LEARNING GOALS FOR CH. 6

1. Describe the wave properties of electromagnetic radiation. Relate the wavelength and frequency of electromagnetic radiation to its speed.

2. Given any two among frequency, wavelength, and energy, calculate the third.

3. Describe what is meant by a light spectrum and distinguish between an emission and an absorption spectrum.

4. Use quantum numbers to label shells, subshells, and orbitals.

5. Explain the concepts of orbital, electron density, and probability as used in the model of the atom.

6. Be able to draw s, p, and d orbitals.

7. Explain the concept of ionization energy.

8. Explain the observed changes in values of the successive ionization energies for a given atom.

9. Be able to interpret an element’s PES spectrum and relate it to its electron configuration.

10. Explain the concept of electron spin.

11. Use the Pauli Exclusion Principle, the Aufbau Principle, and Hund’s rule to give the electron configuration for atoms and ions.

12. Give an element’s electron configuration based on its position in the periodic table.

13. Give the electron configuration for an ion.

14. Determine the number of unpaired electrons in an atom or ion.

15. Explain the variations in atomic radii among the elements and predict the relative sizes of atoms based on their positions in the periodic table.

16. Explain the variations in radii between an element and its anions and cations.

17. Explain the general variations in first ionization energies among the elements and relate these variations to variations in atomic radii.

18. Rank atoms and ions in an isoelectronic series according to their size or ionization energy.