**Physics 214 Quiz 6-6 Week 7**

Consider a free electron in a uniform magnetic field *B*. Recall that the electron has two spin magnetic quantum numbers, *m*s = ±1/2.

1. The energy difference between the two electron spin states is *E* = 6.18 x 10-23 J. What magnetic field is needed to create this energy difference?

2. What frequency photon would have to be absorbed to flip the electron spin from the low-energy to the high-energy state?

3. Now consider that an electron is confined in a three-dimensional cube of length *L* = 5 nm. If 20 electrons are put into the box, what is the kinetic energy in eV of an electron in the highest state that is occupied?