

CHEMISTRY I (HONORS)
K PRACTICE #1

1. Consider the following reaction at 100°C.



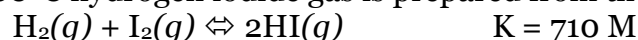
If the equilibrium concentrations of N_2O_4 and NO_2 are 0.0400 M and 0.120 M, respectively, what is the value of K ?

2. In the reaction:



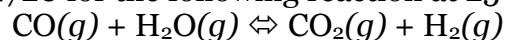
The value of K is 1.80×10^{-5} M at 25°C. What are the equilibrium concentrations of all species if the initial concentration of ammonia is 0.0238 M?

3. At 1000°C hydrogen iodide gas is prepared from the following reaction:



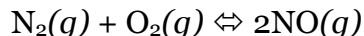
What is the equilibrium concentration of HI if the initial H_2 and I_2 are 0.0890 M and 0.247 M, respectively?

4. K is 0.720 for the following reaction at 25°C:



What are the equilibrium concentrations of all four species if the initial concentrations of CO and H_2O are 0.500 M and 1.15 M, respectively?

5. The value of K for the following reaction at 2027°C is 1.70×10^6 :



What are the equilibrium concentrations of all three species if 10.0 g of each reactant are initially present in a 500-mL container?

Answers

1. 0.360 M

2. $[\text{NH}_3]_{\text{eq}} = 0.0231 \text{ M}$
 $[\text{NH}_4^{1+}]_{\text{eq}} = 6.55 \times 10^{-4} \text{ M}$
 $[\text{OH}^{1-}]_{\text{eq}} = 6.55 \times 10^{-4} \text{ M}$

3. $[\text{HI}]_{\text{eq}} = 0.177 \text{ M}$

4. $[\text{CO}]_{\text{eq}} = 0.177 \text{ M}$
 $[\text{H}_2\text{O}]_{\text{eq}} = 0.827 \text{ M}$
 $[\text{CO}_2]_{\text{eq}} = 0.323 \text{ M}$
 $[\text{H}_2]_{\text{eq}} = 0.323 \text{ M}$

5. $[\text{N}_2]_{\text{eq}} = 0.089 \text{ M}$
 $[\text{O}_2]_{\text{eq}} = 1.03 \times 10^{-5} \text{ M}$
 $[\text{NO}]_{\text{eq}} = 1.25 \text{ M}$

CHEMISTRY I (H)
K PRACTICE #2

1. 5.00 g of both $\text{N}_2(g)$ and $\text{O}_2(g)$ are placed in an empty 2.00-L flask at 0°C . K for the reaction is 4.10×10^{-4} . What are the equilibrium concentrations of the N_2 , O_2 , and NO gases?
2. K for the following reaction is 100: $\text{H}_2(g) + \text{F}_2(g) \rightleftharpoons 2\text{HF}(g)$. In an experiment, 2.0 mol of each reactant are introduced to an empty 1.0-L flask. What are the equilibrium concentrations of all three species?
3. 10.0 g of $\text{ClF}(g)$ are placed in an empty 500-mL flask. K for the reaction is 0.0690. What are the equilibrium concentrations of $\text{ClF}(g)$, $\text{Cl}_2(g)$, and $\text{F}_2(g)$?
4. Calculate the equilibrium concentrations of all species for the following reaction provided that the initial concentration of the reactant is 0.250 M and the K is 230 M: $\text{PCl}_5(g) \rightleftharpoons \text{PCl}_3(g) + \text{Cl}_2(g)$.
5. 0.125 mol of oxygen gas is added to carbon in a 250-mL flask. K for the following reaction is 0.086 M: $\text{C}(s) + \text{O}_2(g) \rightleftharpoons 2\text{CO}(g)$. What is the equilibrium concentration of $\text{CO}(g)$?

Answers

1. $[\text{N}_2]_{\text{eq}} = 0.0883 \text{ M}$
 $[\text{O}_2]_{\text{eq}} = 0.0773 \text{ M}$
 $[\text{NO}]_{\text{eq}} = 0.00169 \text{ M}$
2. $[\text{H}_2]_{\text{eq}} = 0.333 \text{ M}$
 $[\text{F}_2]_{\text{eq}} = 0.333 \text{ M}$
 $[\text{HF}]_{\text{eq}} = 3.33 \text{ M}$
3. $[\text{ClF}]_{\text{eq}} = 0.240 \text{ M}$
 $[\text{Cl}_2]_{\text{eq}} = 0.0635 \text{ M}$
 $[\text{F}_2]_{\text{eq}} = 0.0635 \text{ M}$
4. $[\text{PCl}_5]_{\text{eq}} = 2.72 \times 10^{-4} \text{ M}$
 $[\text{PCl}_3]_{\text{eq}} = 0.250 \text{ M}$
 $[\text{Cl}_2]_{\text{eq}} = 0.250 \text{ M}$
5. $[\text{CO}]_{\text{eq}} = 0.187 \text{ M}$