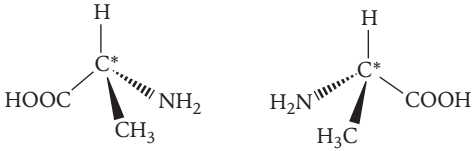
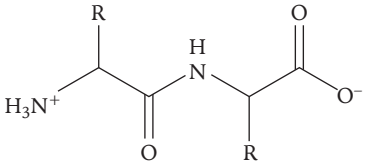
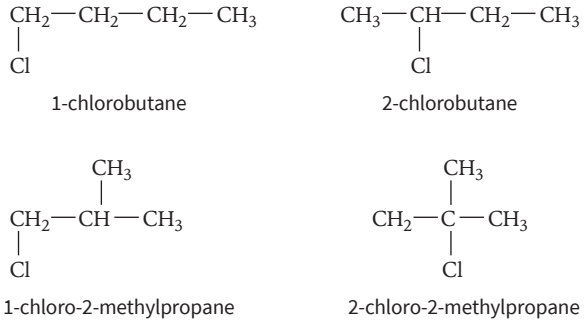
A Level AQA Chemistry

Chapter 19 – answers

Question	Answers	Extra information	Mark	AO Spec reference
01.1	Compounds have the same order of atoms and bonds but a different arrangement in space	Both parts needed for mark	1	3.3.1.3
01.2	Shine plane polarised light through each sample in turn Each enantiomer will rotate the plane of polarised light in a different way		1 1	3.3.7
01.3		Either enantiomer is acceptable. Must use dots and wedges. Chiral carbon must have an asterisk for M2.	2	3.1.3.5
01.4	2-aminopropanoic acid		1	3.3.1.1
01.5	Dipeptide of double alanine Correct charges 	Where R = CH_3	1 1	3.3.13.2
02.1	 1-chlorobutane 2-chlorobutane 1-chloro-2-methylpropane 2-chloro-2-methylpropane	1 mark for each correct structure AND correct name.	4	3.3.1.3, MS 4.2

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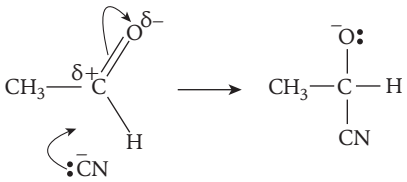
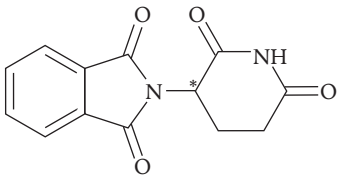
Question	Answers	Extra information	Mark	AO Spec reference
02.2	2-chlorobutane	It is the only one with a chiral carbon	1	3.3.1.1
02.3	Compounds which exist as non-superimposable mirror images of each other (and contain a chiral carbon atom)		1	3.3.7
02.4	Shine plane polarised light through each sample in turn Each enantiomer will rotate the plane of polarised light in a different way OWTTE	Do not need to say they will shift polarised light in opposite directions	1 1	3.3.7
03.1	Nucleophile	Accept electron pair donor	1	3.3.8
03.2		1 mark per curly arrow	3	3.3.8, MS 4.2
03.3	Nucleophilic addition		1	3.3.8
03.4	The product formed is a racemic mixture (containing equal parts of each optical isomer), and therefore will not have any effect on plane polarised light.		1 1	3.3.7
04.1			1	3.3.7, MS 4.3
04.2	A mixture containing equal parts/amounts of each enantiomer		1	3.3.7
04.3	If you shine plane polarised light through the samples, the racemic mixture would not have any effect on the plane polarised light, whereas a sample containing a single enantiomer would rotate the plane polarised light.		1 1	3.3.7

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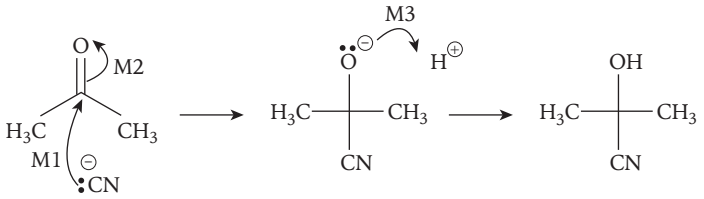
Question	Answers	Extra information	Mark	AO Spec reference
04.4	Proteins have stereospecific active sites which can only bind to one enantiomeric form of a drug		1 1	3.3.13.3
05.1	Two or more compounds which have the same chemical formula but a different arrangement of atoms		1	3.3.1.3
05.2	(P will have a ketone carbonyl peak at) 1680–1750 (cm^{-1})		1	3.3.6.3
05.3	(Q will have an alcohol peak at) 3230–3550 (cm^{-1})	Allow (Q will have an alcohol peak at) 1000–1300 (cm^{-1})	1	3.3.6.3
05.4	P		1	3.3.7
05.5	 Name of mechanism: Nucleophilic additon		3 1	3.3.8
06.1	(Compounds which are) non-superimposable mirror images (of each other, and contain chiral carbons)		1	3.3.7
06.2	BH_4^- ion is based on a tetrahedral shape There are 4 bonding pairs of electrons, (and no lone pairs) Which all repell equally To give bond angles of 109.5°		1 1 1 1	3.1.3.5, MS 4.1, MS 4.2

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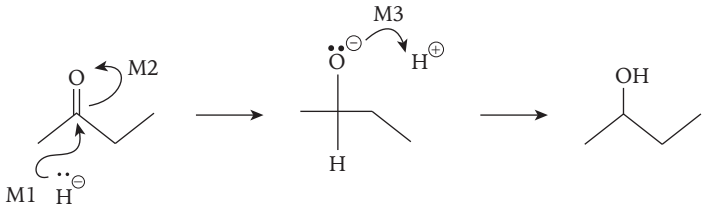
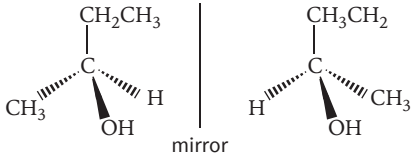
Question	Answers	Extra information	Mark	AO Spec reference
06.3		1 mark for each curly arrow. Only need to show the nuclephile as [H^-].	1 1 1	3.3.8
06.4		Must show at least one wedge/ dashed line. Need to show the mirror, or similar, to show how they are related for second mark.	1 1	3.3.7, MS 4.2, MS 4.3
06.5	Butan-2-ol	Ignore *R*/*S*	1	3.3.1.1

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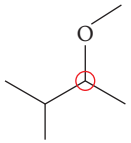
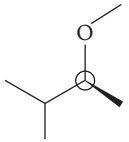
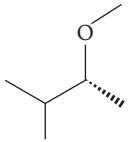
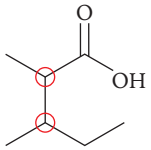
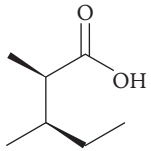
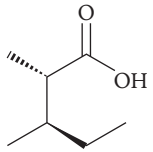
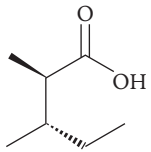
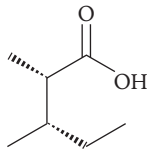
Skills box answers:

Answers: Chiral centres shown in red

1		 
2		   
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