HW 7.9 Periodic Table & Electron Configuration (31 pts)

Part 1: Multiple choice. (3pts total)

1. Compared to the atoms of nonmetals in Period 3, the atoms of metals in Period 3 have
   a. fewer valence electrons
   b. more valence electrons
   c. fewer electron shells
   d. more electron shells

2. The elements on the Periodic table are arranged in order of increasing
   a. atomic number
   b. mass number
   c. number of isotopes
   d. number of moles

3. Which element has chemical properties that are most similar to the chemical properties of sodium?
   a. beryllium
   b. lithium
   c. calcium
   d. magnesium

4. The reactivity of an element is mostly determined by
   a. behavior of core electrons
   b. behavior of valence electrons
   c. total number of electrons
   d. number of protons

5. Which list of elements consists of a metal, a metalloid, and a nonmetal?
   a. Li, Na, Rb
   b. Sn, Si, C
   c. Cr, Mo, W
   d. O, S, Te

6. Which ion(s) have the same electron configuration as Neon?
   a. F\textsuperscript{-}
   b. O\textsuperscript{2-}
   c. Mg\textsuperscript{2+}
   d. Na\textsuperscript{+}
   e. all of the above

Part 2: Short answer.

7. What is the shape of each electron orbital? (1pt)

8. How many electrons can each sublevel hold? (1pt)

9. How many electrons can each orbital hold? (1pt)
10. The bright-line spectra for four elements and a mixture of elements are shown in the diagram below. Which element(s) is/are present in the mixture? (1pt)

![Bright-Line Spectra Diagram]

11. Given the following neutral elements, use the periodic table to… (3pts each)
   - Draw box diagrams for each element
   - Write the longhand electron configuration for each
   - State how many total & unpaired electrons are present
   - Circle the valence electrons.

   a) Na
      Total electrons: _______ Unpaired electrons: _______
      Longhand electron configuration: __________________________

   b) Mg
      Total electrons: _______ Unpaired electrons: _______
      Longhand electron configuration: __________________________
c) Al  
Total electrons: _________  Unpaired electrons: __________

Longhand electron configuration: ________________________________________________________

d) Si  
Total electrons: _________  Unpaired electrons: __________

Longhand electron configuration: ________________________________________________________

e) P  
Total electrons: _________  Unpaired electrons: __________

Longhand electron configuration: ________________________________________________________
f) S 
Total electrons: _________  Unpaired electrons: _________

Longhand electron configuration: _______________________________________


g) Cl 
Total electrons: _________  Unpaired electrons: _________

Longhand electron configuration: _______________________________________


h) Ar 
Total electrons: _________  Unpaired electrons: _________

Longhand electron configuration: _______________________________________