**Physics 214 Quiz 4-2 [20 points]**

An electron is confined to a 1-dimensional infinite potential well of width *L*. The energy of the electron in the first excited state (*n* = 2) is 12 eV.

1. [5 points] What is the energy of the electron in its ground state (e.g., its lowest energy state)?

En=1 = En=2 /4 = 3 eV

2. [5 points] What is the width *L* of the well?

L = 1/(sqrt( 8 m E1 )/h) = .354 nm

3. [6 points] What is the minimum energy photon that could be absorbed so that the electron can transition from the first to the fourth (*n* = 5) excited state?

E = (E5-E2) = (5^2-2^2) 3 eV = 63 eV

4. [4 points] If we double the width of the well what happens to the energy of the first excited state?

It goes down by a factor of 4.