Chemistry I-H
Gaseous Equilibrium Calculations

For exercises 1-5, write equilibrium constant expressions for the following systems in equilibrium:

1. $2N_2H_4\ (g) + 2NO_2\ (g) \leftrightarrows 3N_2\ (g) + 4\ H_2O\ (g)$

2. $I_2\ (g) \leftrightarrows 2I\ (g)$

3. $C_6H_6\ (l) \leftrightarrows C_6H_6\ (g)$

4. $Fe_3O_4\ (s) + 4H_2\ (g) \leftrightarrows 3Fe\ (s) + 4H_2O\ (g)$

5. $2NbCl_4\ (g) \leftrightarrows NbCl_3\ (g) + NbCl_5\ (g)$

6. Consider the following reaction: $2SO_3\ (g) \leftrightarrows 2SO_2\ (g) + O_2$
   If $[SO_3] = 0.0160$ M, $[SO_2] = 0.00560$M, and $[O_2] = 0.00210$M, what is the K_C for this equilibrium?

7. When solid ammonium chloride is put in a reaction vessel at 323K, the equilibrium concentrations of both ammonia and hydrogen chloride are found to be 0.0660 M. Calculate K_C. $NH_4Cl(s) \leftrightarrows NH_3(g) + HCl(g)$

8. For the following reaction, the K_C is 1.60 at 933K. $H_2(g) + CO_2(g) \leftrightarrows H_2O(g) + CO(g)$
   Calculate the equilibrium concentration of hydrogen, $[H_2]$, when $[CO_2] = 0.320$M, $[H_2O] = 0.240$M, and $[CO] = 0.280$M.