Physics 2170, Spring '95 **Homework #1**
Due Wed, Jan 25

Required reading for this week: F+T Chapter 1
(Optional: Beiser, Ch. 2)

Problems:

Please show your work on all problems. The answers to many F+T problems are in the back, so NO credit will be given to answers with hard to follow (or missing) work. Try to organize your homework so that the grader can follow your solution clearly. Explain (in words) what you are doing, and what assumptions you make, when it seems appropriate.

1. F+T 1.8

2. F+T 1.9

3. *The photoelectric effect:* Given that the threshold wavelength of light required to eject electrons from the surface of silver metal is 2700. Å:
a) Calculate the work function of silver. (Given your answer in eV.)

b) If you shine ultraviolet light (wavelength 2000. Å) on silver, what is the maximum kinetic energy of photoelectrons emitted?

c) What happens if you shine light with wavelength 3000 Å on silver?

4. Do F+T 1.12, BUT do not use the value of $V_0 = 40\ \text{kV}$ which they suggest. INSTEAD, use the value $V_0 = 10\ \text{kV}$. (This is roughly the potential difference in t.v. tubes) The last part of the question remains the same, "How much is the result modified if the metal's 4-eV work function is taken into account?" (Be explicit - which WAY is it modified?)

5. F+T 1.2c (part c only) Note: The earth's radius is about 6000 km. This is an *order of magnitude* problem! Please state your assumptions clearly.