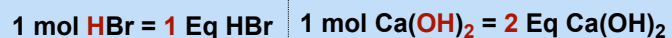


CONCEPT: ACID-BASE EQUIVALENTS

- *Equivalents* are used to measure the number of ___ ions or ___ ions in acids and bases, respectively.

□ **Equivalent (Eq) of Acid:** amount of acid that contributes ___ mole of ___ H⁺ ions.

□ **Equivalent (Eq) of Base:** amount of base that contributes ___ mole of ___ ions.



- To calculate number of equivalents of acid or base, we simply multiply ___ by number of ___ of acid or base.

□ **n** = moles of H⁺ or OH⁻ ions

□ *mEq* is a common unit used to express equivalents: **1 Eq = 1000 mEq**.

Acid Equivalent (Eq)

$$\text{Eq} = \text{___} \times \text{moles of acid}$$

Base Equivalent (Eq)

$$\text{Eq} = \text{___} \times \text{moles of base}$$

EXAMPLE: Calculate number of Equivalents in each of the following:

a) 1 mole of H₃PO₄

b) 2.7 g of RbOH

Equivalent Weight

- Represents the mass (grams) of ___ Acid or Base Equivalent.

Equivalent Weight

$$\text{Eq Weight} = \frac{\text{---}}{n}$$

EXAMPLE: Calculate the equivalent weight of H₂SO₄.

CONCEPT: ACID-BASE EQUIVALENTS

Normality

• Concentration of acid or base in aqueous solutions is represented by _____.

□ **Normality (N)**: represents number of _____ per L of solution.

- Recall: Molarity = mol/L

Normality (N)

$$\text{Normality} = \frac{\text{Equivalent}}{\text{L solution}}$$

OR

Normality (N)

$$\text{Normality} = n \times \underline{\hspace{2cm}}$$

EXAMPLE: Calculate Normality of each of the following solutions:

a) 4.6×10^{-2} M NaOH

b) 0.35 g of H_3PO_4 in 1 L

PRACTICE: Calculate mass (grams) needed for the following base equivalent: 0.18 mEq of $\text{Mg}(\text{OH})_2$.

PRACTICE: Identify the acid that possesses an equivalent weight of 63 grams.

a. $\text{H}_2\text{C}_2\text{O}_4$

b. HCl

c. HNO_3

d. H_2CO_3

PRACTICE: Determine volume (mL) needed to prepare a 0.73 g of $\text{Ca}(\text{OH})_2$ solution with 1.25 N.