Questions

1. Draw the two major isomers for the octahedral complex: $\text{MA}_3\text{B}_3$.

2. Explain how ethylene can act as a B-acid. Use drawings if helpful.

3. Name the following compounds:
   
   $[\text{Cr(NH}_3)_5\text{Cl}]\text{Cl}_2$  \hspace{1cm}  $[\text{Cu(NH}_3)_4]\text{[PtBr}_4]$  

4. Draw and completely label the crystal field diagram for an octahedral complex.

5. Show the optical isomers for the complex: $\text{ML}_3$ where $\text{L}$ is a bidentate ligand.

6. What are the common structures for compound with a coordination number of 5.

7. Determine the crystal field stabilization energy for a $^4d$ low spin complex in a tetrahedral field.

8. Use the EAN rule to predict the oxidation state of the metal in the following complex:
   $[\text{FeCl}_2\text{CN}_4]\text{Cl}_3$

9. Define the terms: paramagnetic and diamagnetic.

10. Describe what a hard and soft substance is (as in Pearson’s principle).

Ten Point Questions

1. Describe the bonding information which can be derived from $\nu_{\text{CO}}$ in the IR spectra of metal carbonyl complexes.

2. Using the supplied Tanabe-Sugano diagram, identify the spin-allowed transitions.

3. Determine the term symbols for the $^3\text{P}$ spin set (i.e. 2 electrons in the P subshell). Hint there are twenty microstates.

4. Describe the amphoteric behavior of the nonaqueous solvent: ammonia.

5. Draw and label the molecular orbital diagram for a complex of tetrahedral symmetry.