

Naming organic compounds and their isomers

Chemistry grades 11-12 (A Level · IB · Class 11-12) · Test answers (mark scheme)

Compare your answers with these model answers and marking points. Names must follow IUPAC rules exactly, so check locants and alphabetical order, and use the notes to identify topics to revise.

Level: Chemistry grades 11-12 (A Level · IB · Class 11-12) · **Curriculum:** IB S3.2

Question 1 Naming (3 marks)

- a. **3-methylpentane**
- b. **butanal**
- c. **2-bromopropane**

Marking: 1 mark each.

Question 2 Structural isomers (2 marks)

- a. Compounds with the **same molecular formula but different structural formulae** (arrangement of atoms).
- b. **Position isomerism.**

Marking: 1 mark each.

Question 3 Alcohols C₄H₁₀O (3 marks)

- a. **butan-1-ol, butan-2-ol, 2-methylpropan-1-ol, 2-methylpropan-2-ol.**
- b. **2-methylpropan-2-ol.**

Marking: 2 for all four names (1 for two or three), 1 for the tertiary alcohol.

Question 4 E/Z isomerism (3 marks)

- a. R is **Z**: the two CH₃ groups (the higher priority) are on the same side.
- b. Rotation about the C=C double bond is restricted.

Marking: 1 for Z, 1 for same-side reason, 1 for restricted rotation.

Question 5 Chiral centre (2 marks)

- a. Carbon 2 is bonded to four different groups (H, OH, CH₃ and C₂H₅), so it is a chiral

centre and gives two non-superimposable mirror images.

Marking: 1 for four different groups, 1 for non-superimposable mirror images.

Question 6 Optical rotation (3 marks)

a. $ee = 12.0 \div 30.0 \times 100 = \mathbf{40\%}$.

b. $(+) = (100 + 40) \div 2 = \mathbf{70\%}$.

Marking: 1 for ee, 1 for method, 1 for 70 %.

Question 7 Name an alcohol (2 marks)

a. Longest chain with OH has four carbons; OH is on carbon 2 and a methyl is on carbon 3: **3-methylbutan-2-ol**.

Marking: 1 for butan-2-ol, 1 for 3-methyl.

Question 8 Same formula, different properties (2 marks)

a. They are functional group isomers. Ethanol has an O-H group and forms hydrogen bonds, which need much more energy to break than the weaker forces between methoxymethane molecules.

Marking: 1 for hydrogen bonding in ethanol, 1 for weaker forces in the ether.