CHM 152/154 Name:

Diebolt Spring '05 Class time:

Quiz 2. Take Home. Due Feb 23.
No quizzes accepted after 5:00 p.m. on Feb 23.
Attach work and circle your answers!

1. A mixture of 1.79 g O_2 and 0.840 g N_2O is placed in a 5.00 L container at 50 °C. After equilibrium is established, there is 0.989 g of NO_2. (a) What are the equilibrium concentrations of O_2, N_2O and NO_2? (b) Calculate K_c for this reaction. (c) Calculate K_p at 50 °C. (8 pts)

   $2N_2O(g) + 3O_2(g) \rightleftharpoons 4NO_2(g)$

2. The gas arsine, AsH_3, decomposes by the following reaction:

   $2AsH_3(g) \rightleftharpoons 2As(s) + 3H_2(g)$

   In an experiment at a certain temperature, AsH_3 gas is placed in a flask at a pressure of 0.465 atm. After equilibrium has been established, the total pressure of the gases (for AsH_3 and H_2 taken together) is 0.579 atm. (a) What is the partial pressure of each gas at equilibrium? (b) Calculate the value of K_p for this reaction. (5 pts)

3. Given the equations

   $6CH_4(g) \rightleftharpoons 3C_2H_6(g) + 3H_2(g)$ $\quad K_c = 8.6\times10^{-37}$

   $CH_4(g) + H_2O(g) \rightleftharpoons CH_3OH(g) + H_2(g)$ $\quad K_c = 2.8\times10^{-21}$

   Calculate the value of K_c for: $2CH_3OH(g) + H_2(g) \rightleftharpoons C_2H_6(g) + 2H_2O(g)$
   Make sure to show your work! (4 pt)

4. A mixture of 0.500 atm H_2 and 0.500 atm CO_2 is placed in a container and undergoes the following reaction:

   $H_2(g) + CO_2(g) \rightleftharpoons CO(g) + H_2O(g)$ $\quad K_p = 0.771$

   Calculate the equilibrium partial pressures of each of the four gases. (5 pts)

5. The value of K_c for the following reaction is 3.17 at 300 K.

   $XeF_2(g) + F_2(g) \rightleftharpoons XeF_4(g)$

   Suppose 0.525 moles of XeF_2 and 1.12 moles of F_2 are placed in a 2.50 L vessel. What are the equilibrium concentrations of XeF_2, F_2, and XeF_4? (8 pts)