CAIE Chemistry A-level

2: Atoms, Molecules and Stoichiometry

Definitions

Definitions and Concepts for CAIE Chemistry A-level

Atoms, Molecules and Stoichiometry

Ag^+: The formula for a silver ion.

Anhydrous: A compound that contains no water.

Avogadro constant (*L*): The number of atoms, molecules or ions in one mole of a given substance. It is the number of atoms in exactly 12 g of C (6.02×10^{23}mol).

CO_3^{2-}: The formula for a carbonate ion.

Compound: A substance that combines two or more different elements through the formation of chemical bonds.

Element: Substances that contain one type of atom only. Atoms of the same element all have the same number of protons.

Empirical formula: Smallest whole number ratio of atoms of each element in a compound. For example, the empirical formula of benzene (C_6H_6), cyclobutadiene (C_4H_4) and acetylene (C_2H_2) are all “CH”.

Excess: When a reactant is in excess there is more than the required amount for the reaction. Having certain reactants in excess can be required so that further substitution reactions do not occur.

HCO_3^-: The formula for a bicarbonate ion.

Hydrated: A hydrated compound is one that contains water.

Hydration: The chemical addition of water to a substance.

Hydrocarbon: A compound consisting of hydrogen and carbon atoms only.

Ionic charge: The electrical charge of an ion caused by the gain (negative charge) or loss (positive charge) of electrons. The magnitude of the charge is related to how many electrons have been lost or gained as electrons have a relative charge of -1.

Ionic compound: A compound made up of anions and cations which are held together by ionic bonds, which arise due to the electrostatic attraction between oppositely charged ions. These structures are neutral overall.

Ionic equation: A chemical equation that involves dissociated, reacting ions only.

Limiting reagent: The reagent in a reaction which is completely used up and determines how much of a product is made.

Mole: The unit for the amount of substance. This is the number of atoms present in 12 g of ^{12}C. One mole is 6.02×10^{23}.

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

Molecule: Formed from two or more atoms that have been covalently bonded together.

NH_4^+: The formula for an ammonium ion.

NO_3^- : The formula for a nitrate ion.

OH^- : The formula for a hydroxide ion.

Oxidation number: The charge of an ion or a theoretical charge of an atom in a covalently bonded compound assuming the bond becomes ionic.

Percentage yield: The percentage ratio of the actual yield of product from a reaction compared with the theoretical yield.

$$\text{Percentage yield} = \frac{\textit{Actual yield}}{\textit{Theoretical Yield}} \times 100$$

PO_4^{3-}: The formula for a phosphate ion.

Relative atomic mass: Average mass of an atom of an element, relative to 1/12 of the mass of an atom of carbon-12.

Relative formula mass: Average mass of a compound relative to 1/12 of the mass of an atom of carbon-12. Relative formula mass refers to compounds that have a giant structure.

Relative isotopic mass: Average mass of an atom of an isotope of an element, relative to 1/12 of the mass of an atom of carbon-12.

Relative molecular mass: Average mass of a molecule relative to 1/12 of the mass of an atom of carbon-12.

SO_4^{2-}: The formula for a sulfate ion.

State symbol: Symbols which show the physical state of the substance during the reaction, they are usually in brackets: gas (g), liquid(l), solid(s) and aqueous(aq). Aqueous means the substance is dissolved in water.

Water of crystallisation: The water which is chemically attached to a crystal, it is a fixed number of water molecules per formula unit.

Zn^{2+}: The formula for a Zinc metal ion.