

Friday

Single Page Note

Date 21st July - 23

Unit 1 Stoichiometry

Solution for Every Prob.

Stoichiometry ² Greek word

Mole basic unit of chemistry

COM

element measurements

The atomic mass, formula mass, molecular mass of substance expressed in grams e.g. 1g H = 1 mole.

C = compare
O = make one
P = multiple.

The study of relative amount of product and reactant in a chemical reaction.

Avagadro No. - NA

Formulas

Stoichiometric Amount

The no. of atoms, molecules, ions & formula of 1 mole of substance.

The amount of reactant and product in balance chemical eq.

Numerically, 6.023×10^{23} (particles)

Mole Ratio -/-

Molar Volume

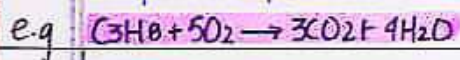
Types of problems.

Ratio of no. moles of reactant to no. of moles of product.

1 mole of any gas at S.T.P. is 22.414 dm^3 (T = 0°C & P = 180, 760 torr, 1 atm/atp)

Mole to Mole.

Mole to Mass



1 mole of C_3H_8 + 5 mole of O_2 eq. 3 mole of CO_2 + 4 mole of H_2O

1 mole of O_2 = 22.414 dm^3 occupies 6.023×10^{23} molecules

Mass to particle.

Mole \rightarrow volume

Percentage Composition

When relative amount of any element in a compound expressed in %.

$\% \text{ of element} = \frac{\text{mass of element}}{\text{molar mass of compound}} \times 100$

In CO_2 = C = 27.2%, O₂ = 72.7%

Volume of gas volume at S.T.P.

(i) g (ii).

Combine eq (i) & (ii).
mass in g = no. of particles \times molar mass

Limiting Reactant

Non-Limiting R.

Theoretical yield

Actual yield

1- The reactant present in less quantity.

The reactant present in excess quantity.

The quantity calculated by a chemical eq.

The quantity took by analytical process.

2- Produce less product.

Can produce more.

It is ideal.

It is real.

3- Stops the reactant.

Donot do so.

More quantity

less quantity.

e.g. $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

H_2 = produce 10 moles of H_2O .

O_2 = produce 4 moles of H_2O .

Reason of Actual yield less theoretical.

• Side product formed.

• \rightarrow Reversible reaction.

• Mechanical loss due to natural conditions

3- no. of moles = $\frac{\text{Volume of gas}}{\text{volume at S.T.P.}}$

1- No. of moles = $\frac{\text{Mass}}{\text{molar mass}}$ eq (i)

4- Combine eq (i) & (ii).

2- No. of moles = $\frac{\text{Particle}}{\text{NA}}$ eq (ii)