

## 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. $\text{H}_2\text{O} \rightleftharpoons \text{H}^+ + \text{OH}^-$ (14.1) | 2. $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$ (14.2) |
| 3. $\text{pH} = -\log[\text{H}^+]$ (14.3)                                  | 4. $\text{pOH} = -\log[\text{OH}^-]$ (14.4)   |

## Part A: Completion

Use the appropriate number to identify the relationship of the conjugate acid-base pair indicated in the second step of the reaction. Write the number in the space provided.

1.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2) (14.1) (14.3) (14.4)
2.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2) (14.1) (14.3) (14.4)
3.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2) (14.1) (14.3) (14.4)
4.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2) (14.1) (14.3) (14.4)
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6.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2) (14.1) (14.3) (14.4)
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1.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2)
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7.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2)
8.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2)
9.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2)
10.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$  (14.2)

# 19 2 Section Review Hydrogen Ions And Acidity

**Sebastian Brünink**



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## **Table of Contents 19 2 Section Review Hydrogen Ions And Acidity**

1. Understanding the eBook 19 2 Section Review Hydrogen Ions And Acidity
  - The Rise of Digital Reading 19 2 Section Review Hydrogen Ions And Acidity
  - Advantages of eBooks Over Traditional Books
2. Identifying 19 2 Section Review Hydrogen Ions And Acidity
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an 19 2 Section Review Hydrogen Ions And Acidity
  - User-Friendly Interface
4. Exploring eBook Recommendations from 19 2 Section Review Hydrogen Ions And Acidity
  - Personalized Recommendations
  - 19 2 Section Review Hydrogen Ions And Acidity User Reviews and Ratings
  - 19 2 Section Review Hydrogen Ions And Acidity and Bestseller Lists
5. Accessing 19 2 Section Review Hydrogen Ions And Acidity Free and Paid eBooks
  - 19 2 Section Review Hydrogen Ions And Acidity Public Domain eBooks
  - 19 2 Section Review Hydrogen Ions And Acidity eBook Subscription Services
  - 19 2 Section Review Hydrogen Ions And Acidity Budget-Friendly Options
6. Navigating 19 2 Section Review Hydrogen Ions And Acidity eBook Formats
  - ePub, PDF, MOBI, and More
  - 19 2 Section Review Hydrogen Ions And Acidity Compatibility with Devices
  - 19 2 Section Review Hydrogen Ions And Acidity Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of 19 2 Section Review Hydrogen Ions And Acidity
  - Highlighting and Note-Taking 19 2 Section Review Hydrogen Ions And Acidity
  - Interactive Elements 19 2 Section Review Hydrogen Ions And Acidity

8. Staying Engaged with 19 2 Section Review Hydrogen Ions And Acidity
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers 19 2 Section Review Hydrogen Ions And Acidity
9. Balancing eBooks and Physical Books 19 2 Section Review Hydrogen Ions And Acidity
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection 19 2 Section Review Hydrogen Ions And Acidity
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine 19 2 Section Review Hydrogen Ions And Acidity
  - Setting Reading Goals 19 2 Section Review Hydrogen Ions And Acidity
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of 19 2 Section Review Hydrogen Ions And Acidity
  - Fact-Checking eBook Content of 19 2 Section Review Hydrogen Ions And Acidity
  - Distinguishing Credible Sources
13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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