PHY140Y

Spring Term – Week 10 Discussion

22 March, 1999

1. (a) Classify all the total angular momentum substates for a hydrogen atom in an $l = 2$ orbital angular momentum state.

   (b) How many different quantum states are there?

2. Suppose you put five electrons into an infinite 1-D square well of length 10 nm.

   (a) What is the total energy of the ground state configuration?

   (b) What is the wave function for ground state. Note that there is still only one entire wave function that describes this system, but it is now a function of the coordinates of all five electrons.

   (c) Discuss the ways in which this system can be excited? What is the lowest energy excited state?