02/11/14
Workshop 3-part 3
Chem. 103, Spring 2014
(Full points 20)

Completed reports to be submitted by 02/27/2014, 2.00 PM (no late submission)

Chapter 3: Quantum theory and Electronic structure of Atoms

H. Carry out the *Identify Electrons (i.e. orbitals) with a Given Set of Quantum Numbers*
(You will be responsible for a part of a discussion group and identify the electrons coded by a set of quantum numbers, 15 minutes)

I. Short lecture on orbitals. Home exercises

a) Define radial distribution function. Draw the radial probability distribution of 1s, 2s, and 3s orbitals (Fig. 3.18). What is the distance of the point, where the electron density is maximum for 1s?

b) Draw p_x, p_y, p_z orbitals (Fig. 3.19).

c) Draw all 3d-orbitals with proper notations.

J. Deriving the Ground-state Electron Configurations of Elements (in-class exercise)

a) Draw Fig. 3.25 - the simple way to remember the order by which electrons are filled in

b) Write the orbitals (upto 7s) in the ascending order (use) of energy

K. In-class exercises

a) Provide spdf notations for H to Ar

b) Explain the difference in the properties of Li and F and Na and Cl, in terms of their electronic configurations

c) Based on electronic configurations, predict the most-stable charged state of Ca, Mg, O, S, N atoms**.**

d) Provide orbital box diagrams of all 4^{th} row elements.

e) Provide electronic configurations using the nearest noble-gas core for the 5^{th} row elements

M. Provide concise definitions of the following

a) Pauli exclusion principle, Degenerate orbitals, Aufbau principle, Hund's rule, diamagnetic atom (three examples, paramagnetic atom (three examples)

N. Problems. 3.95, 3.97, 3.99, 3.101, 3.117, 3.119, 3.121, 3.123