A.P. CHEM ASSIGNMENT SHEET #7 CHEMICAL EQUILIBRIUM ☺ ⇔ ☹

First, eyeball chapter 14 from Chang. In a nutshell, this chapter is:

- ✓ equilibrium expressions
- ✓ problem-solving with K_c, K_p, & Q
- ✓ Le Chatelier's Principle

Next, read the "Chemistry in Action" on pages 630.

♠♥♦♣ Continue memorizing the polyatomic ions (p.60) and the solubility rules (p.123).

From Chang pages 633-641, answer the following (forgive the large number of and any repetition of Qs):

8, 9, 10, 11, 13-32 (K_c and K_p), 33-36 (kinetics and equilibrium), 37, 39-48 (working with K_{eq}), 50-62 (Le Chatelier), 64, 66, 67, 68, 70, 71, 81 (fowl), 92, 98, 103, 106 (just chillin'), 107, 113

From the APQ packet, answer questions **7 bcd**, **14**, **34**, **44 cd**, and **53**.

And here are two more AP questions for your listening enjoyment . . . .

#701

Sulfuryl chloride (SO_2Cl_2) is a highly reactive gaseous compound. When heated, it decomposes as follows:

$$SO_2Cl_{2(g)} \Leftrightarrow SO_{2(g)} + Cl_{2(g)}$$

This decomposition is endothermic. A sample of 3.509 grams of SO_2Cl_2 is placed in an evacuated 1.00 liter bulb and the temperature is raised to 375 K.

a.) What would be the pressure, in atmospheres, in the bulb if no decomposition of the gaseous SO_2Cl_2 occurred?

b.) When the system has come to equilibrium, the total pressure in the bulb is found to be 1.43 atmospheres. Calculate the partial pressures of each of the gaseous species at 375 K.

c.) Give the expression for the equilibrium constant (either K_p or K_c) for the decomposition of gaseous SO_2Cl_2 at 375 K. Calculate the value of the equilibrium constant you have given.

d.) If the temperature were raised to 500 K, what effect would this have on the equilibrium constant? Explain briefly.

#702

Ammonium hydrogen sulfide is a crystalline solid that decomposes as follows: $NH_4HS_{(s)} \Leftrightarrow NH_{3(g)} + H_2S_{(g)}$

a.) Some solid NH_4HS is placed in an evacuated vessel at 25 °C. After equilibrium is attained, the total pressure inside the vessel is found to be 0.659 atmosphere. Some solid NH_4HS remains in the vessel at equilibrium. For this decomposition, write the expression for K_p and calculate its numerical value at 25 °C.

b.) Some extra ammonia (NH_3) gas is injected into the vessel containing the sample described in part (a). When equilibrium is reestablished at 25 °C, the partial pressure of NH_3 in the vessel is twice the partial pressure of H_2S. Calculate the numerical values of the partial pressures of NH_3 and H_2S in the vessel after the NH_3 has been added and equilibrium has been reestablished.

c.) In a different experiment, NH_3 gas and H_2S gas are introduced into an empty 1.00 liter vessel at 25 °C. The initial partial pressure of each gas is 0.500 atmosphere. Calculate the number of moles of solid NH_4HS that is present when equilibrium is established.