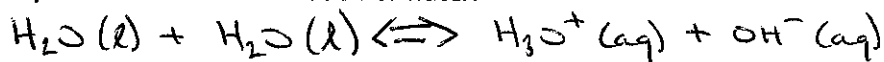


CHEMISTRY - CHAPTER 17
WORKSHEET #4 "K_w"

NAME Key PER

1. Write the equation for the self ionization of water.



2. What is the expression for K_w?

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-]$$

3. What is the value of K_w at 25° C?

$$1.0 \times 10^{-14}$$

4. What does [] mean?

Concentration

5. Solve for the unknown concentration:

a. [H ⁺] = 4.0 × 10 ⁻⁴ M	[OH ⁻] = ?	2.5 × 10 ⁻¹¹ M	Acid
b. [H ⁺] = 1.8 × 10 ⁻⁹ M	[OH ⁻] = ?	5.6 × 10 ⁻⁶ M	Base
c. [OH ⁻] = 3.5 × 10 ⁻⁴ M	[H ⁺] = ?	2.9 × 10 ⁻¹¹ M	Base
d. [OH ⁻] = 9.2 × 10 ⁻¹³ M	[H ⁺] = ?	1.1 × 10 ⁻² M	Acid
e. [OH ⁻] = 1.0 × 10 ⁻⁷ M	[H ⁺] = ?	1.0 × 10 ⁻⁷ M	Neutral

6. Classify each of #5 as acidic or basic:

- a. Calculate the [H⁺] and [OH⁻] of a 2.5 × 10⁻² M HBr solution.

$$[\text{H}^+] = 2.5 \times 10^{-2} \text{ M} \quad [\text{OH}^-] = 4.0 \times 10^{-13} \text{ M}$$

- b. Calculate the [H⁺] and [OH⁻] of a 6.3 × 10⁻⁴ M NaOH solution.

$$[\text{OH}^-] = 6.3 \times 10^{-4} \text{ M} \quad [\text{H}^+] = 1.6 \times 10^{-11} \text{ M}$$

- c. Calculate the [H⁺] and [OH⁻] of a 3.5 × 10⁻⁵ M HCl solution.

$$[\text{H}^+] = 3.5 \times 10^{-5} \text{ M} \quad [\text{OH}^-] = 2.9 \times 10^{-10} \text{ M}$$

- d. Calculate the [H⁺] and [OH⁻] of a 1.9 × 10⁻³ M Sr(OH)₂ solution.

$$[\text{OH}^-] = 2(1.9 \times 10^{-3}) = 3.8 \times 10^{-3} \text{ M} \quad [\text{H}^+] = 2.6 \times 10^{-12} \text{ M}$$