Equilibrium 4 • CHEM 220

1. Consider the following reaction at equilibrium:

$$2\ N_{2(g)} + 5\ O_{2(g)} \Leftrightarrow 2\ N_2O_{5(g)} \qquad \Delta H = +\ 450\ kJ$$

   A) If additional N_2O_5 were added to the system, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

   B) If helium gas were added to the system, doubling the total pressure in the system, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

   C) If the volume of the system were cut in half, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

   D) If O_2 were removed from the system by a reaction with another material, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

   E) If additional N_2 were added to the system, would K_{eq} INCREASE, DECREASE, or remain UNCHANGED?

   F) If the temperature of the system were ***increased***, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

   G) If the temperature of the system were ***decreased***, would K_{eq} INCREASE, DECREASE, or remain UNCHANGED?

2. A. A mixture of 0.200 mol NO and 0.200 mol CO_2 is placed in a 1.00 L flask and allowed to reach equilibrium at a given temperature. Analysis of the equilibrium mixture indicates that 0.067 mol of CO is present. Calculate K_c for the reaction.

$$NO(g) + CO_2(g) \rightleftharpoons NO_2(g) + CO(g)$$

   B. For the reaction above (after it has reached equilibrium), 0.10 moles of CO was injected into the reaction flask. What will be the concentrations of all reactants and products when a new equilibrium is established?