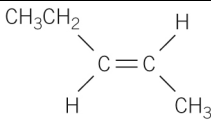
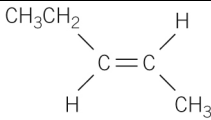
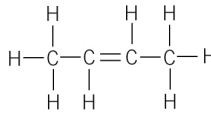
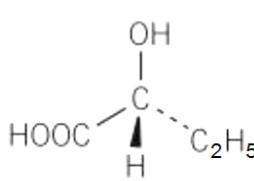
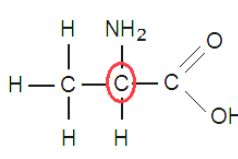


Question number	Answer	Marks	Guidance
1	2-aminopropanoic acid or 2-aminopropionic acid	1	
2	optically inactive OR equal mixture of enantiomers / optical isomers	1	The molecule is not planar – only the carbonyl (C=O) group.
	planar carbonyl group (stated or drawn)	1	Attack can be stated or drawn.
	attack from above or below (either side)	1	
3 (a)	optical	1	
	equal mixture of enantiomers	1	
	plane polarised light	1	
	rotated in opposite/different directions	1	
3 (b)	carbocation	1	The planarity must refer to carbocation or intermediate.
	planar	1	
	attack from either side equally likely	1	
4 (a)	2-methylbutan-1-ol	1	Numbers essential
4 (b)	Optical	1	
4 (c)		1	allow C ₂ H ₅ CH=CHCH ₃
5 (a)	Same molecular formula and same structure but atoms are arranged differently in space.	2	An easy definition to learn. Make sure the difference between structural and stereoisomerism is known.
5 (b)		1	
	no free rotation about the C=C	1	
	pent-2-ene	1	
5 (c)	2-hydroxypropanoic acid	1	
	optical	1	
5 (d)	plane polarised light; rotated by the same amount in opposite directions	1 1	
6 (a)	Isomers with the same molecular formula and structure, but different position of atoms in space.	1	
6 (b)(i)		1	

6 (b)(ii)	<i>E-Z</i> isomerism	1	
6 (b)(ii)	two different functional groups	1	
	either side of a carbon-carbon double bond / bond with restricted rotation.	1	
7 (a)	capable of rotating the plane of polarised light.	1	
7 (b)	 <p>The diagram shows a central carbon atom (C) bonded to four different groups: a hydroxyl group (OH) above, a carboxyl group (HOOC) to the left, a hydrogen atom (H) below, and an ethyl group (C₂H₅) to the right. The C-H bond is shown with a wedge, and the C-C₂H₅ bond is shown with a dash.</p>		
7 (c) (i)	a mixture of equal amounts of two optical isomers of a chiral compound	1	
7 (c) (ii)	The effects of the two isomers cancel out	1	
8 (a)	 <p>The diagram shows a central carbon atom (C) circled in red, bonded to four different groups: a hydrogen atom (H) above, an amino group (NH₂) to the right, a hydrogen atom (H) below, and a methyl group (CH₃) to the left. The methyl group is shown as a carbon atom bonded to three hydrogen atoms.</p>	1	
8 (b)	The chiral centre carbon is bonded to four different groups	1	