CHM 1046
Professor Fowler
Chapter 17 Homework

1. Review Example 17.01 and page 1 of the chapter 17 notes. Define solubility product. Write the balanced reaction and K_{SP} (solubility product) expression for dissolving $AgI_{(s)}$. (1 pt)

2. Review Examples 17.02, 17.03, and 15.3. Review page 1 of the chapter 17 notes also. Define molar solubility. If $K_{SP} = 8.3 \times 10^{-17}$ for AgI, use an equilibrium table to determine $[Ag^{+1}{}_{(aq)}]$ and $[I^{-1}{}_{(aq)}]$ in a solution that is saturated with AgI only. Then, determine the molar solubility in g/L as well, where the molar mass is 234.8 g/mol. (2 pts)

3. Review Example 17.05 and Common Ion Effect on page 1 of the chapter 17 notes. Describe the common ion effect in terms of LeChatelier's principle and molar solubility. Include how the solubility reaction's equilibrium will shift when a product ion is added. Use an equilibrium table to determine $[Ag^{+1}{}_{(aq)}]$ for a solution that is not only saturated with $AgI_{(s)}$, but also has a common ion effect from dissolved NaI so that $[I^{-1}{}_{(aq)}] = 0.10$ M. Then, determine the molar solubility in g/L. (2 pts)

4. Review Complex Ion Equilibria in the chapter 17 notes. Review section 15.2 also. Describe the formation of a complex ion in terms of Lewis acids and bases. That is, describe the reaction's e^{-1} pair transfer. Then, write the balanced reaction and K_F (formation constant) expression for the formation of $Ag(CN)_2^{-1}{}_{(aq)}$. Also, write the balanced dissociation reaction and its K_D (dissociation constant) expression. Include all phase subscripts, charges, and coefficients (exponents) in both of your reactions and both of your expressions. Refer to Table 2.5 if necessary to identify the ligand. (2.5 pts)

5. Review Examples 17.09 and 17.10. If $K_F = 5.6 \times 10^{18}$ for $Ag(CN)_2^{-1}{}_{(aq)}$, determine the value of K_D. Write the equilibrium table for the dissociation reaction with a 1.25 M $Ag(CN)_2^{-1}{}_{(aq)}$ solution. Put the table results into the Kd expression, then determine $[Ag^{+1}{}_{(aq)}]$ and $[CN^{-1}{}_{(aq)}]$. (1.5 pts)

6. Add the reaction for dissolving $AgI_{(s)}$ (in #2) and the reaction which forms the $Ag(CN)_2{}^{-1}{}_{(aq)}$ complex ion (in #4) together to get the following sum:

$$AgI_{(s)} + 2CN^{-1}{}_{(aq)} \rightleftharpoons Ag(CN)_2{}^{-1}{}_{(aq)} + I^{-1}{}_{(aq)}$$

Review Example 17.11. Show how the K_{SP} and K_F **expressions** for the two reactions (in #1 and #4) can be multiplied together to obtain the K_C **expression** for the sum reaction. Then, show how the K_{SP} and K_F **values** (in #2 and #5) can be multiplied together to determine the **value** of K_C. (1 pt)