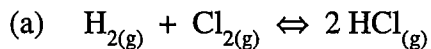


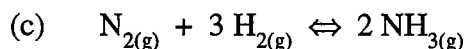
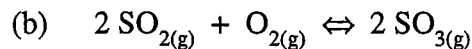
Chemistry 12

Worksheet for K_{eq} calculations

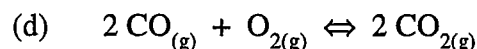
1. Write the expression for the equilibrium constant for each of the following reactions.



$$K_{eq} =$$



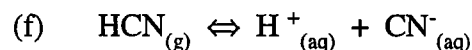
$$K_{eq} =$$



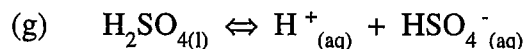
$$K_{eq} =$$



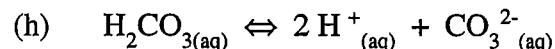
$$K_{eq} =$$



$$K_{eq} =$$



$$K_{eq} =$$



$$K_{eq} =$$

2. From selected equilibrium constant expressions above, calculate the value of the equilibrium constant (K_{eq}).

(a) from 1(a) above: equilibrium $[\text{H}_2] = [\text{Cl}_2] = [\text{HCl}] = 1.0 \times 10^{-2} \text{ M}$

(b) from 1(b) above: equilibrium

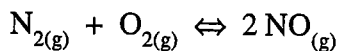
| | |
|-----------------|----------------------------------|
| $[\text{SO}_2]$ | $= 1.0 \times 10^{-3} \text{ M}$ |
| $[\text{O}_2]$ | $= 2.0 \times 10^{-3} \text{ M}$ |
| $[\text{SO}_3]$ | $= 3.0 \times 10^{-3} \text{ M}$ |

(c) from 1(c) above: equilibrium

$$\begin{aligned}
 [\text{N}_2] &= 4.4 \times 10^{-2} \text{ M} \\
 [\text{H}_2] &= 1.2 \times 10^{-1} \text{ M} \\
 [\text{NH}_3] &= 3.4 \times 10^{-3} \text{ M}
 \end{aligned}$$

3. From 1(a) above, assume the equilibrium constant to be 55.0. During an experiment, the equilibrium $[\text{H}_2] = 4.8 \times 10^{-3} \text{ M}$ and $[\text{Cl}_2] = 2.1 \times 10^{-3} \text{ M}$. What is the equilibrium $[\text{HCl}]$?

4. Under a given set of experimental conditions, the reaction;



has a $K_{eq} = 6.2 \times 10^{-4}$. If the equilibrium $[\text{N}_2] = [\text{O}_2] = 5.2 \text{ M}$, then what is the equilibrium $[\text{NO}]$?

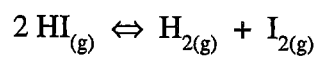
5. According to 1(b) above, if 0.600 mole of SO_2 and 0.600 mole of O_2 are placed into a 1.00 L container and allowed to establish equilibrium, the equilibrium $[\text{SO}_3] = 0.500 \text{ M}$. Calculate the value of K_{eq} .

Must use an ICE box to calculate the equilibrium values of SO_2 and O_2

| | 2SO_2 | + | O_2 | \rightleftharpoons | 2SO_3 |
|---|-----------------|---|--------------|----------------------|-----------------|
| I | | | | | |
| C | | | | | |
| E | | | | | |

$K_{eq} =$

6. Under a given set of experimental conditions, the reaction;



has a $K_{eq} = 2.4$. If the initial $[\text{HI}] = 0.200 \text{ M}$, then what are the equilibrium concentrations of all of the chemicals in the reaction?

| | 2 HI | \rightleftharpoons | H ₂ | + | I ₂ |
|---|------|----------------------|----------------|---|----------------|
| I | | | | | |
| C | | | | | |
| E | | | | | |

$K_{eq} =$