Due: Friday, 23-March-2007 by the beginning of class. Please remember this is to be your own work.

1) What is the solubility of silver oxide, Ag$_2$O, in a solution buffered at pH=11.25. The equilibrium is: Ag$_2$O(s) + H$_2$O(l) → 2Ag$^+$ (aq) + 2 OH$^-$ (aq); the K_c = 2.0 x 10$^{-8}$.

2) Hydrazine, N$_2$H$_4$, is a base that ionizes to give N$_2$H$_5^+$ and OH$. (K_b = 1.7 x 10^{-6}). You add magnesium sulfate to a hydrazine solution. What is the [Mg$^{2+}$] when Mg(OH)$_2$ just begins to precipitate from 0.20 M N$_2$H$_4$. K_sp for Mg(OH)$_2$ is 1.8 x 10$^{-11}$.

3) A solution contains 0.10 M ZnCl$_2$ and 0.020 M MnCl$_2$. 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 x 10$^{-9}$. (Hint: Consider the equation MgF$_2$(s) + 2H$^+$ (aq) ⇌ 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.