

GCE AS and A LEVEL CHEMISTRY (Wales) SUMMARY OF ASSESSMENT Summer 2022 only

This specification is divided into a total of 5 units: 2 AS units and 3 A2 units.
Weightings noted below are expressed in terms of the full A level qualification.

AS (2 units)

AS Unit 1
The Language of Chemistry, Structure of Matter and Simple Reactions
Written examination: 1 hour 30 minutes (80 marks)

A range of short answer, structured and extended response questions.

AS Unit 2
Energy, Rate and Chemistry of Carbon Compounds
Written examination: 1 hour 30 minutes (80 marks)

A range of short answer, structured and extended response questions.

A Level (based on A2 units only in 2022)

A2 Unit 3
Physical and Inorganic Chemistry
Written examination: 1 hour 45 minutes (80 marks) 125 UMS
41.67% of qualification

A range of short answer, structured and extended response questions.

A2 Unit 4
Organic Chemistry and Analysis
Written examination: 1 hour 45 minutes (80 marks) 125 UMS
41.67% of qualification

A range of short answer, structured and extended response questions.

A2 Unit 5
Practical examination (60 marks) 50 UMS
16.67% of qualification

This unit comprises two tasks:

- Experimental Task (30 marks)
- Practical Methods and Analysis Task (30 marks)

This adapted version of GCE Chemistry is for learners cashing-in the A level qualification in **2022 only**. Candidates entering the qualification in 2023 should use the approved [specification](#).

Summary of changes for 2022

AS Units 1 + 2: Written exams

Listed below are specification statements that will not be subject to assessment in the AS examinations in summer 2022.

AS UNIT 1: The Language of Chemistry, Structure of Matter and Simple Reactions	
1.2	Basic ideas about atoms
	(b) behaviour of α -, β - and γ -radiation in electric and magnetic fields and their relative penetrating power
	(d) adverse consequences for living cells of exposure to radiation and use of radioisotopes in many contexts, including health, medicine, radio-dating, industry and analysis
	(i) atomic emission spectrum of the hydrogen atom
	(k) order of increasing energy of infrared, visible and ultraviolet light
	(l) significance of the frequency of the convergence limit of the Lyman series and its relationship with the ionisation energy of the hydrogen atom
1.3	Chemical calculations
	(b) principles of the mass spectrometer [the second part of this statement remains]
1.6	The Periodic Table
	(m) reactions of the halogens with metals
	(q) use of chlorine and fluoride ions in water treatment and the related health and ethical issues
1.7	Simple equilibria and acid-base reactions
	(c) equilibrium constant (K_c) and calculations involving given concentrations
	SPECIFIED PRACTICAL WORK - Double titration, for example, analysis of a mixture of sodium hydroxide and sodium carbonate
AS UNIT 2: Energy, Rate and Chemistry of Carbon Compounds	
2.1	Thermochemistry
	*SPECIFIED PRACTICAL WORK - Determination of an enthalpy of combustion
2.5	Hydrocarbons
	(j) conditions required for the catalytic hydrogenation of ethene and the relevance of this reaction
2.6	Halogenoalkanes
	(e) halogenoalkanes as solvents, anaesthetics and refrigerants, and tight regulation of their use due to toxicity or adverse environmental effects
	(f) adverse environmental effects of CFCs and the relevance of the relative bond strengths of C–H, C–F and C–Cl in determining their impact in the upper atmosphere
2.7	Alcohols and carboxylic acids
	(h) esterification reaction that occurs when a carboxylic acid reacts with an alcohol
	(i) separation by distillation

	SPECIFIED PRACTICAL WORK - Preparation of an ester and separation by distillation
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* Questions may be set on the theory related to these specified practicals.

A2 Units 3 + 4: Written exams

Synoptic questions - AS content that is not developed or required for Units 3 and 4 will not be assessed in 2022.

Listed below are specification statements that will also not be subject to assessment in the A2 examinations in summer 2022.

A2 Unit 3: Physical and inorganic Chemistry	
3.1	Redox and standard electrode potential
	(f) principles of the hydrogen fuel cell and its benefits and drawbacks
3.2	Redox reactions
	*SPECIFIED PRACTICAL WORK - Estimation of copper in copper(II) salts
3.3	Chemistry of the p-block
	(d) structure and bonding in Al_2Cl_6 and formation of donor-acceptor compounds such as $\text{NH}_3\cdot\text{BF}_3$
	(e) bonding and structure in hexagonal and cubic boron nitride and how these relate to their properties and uses
	(k) bleaching and bactericidal action of Cl_2 and chlorate(I) (ClO^-) resulting from their oxidising power
3.4	Chemistry of the d-block transition metals
	(g) catalytic properties of many transition metals and their compounds; heterogeneous catalysis as a result of surface adsorption and homogeneous catalysis as a result of variable oxidation state
	(h) nickel and iron as the catalysts used in the hydrogenation of alkenes and the Haber process respectively
	(i) vanadium(V) oxide as the catalyst used in the contact process and that manganese(IV) oxide as an effective catalyst for the decomposition of hydrogen peroxide
3.5	Chemical kinetics
	(a) principles underlying the measurement of reaction rate by sampling and quenching
3.8	Equilibrium constants
	*SPECIFIED PRACTICAL WORK - Determination of an equilibrium constant, for example, for the equilibrium established when ethanol reacts with ethanoic acid

A2 Unit 4 – Organic Chemistry and Analysis	
4.4	Aldehydes and ketones
	(e) reaction of aldehydes and ketones with 2,4-dinitrophenylhydrazine and its use as a test for a carbonyl group and in identifying specific aldehydes and ketones
4.7	Amino acids and proteins
	(d) formation of polypeptides and proteins

	(e) basic principles of primary, secondary and tertiary protein structure (f) essential role in living systems, for example, as enzymes
4.8	Organic synthesis and analysis *SPECIFIED PRACTICAL WORK - Two-step synthesis, including purification and determination of melting temperature of product SPECIFIED PRACTICAL WORK - Paper chromatography separation, including two-way separation

* Questions may be set on the theory related to these specified practicals.

A2 Unit 5: Practical Examination

Both the Experimental Task and the Practical Methods and Analysis Task will be assessed in 2022.

Further information

- The assessment of practical skills in the AS units and A2 units 3 and 4 will be unchanged.
- AS content that is not developed or required for Units 3 and 4 will not be assessed in 2022.
- To facilitate the return of the Unit 5 assessment in 2022 we will put the following measures in place for the next academic year:
 - The "Instructions to Teachers" document will be released earlier than usual in October instead of January.
 - As usual the equipment list will be present for the Experimental Task in the "Instructions to Teachers" document. In addition to this advance notice for teachers will also be provided on the topic area(s) that will be assessed in the Practical Methods and Analysis Task. This will enable teachers to ensure that they have taught all the necessary content. As always, the information in the "Instructions to Teachers" document must not be shared with candidates.
 - The "Setting up Instructions" document will be released, as usual, one week before the Experimental Task examination. In addition, an extra page will be present containing advance notice for candidates on the topic area(s) that will be assessed in both the Experimental Task and the Practical Methods and Analysis Task. This page should be copied and given to candidates on receipt.
 - The timing of the Unit 5 exams will be as late as possible to allow centres as much teaching time as possible before the assessments take place.

Monitoring visits will take place on the dates of the Experimental Task and the Practical Methods and Analysis task. There is an expectation that Lab books will be used in 2022 and they will be reviewed in the monitoring visit. However, monitors will only observe A2 content in the Lab books in 2022.