ICE tables - Chemistry is cool!!

1. Initially 4.00 mol of $HCl_{(g)}$ and 4.00 mol of $O_{2\,(g)}$ were placed in a 1.00 L vessel and allowed to establish equilibrium. If the vessel contained 0.500 mol of $Cl_{2\,(g)}$ at equilibrium, what is the value of K_{eq}? ***(0.00794)***

$$2\,HCl_{(g)} + O_{2\,(g)} \rightleftharpoons H_2O_{2\,(g)} + Cl_{2\,(g)}$$

2. Consider the equilibrium:

$$2\,SO_{2\,(g)} + O_{2\,(g)} \rightleftharpoons 2\,SO_{3\,(g)}$$

An initial mixture composed of 0.040 mol of SO_2 and 0.0250 mol of O_2 were put in an empty 2.00 L reaction vessel. After equilibrium was reached, the concentration of SO_3 was 0.014 mol/L. What is the equilibrium constant K_{eq} for this system? ***(990)***

3. The equilibrium below occurs when nitrogen monoxide is placed in a closed container and decomposes.

$$2\ NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$$

When 0.250 mol of $NO_{(g)}$ is placed in a sealed 1.0 L container at a constant temperature, 40.0% of it decomposes. Calculate the equilibrium constant at this temperature. ***(0.111)***

4. 2.50 mol of $H_{2\,(g)}$ and 2.50 mol of $I_{2\,(g)}$ are placed in a 1.00 L container at 127 °C. When the equilibrium below is reached, 35.5 % of $I_{2\,(g)}$ has reacted. Calculate the value of the equilibrium constant at 127 °C. ***(1.21)***

$$H_{2\,(g)} + I_{2\,(g)} \rightleftharpoons 2\ HI_{(g)}$$

0.500 mol of $H_2O_2(g)$ are placed in a 2.00 L flask at a certain temperature and allowed to establish the equilibrium below. If there are 0.150 mol of $O_2(g)$ in the flask at equilibrium, what is K for the reaction?

$2\ H_2O_2(g)\ 2\ H_2O(g) + O_2(g)$