Lab #3
Diodes & LEDs
Due: Start of NEXT Lab

Name / SN: ________________________________  TA: __________

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A) Pick up the following components from the TA:

1. 555 timer IC (1)
2. 8-pin IC socket (1)
3. LM7805 voltage regulator (1)
4. Proto-board
5. 1.6V LEDs (5)
6. 10Ω resistor (1)
7. 1KΩ resistor (1)
8. 5.1KΩ resistor (1)
9. 220uF electrolytic capacitor (1)
10. 100nF capacitor (1)
11. Electrolytic capacitor (1): Student to choose value

B) Connect a 555 timer in an Astable configuration to produce a 1/2 Hz square wave with equal high and low time ($t_h = t_l$). Refer to the datasheet provided online in the handouts page for the circuit diagram. Drive it with $Vcc=12V$.

TA: ________________________________

C) Build the full-bridge rectifier circuit shown below and connect it between the output and ground of your oscillator circuit. If it is built correctly, the two pairs of bridge LEDs will flash on and off while the central LED stays on.

TA: ________________________________
1. Measure the voltage at the output of the voltage regulator.

Ans: ____________________________ Vout

2. Assume a forward voltage drop of 0.7V for each of the diodes included inside the voltage regulator. Sketch the circuit contained inside the device. Include the three pins.

Ans: ____________________________

3. Measure the voltage across diodes D2 and D5. Sketch the waveforms. Label the voltage and time axes.

Ans: ____________________________ D2

Ans: ____________________________ D5

4. How could you change the circuit to protect the LM555 timer IC from being damaged if someone were to accidentally turn the power supply up to 20V?
D) Solder your LED circuit onto the prototyping board. Have one team member solder the 555 timer circuit and the other add the diode network. Do not solder the IC directly on the board. Use the socket. Include wire loops for input power and ground.

TA: ________________________________