Definitions and Concepts for Edexcel Chemistry GCSE

Topic 1 - Key Concepts in Chemistry

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*Definitions in **bold** are for higher tier only*

Definitions marked by '' are for separate sciences only*

Definitions have been taken, or modified from the Edexcel Specification for GCSE Chemistry, 1CH0, Issue 3, February 2018

Anion: A negatively charged ion. Formed when an atom gains at least one electron.

Atom: The smallest part of an element that can exist. All substances are made up of atoms.

Atomic nucleus: Positively charged object composed of protons and neutrons at the centre of every atom with one or more electrons orbiting it.

Atomic number: The number of protons in the nucleus.

Avogadro's constant: **The number of atoms, molecules or ions in a mole of a given substance.**

Cation: A positively charged ion. Formed when an atom loses at least one electron.

Compound: A substance made up of two or more types of atoms chemically combined together.

Concentration: The amount of substance (e.g. the mass) in a certain volume of a solution.

Conductor: A material that contains charged particles which are free to move to carry electrical or thermal energy.

Conservation of mass: A law which states that no atoms are lost or made during a chemical reaction so the mass of the products equals the mass of the reactants.

Covalent bond: A shared pair of electrons between two non-metals.

Dalton model: Dalton described atoms as solid spheres, stating that different spheres made up the different elements.

Diamond: A giant covalent structure which is made up of carbon atoms each of which form four covalent bonds with four other carbon atoms.

Electron: Negatively charged subatomic particle which orbit the nucleus at various energy levels. Very small relative mass (negligible).

Electron shell: Different energy levels in atoms occupied by electrons.

Electrostatic forces: The strong forces of attraction between oppositely charged ions.

Element: A substance made up of only one type of atom.

Empirical formula: The simplest whole number ratio of atoms of each element in a compound.

Fullerenes: Molecules of carbon atoms with hollow shapes. The structures are based on hexagonal rings of carbon atoms but they may also contain rings with five or seven carbon atoms. Examples include graphene and C_{60}.

Giant covalent molecule: Molecules containing many atoms covalently bonded together.

Graphene: A single layer of graphite with properties that make it useful in electronics and composites.

Graphite: A giant covalent structure which is made up of carbon atoms each of which form three covalent bonds with three other carbon atoms. The atoms form layers of hexagonal rings which have no covalent bonds between them. There is one delocalised electron per carbon atom which is free to move to carry charge.

Group (periodic table): A column of the periodic table. Elements in the same group have similar chemical properties.

Intermolecular forces: The forces which exist between molecules. The strength of the intermolecular forces impact physical properties like boiling/melting point.

Ion: An atom or molecule with an electric charge due to the loss or gain of electrons.

Ionic bond: The bond formed between the oppositely charged ions when a metal atom loses electron(s) to form a positively charged ion and a non-metal gains these electron(s) to form a negatively charged ion.

Ionic compound: Chemical compound formed of oppositely charged ions, held together by strong electrostatic forces.

Isotope: Atoms of the same element with the same number of protons but a different number of neutrons.

Lattice: A repeating regular arrangement of atoms/ions/molecules. This arrangement occurs in crystal structures.

Limiting reactant: **The reactant that is completely used up since it limits the amount of products formed.**

Mass number: The total number of protons and neutrons in the nucleus.

Metallic bond: The bonds present in metals between the positive metal ions and negatively charged electrons.

Metals: Elements that react to form positive ions. Found to the left and towards the bottom of the periodic table.

Mole: **The unit for amount of substance. The symbol for the unit mole is mol.**

Molecular formula: The actual ratio of atoms of each element present in a compound.

Molecule: A group of at least two atoms held together by covalent bonds.

Neutron: Neutral subatomic particle present in the nucleus of the atom. Relative mass of 1.

Non-metals: Elements that react to form negative ions. Found towards the right and top of the periodic table.

Period (periodic table): A row of the periodic table. Elements in the same period have the same number of electron shells.

Periodic table: Table of elements arranged in order of increasing atomic number and such that elements with similar properties are in the same column (group).

Polymers: Large long-chain molecules made up of lots of small monomers joined together by covalent bonds.

Proton: Positively charged subatomic particle present in the nucleus of the atom. Relative mass of 1.

Relative atomic mass: An average value that takes into account the abundances of the isotopes of the element.

Relative formula mass: The sum of the relative atomic masses of the atoms in the numbers shown in the formula. It is numerically equal to the mass of one mole of a substance in grams.

Simple molecules: Molecules containing a fixed number of atoms covalently bonded together.

Subatomic particles: Particles smaller than an atom. Protons, neutrons and electrons are the three most common subatomic particles.