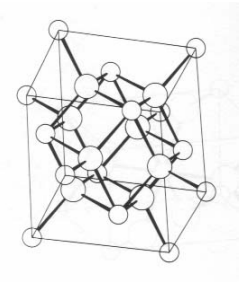
Chemistry 448/548 Name: _____
Test 2
Fall 2003



Very Short Answer Questions: (3 points each)

1. Ions generally increase in size with _____ coordination number.
2. The picture to the right displays the _____ lattice.
3. For a salt, increased polarization results in _____ water solubility.
4. The overlap integral, *S*, is given by the equation: _____.
5. The formula that gives the Mulliken-Jaffe electronegativity is _____.
6. _____ occurs when more than one energetically reasonable structure can be drawn for a molecule.
7. _____ and _____ are the two major disadvantages of neutron diffraction.
8. The hybridization of a central atom in a molecule of trigonal bipyrimidal geometry is _____.
9. IF_5 is a _____ shaped molecule.
10. Water burns in the presence of _____`!

Discussion Questions: (You must show work to receive credit!)

1. What are the three types of phosphorus? Describe their physical properties. (10 points)

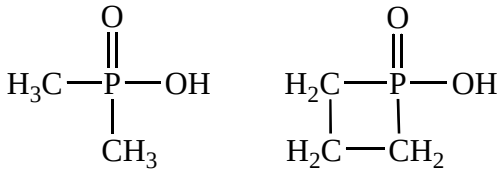
2. Which would be easier to thermally decompose $MgCO_3$ or $MgSO_4$? Propose a physical justification for your answer. (5 points)

3. Write out the Born-Haber cycle for aluminum sulfide, write out the heat of formation equation, and define each term in it. (10 points)

4. Consider the oxidation of fluorine gas: $F_2 \longrightarrow F_2^+ + e^-$. What is the major factor favoring this reaction and why? What is the major factor opposing this reaction and why? (10 points)

5. Draw the most likely Lewis structures of $Me_2P(CF_3)_3$ and $Me_3P(CF_3)_2$. Which, if any, will undergo Berry pseudorotation? Provide the physical justification for your answer. (10 points)

6. Which of the following should be more acidic? Provide the physical justification for your answer. (10 points)



7. Would you expect the distortions from idealized geometries to be larger for TeF_5^- or $TeCl_5^-$? What is the physical justification for your answer? (5 points)

8. In a manner similar to that for $C_5H_5^-$, draw out the ligand group orbitals for benzene. Indicate the degeneracy for each energy level and provide which *d*-orbitals on a first row transition metal would interact constructively with each energy level. (10 points)