

AQA A-Level Chemistry

Intro to organic

Questions only

All 21 intro to organic questions

Questions

21

Total marks

36

Time allowed

47 min

Name

Class or teacher

Date

Instructions

- Answer all questions in the spaces provided.
- Use black ink. Show your working for every calculation.
- You may use a scientific calculator and the AQA Data Sheet.
- Print the separate mark scheme when you are ready to mark your answers.

For marking

Q	Source	Marks	Score
1	2024 A-level P3 Q24	1	
2	2020 A-level P3 Q22	1	
3	2021 AS P2 Q9	1	
4	2022 AS P2 Q3	8	
5	2024 A-level P3 Q25	1	
6	2020 AS P2 Q11	1	
7	2021 A-level P3 Q27	1	
8	2020 AS P2 Q5	6	
9	2021 A-level P3 Q23	1	
10	2022 A-level P3 Q25	1	
11	2023 AS P2 Q18	1	

Q	Source	Marks	Score
12	2024 A-level P3 Q26	1	
13	2024 AS P2 Q11	1	
14	2017 AS P2 Q14	1	
15	2017 AS P2 Q18	1	
16	2018 AS P2 Q15	1	
17	2019 AS P2 Q14	1	
18	2025 AS P2 Q12	1	
19	2025 AS P2 Q4	4	
20	2025 AS P2 Q8	1	
21	2017 A-level P3 Q24	1	

Total _____ / 36 Percentage _____ %

Questions from AQA past papers, 2017–2025, reproduced for revision. Practise these topics online, with instant marking:

whiteboardchemistry.com/revision/aqa-a-level-chemistry/exam-questions?topics=intro-to-organic-chemistry&len=0

Questions

Intro to organic · 21 questions · 36 marks · time allowed 47 min

Q1 · June 2024 · Paper 3 · Q24 · [1 mark]

In which conversion does a nucleophile attack the organic reactant?

Tick (✓) one box.

- ☐ **A** $\text{CH}_3\text{CH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CHClCH}_3$
- ☐ **B** $\text{CH}_3\text{CH}=\text{CH}_2 \rightarrow \text{CH}_3\text{CHBrCH}_3$
- ☐ **C** $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \rightarrow \text{CH}_3\text{CH}=\text{CH}_2$
- ☐ **D** $\text{CH}_3\text{CH}_2\text{CHO} \rightarrow \text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CN}$
-

Q2 · November 2020 · Paper 3 · Q22 · [1 mark]

Which has E-Z isomers?

Tick (✓) one box.

- ☐ **A** $\text{C}_2\text{H}_2\text{Br}_2$
- ☐ **B** $\text{C}_2\text{H}_3\text{Br}$
- ☐ **C** $\text{C}_2\text{H}_4\text{Br}_2$
- ☐ **D** $\text{C}_2\text{H}_5\text{Br}$
-

Q3 · November 2021 · AS Paper 2 · Q9 · [1 mark]

Which alkene shows E-Z isomerism?

Tick (✓) one box.

- ☐ **A** 2,3-dimethylbut-2-ene
- ☐ **B** 4-methylpent-2-ene
- ☐ **C** methylpropene
- ☐ **D** pent-1-ene
-

Q4 · June 2022 · AS Paper 2 · Q3 · [8 marks]

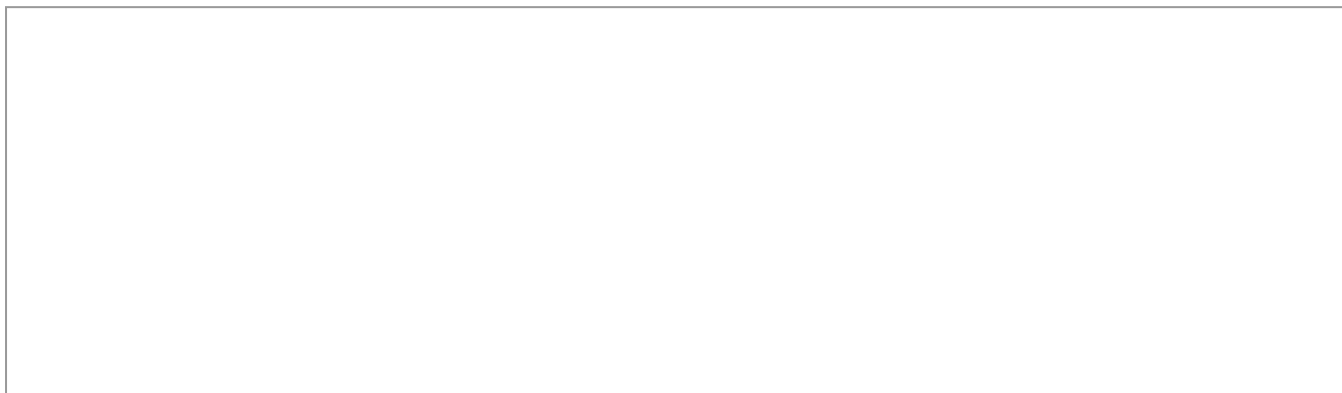
This question also needs Amount of substance and Organic analysis.

This question is about isomers.

Hex-2-ene has the molecular formula C_6H_{12}

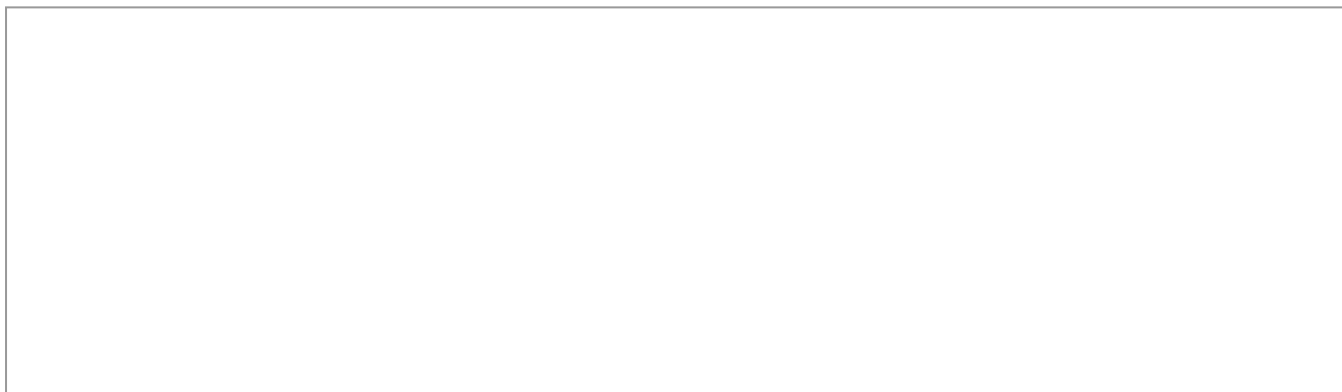
(a) Draw the displayed formula of a position isomer of hex-2-ene that exists as E and Z isomers.

[1 mark]



(b) Draw the displayed formula of a chain isomer of hex-2-ene that does not exist as E and Z isomers.

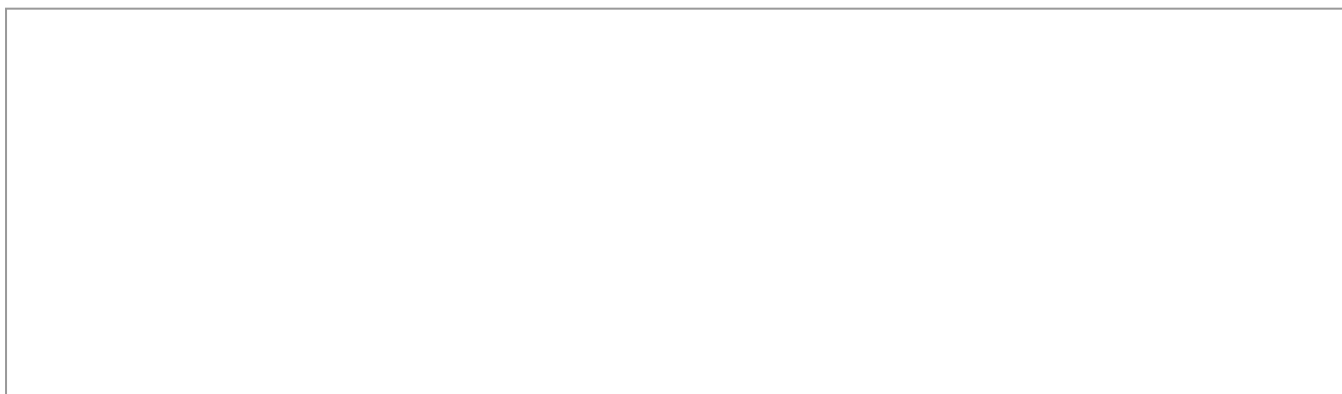
[1 mark]



Butanal has the molecular formula C_4H_8O

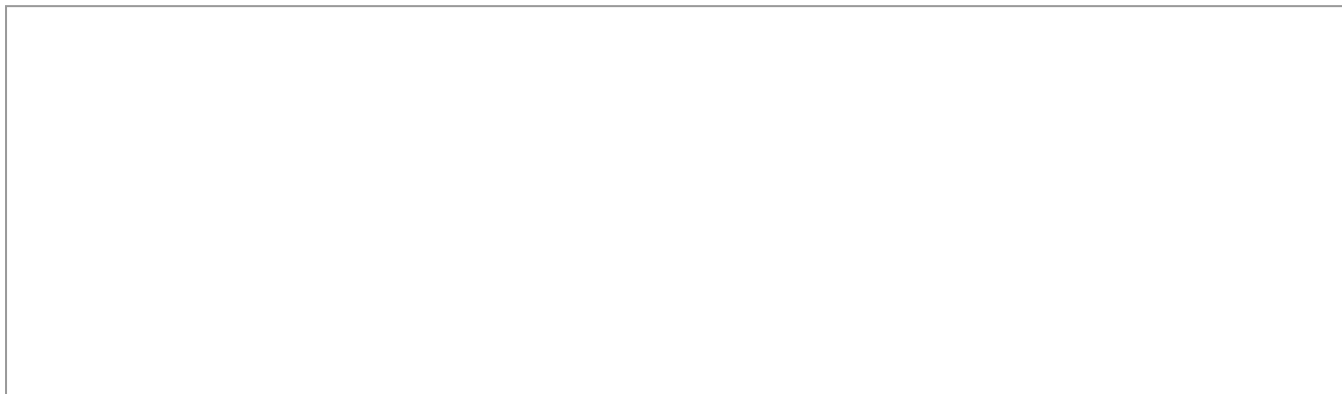
(c) Draw the skeletal formula of a functional group isomer of butanal that has an absorption in the range $1680-1750\text{ cm}^{-1}$ in its infrared spectrum.

[1 mark]



(d) Draw the skeletal formula of a structural isomer of butanal that has an absorption in the range $3230\text{--}3550\text{ cm}^{-1}$ in its infrared spectrum.

[1 mark]



(e) Several saturated halogenoalkanes contain 17.8% carbon, 3.0% hydrogen and 79.2% bromine by mass.

Calculate the empirical formula of these compounds.

Give the IUPAC names of two saturated halogenoalkanes that have this empirical formula.

[4 marks]

Empirical formula

Names of halogenoalkanes

1

2

Q5 • June 2024 • Paper 3 • Q25 • [1 mark]

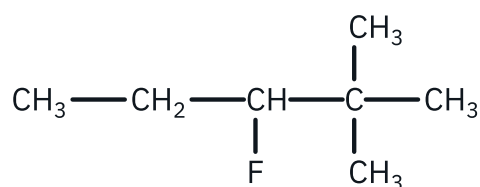
Compound Y has the structural formula $\text{CH}_3\text{COOCH}_2\text{CH}(\text{CH}_3)_2$ Which compound is a position isomer of Y?

Tick (✓) one box.

- ☐ **A** 5-hydroxyhexan-3-one
- ☐ **B** butyl ethanoate
- ☐ **C** hexanoic acid
- ☐ **D** propyl propanoate

Q6 • November 2020 • AS Paper 2 • Q11 • [1 mark]

What is the IUPAC name for this compound?



Tick (✓) one box.

- ☐ **A** 2-dimethyl-3-fluoropentane
- ☐ **B** 2,2-dimethyl-3-fluoropentane
- ☐ **C** 3-fluoro-2,2-dimethylpentane
- ☐ **D** 3-fluoro-2-dimethylpentane

Q7 • November 2021 • Paper 3 • Q27 • [1 mark]

Which is the correct general formula for non-cyclic compounds in the homologous series?

Tick (✓) one box.

- ☐ **A** alcohols $\text{C}_n\text{H}_{2n+2}\text{O}$
- ☐ **B** aldehydes $\text{C}_n\text{H}_{2n+1}\text{O}$
- ☐ **C** esters $\text{C}_n\text{H}_{2n+1}\text{O}_2$
- ☐ **D** primary amines $\text{C}_n\text{H}_{2n+2}\text{N}$

Q8 · November 2020 · AS Paper 2 · Q5 · [6 marks]

Explain the differences between structural isomerism and stereoisomerism. Use examples to show how compounds with the molecular formula C_4H_8 exhibit stereoisomerism and the three types of structural isomerism.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Q9 · November 2021 · Paper 3 · Q23 · [1 mark]

Which compound has E-Z isomers?

Tick (✓) one box.

- ☐ **A** $\text{CH}_2=\text{CHBr}$
- ☐ **B** $\text{CH}_2=\text{CBr}_2$
- ☐ **C** $\text{CHBr}=\text{CHBr}$
- ☐ **D** $\text{CBr}_2=\text{CHBr}$

Q10 • June 2022 • Paper 3 • Q25 • [1 mark]

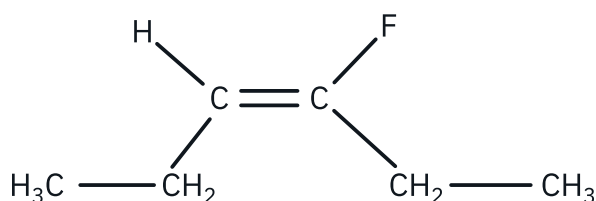
Which compound is an isomer of ethyl ethanoate?

Tick (✓) one box.

- ☐ **A** butyl methanoate
- ☐ **B** methyl propanoate
- ☐ **C** methyl butanoate
- ☐ **D** propanoic acid

Q11 • June 2023 • AS Paper 2 • Q18 • [1 mark]

Which is the IUPAC name for this compound?



Tick (✓) one box.

- ☐ **A** E-3-fluorohex-3-ene
- ☐ **B** E-4-fluorohex-3-ene
- ☐ **C** Z-3-fluorohex-3-ene
- ☐ **D** Z-4-fluorohex-3-ene

Q12 • June 2024 • Paper 3 • Q26 • [1 mark]

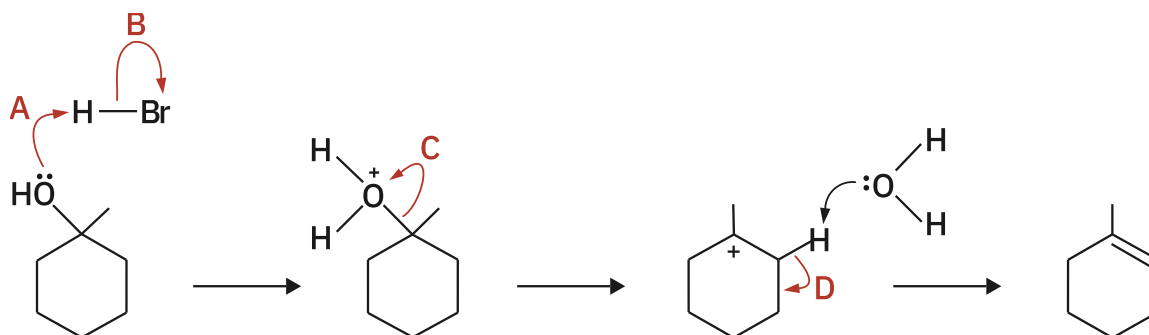
Which compound shows E–Z isomerism?

Tick (✓) one box.

- ☐ **A** 2,3-dimethylbut-1-ene
- ☐ **B** 2,3-dimethylbut-2-ene
- ☐ **C** 2-methylpent-2-ene
- ☐ **D** 3-methylpent-2-ene

Q13 · June 2024 · AS Paper 2 · Q11 · [1 mark]

Which labelled curly arrow shows an incorrect movement of an electron pair?



Tick (✓) one box.

- ☐ **A** A
- ☐ **B** B
- ☐ **C** C
- ☐ **D** D

Q14 · June 2017 · AS Paper 2 · Q14 · [1 mark]

Which compound is a structural isomer of Z-but-2-ene?

Tick (✓) one box.

- ☐ **A** butane
- ☐ **B** E-but-2-ene
- ☐ **C** cyclobutane
- ☐ **D** methylbut-2-ene

Q15 · June 2017 · AS Paper 2 · Q18 · [1 mark]

How many structural isomers are there with the molecular formula C_3H_6BrCl ?

Tick (✓) one box.

- ☐ **A** 4
- ☐ **B** 5
- ☐ **C** 6
- ☐ **D** 7

Q16 · June 2018 · AS Paper 2 · Q15 · [1 mark]

How many structural isomers with an unbranched carbon chain have the molecular formula $C_4H_8Br_2$?

Tick (✓) one box.

- ☐ **A** 4
- ☐ **B** 5
- ☐ **C** 6
- ☐ **D** 7
-

Q17 · June 2019 · AS Paper 2 · Q14 · [1 mark]

How many isomers are there of C_3H_9N ?

Tick (✓) one box.

- ☐ **A** 2
- ☐ **B** 3
- ☐ **C** 4
- ☐ **D** 5
-

Q18 · June 2025 · AS Paper 2 · Q12 · [1 mark]

What is the name of this compound according to IUPAC rules?

Tick (✓) one box.

- ☐ **A** E-3-fluoro-2-methylpent-3-ene
- ☐ **B** Z-3-fluoro-2-methylpent-4-ene
- ☐ **C** E-3-fluoro-4-methylpent-2-ene
- ☐ **D** Z-3-fluoro-4-methylpent-2-ene

Q19 · June 2025 · AS Paper 2 · Q4 · [4 marks]

This question is about some compounds with the molecular formula $C_4H_6O_2$

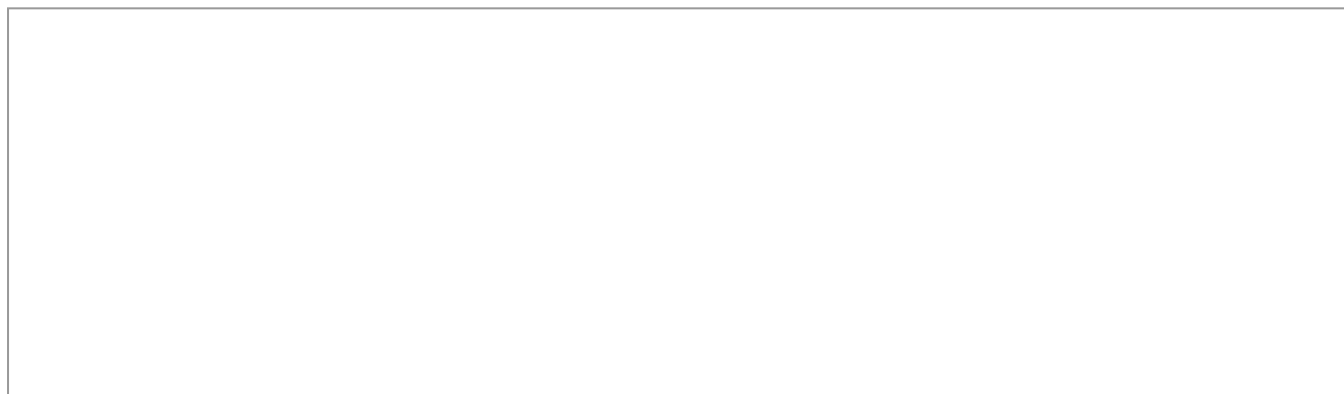
04.1 Compounds A and B

- each have the molecular formula $C_4H_6O_2$
- are functional group isomers of each other
- each react with sodium carbonate to form a gas.

Compound A decolourises bromine water but compound B does not.

Draw a possible structure of A and a possible structure of B.

Compound A Compound B

[2 marks]

04.2 Compound C has the molecular formula $C_4H_6O_2$

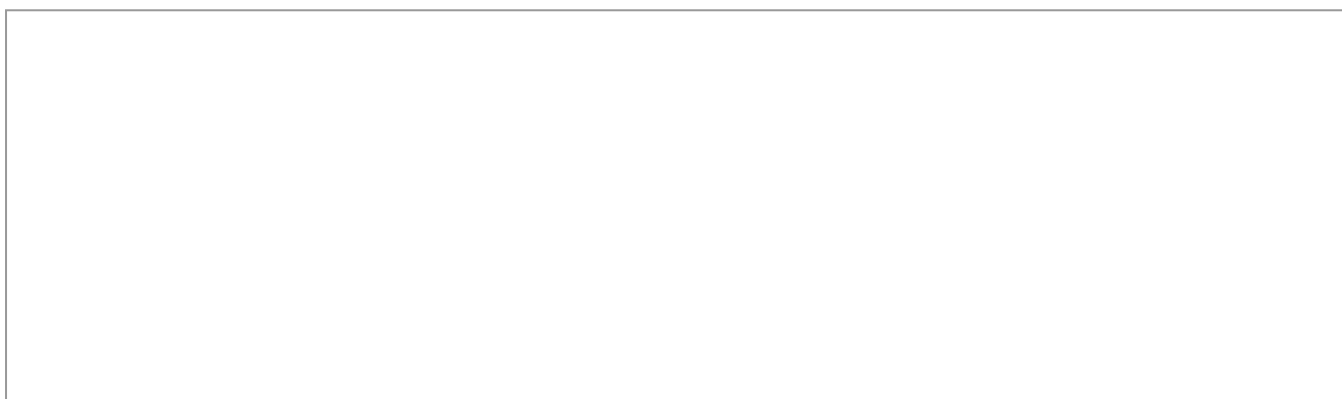
In the infrared spectrum of C, there is

- absorption in the range $3230\text{--}3550\text{ cm}^{-1}$
- absorption in the range $1620\text{--}1680\text{ cm}^{-1}$
- no absorption in the range $1680\text{--}1750\text{ cm}^{-1}$

Draw a possible structure of C.

Use Table A on the Data Sheet to help you answer this question.

[1 mark]

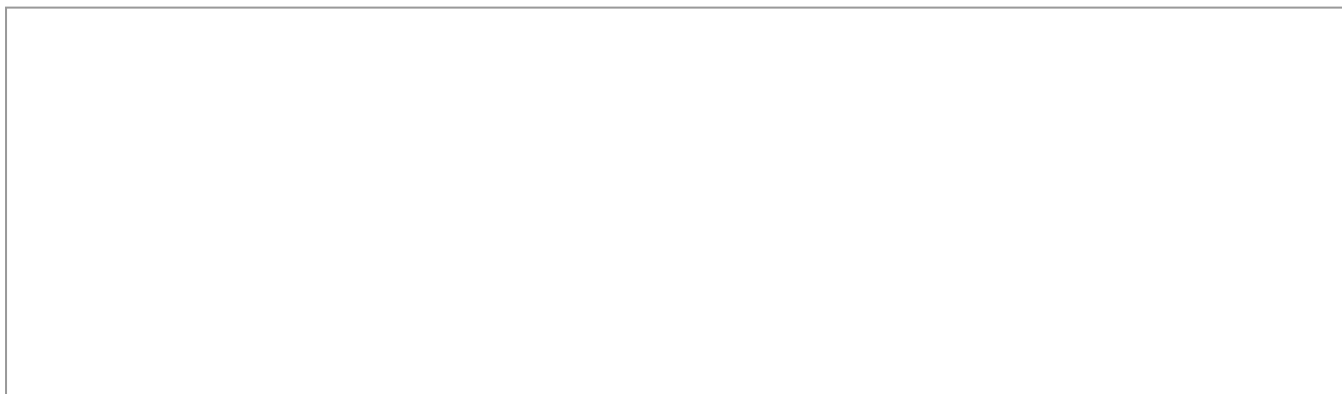
**04.3** Vinyl acetate (VA) has the molecular formula $C_4H_6O_2$

The structure of vinyl acetate is shown.

PVA is an addition polymer of vinyl acetate.

Draw the repeating unit of PVA.

[1 mark]



Q20 · June 2025 · AS Paper 2 · Q8 · [1 mark]

What is the name of this compound according to IUPAC rules?

Tick (✓) one box.

- ☐ **A** 2-methylbutanal
 - ☐ **B** 3-methylbutanal
 - ☐ **C** 2-methylbutan-1-one
 - ☐ **D** 3-methylbutan-1-one
-

Q21 · June 2017 · Paper 3 · Q24 · [1 mark]

Which compound does not show stereoisomerism?

Tick (✓) one box.

- ☐ **A** 1,2-dichloropropene
 - ☐ **B** 1,2-dichloropropane
 - ☐ **C** 1,3-dichloropropene
 - ☐ **D** 1,3-dichloropropane
-

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Mark scheme:

whiteboardchemistry.com/revision/aqa-a-level-chemistry/exam-questions/pdf/intro-to-organic-chemistry-mark-scheme.pdf