Equilibrium 6 • CHEM 220

1. Consider the gas phase decomposition reaction of hydrogen sulfite at high temperature. Initially, 6.00 mol of hydrogen sulfite is present in a 15.0 L container, with no sulfur dioxide or water vapor present. If K_C at the temperature is 4.60×10^{-6} determine the equilibrium concentrations of all species.

$$H_2SO_{3(g)} \Leftrightarrow SO_{2(g)} + H_2O_{(g)}$$

2. At 500 K, an equilibrium mixture for the reaction below is found to contain: P_{NO}= 1.50 atm, P_{O2}= 2.50 atm, and P_{N2} = 4.00 atm. The equilibrium is disturbed by quickly injecting enough O_2 gas to increase the O_2 pressure by an additional 1.50 atm. What will be the new partial pressures once equilibrium is reestablished?

$$2\ NO_{(g)} \Leftrightarrow N_{2(g)} + O_{2(g)}$$

3. Consider the reaction below. If the initial P_{N2} = 4.0 atm and the initial P_{O2} = 5.5 atm with no product present and the final P_{total} = 7.0 atm, calculate K_p.

$$2\ N_{2(g)} + 5\ O_{2(g)} \Leftrightarrow 2\ N_2O_{5(g)}$$

4. At 1000 K, the equilibrium constant for the reaction below is $K_C = 2.8 \times 10^4$. The initial concentration of each species is 3.0 M. What will be the equilibrium concentration of all species?

$$2\ CO_{2(g)} \Leftrightarrow 2\ CO_{(g)} + O_{2(g)}$$