Review Questions -- Chapter 25

1. For each of the following metal complexes, give the ***oxidation state*** of the metal and the ***complete, systematic name*** of the compound or ion.

   (a) $[Fe(CN)_3(NH_3)_3]^-$ (b) $[Cr(en)_2Br_2]_2SO_4$

2. Draw ***clear, 3-dimensional structures*** of all of the isomers, geometric and/or optical, of the following complex. Points will be deducted if the same structure is drawn more than once.

   $Co(en)_2(CN)Br$

3. When an excess of ammonia (NH_3) is added to aqueous solutions of each of the following metal ions, complexes having various coordination numbers and/or structures are produced. Write the ***formula*** for each metal-NH_3 complex and clearly draw it's ***3-dimensional structure***.

   (a) Ag^+ (b) Zn^{2+} (c) Ni^{2+} (d) Co^{3+}

4. For each of the following complexes, **A** and **B**, sketch a ***properly-labeled d-orbital splitting diagram***. Then answer the questions below in a manner consistent with your diagrams.

   A: $[Mn(H_2O)_6]^{2+}$ **B**: $[Mn(NO_2)_6]^{4-}$

   (a) How many unpaired electrons does complex **A** have?

   (b) Which complex, **A** or **B**, will absorb light of longer wavelength?