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Buffer Solution Formulas

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List of 11 Buffer Solution Formulas

Buffer Solution ⤤

1) Buffer Capacity ⤤

Open Calculator ⤤

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

ex $2.5 = \dfrac{10}{4}$

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

Open Calculator ⤤

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

ex $15.81139 \text{mol/L} = \dfrac{50 \text{mol/L}}{10^{3 - 2.5}}$

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

Open Calculator ⤤

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

ex $25.05936 \text{mol/L} = \dfrac{50 \text{mol/L}}{10^{8 - 7.7}}$

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

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

Open Calculator ⤤

ex $47.43416 mol/L = 15 mol/L \cdot \left(10^{3-2.5}\right)$

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

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

Open Calculator ⤤

ex $49.88156 mol/L = 25 mol/L \cdot \left(10^{8-7.7}\right)$

6) Maximum pH of Basic Buffer ⤤

fx $pH = 14 - pK_b$

Open Calculator ⤤

ex $6.3 = 14 - 7.7$

7) Maximum pOH of Acidic Buffer ⤤

fx $pOH = 14 - pK_a$

Open Calculator ⤤

ex $11.5 = 14 - 2.5$

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

fx $pH = pK_a + \log 10 \left(\dfrac{C_{salt}}{C_{acid}}\right)$

Open Calculator ⤤

ex $3.022879 = 2.5 + \log 10 \left(\dfrac{50 mol/L}{15 mol/L}\right)$

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

fx $$pK_a = pH - \log 10 \left(\frac{C_{salt}}{C_{acid}} \right)$$

ex $$2.477121 = 3 - \log 10 \left(\frac{50 mol/L}{15 mol/L} \right)$$

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

fx $$pK_b = pOH - \log 10 \left(\frac{C_{salt}}{C_{base}} \right)$$

ex $$7.69897 = 8 - \log 10 \left(\frac{50 mol/L}{25 mol/L} \right)$$

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

fx $$pOH = pK_b + \log 10 \left(\frac{C_{salt}}{C_{base}} \right)$$

ex $$8.00103 = 7.7 + \log 10 \left(\frac{50 mol/L}{25 mol/L} \right)$$

Variables Used

- 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

- Function: **log10**, log10(Number)
  Common logarithm function (base 10)
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion 🡵

Check other formula lists

- **Acidity and pH Scale Formulas** 🔗
- **Buffer Solution Formulas** 🔗
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