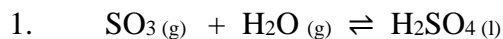
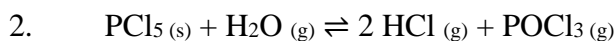


Chemistry 12 – Dynamic Equilibrium
Learning Goal B5
Equilibrium Calculations: Problem Set D

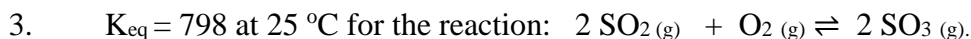


At equilibrium (25 °C): $[\text{SO}_3] = 0.400 \text{ M}$ $[\text{H}_2\text{O}] = 0.480 \text{ M}$ $[\text{H}_2\text{SO}_4] = 0.600 \text{ M}$
Calculate the value of the equilibrium constant, K_{eq} .



At equilibrium a 2.0L flask contains:
0.45 mol of PCl_5 0.26 mol of H_2O 1.35 mol of HCl 0.96 mol of POCl_3

Calculate the K_{eq} for the reaction.



In a particular mixture at equilibrium, $[\text{SO}_2] = 3.80 \text{ M}$ and $[\text{SO}_3] = 9.60 \text{ M}$. Calculate the equilibrium $[\text{O}_2]$ in this mixture at 25°C.

4. Consider the following equilibrium system, shown below.



0.800 moles of SO_2 and 0.800 moles of O_2 are present in a 2.00 L flask at equilibrium.

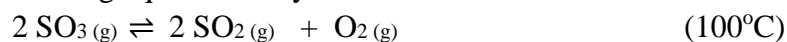
If the $K_{\text{eq}} = 680.0$, calculate the $[\text{SO}_3]$ at 100°C.

5. Consider the following equilibrium:



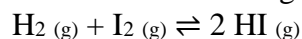
2.00 moles of NO_2 and 1.60 moles of N_2O_4 are present in a 4.00 L flask at equilibrium. Calculate the value of K_{eq} at 20°C .

6. Consider the following equilibrium system below:



4.00 moles of SO_2 and 5.00 moles of O_2 are present in a 2.00 L container at equilibrium. Calculate the equilibrium concentration of SO_3 and the number of moles SO_3 present if the value $K_{\text{eq}} = 1.47 \times 10^{-3}$ at 100°C .

7. If at equilibrium $[\text{H}_2] = 0.200\text{M}$ and $[\text{I}_2] = 0.200\text{M}$ and $K_{\text{eq}} = 55.6$ at 250°C , calculate the equilibrium concentration of HI for the following system:



8. 1.60 moles CO , 1.60 moles H_2O , 4.00 moles CO_2 , 4.00 moles H_2 are found in an 8.00 L container at 690°C at equilibrium for the following chemical system: $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}_2(\text{g}) + \text{H}_2(\text{g})$

Calculate the value of the equilibrium constant.