

Mark Scheme

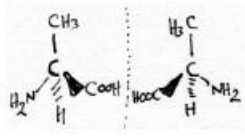
Q1.

Question Number	Answer	Additional Guidance	Mark												
	<p>This question assesses the student's ability to show a coherent and logically structured answer with linkages and fully sustained reasoning.</p> <p>Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.</p> <p>The following table shows how the marks should be awarded for indicative content.</p> <table border="1" data-bbox="363 1115 675 1503"> <thead> <tr> <th data-bbox="363 1115 512 1323">Number of indicative marking points seen in answer</th> <th data-bbox="512 1115 675 1323">Number of marks awarded for indicative marking points</th> </tr> </thead> <tbody> <tr> <td data-bbox="363 1323 512 1357">6</td> <td data-bbox="512 1323 675 1357">4</td> </tr> <tr> <td data-bbox="363 1357 512 1391">5-4</td> <td data-bbox="512 1357 675 1391">3</td> </tr> <tr> <td data-bbox="363 1391 512 1424">3-2</td> <td data-bbox="512 1391 675 1424">2</td> </tr> <tr> <td data-bbox="363 1424 512 1458">1</td> <td data-bbox="512 1424 675 1458">1</td> </tr> <tr> <td data-bbox="363 1458 512 1491">0</td> <td data-bbox="512 1458 675 1491">0</td> </tr> </tbody> </table>	Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points	6	4	5-4	3	3-2	2	1	1	0	0	<p>Guidance on how the mark scheme should be applied:</p> <p>The mark for indicative content should be added to the mark for lines of reasoning. For example, a response with four indicative marking points that is partially structured with some linkages and lines of reasoning scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning).</p> <p>If there were no linkages between the points, then the same indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and zero marks for linkages).</p>	(6)
Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points														
6	4														
5-4	3														
3-2	2														
1	1														
0	0														

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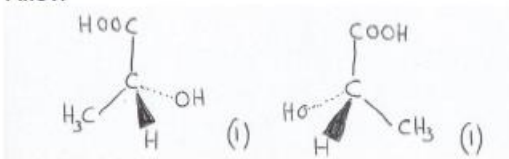
	<p>The following table shows how the marks should be awarded for structure and lines of reasoning</p>										
	<table border="1"> <thead> <tr> <th data-bbox="344 398 604 645"></th> <th data-bbox="604 398 815 645">Number of marks awarded for structure of answer and sustained lines of reasoning</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 645 604 922">Answer shows a coherent logical structure with linkages and fully sustained lines of reasoning demonstrated throughout</td> <td data-bbox="604 645 815 922">2</td> </tr> <tr> <td data-bbox="344 922 604 1061">Answer is partially structured with some linkages and lines of reasoning</td> <td data-bbox="604 922 815 1061">1</td> </tr> <tr> <td data-bbox="344 1061 604 1200">Answer has no linkages between points and is unstructured</td> <td data-bbox="604 1061 815 1200">0</td> </tr> </tbody> </table>		Number of marks awarded for structure of answer and sustained lines of reasoning	Answer shows a coherent logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2	Answer is partially structured with some linkages and lines of reasoning	1	Answer has no linkages between points and is unstructured	0	<p>More than one indicative marking point may be made within the same comment or explanation</p> <p>Accept annotated diagrams to illustrate the indicative points</p> <p>Ignore reference to other amino acid properties</p>	
	Number of marks awarded for structure of answer and sustained lines of reasoning										
Answer shows a coherent logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2										
Answer is partially structured with some linkages and lines of reasoning	1										
Answer has no linkages between points and is unstructured	0										

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	<p>Indicative content</p> <p>IP1 (Similarity)</p> <ul style="list-style-type: none"> they are both 2-amino acids / alpha amino acids / naturally occurring/ zwitterions <p>IP2</p> <ul style="list-style-type: none"> equation for the reaction with an acid <p>IP3</p> <ul style="list-style-type: none"> equation for the reaction with a base 	<p>The zwitterions can be evidenced from each amino acid zwitterion in an equation e.g. $\text{NH}_3^+\text{CH}(\text{CH}_3)\text{COO}^- / \text{NH}_3^+\text{CH}_2\text{COO}^-$</p> <p>e.g. $\text{H}^+ + \text{NH}_3^+\text{CH}_2\text{COO}^- \rightarrow \text{NH}_3^+\text{CH}_2\text{COOH}$ or $\text{H}^+ + \text{NH}_3^+\text{CH}(\text{CH}_3)\text{COO}^- \rightarrow \text{H}_3\text{N}^+\text{CH}(\text{CH}_3)\text{COOH}$</p> <p>$\text{OH}^- + \text{NH}_3^+\text{CH}_2\text{COO}^- \rightarrow \text{NH}_2\text{CH}_2\text{COO}^- + \text{H}_2\text{O}$ or $\text{OH}^- + \text{NH}_3^+\text{CH}(\text{CH}_3)\text{COO}^- \rightarrow \text{NH}_2\text{CH}(\text{CH}_3)\text{COO}^- + \text{H}_2\text{O}$ Allow use of un-ionised amino acid structures</p> <p>If IP2 and 3 not scored then allow 1IP for a suitable description of acid and base behaviour</p>	
	<p>IP4</p> <ul style="list-style-type: none"> alanine has a chiral centre/ asymmetric carbon atom/ non-superimposable mirror images and glycine does not <p>IP5</p> <ul style="list-style-type: none"> (an aqueous solution of) alanine rotates the plane (of polarisation) of plane-polarised (monochromatic) light but glycine does not <p>IP6</p> <ul style="list-style-type: none"> diagram to show enantiomers of alanine 	<p>Allow reference to four different atoms/groups bonded to central carbon for chiral centre</p> <p>'Plane' must be stated at least once</p> <p>Wedges must be drawn e.g. Ignore angles and connectivity</p>	

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Q2.

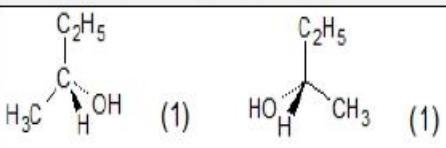
Question Number	Answer	Additional Guidance	Mark
(i)	<p>Allow</p> 	<p>Diagram must be 3-dimensional with either wedges or dashes to score 2 marks</p> <p>Ignore orientation of group at the top</p> <p>Ignore vertical bond to H of OH group</p>	(2)

Question Number	Answer	Additional Guidance	Mark
(ii)	<ul style="list-style-type: none"> They rotate the plane of plane-polarised light (equally) and in opposite/different directions <p>OR</p> <p>Determine in which direction they rotate the plane of plane-polarised light</p>	Allow one plane	(1)

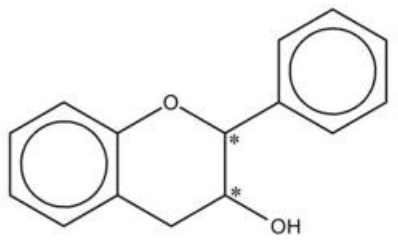
Question Number	Answer	Additional Guidance	Mark
(iii)	<ul style="list-style-type: none"> Does not accumulate in the environment/does not occupy landfill 	<p>Accept answers that outline the benefit of avoiding other means of disposal such as incineration, use of toxic chemicals</p> <p>Ignore just less harm to environment/less harm to animal life/less pollution/less of an "eyesore"/less energy to break it down</p>	(1)

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Q3.

Question Number	Acceptable Answer	Additional guidance	Mark
	 <p>Forms (two) isomers which are non-superimposable (1)</p>	<p>Diagram must be 3-dimensional, i.e. include 'wedges'.</p> <p>Allow Br instead of OH</p> <p>Ignore attachment of – OH, CH₃ and C₂H₅ groups</p> <p>Standalone mark Allow a chiral carbon has four different groups attached (so they are non-superimposable) Do not award has four different 'molecules' attached</p>	(3)

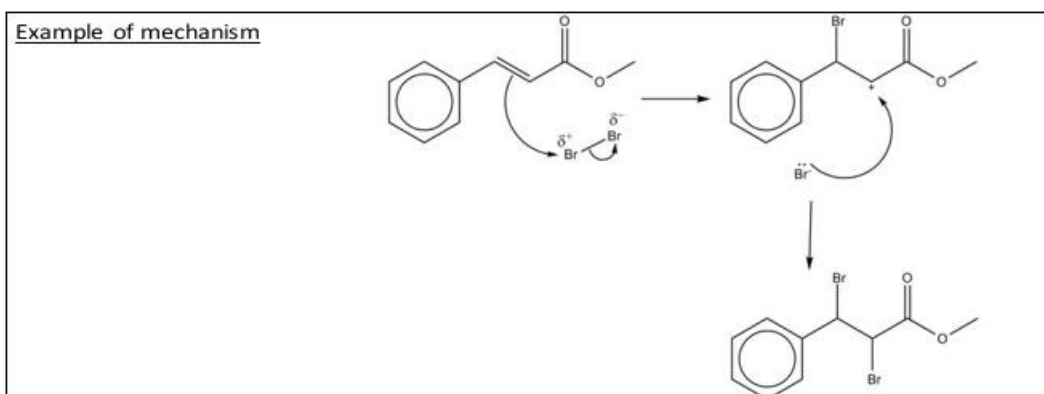
Q4.

Question Number	Answer	Additional Guidance	Mark
			(1)

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Q5.

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> • M1 arrow from double bond to (δ^+)Br in Br₂ (1) • M2 arrow from bond in Br₂ to Brδ^- (1) • M3 structure of carbocation (1) • M4 arrow from lone pair on Br⁻ to C⁺ in carbocation and final product (1) 	<p><u>Example of mechanism</u> See below</p> <p>Penalise lack of dipole only once in M1 and M2</p> <p>Award C⁺ in intermediate on either C from the double bond</p> <p>Do not award M3 if four bonds are shown on carbocation</p> <p>Br atoms can be shown either upwards or downwards in final product</p> <p>Award (0) if just electrophilic substitution mechanism given.</p> <p>If both electrophilic substitution and addition shown allow 2 max</p> <p>Penalise errors in structure of methyl cinnamate once only in either M3 or M4</p>	(4)



Question Number	Answer	Mark
(ii)	<p>The only correct answer is C (4)</p> <p>A is not correct because 2 chiral centres form in reaction, so 4 possible combinations of +/- forms</p> <p>B is not correct because 2 chiral centres form in reaction, so 4 possible combinations of +/- forms</p> <p>D is not correct because 2 chiral centres form in reaction, so 4 possible combinations of +/- forms</p>	(1)

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Question Number	Answer	Mark
(iii)	<p>The only correct answer is D (rotated)</p> <p><i>A is not correct because diffracted is the wrong term</i></p> <p><i>B is not correct because reflected is the wrong term</i></p> <p><i>C is not correct because refracted is the wrong term</i></p>	(1)

Q6.

Question Number	Acceptable Answers	Additional Guidance	Mark
(i)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> glycinate ions / they do not contain a carbon atom with four different atoms / groups attached <p>or</p> <p>the glycinate ion is superimposable on its mirror image (1)</p> <ul style="list-style-type: none"> so there will be no effect (on plane-polarised monochromatic light) (1) 	<p>An answer that states there will be an effect scores (0)</p> <p>Allow not chiral / achiral / has no enantiomers / has no asymmetric carbon atom</p> <p>Allow the carbon atom attached to NH₂ is only attached to 3 different atoms / groups / is not attached to 4 different atoms / groups</p> <p>Ignore glycinate ions are not optically active / do not exhibit optical isomerism</p> <p>Do not award it is a racemic mixture / there are equal amounts of the two isomers / four different molecules attached</p> <p>M2 is conditional on M1</p> <p>Do not award the (monochromatic) light will not be polarised</p>	(2)

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Question Number	Acceptable Answers	Additional Guidance	Mark
(ii)	<ul style="list-style-type: none"> correct formula of one of the copper species (1) rest of equation correct (1) 	<p><u>Example of equation</u> $(\text{CH}_3\text{COO})_2\text{Cu} + 2 \text{NH}_2\text{CH}_2\text{COOH} \rightarrow (\text{NH}_2\text{CH}_2\text{COO})_2\text{Cu} + 2\text{CH}_3\text{COOH}$</p> <p>Allow $\text{Cu}(\text{CH}_3\text{COO})_2 / \text{Cu}(\text{NH}_2\text{CH}_2\text{COO})_2$</p> <p>Allow both charges shown e.g. $(\text{CH}_3\text{COO}^-)_2\text{Cu}^{2+}$</p> <p>Allow displayed / skeletal formulae for organic substances but not molecular formulae</p> <p>Ignore state symbols, even if incorrect</p> <p>Do not award M1 if covalent bond between Cu and O in any species but M2 can still score</p>	(2)

Question Number	Acceptable Answers	Additional Guidance	Mark
(iii)	<p>An answer that makes reference to any four of the following points:</p> <p>Student 1 / higher yield</p> <ul style="list-style-type: none"> the crystals were not dry / still damp when they were weighed (1) there are impurities in the crystals (1) <p>Student 2 / lower yield</p> <ul style="list-style-type: none"> reaction was incomplete (1) not all of the copper(II) glycinate had crystallised / some is left in solution (1) description of a specific handling loss (1) 	<p>Ignore reference to weighing errors for both students</p> <p>Allow the student did not subtract the mass of filter paper / product container</p> <p>Do not award the crystals contain water of crystallisation / are (partially) hydrated</p> <p>Allow a specific impurity e.g. glycine</p> <p>Allow the reaction reached equilibrium / side reactions occur / by-products form</p> <p>Ignore just 'the solution has not cooled enough'</p> <p>Allow any specific example e.g. some crystals left on the walls of the container / beaker / flask / lost during filtration / lost during transfer</p> <p>Ignore just 'transfer error' / lost when handling</p>	(4)

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Q7.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> curly arrow from lone pair on C of CN⁻ to C of ketone group (1) curly arrow from C=O to, or just beyond, O (1) intermediate (1) curly arrow from lone pair on O⁻ to H and curly arrow from H-CN bond to anywhere on CN (1) 	<p>Example of mechanism:</p> <p>Allow C₃H₇ and CH₃ for propyl and methyl groups</p> <p>Allow CN bond displayed</p> <p>Ignore correct dipoles, penalise an incorrect dipole once only</p> <p>Do not award M3 if C⁺ is shown on intermediate</p> <p>For M4, allow curly arrow from lone pair on O⁻ to H⁺ ion / H₂O molecule</p> <p>Penalise incorrect ketone once only in M3 intermediate</p> <p>Penalise curly arrow from -ve charge instead of lone pair once only</p>	(4)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> pentan-2-one / ketone is planar about the carbonyl carbon (1) so the CN⁻ / nucleophile attacks (equally) from above and below / either side (of the plane) (1) 	<p>Allow bonds about C=O are (trigonal) planar or the carbonyl carbon is (trigonal) planar</p> <p>Do not award planar molecule / reference to planar intermediate / ion</p> <p>Do not award multiple directions</p>	(2)

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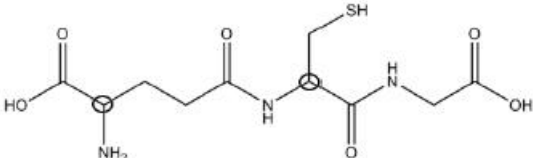
Q8.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> a racemic mixture / racemate is formed or equal amounts / an equimolar mixture of both optical isomers forms (1) intermediate / carbocation is (trigonal) planar around the reaction site / C⁺ / central carbon (1) (equal probability of) attack (by nucleophile / hydroxide ions) from either side / above and below / both sides / opposite sides (of the plane) (1) 	<p>Allow enantiomers / D-L isomers / (+) and (-) isomers Allow the two isomers rotate the plane of plane-polarised light in opposite directions and cancel out Ignore just 'mixture is not optically active' / 'mixture does not rotate the plane of plane-polarised light'</p> <p>Allow the intermediate / carbocation is planar (around the reaction site)</p> <p>Do not award 'the molecule is planar'</p>	(3)

Q9.

Question Number	Answer	Mark
(i)	<p>The only correct answer is C (oxidation)</p> <p><i>A is incorrect as there is no evidence the species have added to the benzene ring</i></p> <p><i>B is incorrect as there is no evidence of chemical breakdown due to reaction with water</i></p> <p><i>D is incorrect as the -NH group and -OH group have lost hydrogen atoms</i></p>	(1)

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Question Number	Answer	Additional guidance	Mark
(ii)	<ul style="list-style-type: none"> both carbon atoms circled 	 <p>Allow any other labelling e.g. asterisk / arrow</p> <p>Do not award additional incorrect carbon atoms</p>	(1)

Question Number	Answer	Mark
(iii)	<p>The only correct answer is B (glutamic acid and cysteine)</p> <p><i>A is incorrect as aspartic acid has only 4 carbon atoms</i></p> <p><i>C is incorrect as the sulfur atom in methionine has a methyl group attached</i></p> <p><i>D is incorrect as the sulfur atom in methionine has a methyl group attached and aspartic acid has only 4 carbon atoms</i></p>	(1)

Q10.

Question Number	Acceptable Answers	Additional Guidance	Mark
(a)(i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> 3300 – 2500 (cm⁻¹) and O-H (bond) (1) 1725 – 1700 (cm⁻¹) and C=O (bond) (1) 	<p>Allow any value(s) within the range 3300 – 2500 (cm⁻¹)</p> <p>Allow -OH</p> <p>Allow any value(s) within the range 1725 – 1700 (cm⁻¹)</p> <p>Allow 1320 – 1210 (cm⁻¹) and C-O</p>	(2)

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Question Number	Acceptable Answers	Additional Guidance	Mark
(a)(ii)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> structures 1 and 2 will have an absorption at Either C=C at 1669 – 1645 (cm⁻¹) or C–H in an alkene at 3095 – 3010 (cm⁻¹) (1) only structure 2 will have an absorption due to the presence of an alcohol / O–H at 3750 – 3200 (cm⁻¹) (1) structure 3 will have none of these absorptions / will not show C=C absorption / C-H absorption for an alkene (1) 	Reject C=C at 3010 (cm ⁻¹)	(3)

Question Number	Acceptable Answers	Additional Guidance	Mark
(b)	<ul style="list-style-type: none"> calculation of moles of NaOH (1) calculation of mass of NaOH (1) 	<p><u>Example of calculation:</u></p> <p>(moles NaOH = 0.140 x <u>250</u>)</p> <p>1000 = 0.035(0) (mol)</p> <p>= 40(.0) x 0.035(0) = 1.4(0) (g)</p> <p>Correct answer with or without working scores 2 marks</p> <p>Allow TE for M2 on moles of NaOH</p> <p>Alternative route, allow M1 for conversion of concentration to 5.6 g dm⁻³</p> <p>Ignore SF</p>	(2)

Question Number	Acceptable Answers	Additional Guidance	Mark
(c)(i)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> (because the) sodium hydroxide has been diluted (1) (the titre will be) smaller (1) 	<p>Allow Fewer moles of sodium hydroxide present / some sodium hydroxide will have been removed</p> <p>M2 dependent on M1</p>	(2)

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Question Number	Acceptable Answers	Additional Guidance	Mark
(c)(ii)	<p>An explanation that makes reference to the following points:</p> <p>M1 no effect (on the titre) (1)</p> <p>M2 because the (number of) moles of sodium hydroxide is unaffected (1)</p>	<p>M2 depends on M1</p> <p>Allow base / alkali / hydroxide (ions) Allow amount / mass of sodium hydroxide is unaffected</p>	(2)

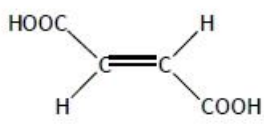
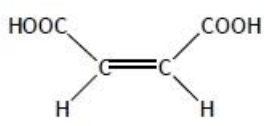
Question Number	Acceptable Answers	Additional Guidance	Mark
(c)(iii)	<ul style="list-style-type: none"> calculation of percentage uncertainty in burette volume (1) calculation of percentage uncertainty in volumetric flask volume <p>and</p> <p>in pipette volume (1)</p> <ul style="list-style-type: none"> identification of volume with the lowest percentage uncertainty (1) 	<p>Example of calculation:</p> $\frac{2 \times (\pm)0.05}{10.20} \times 100\% = (\pm)0.980392156\%$ $\frac{(\pm)0.30}{250.0} \times 100\% = (\pm)0.12\%$ <p>and</p> $\frac{(\pm)0.040}{10.0} \times 100\% = (\pm)0.4\%$ <p>Volumetric flask has the lowest uncertainty</p> <p>Allow TE for identification in M3</p> <p>Allow ANY number of SF in answer, from 1 SF up to calculator value</p>	(3)

Question Number	Acceptable Answers	Additional Guidance	Mark
(d)(i)	<ul style="list-style-type: none"> left-hand side of equation correct (1) right-hand side of equation correct (1) 	<p>Example of equation</p> $\text{HOOCCH}=\text{CHCOOH} + 2\text{NaOH} \rightarrow \text{NaOOCCH}=\text{CHCOONa} + 2\text{H}_2\text{O}$ <p>ALLOW use of molecular formulae or ionic equation:</p> $\text{C}_4\text{H}_4\text{O}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{C}_4\text{H}_2\text{O}_4 + 2\text{H}_2\text{O}$ $\text{HOOCCH}=\text{CHCOOH} + 2\text{OH}^- (+ 2\text{Na}^+) \rightarrow \text{OOCCH}=\text{CHCOO}^- + 2\text{H}_2\text{O} (+ 2\text{Na}^+)$ <p>ALLOW Multiples Correct charges Do not award if O–Na covalent bond drawn IGNORE State symbols, even if incorrect</p>	(2)

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(d)(ii)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • (New mean titre) = 20.4(0) (cm³) / double (the original value) (1) • For structure 2, mole ratio / reacting ratio is 1:1 (with NaOH) (1) 	<p>Mark M1 and M2 independently</p> <p>Allow structure 2 has 1 COOH / 1 acid group</p>	(2)

Question Number	Acceptable Answers	Additional Guidance	Mark												
(e)	<table border="1"> <thead> <tr> <th>Structure</th> <th>Test with Br₂ water</th> <th>Test with acidified K₂Cr₂O₇</th> </tr> </thead> <tbody> <tr> <td>HOOCCH=CHCOOH</td> <td>✓</td> <td>x</td> </tr> <tr> <td>HOCH₂CH=CHCH₂COOH</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>CH₃CH₂CH₂CH₂COOH</td> <td>x</td> <td>x</td> </tr> </tbody> </table> <p>Left hand column correct (1) Right hand column correct (1)</p>	Structure	Test with Br ₂ water	Test with acidified K ₂ Cr ₂ O ₇	HOOCCH=CHCOOH	✓	x	HOCH ₂ CH=CHCH ₂ COOH	✓	✓	CH ₃ CH ₂ CH ₂ CH ₂ COOH	x	x	<p>3 correct ticks with no crosses scores 1</p> <p>Ignore descriptions of result in terms of colour (changes) / reactions occurring</p>	(2)
Structure	Test with Br ₂ water	Test with acidified K ₂ Cr ₂ O ₇													
HOOCCH=CHCOOH	✓	x													
HOCH ₂ CH=CHCH ₂ COOH	✓	✓													
CH ₃ CH ₂ CH ₂ CH ₂ COOH	x	x													

Question Number	Acceptable Answers	Additional Guidance	Mark
(f)(i)	<ul style="list-style-type: none"> • <i>E</i>-isomer: <div style="text-align: center;">  </div> (1) • <i>Z</i>-isomer: <div style="text-align: center;">  </div> (1) 	<p>ALLOW skeletal or displayed structures</p> <p>ALLOW -CO₂H</p> <p>IGNORE Connectivity to the -COOH group</p> <p>IGNORE bond angles</p> <p>Award one mark if correct structures are drawn, but <i>E</i>- and <i>Z</i>-isomers labelled the wrong way round</p> <p>Award 1 mark if incorrect molecule used but <i>E</i>- and <i>Z</i>-isomers are correct</p>	(2)

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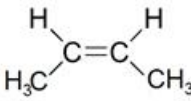
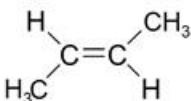
Question Number	Acceptable Answers	Additional Guidance	Mark
(f)(ii)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> restricted / limited rotation (about the C=C double bond)(1) each carbon atom in the double bond is attached to (two) different atoms / different groups (of atoms) / to a H (atom) and a COOH group (1) 	<p>Allow "no rotation"</p> <p>Do not award the carbons are attached to 2 "different molecules"</p> <p>Mark points M1 and M2 independently</p>	(2)

Q11.

Question Number	Answer	Mark
(i)	<p>The only correct answer is B (elimination)</p> <p><i>A is not correct because this is a typical reaction of alkenes, not a reaction to form alkenes</i></p> <p><i>C is not correct because alcohols are typically oxidised to aldehydes, ketones or carboxylic acids</i></p> <p><i>D is not correct because substitution removes just the -OH not an -H as well</i></p>	(1)

Edexcel Chemistry A-level - Chirality

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> compounds with the same structural formula (1) where the atoms have a different arrangement in space (1) 	<p>Allow the bonds/groups have different spatial arrangements or orientation or configuration or 3D arrangement</p> <p>Allow have a different displayed formula</p> <p>Do not award where the molecules have a different arrangement in space</p> <p>Do not award a discussion of optical isomerism</p> <p>Do not award just 'cis/trans isomerism / E/Z isomerism'</p>	(2)

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(iii)	<ul style="list-style-type: none"> any two of structures and/or names correct (1) both structures and names correct. (1) 	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Z/cis-but-2-ene</p> </div> <div style="text-align: center;">  <p>E/trans-but-2-ene</p> </div> </div> <p>ene</p> <p>Can be in either order.</p> <p>If the isomerism described in (b)(ii) is the position of the double bond allow but-1-ene and either Z/cis- or E/trans-but-2-ene here.</p> <p>Allow skeletal/displayed formulae</p>	(2)

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(iv)	<ul style="list-style-type: none"> geometric (isomerism) 	Accept <i>cis-trans</i> / <i>E-Z</i>	(1)