Periodic Trend Practice Questions

1. Arrange each of the following sets of atoms or ions in order of increasing radius (i.e. from smallest to largest):

a) Ba, Ca, Cs, Sc b) Br–, Rb+, Se2–, Sr2+ c) Zr2+, Zr3+, Zr4+

1. An element in period 4 (elements 19 through 36) has the following ionization energies. Identify the element and explain logic.

IE1 = 633 kJ/mol IE2 = 1235 kJ/mol IE3 = 2389 kJ/mol

IE4 = 7090 kJ/mol IE5 = 8843 kJ/mol IE6 = 10679 kJ/mol

1. Both vanadium and its 3+ ion are paramagnetic. Use electron configurations to explain why this is so.
2. Explain how effective nuclear charge and ionization energy are related.
3. Why is the first ionization energy of oxygen less that the ionization energy for nitrogen
4. Use the concepts of effective nuclear charge, shielding, and *n* value of the valence orbital to explain the trend in atomic radius as you move across a period in the periodic table from left to right.
5. Each of the following energy terms is equal to ΔH for a particular chemical process. Write a specific, ***balanced chemical equation*** for each process.
6. the electron affinity of nitrogen
7. the first ionization energy of aluminum