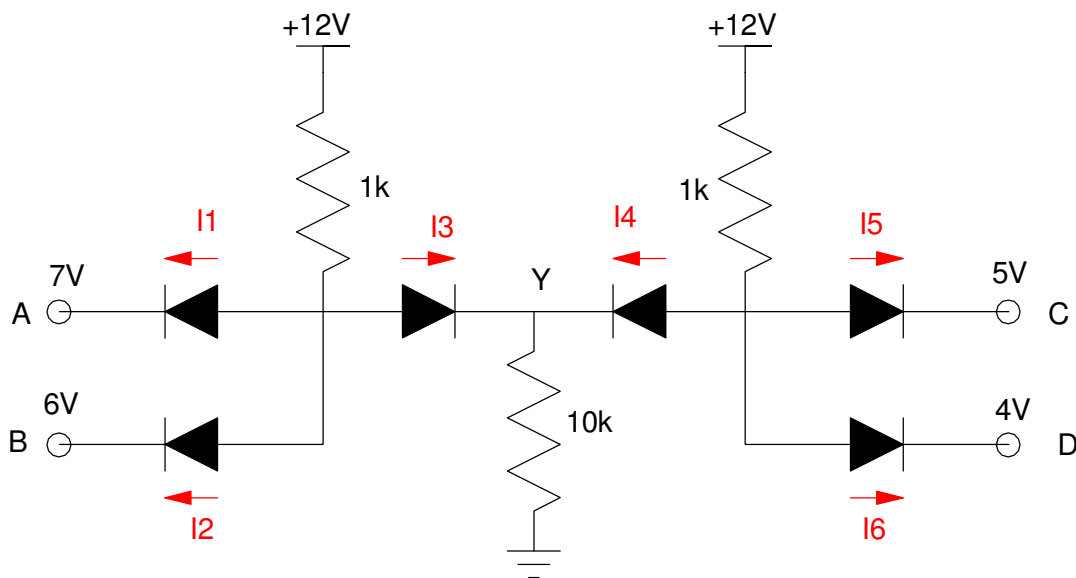
- 4) Determine the voltages at V_1 and V_2 (DC and AC)
- 5) Determine C_1 and C_2 so that AC voltages are: $V_1 = 2V_{pp}$ and $V_2 = 250mV_{pp}$.
- 6) Build the circuit in CircuitLab (or similar program) and verify your calculations for problem #5



Circuit for problems 4 - 6

Max/Min

- 7) Determine the voltages and currents for the following max/min circuit. What function does this circuit implement?
 $Y = f(A, B, C, D)$
- 8) Check your results in CircuitLab (or similar program)



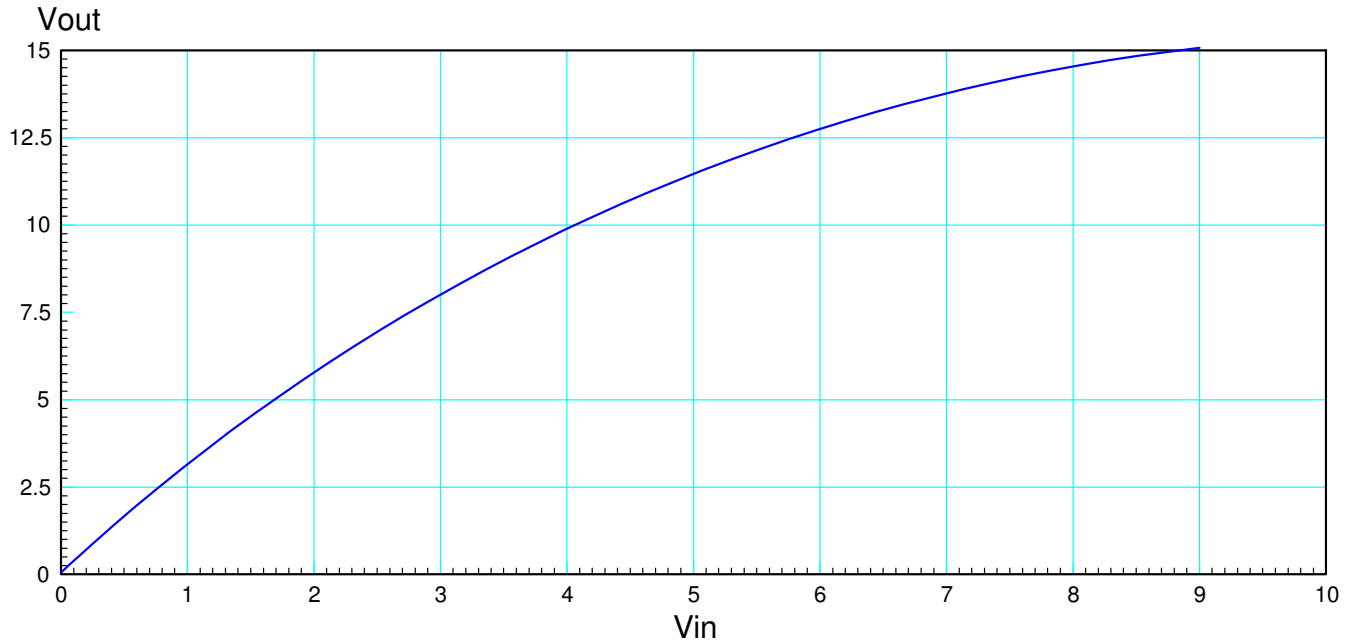
Problem 7-8

Clipper Circuits:

9) Design a circuit to approximate the following function subject to the following requirements:

- Input: 0 .. 10V, capable of 100mA
- Output: 100k resistor
- Relationship: Graph below, +/- 200mV

10) Check your design in CircuitLab



Problem 9-10