Due: Thursday, 20-March-2008 by the beginning of class. Sorry for the very short time, but I want to be able to go over this as review for Exam II. Please remember this is to be your own work.

1) The osmotic pressure of a saturated solution of strontium sulfate at 25°C is 21 mm Hg. What is the $K_{sp}$ of this salt at this temperature?

2) Hydrazine, $N_2H_4$, is a base that ionizes in water to give $N_2H_5^+$ and $OH^-$. ($K_b = 1.7 \times 10^{-6}$). You add lead(II) nitrate to a hydrazine solution. What is the [Pb$^{2+}$] when Pb(OH)$_2$ just begins to precipitate from 0.20 M $N_2H_4$. $K_{sp}$ for Pb(OH)$_2$ is $1.2 \times 10^{-15}$.

3) A solution contains 0.10 M Pb(NO$_3$)$_2$ and 0.020 M Fe(NO$_3$)$_2$. Between what pH values will only one of these precipitate in a solution saturated with H$_2$S (0.10 M)? Note that I want both the pH value(s) and the ion. $K_{sp}$ values can be found in your textbook.

4) What is the solubility of magnesium fluoride in a buffer solution containing 0.45 M HC$_2$H$_3$O$_2$ (acetic acid) and 0.20 M NaC$_2$H$_3$O$_2$? The $K_{sp}$ for magnesium fluoride is $6.5 \times 10^{-9}$. (Hint: Consider the equation $MgF_2(s) + 2H^+(aq) \leftrightarrow Mg^{2+}(aq) + 2HF(aq)$ and solve the equilibrium problem.)

5) Your friend, who is also studying chemistry, tells you: “The constant, $K_{sp}$, of a salt is called the solubility product constant and is calculated from the concentrations of the ions in the solution. Thus, if salt A dissolves to a greater extent than salt B, salt A must have a higher $K_{sp}$ value than salt B.” Do you agree with your friend? Explain your answer.