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SOME BASIC CONCEPT OF -: CHEMISTRY :-

WHAT IS MOLE ??

→ mole → number → 6.025×10^{23} N_A

1 mole atom = N_A atoms

	Electron	Proton	Neutrons
mass =	9.1×10^{-31} kg	1.672×10^{-27} kg	1.674×10^{-27} kg
charge =	-1.6×10^{-19} C	$+1.6 \times 10^{-19}$ C	zero

$m_n > m_p > m_e$

N_A electrons = $\frac{1.6 \times 10^{-19} C}{} = 96500 C$

ATOMIC MASS :-

→ mass of one atom of an element is called as atomic mass.

Ex = H = 1amu He = 4amu

GRAM ATOMIC MASS

→ mass of one mole atoms of elements. (N_A atoms)

Eg :- H = 1gm He = 4gm Li = 12gm

MOLECULAR MASS :-

→ mass of one molecule of a substance.

Eg :- NH_2CONH_2 (urea) = 60gm.

RELATION B/W AMU & GRAMS

→ $1\ amu = \frac{1}{N_A}\ gram = 1.67 \times 10^{-24}$ gm.

AVERAGE ATOMIC MASS :-

→ weighted atomic mass

↳ applicable on isotopes.

$Cl^{35} \rightarrow 75\%$

$Cl^{37} \rightarrow 25\%$

$AAM = \frac{(35 \times 75) + (37 \times 25)}{75 + 25} = 35.5$

CALCULATION OF MOLE :-

density = $\frac{mass}{volume} \Rightarrow \rho = \frac{m}{V}$

$mole = \frac{weight}{molar\ mass}$

$mole = \frac{No^{\circ}\ of\ molecules}{Avagedro's\ No^{\circ}}$

$mole = \frac{volume\ given}{22.4\ L\ at\ STP}$

PECENTAGE COMPOSITION

→ % composition = $\frac{weight\ of\ element}{Molecular\ mass} \times 100$

EMPERICAL FORMULA :-

* molecular formula ; represents the actual number of atom.
* Empirical formula ; simplest ratio of atoms.

$C_6H_{12}O_6$ → Molecular formula.

6 : 12 : 6 = 1 : 2 : 1

∴ CH_2O = empirical formula.

STOICHIOMETRY :-

→ Balance the quation (hit and trial method).

COMBUSTIONS REACTIONS

→ Reaction with oxygen.

$C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$

Balancing done (✓)

Magical equation ;

$\frac{n_{C_3H_8}}{1} = \frac{n_{O_2}}{5} = \frac{n_{CO_2}}{3} = \frac{n_{H_2O}}{4}$

PERCENTAGE PURITY :-

→ sample → Purity

↳ impurity

Pure = $\frac{weight\ pure}{Total} \times 100$

Impurity = $\frac{weight\ impure}{Total} \times 100$

PERCENTAGE YIELD :-

Q. 28 gm N_2 reacts with H_2 to form 1.5 mole NH_3. Find % yield ?

$1N_2 + 3H_2 \longrightarrow 2NH_3$

28gm

$\eta = \frac{28}{28} = 1$ ($n_{NH_3} = 2$)

% yield = $\frac{1.5}{2} \times 100 = 75\%$

LIMITING REAGENTS :-

$2H_2 + O_2 \longrightarrow 2H_2O$

100 mole 5 mole

Excess Reagent — limiting Reagent

H_2 = 10 mole react

n_{H_2} left = 100 − 10 = 90 mole.

How to find LR ?

That reactant is LR whose $\frac{mole}{S.C}$ is minimum.

$2H_2 + O_2 \longrightarrow 2H_2O$

8gm 32gm

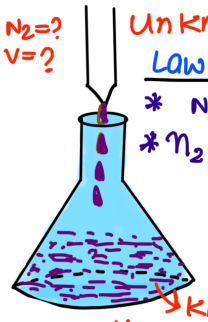
$\eta = \frac{8}{2} = 4$ $\eta = \frac{32}{32} = 1$

$LR = \frac{n}{SC} \Rightarrow \frac{4}{2} = 2$ $\frac{1}{1} = 1$

per Stoichiometry

* n_{H_2} React = SC × per stoichiometry ⇒ 2 × 1 = 2 mole
* n_{H_2} left = 4 − 2 = 2 mole
* n_{H_2O} formed = SC × Perstoichiometry = 2 × 1 = 2 mole

TITRATIONS :-



Law of equivalence

* $N_2 \times V_2 = N_1 \times V_1$
* $n_2 \times m_{f_2} = n_1 \times m_{f_1}$

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