CSCA Chemistry

48 questions | 60 minutes | Marked out of 100 | Single-answer multiple choice | Paper in Chinese or English | No calculator

The official syllabus (2025 edition) has four modules: Basic Chemical Concepts and Calculations, Properties and Reactions of Substances, Chemical Theories and Laws, and Chemical Experiments and Applications. This list follows the modules of the CSCA.HELP course, which group the same points differently.

How to use it: tick a topic when you can answer questions on it against the clock, not when you have read about it. Lessons and timed mock papers for every topic are free at csca.help.

Module 1 — Atomic Structure and the Periodic Table

- [ ] The atom: protons, neutrons, electrons, atomic and mass number
- [ ] Isotopes and relative atomic mass calculations
- [ ] Electron shells and electron configuration
- [ ] Structure of the periodic table: groups, periods, blocks
- [ ] Periodic trends: atomic radius and ionisation energy
- [ ] Periodic trends: electronegativity and metallic character
- [ ] Group 1 alkali metals
- [ ] Group 17 halogens
- [ ] Group 18 noble gases
- [ ] Ions and the basics of ionic bonding
- [ ] Relative formula mass and an introduction to moles

Module 2 — Chemical Reactions

- [ ] Writing and balancing chemical equations
- [ ] Types of reaction: synthesis, decomposition, displacement, combustion
- [ ] Acids, bases and the pH scale
- [ ] Reactions of acids with metals, bases and carbonates
- [ ] Exothermic and endothermic reactions
- [ ] Rates of reaction and collision theory
- [ ] Catalysts
- [ ] Reversible reactions and chemical equilibrium (化学平衡): Le Chatelier's principle and the conditions of ammonia synthesis
- [ ] Electrolyte solutions: strong and weak electrolytes, ionic equations, the ionisation of water, pH and salt hydrolysis
- [ ] Electrolysis basics (not named in the syllabus; taught as an application of redox)
- [ ] The reactivity series and extraction of metals
- [ ] Conservation of mass and reacting-mass calculations
- [ ] Oxidation and reduction (redox)

Module 3 — Organic Chemistry

- [ ] Introduction to organic chemistry and homologous series
- [ ] Alkanes
- [ ] Alkenes and the bromine water test
- [ ] Crude oil and fractional distillation
- [ ] Polymers and polymerisation
- [ ] Alcohols
- [ ] Carboxylic acids
- [ ] Isomers: chain, position and functional group isomerism

Beyond the syllabus, for background only: air quality and pollution, the Earth's atmosphere, water treatment

Module 4 — Inorganic Chemistry and Quantitative Analysis

- [ ] Covalent bonding and dot-and-cross diagrams
- [ ] Giant covalent structures: diamond, graphite, silicon dioxide
- [ ] Metallic bonding
- [ ] Ionic bonding in detail and the properties it produces
- [ ] States of matter and changes of state
- [ ] Separation techniques: filtration, distillation, chromatography
- [ ] Chemical tests for gases and ions
- [ ] The mole and molar mass calculations
- [ ] Concentration and titration calculations
- [ ] Gas volume calculations (Vm = 22.4 L/mol at STP, and pV = nRT), and percentage yield
- [ ] Intermolecular forces and hydrogen bonding
- [ ] Laboratory safety and apparatus, and the preparation and collection of common gases (O_2, H_2, CO_2, Cl_2, NH_3)

Electrolysis in detail (beyond the syllabus, for depth only)