

## 14.1

## HYDROGEN IONS AND ACIDITY

## Section Overview

## Objectives

1. Identify conjugate acid-base pairs of ions, acids, or hydroxides and of aqueous concentrations.
2. Calculate hydroxide and hydronium ion concentrations and pH values and vice versa for weak acids and bases.
3. Calculate the pH of weak acid solutions.

## Vocabulary

- |                   |                                    |                   |
|-------------------|------------------------------------|-------------------|
| 1. autoionization | 2. conjugate acid-base pair        | 3. weak acid      |
| 4. hydronium      | 5. hydroxide ion ( $\text{OH}^-$ ) | 6. autoionization |
|                   | 7. weak base                       | 8. pH             |

## Key Equations

- |  |  |
|--|--|
| 1. $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$ | 2. $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$ |
| 3. $\text{pH} = -\log [\text{H}_3\text{O}^+]$  | 4. $\text{pH} = -\log [\text{H}_3\text{O}^+]$  |

## Part A: Completion

Use the appropriate number to identify the relationship of the conjugate acid-base pair indicated in the reaction. Also indicate which member of the pair is the stronger acid.

1.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong hydroxide base) / autoionization of  $\text{H}_2\text{O}$  / the autoionization of  $\text{H}_2\text{O}$  is preferred in  $\text{H}_2\text{O}$  solution.
2.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
3.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
4.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
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7.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
8.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
9.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)
10.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (strong acid)

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9.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$
10.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$

# 19 2 Hydrogen Ions And Acidity Worksheet Answers

**Agnes J. Quirk**



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