

Definitions and Concepts for OCR (B) Chemistry GCSE

Topic 5 - Chemical Analysis

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

Definitions marked by '' are for separate sciences only*

Definitions have been taken, or modified from the [OCR \(B\) Specification for GCSE Chemistry, J258, Version 3.2 April 2020](#)

Acid: Produces hydrogen ions (H^+) in aqueous solutions with a pH range between 0 and 7.

***Actual yield:** The mass of product obtained from a reaction. It is normally less than the theoretical yield due to incomplete reactions, side reactions and loss of product in transfer.

Alkali: Produces hydroxide ions (OH^-) in aqueous solutions with a pH range between 7 and 14.

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

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. Metals tend to form cations.

Chromatography: A process used to separate substances in a mixture. Separation of the substance depends on distribution between a mobile phase and a stationary phase.

Conservation of mass: 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.

Crystallisation: A separation technique to obtain soluble solids from solutions. The process involves heating the solution until crystals start to form, leaving the solution to cool and then filtering the formed crystals from the solution.

Emission spectroscopy: A technique which looks at the spectrum of light emitted from a hot sample. Each element will give a unique pattern of lines and so identification of elements can be done by matching the patterns and wavelengths of lines to reference data from known elements.

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Filtration: A separation technique used to separate an insoluble solid from a solution.

Flame test: Qualitative test used to identify metal ions (cations). Carried out by inserting a nichrome wire loop with the unknown compound on into a flame and observing the colour.

Formulation: Mixtures designed for a particular use. They are made up of exact quantities of pure substances.

Fractional distillation: A process used to separate a mixture of liquids. The liquids have different boiling points so can be separated into different fractions within a fractionating column.

Indicators: A chemical used to distinguish between acidic and alkaline solutions. Examples include phenolphthalein, litmus and methyl orange. They are also used in titration reactions to indicate the end point of the reaction by a clear colour change

Instrumental methods: Used to detect and identify elements and compounds. They are accurate, sensitive and rapid.

Locating agent: A chemical which reacts with a colourless substance to produce a coloured product. They are used in paper and thin layer chromatography to help identify the substances on the stationary phase.

Mixture: Contains at least two different elements or compounds which are not chemically bonded together. Mixtures may melt or boil over a range of temperatures.

Mobile phase: The fluid (gas or liquid) which moves through the chromatography system, carrying the mixture which is to be separated.

***Molar volume:** The volume occupied by one mole of gaseous molecules.

***Molar volume at RTP:** The volume occupied by one mole of molecules of any gas at room temperature and pressure (RTP). The molar volume at RTP is 24 dm^3 .

Mole: The unit for amount of substance. Chemical amounts are measured in moles. The symbol for the unit mole is mol.

Neutralisation: The reaction in which an acid and a base react together to form a salt and water.

Paper chromatography: A type of chromatography which uses paper as the stationary phase and a solvent as the mobile phase. The solvent carries the mixture up the paper and the substances in the mixture separate, depending on their solubility in the mobile phase.



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

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

Precipitation reaction: A reaction in which solutions react to form an insoluble product.

Pure substance: The chemistry definition of a pure substance is a substance which contains only one compound or element. The everyday definition of a pure substance is a substance which has nothing added to it, e.g. pure milk. Pure substances can be identified using melting point.

***Qualitative analysis:** Analysing a sample by its quality. This generally refers to the observations of the sample's colour and state.

***Quantitative analysis:** Analysing a sample by measuring quantities such as mass, percentage yield, atom economy.

Relative atomic mass: An average value that takes account of the abundance 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.

Rf value: A value used in chromatography which is calculated as the distance travelled by the dissolved substance divided by the distance travelled by the solvent. It can be used to identify substances within a mixture.

Simple distillation: A separation technique used to separate a liquid from a solution. The solution is heated so that only the liquid with the lowest boiling point evaporates. This gas is then condensed in a condenser before being collected as a liquid.

Stationary phase: The nonmoving phase which the mobile phase passes over during chromatography.

***Theoretical yield:** The maximum possible mass of product that can be obtained from a reaction.

Titration: A technique used where a solution of known concentration is used to determine the concentration of an unknown solution.

