Conventions and Rules

* **Molar mass** is the mass of one mole of atoms in a substance.
* **1 mole of any gas is 24dm^3 at r.t.p.**
* **Avogadro's Constant** is the number of particles in one mole of any substance. The number is ***6 x 10^{23}***.
* ***Relative Atomic Mass*** is the mass of one atom of an element compared to 1/12 of the mass of one carbon-12 atom.
* ***Relative Molecular Mass*** is the mass of one molecule of an element compared to 1/12 of the mass of one carbon-12 atom.
* ***Relative Formula Mass*** is the mass of one formula unit of an ionic compound. It is the sum of the Ar of all the ions in the formula unit.
* ***1000cm^3 = 1 dm^3***

Formula Triangles

Top	Bottom 1	Bottom 2
No. of Particles	No. of Moles	Avogadro's No.
Mass in Grams	No. of Moles	Molar Mass in g/mol
Volume of Gas in dm^3	No. of Moles	24dm^3
Mass in g	Volume in dm^3	Mass Concentration in g/dm^3
No. of Moles	Volume in dm^3	Molar Concentration in mol/dm^3

* To find top, multiply bottom values. To find bottom, take top divided by other bottom value.

1. No. of Particles // Moles // Avogadro's No.
2. Mass // Moles // Molar Mass
3. Volume // Moles // 24dm^3
4. Mass // Volume // Mass Concentration
5. Moles // Volume // Molar Concentration

Concentration

* The amount of solute dissolved in a unit volume of the solution.
* Usually in g/dm^3 or mol/dm^3.
* Mol/dm^3 is also called Molarity.
* 1M = 1 mol/dm^3

Molecular Formula & Empirical Formula

Value	Element A	Element B
Mass in Grams	x	x
Molar Mass	x	x
Moles	x	x
Mole Ratio	x	x

1. Given % Composition, find masses of both substances in 100g. If 70% is A and 30% is B, then there is 70g of A and 30g of B in 100g of AB.
2. Find molar mass using periodic table.
3. Find no. of moles by multiplying mass and molar mass.
4. Divide all sides by the smallest number and round off to the nearest whole number to get mole ratio.
5. Molecular Formula is always a multiple of the Empirical Formula.

% Purity and % Yield

% Purity = Mass of Pure Substance / Total Mass x 100%

% Yield = Actual Mass / Theoretical Mass x 100%

Limiting Reagents & Reactants in Excess

x	No. of Available Moles	vs	No. of Moles Needed
Limiting Reagents	No. of Available Moles	<	No. of Moles Needed
Reactants in Excess	No. of Available Moles	>	No. of Moles Needed

How to Find Limiting Reagents

A + 2B → 2AB

1. Find no. of available moles for A.
2. Find no. of available moles for B.
3. Find no. of moles needed for A/B.

E.g. *Moles needed for A = Available moles for B / 2*

(Refer to mole ratio)

If moles available is < moles needed, then that reactant is the limiting reagent.

The concept of limiting reagents is the available moles for reaction vs the needed moles for reaction.

Mole Calculations

Given			Find
Mass of A	Moles of A	Moles of B	Mass of B
Vol. of A	Moles of A	Moles of B	Vol. of B
Mass of A	Moles of A	Moles of B	Vol. of B
Vol. of A	Moles of A	Moles of B	Mass of B

Refer to mole ratio when converting Moles of A to Moles of B.

1 mole of any gas is 24dm^3 at R.T.P.

Acids & Bases

Metal + Acid → Salt + Hydrogen Gas

Metal Carbonate + Acid → Salt + Water + Carbon Dioxide

Metal Oxide + Acid → Salt + Water

Metal Hydroxide + Acid → Salt + Water

Base + Acid → Salt + Water (Neutralisation)

Alkali + Acid → Salt + Water

Alkali + Ammonium Salt → Salt + Water + Ammonia Gas

Alkali + Salt → Metal Hydroxide + Salt

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Published 18th July, 2018.

Last updated 21st July, 2018.