

ASOE Chemistry Syllabus

This exam focuses on testing skills rather than recall of knowledge. Students need to approach the problems logically and apply chemical reasoning to the scenarios described. We assume familiarity with the following topics, the majority of which should be encountered in the penultimate year of high school chemistry.

General

Elements, compounds, mixtures, separation techniques, solubility.

Atomic structure

Bohr model, isotopes, simple shell electron configurations of atoms and ions.

Structure and bonding of elements and compounds

Ionic, covalent, metallic bonding; intermolecular forces; relation to melting point and boiling point. Lewis/electron dot structures including simple organic chemicals; molecular shape and polarity.

Periodic trends

Trends down groups and across periods: atomic radius, electronegativity, types of compounds formed, chemical reactivity.

Stoichiometry

Balancing chemical equations; mole calculations involving mass/molar mass, concentration/solution volume, gas volume/molar gas volume; percentage composition and empirical formula calculations; excess and limiting reagents.

Kinetics

Measuring rates of reaction; factors affecting reaction rate, kinetic/particle theory.

Redox

Basic concepts involving reduction as gain and oxidation as loss of electrons; combining two given half-equations to form a balanced overall equation; extraction of two half-equations from a balanced overall equation.

Acids and bases

Common acids and bases and the polyatomic ions derived from them; reactions of acids with metals, oxides/hydroxides and carbonates/hydrogencarbonates; indicators.

Exam format

The exam will consist of two sections: Part A will contain 15 multiple choice questions which will cover basic concepts in chemistry; Part B will consist of three written questions. The Part B questions will cover a range of topics. Students are not always expected to be familiar with these topics; in such cases sufficient information to solve the problem is provided in the question.

Students should attempt all questions. Part A is worth 25% of the paper, as is each question in part B. There is no penalty (negative marking) for incorrect answers and where possible calculation errors are carried through to subsequent steps.