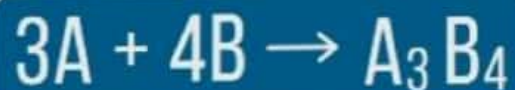
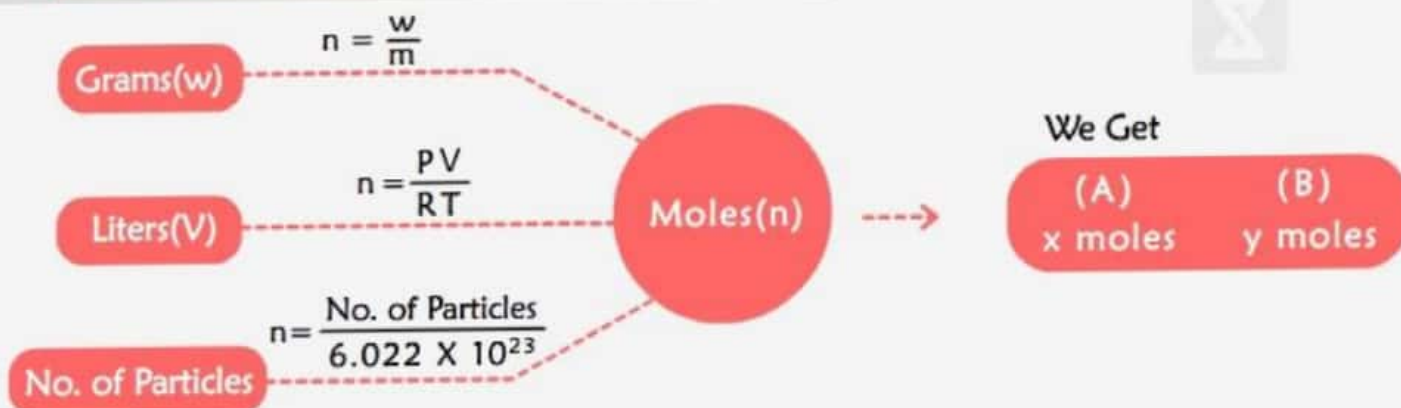


HOW TO SOLVE ? STOICHIOMETRY PROBLEM

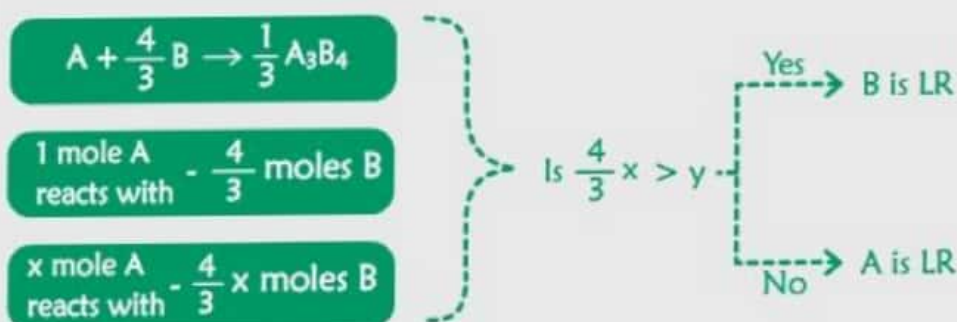


1 Converting reactants into moles



2 Finding Limiting Reagent (L.R)

Divide by Coefficient of any Reactant, in above reaction its 'A' i.e. 3



3 Find Moles of Product using L.R (assume L.R = B)

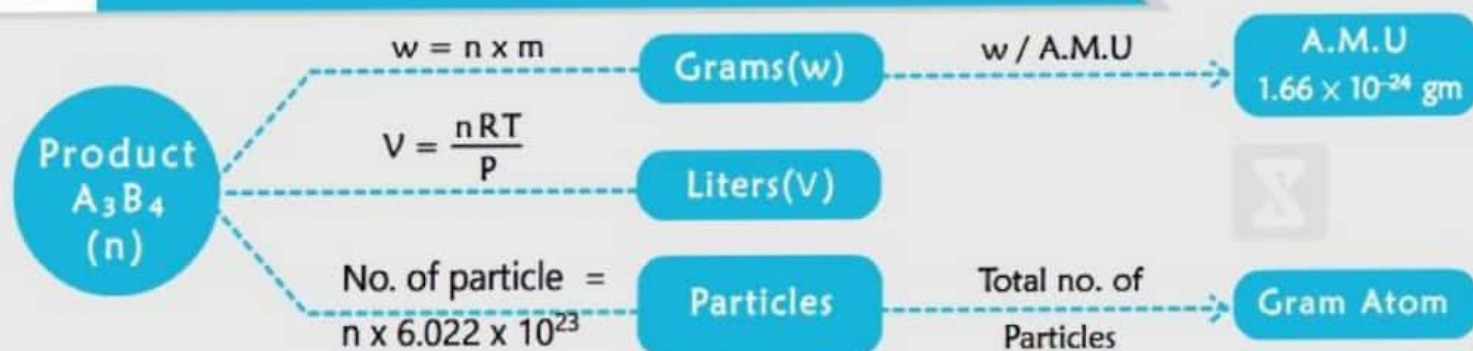


$$n = \frac{1}{4}y$$

4 moles of 'B' gives 1 mole A_3B_4

\rightarrow so y moles of 'B' gives $\frac{1}{4}(y)$ moles A_3B_4

4 Converting Product Moles into required quantity



Concentration Terms



Molarity (M)

Molarity is no. of moles of a solute per liter of solution

$$M = \frac{\text{moles of solute}}{\text{volume of solution(in liter)}}$$



Molality (m)

Molality is the no. of moles of solute per kilogram of solvent.

$$m = \frac{\text{moles of solute}}{\text{weight of solvent (in kg.)}}$$



Normality (N)

Normality is the gram equivalent weight per liter of solution.

$$N = \frac{\text{gram equivalents of solute}}{\text{volume of solution(in liter)}}$$



Formality (f)

Formality is the no. of gram formula masses of the ionic solute dissolved per liter of solution.

$$f = \frac{\text{weight in gram}}{\text{formula weight} \times \text{volume of solution(liter)}}$$



Mole Fraction

Mole Fraction is equal to the moles of one component divided by total moles in the solution or mixture.

$$X_A = \frac{n_A}{n_A + n_B}$$



Parts per million (ppm)

Parts per million is value that represent the part of whole no. in units of 1/1000000

$$\text{ppm} = \frac{\text{mass of solute}}{\text{mass of solvent}} \times 10^6$$

CONCENTRATION OF SOLUTION

Part-II

(1) % by weight

4.9 gm
 H_2SO_4

(4.9% H_2SO_4 by weight) : \Rightarrow

100gm of solution contains 4.9gm of H_2SO_4



Solvent



Solution

(2) % by volume

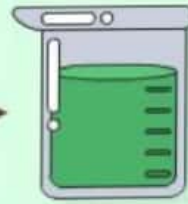
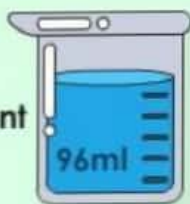
4ml
 H_2SO_4

(4% H_2SO_4 by Volume) : \Rightarrow

100ml of solution contains 4ml of H_2SO_4



Solvent



Solution

(3) % weight by volume

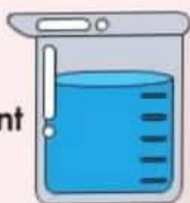
4gm H_2SO_4

(4% H_2SO_4 w/v) : \Rightarrow

4ml H_2SO_4 present in 100ml of solution.



Solvent



Solution

(4) % volume by weight

4ml
 H_2SO_4

(4% H_2SO_4 v/w) : \Rightarrow

4ml H_2SO_4 present in 100gm solution.



Solvent



Solution
100gm

EQUIVALENT MASS

Definition

The mass of a substance especially in grams that combines with or is chemically equivalent to **eight grams of oxygen** or **one gram of hydrogen**

$$\text{Equivalent Mass} = \frac{\text{Molar Mass}}{n\text{-Factor}}$$

EQUIVALENT MASS

Element

$$E = \frac{\text{Atomic mass of element}}{\text{Valence of element}}$$

Ion

$$E = \frac{\text{Formula mass of ion}}{\text{Charge on ion}}$$

Salt

$$E = \frac{\text{Formula mass of salt}}{\text{Total positive or negative charge on cationic or anionic part}}$$

Acid

$$E = \frac{M_{\text{acid}}}{\text{Basicity}}$$

Base

$$E = \frac{M_{\text{Base}}}{\text{Acidity}}$$

Acid Salt

$$E = \frac{M}{\text{Replaceable 'H' left in the salt}}$$

Redox Change

$$E = \frac{M_{\text{oxidant or reductant}}}{\text{Number of electrons lost or gained by one molecule of oxidant or reductant}}$$

CHEMICAL REACTIONS

Part-I

COMBUSTION



COMBUSTION or burning is a high temperature exothermic redox chemical reaction between a fuel and an oxidant usually atmospheric oxygen.



ADDITION

ADDITION reaction is a reaction in which one molecule combines with another to form a large molecule with no other product.



DECOMPOSITION

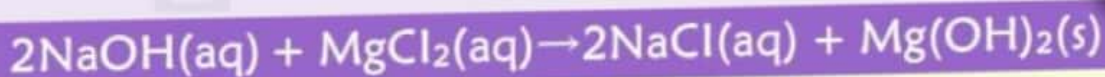


DECOMPOSITION reaction involves the breakdown of chemical compound into its elements or simpler compounds. These reactions often involve an energy source such as heat, light, or electricity that breaks apart the bonds of compounds.



PRECIPITATION

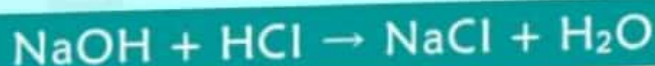
PRECIPITATION reaction is the one in which aqueous compounds react to form an insoluble solid, called a precipitate. Whether or not a reaction will form a precipitate is dictated by solubility rules for ionic compounds.



NEUTRALISATION



NEUTRALISATION reaction is the one in which an acid and a base react to form a salt and water. Neutralisation reactions do not necessarily result in a pH of 7, resultant pH is dependent on the strengths of the acid and base.



CHEMICAL REACTIONS

CONDENSATION



CONDENSATION reaction is the one in which two molecules combine to form a larger molecule with a small molecule. The small molecule lost is usually water, but not always. It can be considered to be the opposite of hydrolysis.



HYDROLYSIS

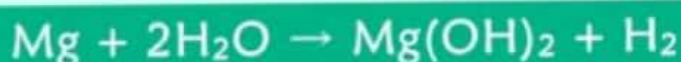
HYDROLYSIS reaction involves the breaking of chemical bonds by the addition of water to a substance. In some cases, this addition can cause both the substance and the water molecule to split into two parts.



DISPLACEMENT

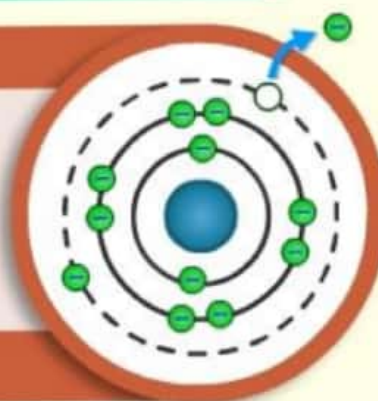
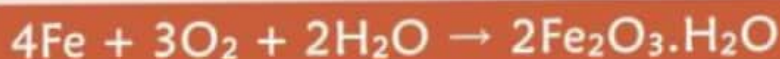


DISPLACEMENT reaction is chemical reaction in which a more reactive element displaces a less reactive element from its compound. Both metals and non-metals take part and more reactive displaces the less reactive.



OXIDATION

OXIDATION reactions are sometimes defined as the reactions in which an element forms bonds with oxygen atoms. Generally, oxidation can be defined as a reaction in which atoms of an element **lose electrons**.



REDUCTION

REDUCTION reactions are sometimes defined as reactions in which other molecules lose oxygen atoms. Generally, reduction can be defined as a reaction in which atoms of an element **gain electrons**.

