Chem12 Equilib Calculations : Quiz-100

1) At equilibrium, $[N_2]$ = 0.65 mol/L and $[H_2]$ = 0.85 mol/L. What is the equilibrium $[NH_3]$ for the following reaction if K_{eq} = 0.017 ?

$$N_2(g) + 3H_2(g) <-> 2NH_3(g)$$

2) Consider the following reaction :

$$2NO(g) + Br_2(g) <-> 2NOBr(g)$$

When 0.30 mol of NO and 0.30 mol of Br_2 are placed in a 1.0 L container, it is found that the equilibrium [NOBr] = 0.20 M. Calculate the value of K_{eq}.

3) Consider the following reaction :

$$N_2(g) + 2O_2(g) <-> 2NO(g)$$

The equilibrium concentrations are $[N_2]$ = 8.0 M, $[O_2]$ = 2.0 M, [NO] = 4.0 M. Find the equilibrium constant.

4) The equilibrium constant for the reaction :

$$2HCl(g) <-> H_2(g) + Cl_2(g)$$

is 0.020. If 2.0 mol of HCl are placed in a 1.0 L vessel, what will be the equilibrium concentrations of the three gases ?

5) Gas X_2 reacts with gas Y_2 according to the equation :

$$X_2 + Y_2 <-> 2XY$$

0.50 mol each of X_2 and Y_2 are placed in a 1.0 L vessel and allowed to come to equilibrium at a given temperature. The equilibrium concentration of XY is found to be 0.025 mol/L. What is the equilibrium constant for this reaction ?

6) Given the reaction :

$$Fe^{2+}(aq) + Ag^{+}(aq) <-> Fe^{3+}(aq) + Ag(s)$$

The equilibrium constant is 3.0. If, at equilibrium, the concentration of Fe^{2+} is 0.20 M and the concentration of Ag^{+} is 0.30 M, find the concentration of Fe^{3+}.

7) Given the reaction :

$$2SO_2(g) + O_2(g) <-> 2SO_3(g)$$

The initial concentrations of all three gasses is 0.020 M. At equilibrium the concentration of SO_2 is found to be 0.0080 M. Find the equilibrium concentrations of O_2 and SO_3.

Answers : 1) 0.082 M, 2) 20., 3) 0.50, 4) 1.6, 0.22, 0.22, 5) 0.0026, 6) 0.18 M, 7) 0.014 M, 0.032 M.