CHM 152 Group Work 2

1. Answer the following for the reaction of NO gas with chlorine gas to produce NOCl gas.
   a. Write out the balanced reaction, and the K_c and K_p expressions.

   b. Calculate K_p and K_c at 25.0°C given the pressure of NO gas is 1.56 atm, chlorine gas is 0.887 atm, and NOCl gas is 3.45 atm.

2. Phosphorus pentachloride decomposes into phosphorus trichloride and chlorine gas. What is the initial concentration of phosphorus pentachloride if at equilibrium the concentration of chlorine gas is 0.500M? Given: $K_c = 10.00$ *(Hint: ICE table)*

3. Once a system has reached equilibrium, are the following true or false?
   a. The reaction is finished, no more products are forming. _____
   b. The concentrations of the reactants and the products are equal. _____
   c. The concentrations are no longer changing. _____
   d. The reaction is not over, but will continue forever if isolated. _____
   e. The speed at which products are made equals the speed at which reactants form. ____

4. Consider this endothermic reaction: $3\ O_2(g) \leftrightarrows 2\ O_3(g)$. To shift this reaction to the reactants:
   a. You could _____ the pressure. (increase or decrease)
   b. You could _____ the volume. (increase or decrease)
   c. You could _____ oxygen gas. (add or remove)
   d. You could _____ the temperature. (increase or decrease)

5. Calculate the equilibrium constant K_c for this unbalanced reaction:
   $2\ SO_3\ (g) \leftrightarrows 2\ SO_2\ (g) + O_2\ (g)$
   Given: $[SO_3] = 0.0255M$, $[SO_2] = 1.08M$, and $[O_2] = 1.45M$ at equilibrium.

6. Write the equilibrium expression K_c for the reaction between potassium phosphate and calcium nitrate in water. Show the balanced reaction.

7. A 1.000 L flask is initially filled with 1.000 mole of hydrogen gas and 2.000 moles of iodine gas at 448^{o}C. At this temperature K_c is 50.5. Calculate the equilibrium concentrations for all the chemical species in the reaction, which is hydrogen gas and iodine gas produce HI gas.