Important Hydrolysis for Weak Acid and Weak Base Formulas PDF

Formulas
Examples
with Units

List of 13
Important Hydrolysis for Weak Acid and Weak Base Formulas

1) Acid Ionization Constant of Weak Acid Formula

Evaluate Formula

Formula

$$K_a = \frac{K_w}{K_h}$$

Example

$$2E\text{-}5 = \frac{1.0E\text{-}14}{5E\text{-}10}$$

2) Basic Ionization Constant of Weak Base Formula

Evaluate Formula

Formula

$$K_b = \frac{K_w}{K_h}$$

Example

$$2E\text{-}5 = \frac{1.0E\text{-}14}{5E\text{-}10}$$

3) Concentration of Hydronium ion in Salt of Weak Acid and Weak Base Formula

Evaluate Formula

Formula

$$C = \sqrt{K_w \cdot \frac{K_a}{K_b}}$$

Example with Units

$$1.1E\text{-}10\,\text{mol/L} = \sqrt{1.0E\text{-}14 \cdot \frac{2.0E\text{-}5}{1.77E\text{-}5}}$$

4) Constant of Hydrolysis given Ionic Product of Water and Acid Ionization Constant of Weak Acid Formula

Evaluate Formula

Formula

$$K_h = \frac{K_w}{K_a}$$

Example

$$5E\text{-}10 = \frac{1.0E\text{-}14}{2.0E\text{-}5}$$

5) Constant of Hydrolysis given Ionic Product of Water and Basic Ionization Constant of Weak Base Formula

Evaluate Formula

Formula

$$K_h = \frac{K_w}{K_b}$$

Example

$$5.6E\text{-}10 = \frac{1.0E\text{-}14}{1.77E\text{-}5}$$

6) Degree of Hydrolysis in Salt of Weak Acid and Weak Base Formula

Evaluate Formula

Formula

$$h = \sqrt{\frac{K_w}{C_{salt} \cdot K_a \cdot K_b}}$$

Example with Units

$$0.1267 = \sqrt{\frac{1.0E\text{-}14}{1.76E\text{-}6\,mol/L \cdot 2.0E\text{-}5 \cdot 1.77E\text{-}5}}$$

7) Hydrolysis Constant in Weak Acid and Weak Base Formula

Evaluate Formula

Formula

$$K_h = \frac{K_w}{K_a \cdot K_b}$$

Example

$$2.8E\text{-}5 = \frac{1.0E\text{-}14}{2.0E\text{-}5 \cdot 1.77E\text{-}5}$$

8) Ionic Product of Water given Constant of Hydrolysis and Acid Ionization Constant of Weak Acid Formula

Evaluate Formula

Formula

$$K_w = K_a \cdot K_h$$

Example

$$1E\text{-}14 = 2.0E\text{-}5 \cdot 5E\text{-}10$$

9) Ionic Product of Water given Constant of Hydrolysis and Basic Ionization Constant of Weak Base Formula

Evaluate Formula

Formula

$$K_w = K_b \cdot K_h$$

Example

$$8.9E\text{-}15 = 1.77E\text{-}5 \cdot 5E\text{-}10$$

10) pH of Salt of Weak Acid and Weak base Formula

Evaluate Formula

Formula

$$pH = \frac{pK_w + pk_a - pk_b}{2}$$

Example

$$6 = \frac{14 + 4 - 6}{2}$$

11) pKa of Salt of Weak Acid and Weak base Formula

Evaluate Formula

Formula

$$pk_a = 2 \cdot pH - 14 + pk_b$$

Example

$$4 = 2 \cdot 6 - 14 + 6$$

12) pKb of Salt of Weak Acid and Weak base Formula

Evaluate Formula

Formula

$$pk_b = -2 \cdot pH + 14 + pk_a$$

Example

$$6 = -2 \cdot 6 + 14 + 4$$

13) pOH of Salt of Weak Acid and Weak Base Formula

Evaluate Formula

Formula

$$pOH = 14 - \frac{pK_w + pk_a - pk_b}{2}$$

Example

$$8 = 14 - \frac{14 + 4 - 6}{2}$$

Variables used in list of Hydrolysis for Weak Acid and Weak Base Formulas above

- **C** Hydronium Ion Concentration *(Mole per Liter)*
- **C_{salt}** Concentration of Salt *(Mole per Liter)*
- **h** Degree of Hydrolysis
- **K_a** Constant of Ionization of Acids
- **K_b** Constant Of Ionization Of Bases
- **K_h** Constant Of Hydrolysis
- **K_w** Ionic Product of Water
- **pH** Negative Log of Hydronium Concentration
- **pk_a** Negative Log of Acid Ionization Constant
- **pk_b** Negative Log of Base Ionization Constant
- **pK_w** Negative Log of Ionic Product of Water
- **pOH** Negative Log of Hydroxyl Concentration

Constants, Functions, Measurements used in list of Hydrolysis for Weak Acid and Weak Base Formulas above

- Functions: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion

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