Equilibrium Review Sheet

1) Define the following terms:

- equilibrium:

- equilibrium constant:

- Le Chatlier's principle:

- reversible:

2) If a forward reaction converts 90% of reactants into product in one minute and the reverse reaction converts only 10% of products into reactants in one minute, explain how this process can ever achieve equilibrium.

3) At equilibrium, how do the concentrations of the products and reactants change over time?

4) Write the equilibrium expressions for the following reactions and find the equilibrium constants for each reaction using the information given.

- ___ O_2 + ___ HNO_2 → ___ HNO_3 ; at equilibrium, the partial pressure of oxygen is 0.11 atm, the partial pressure of nitrous acid is 0.32 atm, and the partial pressure of nitric acid is 1.5 atm.

- ___ H_2SO_4 → ___ H_2O + ___ SO_3 ; at equilibrium, the partial pressure of sulfuric acid is 0.77 atm, the partial pressure of water is 0.045 atm, and the partial pressure of sulfur trioxide is 0.088 atm.

- ___ NH_3 + ___ Cl_2 → ___ NCl_3 + ___ H_2 ; at equilibrium, the partial pressure of ammonia is 1.01 atm, the partial pressure of chlorine is 1.28 atm, the partial pressure of nitrogen trichloride is 3.45 atm, and the partial pressure of hydrogen is 2.69 atm.

5) For the reaction: ___ $N_{2(g)}$ + ___ $Br_{2(g)}$ → ___ $NBr_{3(g)}$ ΔH = -231 kJ/mol

What would happen to the equilibrium if I:

- Decreased the temperature?

- Added additional bromine to the mixture?

- Increased the volume of the container?

- Added 1.0 mol of oxygen gas?