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.

1 mol HBr = 1 Eq HBr	1 mol $Ca(OH)_2$ = 2 Eq $Ca(OH)_2$

- 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)

Eq = __ x moles of acid

Base Equivalent (Eq)

Eq = __ x moles of base

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

a) 1 mole of H_3PO_4

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 H_2SO_4.

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)

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

OR

Normality (N)

Normality = n x _____

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 $Mg(OH)_2$.

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

a. $H_2C_2O_4$ b. HCl c. HNO_3 d. H_2CO_3

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