Pre-labs and Reports

There is a lock box labeled “ECE 331” next to the printer in C107. This is where all work for the labs (**NOT HW**) needs to be turned in. All Pre-lab are due by noon (12:00) on the date listed in the assignment. All Laboratory Reports are due at the beginning of your own lab period during the week listed on the assignment. All work must be turned in at the time it is due. If you will be out of town on a due date for any reason, you must arrange for the material to be turned in ahead of time.

There are six laboratory assignments for ECE 331, labeled “Lab 0” through “Lab 5”. Each of these labs lasts two weeks, as shown in the assignment. Each lab has pre-lab exercises due on Thursday before the first week of the lab, except for Lab 0, which has no pre-lab. Each lab lasts two weeks, and a lab report is due at the beginning of the following lab period

The pre-lab exercises consist of two or three questions on the general topic of the lab. For problems that require calculation, show all your work clearly. For conceptual questions, explain your answer in detail. In addition to testing your knowledge, the pre-lab exercises may also test your ability to explain related topics. You may type or write out the pre-lab exercises. It must be legible and be written on only one side of the paper.
Sloppy work will NOT be accepted and result in points lost.

ECE 331: Electronics
Principles I Fall 2014

Lab #1: Diodes Characteristics and Applications

Pre-lab due on Tue, Sept. 4th, before noon

Pre-lab

1: Sketch the I-V curves, write the equations, and draw the equivalent circuits for each of the 5 diode models for $v_D > 0$. Diode models includes piecewise linear model, constant voltage drop model, ideal model, small signal model and exponential model.
Sketch the I-V curve for a zener diode with $v_D < 0$. Be sure to indicate the incremental resistance and knee current on your graph. ----------10 pts

2: Draw a bridge rectifier circuit and graph its input and output waveforms, making sure to indicate important values. Assume all diodes have a maximum forward voltage drop of 1.5 V. The input signal is a sine wave of 2.2 V peak @ 60 Hz (you only need to graph one full cycle). ---------- 11 pts

3: Given a peak rectifier circuit with a load of 7 kΩ and an input waveform of 110 V peak@ 75 Hz,
How large of a value must the capacitor be to keep the output ripple voltage under 1 V? How large of the capacitor to keep the output ripple under 0.3V?
What are the average and peak values of the diode current?
What percentage of the cycle is the diode conducting? ---------- 11 pts