CHEM 281, HW 4. Chapter 5.

1. What properties of a compound would lead you to expect that it contains ionic bonds?
2. Which would you expect to contain ionic bonds, $MgCl_2$ or $SC1_2$? Explain your reasoning.
3. Which one of each of the following pairs will be smaller? Explain your reasoning in each case. (a) K or K^+; (b) K^+ or Ca^{2+}; (c) Br^- or Rb^+.
4. Which one of each of the following pairs will be smaller? Explain your reasoning in each case. (a) Se^{2-} or Br^-; (b) O^{2-} or S^{2-}.
5. Compare the charge density values of the three silver ions: Ag^+, Ag^{+2}, and Ag^{+3} (Appendix 2). Which is most likely to form compounds exhibiting ionic bonding?
6. Compare the charge densities of the fluoride ion and the iodide ion (Appendix 2). On this basis, which would be the more polarizable?
7. Would you expect sodium chloride to dissolve in carbon tetrachloride, CCl_4? Explain your reason.
8. Explain the factor affecting the ion coordination number in an ionic compound.
9. Why, in the study of an ionic lattice, is the anion packing considered to be the frame into which the cations fit?
10. Suggest the probable crystal structure of (a) barium fluoride; (b) potassium bromide; (c) magnesium sulfide. You can use comparisons or obtain ionic radii from data tables.
11. Use Figure 5.6 as a model to draw a partial ionic lattice diagram for the antifluorite structure of lithium oxide In a sodium chloride lattice, the ions usually touch along the edge of the unit cell. If the ionic radii are in r+, and r-, calculate the length of each side of the unit cell.
12. In a cesium chloride lattice, the atoms usually touch along the diagonal from one corner through the center of the cell to the opposite comer. If the ionic radii are r+ and r-, calculate the length of each side of the unit cell.
13. The ions in cesium chloride are arranged in a body-centered cubic unit cell. Calculate the radius of a cesium ion if the density of cesium chloride is 3.97 $g\text{-}cm^{-1}$, and it is assumed that the ions touch through the diagonal

of the unit cell.

The ions in rubidium chloride are arranged in a face-centered cubic unit cell. Calculate the radius of a rubidium ion if the density of rubidium chloride is 2.76 g-cm ', and it is assumed that the ions touch along the edges of the unit cell.