

Stoichiometry Calculations

Involving: Molar Concentration

When a **VOLUME** is mentioned, the problem involves **MOLARITY**. **DO NOT** assume “22.4 L”. This is only used when “at STP” is mentioned.



Some more
examples...

YAY!!

Tums is an antacid composed primarily of calcium carbonate (chalk), and stomach acid is a dilute solution of hydrochloric acid. The neutralization between $\text{CaCO}_{3(s)}$ and stomach acid is represented by the equation:



- a) A tablet of Tums has a mass of 0.750 g. What volume of stomach acid having $[\text{HCl}] = 0.0010 \text{ M}$ is neutralized by 0.750 g portion of $\text{CaCO}_{3(s)}$?

- b) What volume of $\text{CO}_{2(g)}$ at STP is produced if 1.25 L of 0.0055 M $\text{HCl}_{(aq)}$ reacts with an excess of $\text{CaCO}_{3(s)}$?



Mainly for Chemistry 12...

TITRATION:

A process in which a measured amount of solution is reacted with a known volume of another solution (one of the solutions has an unknown concentration) until a desired **EQUIVALENCE POINT** is reached.

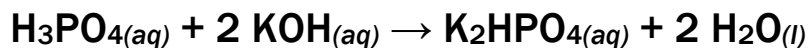
EQUIVALENCE POINT (STOICHIOMETRIC POINT):

The point in a titration where the ratio of the moles of each species involved exactly equals the ratio of the coefficients given in the balanced chemical equation.

The equivalence point is recognized by an **INDICATOR**.

For Example:

Consider the reaction:



- a) If 19.8 mL of $\text{H}_3\text{PO}_{4(aq)}$ with an unknown concentration reacts with 25.0 mL of 0.500 M $\text{KOH}_{(aq)}$, according to the above reaction, what is the molarity of the $\text{H}_3\text{PO}_{4(aq)}$?
- b) What volume of 0.200 M $\text{KOH}_{(aq)}$ is required to react with 125 mL of 0.250 M $\text{H}_3\text{PO}_{4(aq)}$ in order to produce a solution of $\text{K}_2\text{HPO}_{4(aq)}$?