A Getting-It-On Review and Self-Test
Periodic Arrangement of the Elements

Placing the electron in a systematic diagram according to energies is called an _______ ______ ______. Thus, electrons occupying the highest energy levels with the same principal quantum number are the _______ ______ ______. The element’s chemical properties are primarily a function of the ______ binding these electrons to the ______. The force of attraction has the general expression _________. Increasing the distance between the charges ______ the force. Increasing the magnitude of charge ______ the force.

The periodic table is ordered according to ______ ______. The metals are located on the _______ and the non-metals on the _______ of the table. Columns are called ________ and rows are called _________. The A family element’s outer levels are _______ and _______. The B family element’s outer levels are the _______. The atomic radius _________ with increasing atomic number in a family and ______ with increasing atomic number in a period. Within a family, the ionization energy ________ with increasing atomic number. Within a period, the ionization energy ________ with increasing atomic number. Metals tend to form _______ and non-metals tend to form _______.

1. Draw the electron dot symbols for the elements below:
   sulfur, barium, phosphorus, potassium, iodine, argon, oxygen

2. Give the charges on the monatomic ions of question #1 above.

3. Give three examples of:
   a. inert gases  
   b. alkali metals
   c. halogens  
   d. alkaline-earth metals

4. Using spectroscopic notation, give the electronic configuration of the first member of the following families:
   IA, IIA, IIIA, IVA, VA, VIA, VIIA
ANSWERS

energy level diagram   outer level electron   forces

nucleus   \( F = \frac{q^+ q^-}{r^2} \)   reduces   increases

atomic number   left   right   families   periods
s   p   d   increases   decreases
decreases   increases   cations   anions

1. \( \text{S} \)   \( \text{Ba}^+ \)   \( \text{P}^- \)   \( \text{K}^+ \)
   \( \text{I}^- \)   \( \text{Ar}^{3+} \)   \( \text{O}^2^- \)

2. \( S^- \)   \( \text{Ba}^{+2} \)   \( P^{-3} \)   \( K^+ \)   \( I^- \)   \( \text{Ar}^0 \)
   \( O^{2-} \)

3. examples:
   a. He, Ne, Ar
   b. Li, Na, K
   c. F, Cl, Br
   d. Mg, Ca, Ba

4. I A   Li   \( 1s^2 2s^1 \)
   I I A   Be   \( 1s^2 2s^2 \)
   I I I A   B   \( 1s^2 2s^2 2p^1 \)
   I V A   C   \( 1s^2 2s^2 2p^2 \)
   V A   N   \( 1s^2 2s^2 2p^3 \)
   V I A   O   \( 1s^2 2s^2 2p^4 \)
   V I I A   F   \( 1s^2 2s^2 2p^5 \)