MOJZA

5070 & 0620

O Levels & IGCSE

CHEMISTRY

KEY TERMINOLOGIES

UPDATED TO THE
2025-27 SYLLABUS

1st Edition

Key Terminology Glossary

O Level/IGCSE Chemistry

BY TEAM MOJZA

Section 1: States of Matter

- **Kinetic Energy**: Energy due to motion of a substance.
- **Kinetic Theory:** Kinetic theory explains the differences in physical properties of solids, liquids, and gases by referring to the arrangement and motion of particles.
- **Compressible:** The quality of a substance to change its volume when pressure is applied to it .
- **Density:** Density is the mass per unit volume of a substance.
- **Orderly:** Atoms in solid are arranged in a regular pattern .
- **Disorderly:** Atoms in liquid and gas are arranged in a random pattern.
- **High Concentration:** Solution which contains more solute than solvent.
- **Low Concentration:** Solution which contains less solute than solvent.
- **Concentration gradient:** A concentration gradient is the difference in concentration of particles between two areas / places.
- **Soluble:** A substance which can be dissolved easily.
- **Decompose:** A chemical reaction in which a reactant breaks down into two or more products.
- **Volume:** The amount of space covered by an object of matter.
- **Melting:** Melting is when a solid changes into a liquid. requiring heat energy which transforms into kinetic energy, allowing the particles to move
- **Freezing:** When a liquid changes into a solid, it is known as freezing. It is the reverse of melting.
- **Boiling:** Boiling is when an entire liquid changes into a gas.
- **Evaporation:** When the high energy surface particles of a liquid turn into gas and escape, it is known as evaporation.
- **Condensation:** When a gas changes into a liquid, it is known as condensation.
- **Sublimation:** Sublimation occurs when a solid has enough energy to convert into a gas or gas converted into a solid.
- **Heating curve:** Changes to a state of matter caused by heating can be shown on a graph called the heating curve.
- **Cooling Curve:** Changes to a state of matter caused by cooling can be shown on a graph called the cooling curve.
- **Boiling point:** Boiling point is the specific temperature at which a liquid changes into a gas. (Generally same as melting point for pure substances)
- **Melting point:** Melting point is the specific temperature at which a solid changes into a gas. (Generally same as the boiling point for pure substances)
- **Diffusion:** The movement of particles from an area of higher concentration to an area of lower concentration due to their random movements until equilibrium is reached.

Section 2: Atoms, Elements and Compounds

- **Malleable:** Can be hammered into shape.
- **Ductile:** Can be drawn into wires.
- **Lustrous:** Can reflect light from its surface and can be polished.
- **Sonorous:** Makes a ringing sound when stricken.
- **Giant Covalent Structure:** Is a macromolecule compound containing excessive covalent bonds.
- **Lattice Structure:** A structure in which atoms are arranged in an orderly repeating pattern.
- **Mobile/Delocalised/Free Moving Electrons:** That conducts heat and electricity and are not included in bond making.
- **Atoms:** The building block of matter which all the substances are made of.
- **Element:** A substance that is made of all single kinds of atoms which cannot be split into anything simpler.
- **Compound:** When two or more elements are chemically combined together, the pure substance that is formed.
- **Isotopes:** Elements which have the same number of protons but a different number of neutrons.
- **Mixture:** Two or more substances combined together but not chemically bonded.
- **Electronic configuration:** Arrangement of the electrons.
- **Atomic/Proton number:** Number of protons in the nucleus of an atom.
- **Protons:** Positive particles.
- **Electrons:** Negative particles.
- **Neutrons:** Neutral particles.
- **Nucleus:** Center of the atom containing the protons and neutrons and being responsible for most of the atom's mass.
- **Nucleon number:** Total number of protons and neutrons in the nucleus.
- **Shells:** Electrons orbit the nucleus in energy levels known as shells.
- **Relative atomic mass:** The average mass of the atoms and isotopes of an element, relative to the mass of a Carbon-12 atom.
- **Abundance:** The relative abundance of an isotope is the percentage of atoms with a specific atomic mass found in a naturally occurring sample of an element.
- **Ion:** An electrically charged atom or group of atoms, formed by the gain or loss of electrons.
- **Anion:** Negative ion
- **Cation:** Positive ion
- **Ionic bond:** The strong electrostatic forces of attraction between opposite charges that the positive and negative ions are held together by.
- **Dot and cross diagram:** Diagrams that show the arrangement of the outer-shell electrons in an ionic or covalent compound or element.
- **Covalent bond:** Covalent bonds involve the sharing of electrons, often between two nonmetals, in order to attain a full outer shell.
- **Double bond:** Two covalent bonds formed by the sharing of two pairs of electrons.
- **Allotropes:** Different atomic or molecular arrangements of the same element in the same physical state.
- **Metallic bond:** Strong force of attraction between the positive metal ions and the delocalised electrons in metals.

Section 3: The Mole & Stoichiometry

- **Molecular formula :** This formula shows the exact number of atoms of each element present in a compound.
- **Empirical formula:** This formula shows the simplest ratio between atoms present in a compound .
- **Relative atomic mass:** Is the average mass of an atom of the element when compared with 1/12 the mass of carbon-12.
- **Relative molecular mass:** Is the average mass of a molecule of the compound when compared with 1/12 the mass of one atom of carbon-12.
- **Relative formula mass:** the mass of a compound and can be calculated using the relative atomic masses (Ar) of all elements contained in the compound.
- **Word equation:** Show the reactants and products of a chemical reaction using their full chemical names.
- **Symbol equation:** Uses the formulae of the reactants and products to show what happens in a chemical reaction.
- **Balanced equation:** A chemical equation where there are an equal number of atoms and charges on both sides of the equation. (Reactants and products)
- **Reactants:** Substances that react together to form products, present on the left-hand side of a chemical equation.
- **Products:** New substances which are on the right-hand side of the arrow in a chemical equation, formed by the reaction of reactants.
- **Moles:** SI Unit of the amount of a substance. (Avogadro's constant: $6x10^{23}$).
- **Avogadro's number:** $6x10^{23}$ particles are equal to 1 mole.
- **Avogrado's law:** At the same temperature and pressure, equal amounts of gases occupy the same volume of space.
- **RTP:** The room temperature and pressure, specifically 20 degrees and 1 atm.
- **Molar mass:** The mass of one mole of a substance, expressed in grams per mole (g/mol).
- **Molar ratio:** It relates the amounts in moles of any two substances in a chemical reaction.
- **Limiting reactant:** That reactant which will finish first is the limiting reactant.
- **Yield:** The amount of product gotten from a reaction.
- **Theoretical yield:** The amount of product received from a reaction in case of perfect chemical and practical conditions.
- **Actual yield:** It is the recorded amount of product obtained.
- **Percentage composition:** The mass of each element in any compound as a percentage of the total mass of the compound.
- **Spectator ions:** Ions which appear on both sides of an ionic equation and are eliminated from the final equation.

Section 4: Electrochemistry

- **Aqueous Ionic Compound:** Compound having water dissolved in it.
- **Molten Ionic Compound:** A compound in its pure liquid state.
- **Electric Cell:** Is an electrochemical cell that converts chemical energy into electric energy.
- **Electrode:**Is a rod or plate where electricity enters or leaves electrolyte during electrolysis.
- **Inert:** Are those electrodes which do not react with electrolyte or do not oxidise during electrolysis.
- **Reactive:** Are electrodes which react with electrolyte or oxidised during electrolysis.
- **Cathode:** Reduction takes place at the cathode.
- **Anode:** Oxidation takes place at the anode.
- **Electrolyte:** Is an ionic compound which conducts electricity in molten or aqueous solution.
- **Binary Compound:** A chemical compound made of two different elements.
- **Concentrated :** Contains more solute than solvent.
- **Ease of Discharge :**The less reactive elements in the reactivity series are easy to discharge.
- **Molten :** The liquid form of an ionic compound.
- **Electroplated:** Involves the deposition of superior metal on inferior metal by electrolysis.
- **Brine:** A concentrated solution of aqueous sodium chloride.
- **Oxidation:** Loss of electrons
- **Reduction:** Gain of electrons
- **Ionic half equation:** Show half of what is happening in a reaction involving electron transfer.
- **Fuel:** A substance which releases energy when it is burned.
- **Hydrogen-oxygen fuel cell:** It produces electricity by combining the elements-hydrogen and oxygen- to release energy and water.

Section 5: Chemical Energetics

- **Bond Breaking:** (It is endothermic) when bonds in a molecule break; when molecules turn into atoms.
- **Bond Forming:** (It is exothermic) when bonds are made; when atoms turn into molecules.
- **Chemical bonds:** Ionic, covalent and metallic bonds- so that elements can achieve a more stable energy state by gaining a full outer shell of electrons
- **System:** The reacting chemicals
- **Surroundings:** Anything other than the chemicals that are reacting
- **Exothermic :** The reaction in which heat is given out.
- **Endothermic:** The reaction in which heat is absorbed.
- **Enthalpy Change:** Is the amount of energy released or absorbed during the reaction.
- **Negative energy change:** When the energy of the system decreases. (Exothermic reactions)
- **Positive energy change:** When the energy of the system increases. (Endothermic reactions)
- **Overall energy change:** The difference in height between the energy of reactants and products is the overall energy change of a reaction

- **Reaction pathway diagram:** graphical representations of the relative energies of the reactants and products in chemical reactions
- **Activation Energy:** The minimum energy required to start a reaction.
- **Alternative Pathway:** Pathway followed by the reaction when activation energy is lowered.
- **Catalyst:** Speeds up the reaction without itself being changed. It lowers the activation energy.

Section 6: Chemical Reactions

- **Collision:** When particles hit each other in a chemical reaction.
- **Successful collision:** Particles have sufficient energy to cause a reaction when they collide.
- **Per unit volume:** The quantity of matter in one unit of measure.
- **Frequent :** When particles collide from time to time in a short period.
- **Infrequent :** When particles collide with large break in times.
- **Kinetic Energy:** Energy due to motion of a substance.
- **Activation Energy:** The minimum energy required to start a reaction.
- **Catalyst:** Speeds up the chemical reaction by lowering the activation energy.
- **Enzymes:** Biological catalysts
- **Physical change:** That does not produce any new substance
- **Chemical change:** New chemical substances are formed that have very different properties to the reactants.
- **Effervescence:** A type of fizzing which is a sign of a chemical reaction.
- **Unchanged:** The catalyst remains unchanged during the reaction.
- **Surface Area (of Solids):** Smaller the size of particles, larger will be the surface area , more particles available for collision.
- **Reversible :** Is a reaction in which reactants are making products and products are making reactants at the same time.
- **Irreversible :** Is a reaction in which reactants are making products only.
- **Position of Equilibrium:** It depends on the speed of forward and backward reaction.
- **Redox :** Is a reaction in which oxidation and reduction reactions are taking place simultaneously.
- **Oxidation:** Oxygen is being added.
- **Reduction:** Oxygen is being removed.
- **Oxidation Number:** Is the positive charge on a metal when it loses electrons.
- **Reduction Number:** Is the negative charge on a non metal when it gains electrons.
- **Reducing Agent:** The substance which is being oxidised and reduced in a chemical reaction.
- **Oxidising Agent :** The substance which is being reduced and oxidised in a chemical reaction.
- **Haber process :** Is a process by which ammonia is prepared. Conditions required are temperature of 450°C , 200 atm pressure and an iron catalyst.
- **Contact process :** Is a process by which sulfuric acid is formed.Conditions required are 450°C temperature, 2 atm pressure and vanadium (V) oxide as catalyst.
- **Collision theory:** In order for a reaction to occur, particles must collide with sufficient energy in order to break the bonds.
- **Hydrated salt:** A crystallised salt that contains water molecules as part of its structure.
- **Le Chatelier's Principle:** when a change is made to the conditions of a system at equilibrium, the system automatically moves to oppose the change

- **Forward reaction:** A reaction in which products are produced from reactants and it goes from left to right in a reversible reaction.
- **Reverse reaction:** The product molecules can themselves react with each other or decompose and form the reactant molecules again.
- **Equilibrium:** At equilibrium, the rate of forward reaction is equal to the rate of reverse reaction and the concentrations of both the reactants and the products are constant.

Section 7: Acids, Bases and Salts

- **Aqueous Solution:** Is a solution which contains water and one or more dissolved substances in it.
- **Acidity:** When a substance releases H+ ions in water .
- **Alkalinity:** When a substance produces OH ion when dissolved in water.
- **Neutralisation:** Is a reaction between an acid and alkali in which salt and water are the only products.
- **Litmus:** A substance which turns red in acidic conditions and blue in alkaline conditions.
- **Weak Acid:** Those acids which partially ionise in water .
- **Strong Acid:** Those acids which are completely ionised in water .
- **Concentration:** Is the amount of substance in a specific area .
- **Partially Dissociate:** Not Completely breakdown/ionise to give H+ or OH- ions
- **Fully Dissociate:** Completely breakdown/ionise to give H+ or OH- ions
- **Precipitation:** Is a chemical reaction in which an insoluble solid is formed.
- **Titration:** Is a technique where a solution of known concentration is used to determine the concentration of an unknown solution.
- **Hydrated Substance:** A substance containing water molecules.
- **Anhydrous Substance:** A substance which does not contain water molecules.
- **Oxides:** Are binary compounds of oxygen with another element.
- **Amphoteric oxide:** Those metal oxides which have properties of both acid and base .
- **Basic oxide :** All metal oxides are base except for ZnO, pbO and aluminium oxide .
- **Acidic oxide:** Mostly non metal oxides are acidic.
- **Neutral oxide:** CO, NO and water are neutral oxides.
- **Water of crystallisation:** Is the water molecule present in hydrated crystals.

Section 8: Periodic Table

- **Periods:** Horizontal row of elements in the periodic table.
- **Group:** Vertical column of elements in the periodic table.
- **Electronic Configuration:** The arrangement of electrons around the nucleus of an atom or a molecule.
- **Trends:** Are the changes in reactivity, boiling and melting points down the group or across the period.
- **Alkali Metals:** Are group 1 metals and they readily dissolve in water to form hydroxides.
- **Halogens:** Group VII Elements (non-metals) are known as Halogens.
- **Diatomic:** Two atoms bonded together to form a molecule.
- **Monatomic:** Only one atom.
- **Unreactive:** A substance which does not take part in chemical reaction.
- **Transition elements:**Are elements having high melting points , high density, they have variable oxidation state , form coloured compounds and act as catalysts.

- **Noble gases :** Are group eight elements, are least reactive elements in the state of gas , they do not form bonds, have low melting and boiling points and are coloured gases consisting of single atoms (monoatomic).
- **Displacement reaction:** More reactive halogen displaces less reactive halogen from the solution of its salt.

Section 9: Metals

- **Physical Properties:** Are the colour, density and melting boiling points of a substance.
- **Malleability:** can be hammered into different shapes
- **Ductility:** Can be drawn into wires .
- **Conductivity:** Ability to conduct electricity and heat .
- **Density:**The degree of compactness of a substance.
- **Overhead Cables:** Are made of copper due to its low density and good electrical conductivity.
- **Alloy:** An alloy is a mixture of two or more metals fused together in molten state.
- **Hardness:** In alloy of 2 metals , they have different sizes of atoms so this disrupts the orderly layer of atoms making it difficult for atoms to slide over .
- **Resistance (to corrosion):** Is the protection against corrosion by surface and sacrificial protection, and use of stainless steel.
- **Tendency:** (to form ions) : The more reactive metals lose electrons to become more stable.
- **Rusting:** When iron undergoes oxidation by reacting with oxygen present in the air along with water , it forms hydrated iron(lll) oxide , which is called rust .
- **Barrier Method:** Cover metal with a layer of substance such as paint or oil.
- **Sacrificial Method:** Is to sacrifice more reactive metal to corrode with water and air by layering it over less reactive metal.
- **Zinc Galvanising:** Is steel coated with zinc , usually used on roofs.
- **Haematite ore:** Is an iron ore used in extraction of iron.
- **Bauxite ore:** Is an aluminium ore which is purified to yield a white powder in aluminium extraction.
- **Reduction:** Metals above zinc in the reactivity series may be extracted from its ore by reduction.
- **Cryolite:** Is an aluminium compound which is dissolved in aluminium oxide to lower the melting point when extracting aluminium.

Section 10: Chemistry of the Environment

1. **Coagulation:** Is the process by which small solid clay particles join together into large lumps of solids when lime and alum are added, during water purification.
2. **Sedimentation:** Is the process by which lumps of solid settle to the bottom of the tank during water purification.
3. **Chlorination:** Is the process by which bacterias are killed during water purification.
4. **Fertiliser:** Are additional substances supplied to the crops to increase their productivity e.g. nitrogen,phosphorus and potassium.
5. **Eutrophication:** Is the increase in organic content of water when fertilisers leach into soil and washed into rivers and streams.

6. **Atmosphere:**Is a mixture of nitrogen (78%) , oxygen (21%) and other gases (1%) that surrounds Earth.
7. **Air pollution:** Is the introduction of chemicals, particulate matter , or biological materials that cause harm or discomfort to humans or other living organisms, or cause damage to the natural environment.
8. **Greenhouse effect:** Is the trapping of heat from the sun by greenhouse gases to regulate Earth's temperature so that not all heat is re radiated back to space .
9. **Acid rain:** Is formed by sulfur dioxide and nitrogen dioxide, both react with water to form sulphuric acid / nitric acid . This is called hydrolysis.
10. **Desulphurization:** It is the removal of sulphur dioxide from flue(waste) gases. The product is carbon dioxide, which is a non polluting gas , and calcium sulfite.
11. **Photochemical smog:** It is a hazy brown air,which is a mixture of fog and smoke , that reduces visibility, causes eye irritation and breathing difficulties.It is produced by reaction between nitrogen dioxide and oxygen in the presence of NO ,O and oxygen.
12. **Catalytic converter:** It splits up the molecules after they leave a car's engine and before they get pumped out into the air
13. **Photosynthesis:** Occurs when plants use light energy to convert carbon dioxide and water into glucose and oxygen..

Section 11: Organic Chemistry

- ➔ **Petroleum:** It is a naturally occurring mixture of Hydrocarbons (mainly alkanes)
- ➔ **Fractional Distillation:** A process through which miscible liquids in a compound are separated at different boiling points.
- ➔ **Viscosity:** A measure of a fluid's resistance to flow
- ➔ **Hydrocarbon:** Compounds that only contain the elements Carbon and Hydrogen.
- ➔ **Homologous Series:** It is a family of organic compounds with the same functional group and similar chemical properties
- ➔ **Functional Group:** an atom or a group of atoms that give a molecule its characteristic properties
- ➔ **General Formula:** The general molecular formula of compounds
- ➔ **Structural Isomers:** Two or more compounds that have the same molecular formula but different structural formula
- ➔ **Saturated Compound:** Compounds that have no C-C double bond
- ➔ **Unsaturated Compound:** Compounds that have at least one C-C double bond.
- ➔ **Branched:** (in Isomers) Compounds that have a branch or a side chain and not a straight chain
- ➔ **Combustion:**The burning of a substance in the presence of oxygen .
- ➔ **Substitution:** (in Alkanes) when a hydrogen atom in an alkane is replaced (substituted) by a halogen to form a new compound in the presence of UV light.
- ➔ **Photochemical Reaction:** (in Alkanes) a reaction initiated by the absorption of light (eg. Substitution reaction)
- ➔ **Cracking:** it is the breaking down of long-chained hydrocarbons in the presence of a catalyst into smaller molecules.
- ➔ **Bromination/Aqueous Bromine:** the addition of Aqueous Bromine to check if the compound is unsaturated. In unsaturated compounds (ie. Alkenes). Aqueous Bromine goes from brown to colourless.
- ➔ **Hydrogenation:** The Addition of Hydrogen to an alkene in the presence of Nickel as a catalyst at 200℃

- **Hydration:** The Addition of Steam to alkenes to produce alcohols at 300°C and 60 atm in the presence of H_3PO_4 catalyst.
- **Fermentation:** A process to manufacture ethanol . Fermentation of aqueous glucose takes place at 25-35°C in the presence of yeast.
- **Anaerobic:** Ethanol fermentation in which yeast works in the absence of oxygen.
- **Oxidation:** Alcohol can be oxidised by warming it with oxidising agent(e.g. acidified potassium manganate) and when left in air with bacterial enzymes as catalyst to produce carboxylic acid and water.
- **Esterification:**The process of combining a carboxylic acid and alcohol with the removal of one molecule of water. Concentrated sulfuric acid is used as a catalyst.
- **Monomer:** The small molecules which join together to form a large molecule called polymer.
- **Polymer:** Is a large molecule made by joining together many small molecules called monomers.
- **Repeat Unit:** Is a part of a polymer whose repetition would produce the complete polymer chain.
- **Linkage:** Essentially, a covalent bond.
- **Condensation Polymerisation:** A large number of monomers combine together to give a bigger molecule called a **polymer**, and a small molecule, typically **H_2O** as products.
- **Addition Polymerisation:** A large number of monomers join together to give a large molecule called a **polymer** as the **only** product.
- **Ester Linkage:** It is the hydroxyl group (of alcohol) covalently bonded with the carboxylic acid.
- **Amide Linkage:** It is a carbonyl carbon-nitrogen bond.
- **Polyester:** The linkage between the monomers in terylene is called **ester linkage**. Therefore we can call this polymer a polyester.
- **Polyamide:** The linkage between monomers in nylon is called **amide linkage**. Therefore we can call nylon as polyamide.

Section 12: Experimental Techniques & Chemical Analysis

- **Stopwatch :** Apparatus used for measuring time.
- **Thermometer:** Apparatus used for measuring temperature.
- **Balance:** Apparatus used for measuring mass.
- **Volumetric pipette:** Apparatus used for measuring volume .
- **Gas syringe:** Apparatus used for measuring the volume of a gas.
- **Solvent:** A substance that dissolves a solute.
- **Solute:** Substance that is dissolved in the solvent .
- **Saturated solution:** Solution containing the maximum concentration of a solute dissolved in the solvent at a specified temperature.
- **Residue:** A substance that remains after evaporation, distillation, filtration or any similar process.
- **Filtrate :** Liquid or solution that has passed through a filter .
- **Chromatography:** A process used to separate mixtures of soluble substances , using a suitable solvent .Chromatography identifies unknown substances by comparison with known substances , and pure and impure substances.

- ➔ **Filtration:** Is used to separate insoluble solid from a liquid.
- ➔ **Evaporation:** Is used to separate dissolved solid from a solution by evaporating all the liquid.
- ➔ **Crystallisation:** This process separates dissolved solid from a solution when we make the solution saturated by heating and then on cooling, crystals are formed as solubility of solute decreases on decreasing temperature.
- ➔ **Simple distillation:** Separates pure liquid from a solution by condensing the vaporised liquid .
- ➔ **Fractional distillation:** It is used for separating miscible liquids having boiling points differing by 10-20°C. The liquid having the lower boiling point distils over first , and the other component is left behind.

A Note from Mojza

This resource for Chemistry(5070) has been prepared by Team Mojza, covering the content for GCE O Levels and IGCSE 2025-27. The content of this resource has been prepared with utmost care. We apologise for any issues overlooked; factual, grammatical or otherwise. We hope that you benefit from these and find them useful towards achieving your goals for your Cambridge examinations.

If you find any issues within these notes or have any feedback, please contact us at support@mojza.org.

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CHEMISTRY

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These notes are made to encompass the complete syllabus for 5070 & 0620 from 2025 to 2027, with great attention and care for every topic. All information is curated in a simple, clear, and concise manner. The aim is to aid students and make learning easier in preparation for their exams. Team Mojza makes every effort to error-check all the content; if you find any discrepancies, please reach out to us at *support@mojza.org*.