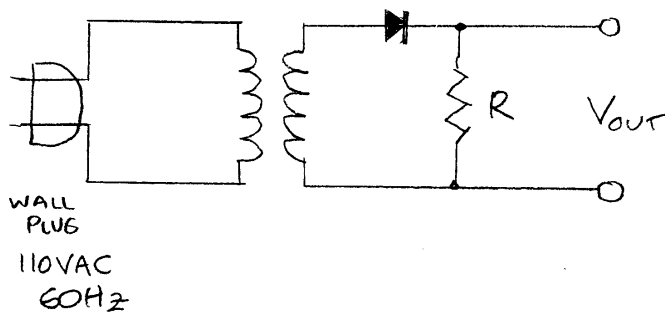


Physics 334, Winter Quarter 2012

Homework Assignment 2

Due Tuesday January 17 in class or in my mail box before the end of class.

1. Diode/power circuits. Consider the half-wave rectifier below. Assume the transformer output has amplitude 10.0 V and the diode forward voltage drop is zero. (a) What's the average output voltage? (b) What's the RMS output voltage?



2. Estimation. Four one- μF capacitors are connected in parallel and charged to 200 V, then discharged through a 2-inch length of 30 AWG (American Wire Gauge) copper wire. Do you expect the wire to melt? Why or why not? To attack this problem, you'll need certain physical constants of copper; include in your answer a table of the physical constants you used.

3. Zener power circuits. Below is the I-V curve of a 30 V zener diode. (a) Estimate the dynamic resistance of this diode when operating in the “zener region” at “reasonable” currents. (b) Suppose you want to produce a well-regulated 30 ± 0.5 V voltage from a poorly-regulated 50.0 ± 5.0 V power supply in the manner of the circuit in text figure 1.14. Find a reasonable value of the series resistor R; specify the resulting zener current and output voltage “wobble”.

