

## Year 12 - OCR A-level (H432) Chemistry

Timing	Unit Title	Key Question	Knowledge	Assessing understanding
Autumn Term 1	<b>Module 2</b> <b>Chapter 2</b> <b>Chapter 5</b> <b>Chapter 7</b>  <b>Structure of atoms</b>  <b>Bonding</b>	<b>What are the nuclear and electronic structure of atoms?</b>  <b>How do atoms bond together?</b>	<ul style="list-style-type: none"> <li>• Atoms and isotopes</li> <li>• RAM and using a mass spectrometer</li> <li>• Arrangement of electrons in atoms</li> <li>• Ionization energy</li> <li>• Electronic configuration and s,p,d, f orbitals</li> <li>• Theories of ionic, covalent and metallic bonding</li> <li>• Periodicity</li> </ul>	<b>How understanding is assessed</b> Students will be assessed on their ability to: <ul style="list-style-type: none"> <li>• Recall the knowledge covered</li> <li>• Explain the chemical phenomena</li> <li>• Interpret graphical and experimental data</li> <li>• Make connections between different areas of understanding.</li> </ul> <b>Skills</b> <ul style="list-style-type: none"> <li>• Description</li> <li>• Explanation</li> <li>• Evaluation</li> <li>• Comparison</li> <li>• Planning and carrying out investigations</li> <li>• Chemical calculations</li> </ul>
	<b>Module 2</b> <b>Chapter 3</b>  <b>Amounts of substance</b>	<b>How do we calculate amounts of substance in chemistry?</b>	<ul style="list-style-type: none"> <li>• Formulae and equations,</li> <li>• Using moles</li> <li>• Measuring concentration</li> <li>• Reacting masses</li> <li>• % yield and atom economy.</li> <li>• Gas calculations and Ideal Gas Equation</li> <li>• Titration and titration calculations</li> </ul>	<b>Assessment point information</b>  Based on two written tests on: <ul style="list-style-type: none"> <li>• Atomic Structure and Calculations</li> <li>• Structure and Bonding</li> </ul>
	<b>Module 2</b> <b>Chapter 4</b>  <b>Acids and Redox</b>	<b>How can we make and purify salts?</b>	<ul style="list-style-type: none"> <li>• Acid-base reactions and salt production</li> <li>• Anhydrous and hydrated salts</li> </ul>	<b>Practical endorsement</b> <ul style="list-style-type: none"> <li>• 1.2 <b><u>Determination of the relative atomic mass of magnesium</u></b></li> <li>• 2.1 <b><u>Determination of concentration of hydrochloric acid</u></b></li> </ul>

Autumn Term 2	<b>Module 2 Chapter 6</b>  <b>Shapes of molecules</b>	<b>How can we predict the shapes of molecules?</b>	<ul style="list-style-type: none"> <li>• VSEPR theory and shapes of molecules.</li> <li>• Types of intermolecular forces</li> </ul>	<ul style="list-style-type: none"> <li>• 2.2 <u>Determination of the molar mass of an acid</u></li> </ul>
	<b>Module 2 Chapter 4</b>  <b>Redox</b>	<b>How is the concept of oxidation number useful in explaining redox reactions?</b>	<ul style="list-style-type: none"> <li>• Oxidation number</li> <li>• Balancing redox equations</li> </ul>	
	<b>Module 3 Chapter 8</b>  <b>Reactivity Trends</b>	<b>How are reactions related to position of an element in the periodic table?</b>	<ul style="list-style-type: none"> <li>• Reactions of Group 2 metals and compounds.</li> <li>• Reactions of Group 7 – the halogens and their compounds</li> <li>• Qualitative analysis</li> </ul>	

	<b>Module 4</b> <b>Chapter 11</b> <b>Chapter 12</b>	<b>What are the structures and properties of hydro-carbons ?</b>	<ul style="list-style-type: none"> <li>● Origin of hydrocarbons and nomenclature</li> <li>● Reactions of alkanes</li> <li>● Types of bond breaking</li> <li>● Free radical substitution</li> </ul>	
Spring Term 1	<b>Module 3</b> <b>Chapter 9</b>  <b>Energy</b>	<b>How much energy change is associated with chemical reactions?</b>	<ul style="list-style-type: none"> <li>● Measuring energy changes</li> <li>● Defining important enthalpy changes</li> <li>● Using Hess's Law</li> <li>● Using bond enthalpies</li> </ul>	<b>How understanding is assessed</b> Students will be assessed on their ability to: <ul style="list-style-type: none"> <li>● Recall the knowledge covered</li> <li>● Explain the chemical phenomena</li> <li>● Interpret graphical and experimental data</li> <li>● Make connections between different areas of understanding.</li> </ul> <b>Skills</b> <ul style="list-style-type: none"> <li>● Description</li> <li>● Explanation</li> <li>● Evaluation</li> <li>● Comparison</li> <li>● Planning and carrying out investigations</li> <li>● Chemical calculations</li> </ul> <b>Assessment point information</b>  Based on: <ul style="list-style-type: none"> <li>● Two written tests on Periodic Table and Energy and Organic Chemistry</li> </ul> <b>Practical endorsement</b> <ul style="list-style-type: none"> <li>● 4.2 <u>Identifying unknowns</u></li> <li>● 3.1 <u>Determination of the enthalpy change of neutralisation</u></li> </ul>
	<b>Module 4</b> <b>Chapter 13</b>  <b>Organic Chemistry</b>	<b>What are the structures and properties of hydro-carbons ?</b>	<ul style="list-style-type: none"> <li>● Reactions of alkenes</li> <li>● The carbon-carbon double bond and delocalisation</li> <li>● Cis-trans/E-Z isomerism</li> <li>● Electrophilic addition and Markovnikov's rule</li> <li>● Describing mechanisms using curly arrow notation</li> <li>● Polymerisation and issues surrounding use, recycling and disposal of plastics</li> </ul>	
	<b>Module 3</b> <b>Chapter 10</b>  <b>Rate</b>  <b>Equilibrium</b>	<b>What influences the rate of a chemical reaction?</b>	<ul style="list-style-type: none"> <li>● Qualitative ideas about factors that affect chemical reactions</li> <li>● Methods for measuring rates of reaction</li> <li>● Activation energy</li> <li>● Catalysis</li> </ul>	

		How far do reactions go?	<ul style="list-style-type: none"> <li>Qualitative ideas about dynamic equilibrium</li> <li>Changing the position of equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>3.2 <u>Determination of a enthalpy change of reaction by Hess' Law</u></li> <li>3.3 <u>Determination of enthalpy changes of combustion</u></li> <li>5.2 <u>Preparation of cyclohexene</u></li> </ul>
Spring Term 2	<b>Module 4</b> <b>Chapter 14</b> <b>Chapter 15</b> <b>Chapter 16</b>  <b>Alcohols and halogenoalkanes</b>	What are the structures and properties of alcohols and halogenoalkanes?	<ul style="list-style-type: none"> <li>Properties and reactions of alcohols</li> <li>Reactions of halogenoalkanes</li> <li>Uses of halogenoalkanes and associated issues</li> <li>Identifying halogenoalkanes</li> <li>Preparing halogenoalkanes from alcohols and vice versa</li> <li>Organic synthetic techniques</li> </ul>	<b>How understanding is assessed</b>  Students will be assessed on their ability to: <ul style="list-style-type: none"> <li>Recall the knowledge covered</li> <li>Explain the chemical phenomena</li> <li>Interpret graphical and experimental data</li> <li>Make connections between different areas of understanding.</li> </ul> <b>Skills</b> <ul style="list-style-type: none"> <li>Description</li> <li>Explanation</li> <li>Evaluation</li> <li>Comparison</li> <li>Planning and carrying out investigations</li> <li>Chemical calculations</li> </ul>
	<b>Module 4</b> <b>Chapter 17</b>  <b>Analytical techniques</b>	What information can we obtain from analysis of chemical compounds?	<ul style="list-style-type: none"> <li>Mass spectrometry</li> <li>Infra-red spectroscopy</li> </ul>	
Summer Term 1	<b>Study leave and exams</b>	What is the best preparation for your AS/Internal Chemistry exams?	<ul style="list-style-type: none"> <li>Revision and past paper practise</li> </ul>	<b>How understanding is assessed</b>  Students will be assessed on their ability to: <ul style="list-style-type: none"> <li>Recall the knowledge covered</li> <li>Explain the chemical phenomena</li> <li>Interpret graphical and experimental data</li> <li>Make connections between different areas of understanding.</li> </ul>

				<p><b>Skills</b></p> <ul style="list-style-type: none"> <li>● Description</li> <li>● Explanation</li> <li>● Evaluation</li> <li>● Comparison</li> <li>● Planning and carrying out investigations</li> <li>● Chemical calculations</li> </ul> <p><b>Assessment point information</b></p> <p>Based on:</p> <ul style="list-style-type: none"> <li>● Internal AS level examinations</li> </ul>
Summer Term 2	<p><b>Module 5</b> <b>Chapter 19</b> <b>Equilibria</b></p>	<p><b>What happens when reactions do not go to completion?</b></p>	<ul style="list-style-type: none"> <li>● Equilibrium constants</li> <li>● Calculating <math>K_c</math> and <math>K_p</math></li> <li>● Determination of <math>K_c</math>,</li> <li>● Effect of concentration, temperature, pressure and catalysts on equilibrium position</li> </ul>	<p><b>Practical endorsement</b></p> <ul style="list-style-type: none"> <li>● <b>6 <u>Preparation of aspirin</u></b></li> </ul>
	<p><b>Module 6</b> <b>Chapter 25</b> <b>Arene chemistry</b></p>	<p><b>What is so special about <math>C_6H_6</math>?</b></p>	<ul style="list-style-type: none"> <li>● Structure and bonding in benzene</li> <li>● Electrophilic substitution mechanism</li> <li>● Reactions of benzene</li> <li>● Reactions of phenol</li> <li>● Directing groups</li> </ul>	
	<p><b>Practical skills</b> <b>Making aspirin</b></p>		<ul style="list-style-type: none"> <li>● Making aspirin</li> </ul>	