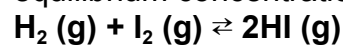


Name: _____

Equilibrium Calculations-ICE TABLES Solve each problem and show all of your work.

1. If the initial $[H_2] = 0.200\text{ M}$, $[I_2] = 0.200\text{ M}$ and $K_{eq} = 55.6$ at 250°C calculate the equilibrium concentrations of all molecules.



2. 1.60 moles CO and 1.60 moles H_2O are placed in a 2.00 L container at 690°C ($K_{eq} = 10.0$). $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$
Calculate all equilibrium concentrations.

3. $\text{SO}_{3(g)} + \text{NO}_{(g)} \rightleftharpoons \text{NO}_{2(g)} + \text{SO}_{2(g)}$
 $K_{\text{eq}} = 0.800$ at 100°C . If 4.00 moles of each reactant are placed in a 2.00L container, calculate all equilibrium concentrations at 100°C .

4. Consider the following equilibrium system: $2\text{NO}_{2(g)} \rightleftharpoons \text{N}_2\text{O}_4$
Two sets of equilibrium data are listed for the same temperature.

Container 1	2.00 L	0.12 moles NO_2	0.16 moles N_2O_4
Container 2	5.00 L	0.26 moles NO_2	? moles N_2O_4

Determine the number of moles N_2O_4 in the second container. Get a K_{eq} from the first container and use it for the second container.

5. Consider the following equilibrium: $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$
When a 0.600 moles of SO_2 and 0.600 moles of O_2 are placed into a 2.00 litre container and allowed to reach equilibrium, the equilibrium $[\text{SO}_3]$ is to be 0.250 M. Calculate the K_{eq} value.

6. $\text{H}_{2(\text{g})} + \text{S}_{(\text{s})} \rightleftharpoons \text{H}_2\text{S}_{(\text{g})} \quad K_{\text{eq}} = 14$
0.60 moles of H_2 and 1.4 moles of S are placed into a 2.0L flask and allowed to reach equilibrium. Calculate the $[\text{H}_2]$ at equilibrium.

7. $K_{eq} = 0.0183$ for the reaction: $2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)}$
If 3.0 moles of HI are placed in a 5.00L vessel and allowed to reach equilibrium, what is the equilibrium concentration of H_2 ?

8. Consider the equilibrium: $I_{2(g)} + Cl_{2(g)} \rightleftharpoons 2ICl_{(g)}$ $K_{eq} = 10.0$

The same number of moles of I_2 and Cl_2 are placed in a 1.0L flask and allowed to reach equilibrium. If the equilibrium concentration of ICl is 0.040 M, calculate the initial number of moles of I_2 and Cl_2 .

9. Consider the equilibrium: $2\text{ICl}_{(g)} \rightleftharpoons \text{I}_{2(g)} + \text{Cl}_{2(g)}$ $K_{eq} = 10.0$
If x moles of ICl were placed in a 5.0 L container at 10 °C and if an equilibrium concentration of I_2 was found to be 0.60 M, calculate the number of moles ICl initially present.

10. A student places 2.00 moles SO_3 in a 1.00 L flask. At equilibrium $[\text{O}_2] = 0.10 \text{ M}$ at 130 °C. Calculate the K_{eq} . $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)}$