Important Cationic and Anionic Salt Hydrolysis Formulas PDF

Formulas
Examples
with Units

List of 13
Important Cationic and Anionic Salt Hydrolysis Formulas

1) Concentration of Hydronium Ion in Salt of Weak Acid and Strong Base Formula

Evaluate Formula

Formula

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

Example with Units

$$1.1E\text{-}11\,\text{mol/L} = \sqrt{\frac{1.0E\text{-}14 \cdot 2.0E\text{-}5}{1.76E\text{-}6\,\text{mol/L}}}$$

2) Concentration of Hydronium ion in Weak Base and Strong Acid Formula

Evaluate Formula

Formula

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

Example with Units

$$1E\text{-}9\,\text{mol/L} = \sqrt{\frac{1.0E\text{-}14 \cdot 1.76E\text{-}6\,\text{mol/L}}{1.77E\text{-}5}}$$

3) Conductance of NaCl at Infinite Dilution Formula

Evaluate Formula

Formula

$$\lambda_{NaCl} = \lambda_{Na} + \lambda_{Cl}$$

Example with Units

$$600\,S = 200\,S + 400\,S$$

4) Degree of Hydrolysis in Salt of Weak Acid and Strong Base Formula

Evaluate Formula

Formula

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

Example with Units

$$0.0005 = \sqrt{\frac{1.0E\text{-}14}{2.0E\text{-}5 \cdot 1.76E\text{-}6\,\text{mol/L}}}$$

5) Degree of Hydrolysis in Salt of Weak Base and Strong Base Formula

Evaluate Formula

Formula

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

Example with Units

$$0.0006 = \sqrt{\frac{1.0E\text{-}14}{1.77E\text{-}5 \cdot 1.76E\text{-}6\,\text{mol/L}}}$$

6) Hydrolysis Constant in Strong Acid and Weak Base Formula

Evaluate Formula

Formula

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

Example

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

7) Hydrolysis Constant in Weak Acid and Strong Base Formula

Evaluate Formula

Formula

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

Example

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

8) pH of Salt of Weak Acid and Strong Base Formula

Evaluate Formula

Formula

$$pH = \frac{pK_w + pk_a + \log10\left(C_{salt}\right)}{2}$$

Example with Units

$$6.1228 = \frac{14 + 4 + \log10\left(1.76E\text{-}6\,\text{mol/L}\right)}{2}$$

9) pH of Salt of Weak Base and Strong Base Formula

Evaluate Formula

Formula

$$pH = \frac{pK_w - pk_b - \log10\left(C_{salt}\right)}{2}$$

Example with Units

$$5.3772 = \frac{14 - 6 - \log10\left(1.76E\text{-}6\,\text{mol/L}\right)}{2}$$

10) pKa of Salt of Weak acid and Strong base Formula

Evaluate Formula

Formula

$$pk_a = 2 \cdot pH - 14 - \log10\left(C_{salt}\right)$$

Example with Units

$$0.7545 = 2 \cdot 6 - 14 - \log10\left(1.76E\text{-}6\,\text{mol/L}\right)$$

11) pKb of Salt of Strong Acid and Weak base Formula

Evaluate Formula

Formula

$$pk_b = 14 - \left(2 \cdot pH\right) - \log10\left(C_{salt}\right)$$

Example with Units

$$4.7545 = 14 - \left(2 \cdot 6\right) - \log10\left(1.76E\text{-}6\,\text{mol/L}\right)$$

12) pOH of Salt of Strong Base and Weak Acid Formula

Evaluate Formula

Formula

$$pOH = 14 - \frac{pk_a + pK_w + \log10\left(C_{salt}\right)}{2}$$

Example with Units

$$7.8772 = 14 - \frac{4 + 14 + \log10\left(1.76E\text{-}6\,\text{mol/L}\right)}{2}$$

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

Evaluate Formula

Formula

$$pOH = 14 - \frac{pK_w - pk_b - \log10\left(C_{salt}\right)}{2}$$

Example with Units

$$8.6228 = 14 - \frac{14 - 6 - \log10\left(1.76E\text{-}6\,mol/L\right)}{2}$$

Variables used in list of Cationic and Anionic Salt Hydrolysis 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
- λ_{Na} Conductance of Na Cation *(Siemens)*
- λ_{Cl} Conductance of Cl Anion *(Siemens)*
- λ_{NaCl} Conductance of NaCl at Infinite Dilution *(Siemens)*

Constants, Functions, Measurements used in list of Cationic and Anionic Salt Hydrolysis Formulas above

- Functions: **log10**, log10(Number)
  The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.
- 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: **Electric Conductance** in Siemens (S)
  Electric Conductance Unit Conversion
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion

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