Formulae & Definitions

Define:

Empirical Formula
Molecular Formula
Structural Formula
Relative Atomic Mass
Relative Molecular Mass
Relative Formula Mass
Mole
Avogadro Constant
Molar Solution
Molar Volume of a Gas

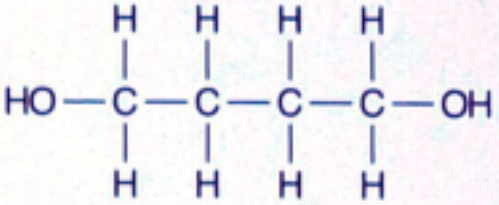
How do you convert between dm^3 and cm^3?

Formulae:

Empirical Formula: Shows the **simplest ratio** in which atoms combine to form a compound, e.g. C_2H_5O

Molecular Formula: Shows the **actual** numbers of atoms that combine to form a molecule, e.g. $C_4H_{10}O_2$

Structural Formula: Shows how the atoms are arranged in the molecule, e.g.

$CH_2OHCH_2CH_2CH_2OH$ or 

The example formulae shown above are all for the same molecule

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Masses:

***Relative Atomic Mass (A_r):** The average mass of naturally occurring atoms of an element relative to the mass of a carbon–12 atom

***Relative Molecular Mass (M_r):** The sum of the relative atomic masses

Add up the relative atomic masses of all of the atoms in the molecular formula

Relative Formula Mass (M_r): The sum of the relative atomic masses for an ionic compound

Add up the relative atomic masses of all atoms in the empirical formula of an ionic compound

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Mole Definitions:

***Mole:** The amount of a substance that contains the same number of particles as the number of carbon atoms in 12g of carbon–12

***Avogadro Constant:** The number of particles in one mole of an element or compound

Molar Solution: A solution that contains 1 mole of solute per dm^3 of solution, written as 1 mol/dm^3 (*or abbreviated as* 1M)

Molar Volume of a Gas: 1 mole of a gas occupies 24 dm^3 at room temperature and pressure

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Volume Conversions:

1 dm^3 = 1000 cm^3 $dm^3 \longrightarrow cm^3$: **× by 1000** $cm^3 \longrightarrow dm^3$: **÷ by 1000**

Equations

Write mathematical equations for calculating:

Number of Moles

Concentration

Moles of a Gas

Percentage Yield

Percentage Composition

Percentage Purity

Number of Moles:

$$\text{Number of moles} = \frac{\text{Mass}}{M_r}$$

Concentration:

$$\text{Molar Concentration (mol/dm}^3\text{)} = \frac{\text{Amount of solute (mol)}}{\text{Volume of solution (dm}^3\text{)}}$$

$$\text{Mass Concentration (g/dm}^3\text{)} = \frac{\text{Amount of solute (g)}}{\text{Volume of solution (dm}^3\text{)}}$$

Moles of a Gas:

$$\text{Number of moles of a gas} = \frac{\text{Volume of a gas (in dm}^3\text{)}}{24\ \text{dm}^3}$$

Percentage Yield:

$$\text{Percentage Yield} = \frac{\text{Actual mass obtained}}{\text{Theoretical (calculated) mass}} \times 100$$

*Both masses must be in the **same units** (typically grams)*

Percentage Composition:

$$\text{Percentage Composition} = \frac{\text{Total } A_r \text{ of element in compound}}{M_r \text{ of compound}} \times 100$$

Percentage Purity:

$$\text{Percentage Purity} = \frac{\text{Mass of substance in mixture}}{\text{Total mass of mixture}} \times 100$$

*Both masses must be in the **same units** (typically grams)*