Physics 355 - Problem Set #1, due Sept. 13, 2004

1. Using reasonable values of the dimensions of his CRT and of the electric voltage and magnetic field, estimate the deflection of electrons observed by J.J. Thomson. Suppose the particles had been alpha particles. What would the deflection have been, and what would his chances for a successful measurement have been?

2. A nucleus, initially at rest, emits a gamma ray photon. The nucleus recoils in the $\hat{z}$ direction. The photon Compton scatters off an electron, which was initially at rest, into a detector at a 60^o angle with respect to the $-\hat{z}$ direction, with energy 0.63 MeV. What is the de Broglie wave length for the recoiling nucleus ?

3. Griffiths, problem 1.1.

4. Griffiths, problem 1.3.

5. Griffiths, problem 1.4.