



# Definitions and Concepts for Edexcel Chemistry A-level

## Topic 5: Formulae, Equations & Amounts of Substance

**Mole:** The unit for the amount of substance. This is the amount of chemical species found in 12 g of  $^{12}\text{C}$ .

**Avogadro's constant:** The number of atoms in exactly 12 g of  $^{12}\text{C}$  ( $6.02 \times 10^{23} \text{ mol}^{-1}$ ).

**Molar Mass:** Mass of one mole of the substance expressed in  $\text{g mol}^{-1}$ .

**Empirical formula:** Smallest whole number ratio of atoms of each element in a compound, e.g. the empirical formula of benzene ( $\text{C}_6\text{H}_6$ ), cyclobutadiene ( $\text{C}_4\text{H}_4$ ) and acetylene ( $\text{C}_2\text{H}_2$ ) is simply "CH".

**Molecular formula:** The actual number of atoms of each element in a molecule.

**Spectator ions:** Ions that do not take part in the reaction,

e.g.  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$  can be written as  $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$ ; the spectator ions are:  $\text{Na}^+$ ,  $\text{Cl}^-$

**Hydrate:** a compound that has molecules of water of crystallisation, e.g.  $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$ .

**Solution:** *solute* (is dissolved) + *solvent* (dissolves the solute). *Standard solution* is the one with accurately known concentration.

**Mass concentration:** mass of *solute* per volume of *solution*,  $\text{g dm}^{-3}$ .

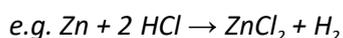
**Molar concentration:** moles of *solute* per volume of *solution*,  $\text{mol dm}^{-3}$ .

**Primary standard:** a substance used for preparation of a standard solution by weighing.

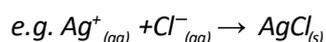
**Avogadro's law:** Provided the conditions of temperature and pressure are the same, equal volume of gases contain the same number of molecules.

**Molar volume:** The volume of 1 mol of a gas.

**Displacement reaction:** More reactive element reacts to take place of less reactive element in a compound,



**Precipitation reaction:** The one that produces an insoluble solid.



**Error:** A discrepancy between the value obtained in the experiment and an actual value.

**Precision:** Refers to how close to each other are the values obtained in an experiment.

**Accuracy:** Refers to how close these values are to the actual value.

**Concordant results:** Results that lie close to each other. In titration, these are titres that usually lie within  $\pm 0.20 \text{ cm}^3$ .

**Margin of error:** The range in which the true value of a measurement could lie, e.g. for burettes  $\pm 0.05 \text{ cm}^3$ .





**Random errors:** They occur when conditions are varied in an unpredictable manner.

**Systematic errors:** Errors which are constant when you repeat an experiment. They usually are a result of the apparatus used.

$$\text{Percentage uncertainty} = (\text{Uncertainty/Reading}) \times 100\%$$

$$\text{Percentage yield} = (\text{Actual yield/Theoretical yield}) \times 100\%$$

**Atom economy:** Measure of the proportion of reaction atoms that become part of the desired product in the balanced chemical equation.

$$\text{Atom Economy} = (\text{Molar mass of desired product/Total molar mass of all products}) \times 100\%$$

