Important Buffer Solution Formulas PDF

Formulas
Examples
with Units

List of 11
Important Buffer Solution Formulas

1) Buffer Capacity Formula

Evaluate Formula

Formula

$$\beta = \frac{n_{a/b}}{d_{pH}}$$

Example

$$2.5 = \frac{10}{4}$$

2) Concentration of Acid in Acidic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$C_{acid} = \frac{C_{salt}}{10^{pH - pK_a}}$$

Example with Units

$$15.8114\,\text{mol/L} = \frac{50\,\text{mol/L}}{10^{3 - 2.5}}$$

3) Concentration of Base in Basic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$C_{base} = \frac{C_{salt}}{10^{pOH - pK_b}}$$

Example with Units

$$25.0594\,\text{mol/L} = \frac{50\,\text{mol/L}}{10^{8 - 7.7}}$$

4) Concentration of Salt in Acidic Buffer using Henderson's equation Formula

Evaluate Formula

Formula

$$C_{salt} = C_{acid} \cdot \left(10^{pH - pK_a}\right)$$

Example with Units

$$47.4342\,\text{mol/L} = 15\,\text{mol/L} \cdot \left(10^{3 - 2.5}\right)$$

5) Concentration of Salt in Basic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$C_{salt} = C_{base} \cdot \left(10^{pOH - pK_b}\right)$$

Example with Units

$$49.8816\,\text{mol/L} = 25\,\text{mol/L} \cdot \left(10^{8 - 7.7}\right)$$

6) Maximum pH of Basic Buffer Formula

Evaluate Formula

Formula

$$pH = 14 - pK_b$$

Example

$$6.3 = 14 - 7.7$$

7) Maximum pOH of Acidic Buffer Formula

Evaluate Formula

Formula

$$pOH = 14 - pK_a$$

Example

$$11.5 = 14 - 2.5$$

8) pH of Acidic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$pH = pK_a + \log10\left(\frac{C_{salt}}{C_{acid}}\right)$$

Example with Units

$$3.0229 = 2.5 + \log10\left(\frac{50\,mol/L}{15\,mol/L}\right)$$

9) pKa of Acidic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$pK_a = pH - \log10\left(\frac{C_{salt}}{C_{acid}}\right)$$

Example with Units

$$2.4771 = 3 - \log10\left(\frac{50\,mol/L}{15\,mol/L}\right)$$

10) pKb of Basic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$pK_b = pOH - \log10\left(\frac{C_{salt}}{C_{base}}\right)$$

Example with Units

$$7.699 = 8 - \log10\left(\frac{50\,mol/L}{25\,mol/L}\right)$$

11) pOH of Basic Buffer using Henderson's Equation Formula

Evaluate Formula

Formula

$$pOH = pK_b + \log10\left(\frac{C_{salt}}{C_{base}}\right)$$

Example with Units

$$8.001 = 7.7 + \log10\left(\frac{50\,mol/L}{25\,mol/L}\right)$$

Variables used in list of Buffer Solution Formulas above

- C_{acid} Concentration of Acid *(Mole per Liter)*
- C_{base} Concentration of Base *(Mole per Liter)*
- C_{salt} Concentration of Salt *(Mole per Liter)*
- d_{pH} Change in pH
- $n_{a/b}$ Number of Moles of Acid or Base
- **pH** Negative Log of Hydronium Concentration
- pK_a Negative Log of Acid Ionization Constant
- pK_b Negative Log of Base Ionization Constant
- **pOH** Negative Log of Hydroxyl Concentration
- **β** Buffer Capacity

Constants, Functions, Measurements used in list of Buffer Solution 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.
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion

Download other Important Ionic equilibrium PDFs

- Important Acidity and pH Scale Formulas
- Important Buffer Solution Formulas
- Important Ostwald Dilution Law Formulas
- Important Relative Strength of Two Acids Formulas

Try our Unique Visual Calculators

- Percentage error
- LCM of three numbers
- Subtract fraction

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

7/8/2024 | 8:31:51 AM UTC