

Year 12 Chemistry Revision Tables

Organic and Biological Chemistry

Topic 4.1: Systematic Nomenclature

<i>Expectation</i> From SACE Subject Outline <i>Note: these can be asked in converse</i>	<i>Summary of things I know about this</i> (include tricks for memorising things, etc.)	<i>Example question(s) to practice until I can do under test conditions without help</i> There are likely to be some in the textbook too; also take note of questions you'd like examples of from the teacher
Identify the functional groups in the structural formulae of alcohols, aldehydes, ketones, carboxylic acids, amines, esters, and amides.		Formative Test 1 Q1(f) Formative Test 1 Q4(a) Formative Test 1 Q5(c)
State, given its structural formula, the systematic name of an organic compound containing: <ul style="list-style-type: none">• up to eight carbon atoms arranged as either a straight chain or a branched chain• one or more of the same functional groups (with these limited to hydroxyl, aldehyde, ketone, carboxyl, or primary amino groups).		Assignment 2 Q5 Formative Test 1 Q1(a)-(c) Formative Test 1 Q6(a)
Given its systematic name, draw the structural formula of an organic compound containing: <ul style="list-style-type: none">• up to eight carbon atoms arranged as either a straight chain or a branched chain• one or more of the same functional groups (with these limited to hydroxyl, aldehyde, ketone, carboxyl, or primary amino groups).		Assignment 1 Q1 Formative Test 1 Q6(c)

Topic 4.2: Physical Properties

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Predict and explain the melting points and boiling points of an organic compound in comparison with those of other compounds that contain the same functional group.		Assignment 1 Q2(c)
Predict and explain the boiling points of alcohols in comparison with those of aldehydes and ketones of similar molar mass.		Assignment 1 Q3
Predict and explain the boiling points of esters in comparison with those of isomeric acids.		Assignment 2 Q3 Formative Test 1 Q1(e),(g)
Explain the insolubility in water of most organic compounds.		Formative Test 1 Q3
Predict and explain the solubility in water of the smaller amino acids, carboxylic acids, alcohols, aldehydes, and ketones.		
Predict and explain the relative solubilities in water of two organic compounds, given their structural formulae.		

Topic 4.3: Alcohols

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Describe the conditions, and write equations, for the hydrolysis of polysaccharides and disaccharides, and the production of ethanol by the fermentation of glucose.		Formative Test 1 Q2
Identify a hydroxyl group in an alcohol as primary, secondary, or tertiary, given the structural formula.		Assignment 2 Q2 Formative Test 1 Q6(b)
Describe how primary and secondary alcohols can be distinguished from tertiary alcohols by their reaction with acidified dichromate solution.		
Predict the structural formula(e) of the product(s) of dichromate oxidation of a primary or secondary alcohol, given its structural formula.		

Topic 4.4: Aldehydes and Ketones

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Given the structural formula of the aldehyde or ketone, draw the structural formula of the alcohol from which it could be produced by oxidation, and describe the necessary reaction conditions.		
Draw the structural formula of the oxidation product of a given aldehyde in either acidic or alkaline conditions.		Assignment 1 Q4 (b)
Describe how acidified dichromate solution and Tollens' reagent (ammoniacal silver nitrate solution) can be used to distinguish between aldehydes and ketones.		

Topic 4.5: Carboxylic Acids

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Identify the aldehyde or primary alcohol from which a carboxylic acid could be produced by oxidation, given its structural formula.		
Write an equation for the ionisation of a carboxylic acid in water.		
Write equations for the reactions of carboxylic acids with hydroxides, carbonates, and hydrogencarbonates, and describe changes that accompany these reactions.		Assignment 1 Q5 Formative Test 1 Q5(b)
Explain why some drugs with carboxyl groups are usually taken in the form of their salts.		Formative Test 1 Q5(a)

Topic 4.6: Amines

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Draw the structural formula of the protonated form of an amine, given the structural formula of its molecular form, and vice versa.		Assignment 2 Q4(c) Formative Test 1 Q7(c)
Identify an amino group in an amine as primary, secondary, or tertiary, given the structural formula.		Formative Test 1 Q1(d) Formative Test 1 Q7(b)
Explain why some drugs with amine groups are usually taken in the form of their salts.		

Topic 4.7: Esters

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Draw the structural formula of the ester that could be produced by the condensation reaction between an alcohol and a carboxylic acid, given their structural formulae, and write an equation for the reaction.		Assignment 1 Q2 (d) Assignment 2 Q4 (b) Formative Test 1 Q5(d)
Explain the use of heating under reflux and the presence of a trace of concentrated sulfuric acid in the laboratory production of esters.		
Identify the products of hydrolysis of an ester, given its structural formula.		Formative Test 1 Q1(h) Formative Test 1 Q4(b)

Topic 4.8: Amides

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Draw the structural formula of the amide that could be produced by the condensation reaction between an amine and a carboxylic acid, given their structural formulae.		
Identify the products of hydrolysis of an amide, given its structural formula.		

Topic 4.9: Proteins

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Determine whether or not a compound is an amino acid, given its structural formula.		
Draw the structural formula of the product formed when an amino acid self-ionises.		Assignment 3 Q1(b) Formative Test 2 Q1(e)
Identify the amide group and deduce the structural formula(e) of the monomer(s), given the structural formula of a section of a protein.		Formative Test 2 Q1(a)-(b)
Write the general formula of amino acids and recognise their structural formulae.		Assignment 3 Q1(h)
Identify where hydrogen bonding can occur between protein chains or between the chain and water, given the structural formula of a section of the chain.		Assignment 3 Q1(f)
Explain why the biological function of a protein (e.g. an enzyme) is altered if its spatial arrangement is altered.		Assignment 3 Q2(a) Formative Test 2 Q1(d)
Explain why proteins are sensitive to changes in pH and temperature.		Assignment 3 Q2

Topic 4.10: Triglycerides

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Draw the structural formula of an edible oil or fat, given the structural formula(e) of the carboxylic acid(s) from which it is derived.		Assignment 3 Q3(a)
Identify the alcohol and acid(s) from which a triglyceride is derived, given its structural formula.		Assignment 3 Q3(b) Formative Test 2 Q3(a)
Identify the most likely source of a triglyceride, given its state at 25°C.		Assignment 3 Q3(c) Formative Test 2 Q2
Describe and explain the use of a solution of bromine or iodine to determine the degree of unsaturation of a compound. Draw the structural formula of the reaction product.		Assignment 3 Q3(d) Assignment 3 Q3(e) Formative Test 2 Q3(b)
Explain the role of pressure, temperature, and a catalyst in the hydrogenation of liquid triglycerides.		Assignment 3 Q3(f) Formative Test 2 Q3(c)-(d)

Topic 4.11: Carbohydrates

<i>Expectation</i>	<i>Summary of things I know about this</i>	<i>Example question(s) to practice</i>
Given its structural formula, determine the molecular formula of an organic compound, and whether or not it is a carbohydrate.		Formative Test 2 Q4(a)
Write molecular formulae for glucose, and for disaccharides and polysaccharides based on glucose monomers.		
Identify the repeating unit and draw the structural formula of the monomer, given the structural formula of a section of a polysaccharide derived from one monomer.		
Explain the ability of glucose to react as an aldehyde when in chain form but not when in ring form.		Assignment 3 Q4(c),(d) Formative Test 2 Q4(b)
Explain the differences in solubility in water of simple carbohydrates and polysaccharides in terms of the size of the molecules and the number of hydroxyl groups.		Assignment 3 Q4(b) Formative Test 2 Q4(c)