



CrackingCHEM

GCSE | A-LEVEL

UNDERSTAND • APPLY • SUCCEED

AQA 7405

Introduction to Organic Chemistry I

Original exam questions | TEST IT → EXAM STYLE → HARDER MIXED

SPECIFICATION-LED. PROGRESSIVE. EXAM-FOCUSED.

AQA SPECIFICATION

3.3.1.1 | 3.3.1.3 STRUCTURAL ISOMERISM

TEST IT	EXAM STYLE	HARDER MIXED	STRETCH
8	8	4	2

22 ORIGINAL QUESTIONS

166 TOTAL MARKS

Independent practice material. Every question is original and designed from recurring AQA assessment patterns.

Mapped to AQA Chemistry 7405 | specification checked September 2026

How to use this pack [START HERE](#)

1

Complete TEST IT without notes

Repair formula language, carbon counting and definitions before moving on.

2

Work directly from each structure

Count every skeletal end and vertex; mark the functional group before naming.

3

Use the fixed naming route

Choose the parent, number it, locate substituents, assemble the name, then punctuation-check.

4

Mark with precision

Award marks only for the exact name, formula, structure or justification shown in the answer section.

FORMULA CONTROL Molecular = actual atom count; empirical = simplest ratio; general = homologous-series pattern; structural = connectivity; displayed = every atom and bond; skeletal = carbon skeleton with C and C-bound H omitted.

ISOMER CONTROL First prove the molecular formula is identical. Then identify whether the carbon skeleton, position or functional-group type changes. A rotated drawing is not a new isomer.

AQA BOUNDARY This pack assesses 3.3.1.1 and structural isomerism from 3.3.1.3. Mechanisms, curly arrows, stereoisomerism, E/Z isomerism and CIP rules are deliberately excluded.

SECTION A

TEST IT

Secure formula language, structures and basic nomenclature

QUESTION 1 | TEST IT

- (a) Define the term hydrocarbon. (1 mark)
.....
- (b) Define the term functional group. (2 marks)
.....
.....
- (c) Define the term homologous series. (2 marks)
.....
.....
- (d) State three further characteristics of a homologous series. (3 marks)
.....
.....
.....
- (e) Explain why $\text{C}_2\text{H}_5\text{OH}$ is not a hydrocarbon. (1 mark)
.....

QUESTION 2 | TEST IT

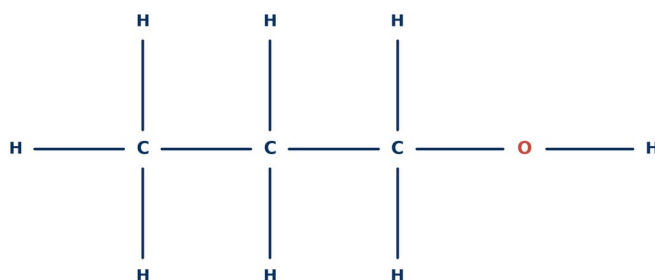
Pent-2-ene can be written as $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_3$.

- (a) State its molecular formula. (1 mark)
.....
- (b) State its empirical formula. (1 mark)
.....
- (c) State the general formula of the homologous series to which it belongs. (1 mark)
.....
- (d) Explain the difference between a molecular formula and a general formula. (2 marks)
.....
.....
- (e) State the type of formula represented by $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_3$. (1 mark)
.....

QUESTION 3 | TEST IT

Figure 1 shows a displayed formula.

Figure 1

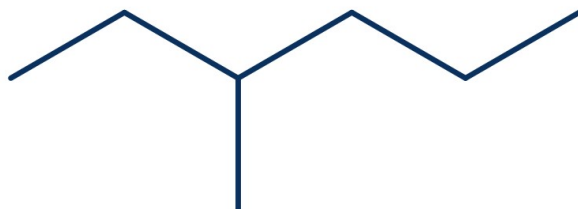


- (a) State the molecular formula of the compound. (1 mark)
.....
- (b) Write its structural formula. (1 mark)
.....
- (c) State the number of C-H bonds shown. (1 mark)
.....
- (d) State the maximum number of covalent bonds around a carbon atom in this structure. (1 mark)
.....

QUESTION 4 | TEST IT

Figure 2 shows a skeletal formula.

Figure 2



- (a) State the number of carbon atoms represented. (1 mark)
.....
- (b) Deduce the molecular formula. (1 mark)
.....
- (c) Write a structural formula for the compound. (1 mark)
.....
- (d) State the two main types of atom omitted from a skeletal formula. (2 marks)
.....
.....

QUESTION 5 | TEST IT

State the homologous series indicated by the functional group in each structural formula.

A $\text{CH}_2=\text{CHCH}_3$	B $\text{CH}_3\text{CHBrCH}_3$	C $\text{CH}_3\text{CH}_2\text{OH}$	D CH_3CHO
E CH_3COCH_3	F CH_3COOH	G $\text{CH}_3\text{COOCH}_3$	H $\text{CH}_3\text{CH}_2\text{CN}$

(a) Identify A-H.

(8 marks)

.....

.....

.....

.....

QUESTION 6 | TEST IT

Give the systematic IUPAC name of each compound.

A $\text{CH}_2=\text{CHCH}_2\text{CH}_3$	B $\text{CH}_3\text{CHBrCH}_2\text{CH}_3$
C $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$	D $\text{CH}_3\text{COOCH}_2\text{CH}_3$

(a) Name A-D.

(4 marks)

.....

.....

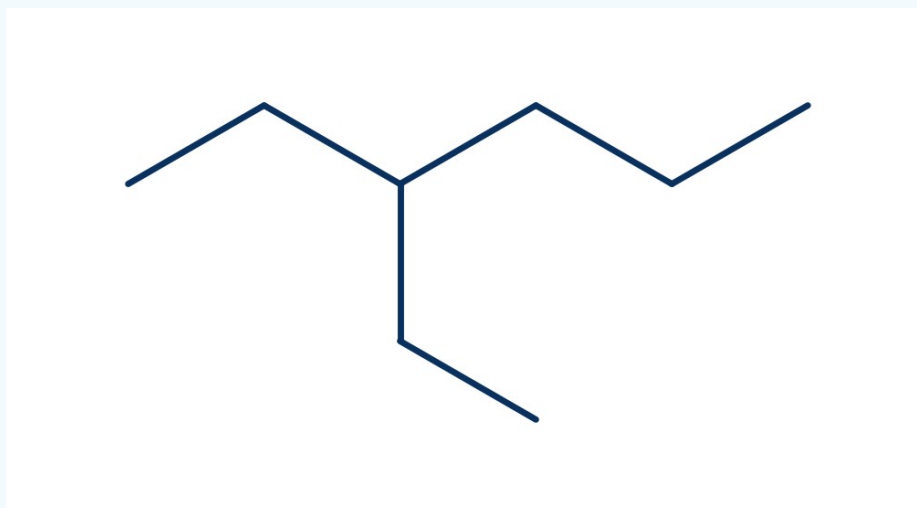
.....

.....

QUESTION 7 | TEST IT

A student describes Figure 3 as 3-propylpentane.

Figure 3



(a) State the number of carbon atoms in the longest continuous chain.

(1 mark)

.....

(b) Give the correct IUPAC name.

(2 marks)

.....

- (c) Explain why 3-propylpentane is not an acceptable systematic name. (1 mark)

.....
.....

QUESTION 8 | TEST IT

- (a) Define the term structural isomers. (2 marks)

.....
.....

Pair 1**Pair 2****Pair 3**

- (b) Classify Pair 1 and justify your answer. (2 marks)

.....
.....

- (c) Classify Pair 2 and justify your answer. (2 marks)

.....
.....

- (d) Classify Pair 3 and justify your answer. (2 marks)

.....
.....

SECTION B

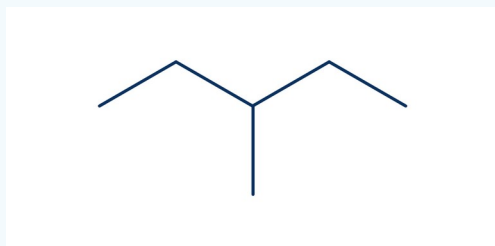
EXAM STYLE

Apply AQA naming and representation skills in linked questions

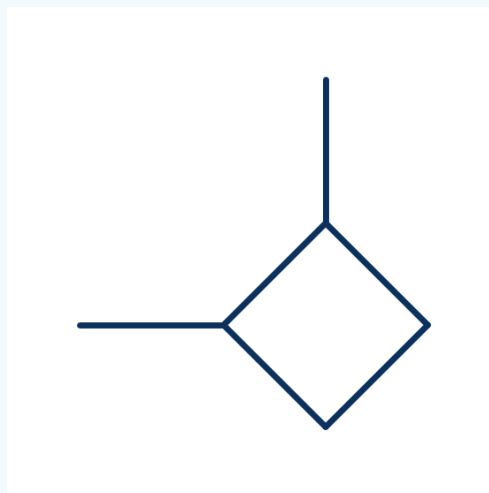
QUESTION 9 | EXAM STYLE

Four unfamiliar compounds are represented by the skeletal formulae A-D.

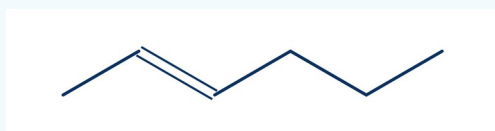
A



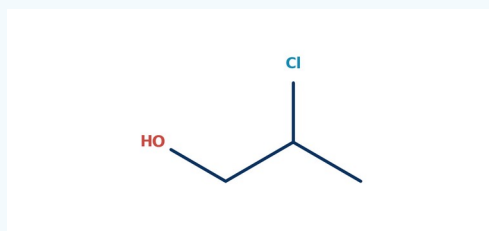
B



C



D



(a) Give the IUPAC name of A-D.

(4 marks)

.....

.....

.....

.....

(b) State the molecular formula of A-D.

(4 marks)

.....

.....

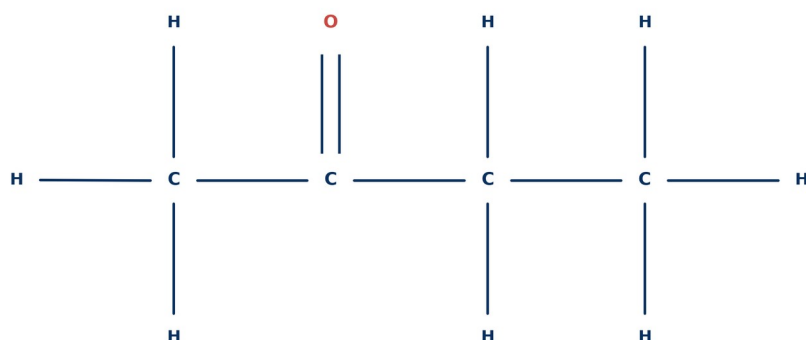
.....

.....

QUESTION 10 | EXAM STYLE

Figure 4 shows the displayed formula of an organic compound.

Figure 4



- (a) State the molecular formula. (1 mark)
-
- (b) State the empirical formula. (1 mark)
-
- (c) Write the structural formula. (1 mark)
-
- (d) Identify the functional group. (1 mark)
-
- (e) Give the IUPAC name. (1 mark)
-
- (f) Draw the skeletal formula. (2 marks)

Structure / working space

QUESTION 11 | EXAM STYLE

Draw a skeletal formula for each named compound. Every locant must be represented correctly.

- (a) 1,3-dimethylcyclopentane (2 marks)

Structure / working space

- (b) 3-bromo-2-methylpentane (2 marks)

Structure / working space

(c) hex-2-ene

(2 marks)

Structure / working space

(d) 2-methylpropan-1-ol

(2 marks)

Structure / working space

QUESTION 12 | EXAM STYLE

A $\text{CH}_3\text{CH}_2\text{CHO}$	B $\text{CH}_3\text{COOCH}_2\text{CH}_3$
C $\text{CH}_3\text{CH}_2\text{CN}$	D $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

(a) Give the IUPAC name of A-D.

(4 marks)

(b) Explain why the carbon atom in -CHO and the carbon atom in $-\text{C}\equiv\text{N}$ are included in the parent-chain count. (2 marks)

(c) State the molecular formula of B.

(1 mark)

(d) State which part of an ester name is written first.

(1 mark)

QUESTION 13 | EXAM STYLE

Each student name below contains one error. Give the correct name and explain the error.

STRUCTURAL FORMULA	STUDENT NAME
$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$	3-methylbutane
$\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{CH}_3$	hex-4-ene
$\text{CH}_3\text{CHBrCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$	3-methyl-2-bromopentane

(a) Correct the three names.

(3 marks)

(b) Explain the naming rule broken in each case.

(3 marks)

$$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 \quad / \quad \text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_3$$
$$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH} \quad / \quad \text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$$
$$\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO} \quad / \quad \text{CH}_3\text{COCH}_2\text{CH}_3$$

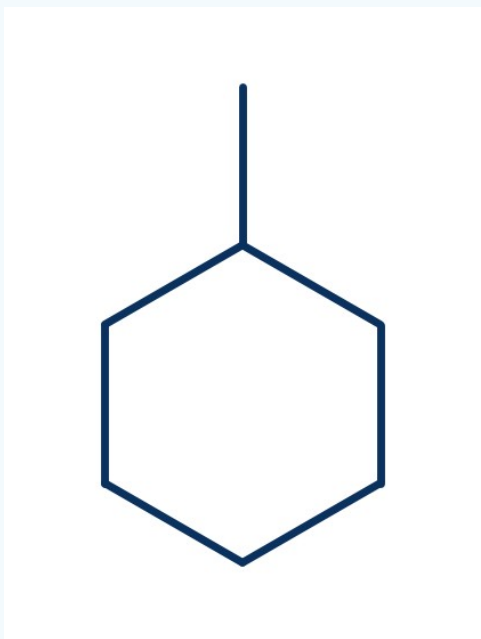
QUESTION 15 | EXAM STYLE

(a) Draw the skeletal formula of all three structural isomers. (3 marks)

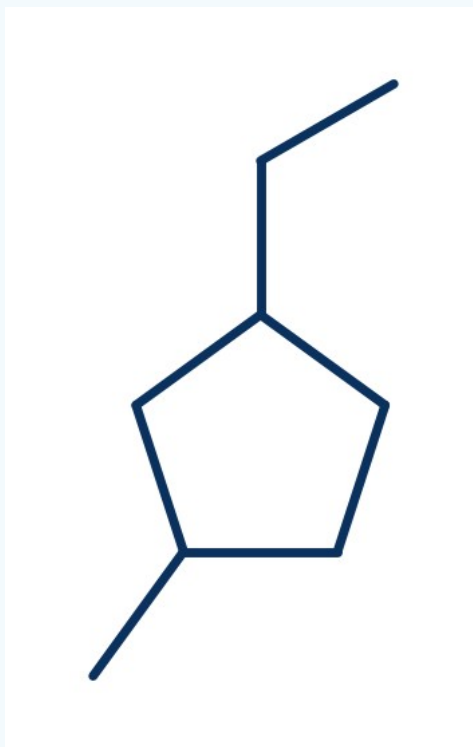
QUESTION 16 | EXAM STYLE

Name each structure and state its molecular formula.

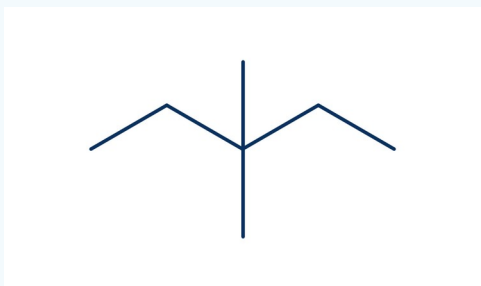
A



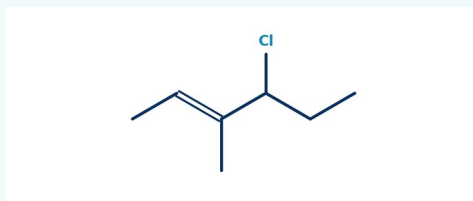
B



C



D



(a) Give the IUPAC name of A-D.

(4 marks)

.....

.....

.....

(b) State the molecular formula of A-D.

(4 marks)

.....

.....

.....

SECTION C

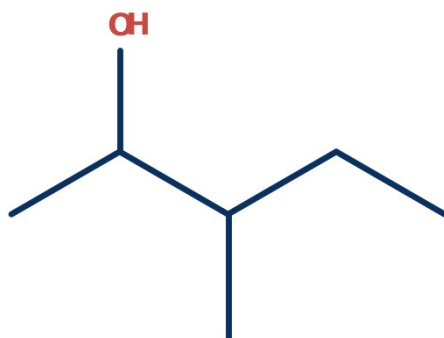
HARDER MIXED

Select the route across formulae, names and isomers

QUESTION 17 | HARDER MIXED

Compound X is shown in Figure 5. Use the structural clues to distinguish non-equivalent positions on its carbon skeleton.

Figure 5



(a) Give the IUPAC name and molecular formula of X.

(3 marks)

(b) Compound Y has the same molecular formula and carbon skeleton as X. The carbon bonded to the -OH group is attached to three other carbon atoms. Deduce the IUPAC name of Y.

(2 marks)

(c) Compound Z also has the same molecular formula and carbon skeleton as X, but its IUPAC name has a four-carbon parent chain. Draw Z and give its IUPAC name.

(2 marks)

Structure / working space

(d) A student moves the -OH group to the equivalent position at the opposite end of X and claims another isomer. Explain why the claim is incorrect.

(1 mark)

QUESTION 18 | HARDER MIXED

Three open-chain compounds P, Q and R all have molecular formula $C_5H_{10}O_2$. P contains a terminal $-COOH$ group and has an unbranched carbon skeleton. Q contains $-COO-$; the group bonded directly to the single-bonded oxygen has two carbon atoms, and the acid-derived chain has three. R also contains $-COO-$; its alkyl group is methyl and its acid-derived part is branched.

- (a) Draw P, Q and R and give the IUPAC name of each compound. (6 marks)

Structure / working space

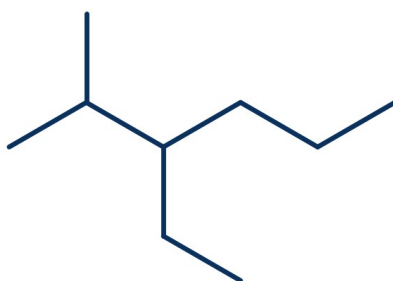
- (b) State and justify the structural-isomer relationship between P and Q. (2 marks)

- (c) A student names Q propyl ethanoate. Identify the naming error. (1 mark)

QUESTION 19 | HARDER MIXED

Three names are proposed for Figure 6: I 4-ethyl-5-methylhexane; II 3-ethyl-2-methylhexane; III 2,3-diethylpentane.

Figure 6



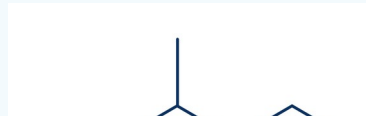
- (a) State which proposed name is correct. (1 mark)

- (b) Explain why name I is incorrect. (1 mark)

- (c) Explain why name III is incorrect. (2 marks)

- (d) Deduce the molecular formula of the compound. (1 mark)

- (e) A chain isomer Y has a six-carbon parent chain and three methyl substituents with locants 2,2,3. Write its structural formula and IUPAC name. (3 marks)

<p>A</p> 	<p>B</p> 
<p>C</p> 	<p>D</p> <p>$\text{CH}_3\text{CH}(\text{CH}_2\text{CH}_3)\text{CH}_2\text{CH}_3$</p>

STRETCH / SYNOPTIC

QUESTION 21 | STRETCH / SYNOPTIC

(b) Draw and name both possible Y compounds.

(4 marks)

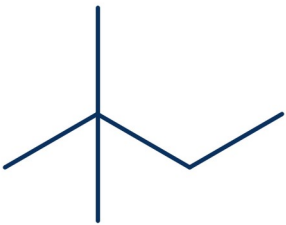
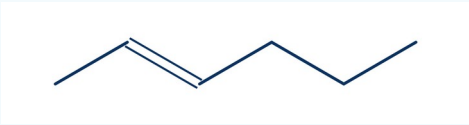
Structure / working space

(c) Explain why every X compound is a functional-group structural isomer of every Y compound.

(2 marks)

QUESTION 22 | STRETCH / SYNOPTIC

The final set contains four different representations. Decode each before comparing them.

<p>A</p> 	<p>B</p> 
<p>C</p> <p>CH₃COOCH₂CH₃</p>	<p>D</p> <p>CH₃CH₂CH₂COOH</p>

(a) Give the IUPAC name of A-D.

(4 marks)

(b) State the molecular formula of A-D.

(4 marks)

(c) Identify the functional-group structural-isomer pair and justify your choice.

(2 marks)

(d) Write a structural formula for A.

(1 mark)

(e) State the formula representation used for B.

(1 mark)



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AQA 7405

Introduction to Organic Chemistry I

Fully worked answers | AQA-style marking guidance

FULLY WORKED. PRECISELY MARKED. BUILT FOR IMPROVEMENT.

AQA SPECIFICATION

3.3.1.1 | 3.3.1.3 STRUCTURAL ISOMERISM

TEST IT	EXAM STYLE	HARDER MIXED	STRETCH
8	8	4	2

22 QUESTIONS MARKED

166 TOTAL MARKS

Use the marking points to diagnose exactly which chemistry or naming step needs repair.

Mapped to AQA Chemistry 7405 | specification checked September 2026

Specification coverage audit

AQA AREA	DELIBERATE PRACTICE	QUESTIONS
3.3.1.1 Formula representations	Empirical, molecular, general, structural, displayed and skeletal formulae; conversion and interpretation	2-4, 9-10, 17, 20, 22
3.3.1.1 Homologous series	Core definitions, characteristics, functional groups and general formulae	1-2, 5, 21
3.3.1.1 IUPAC nomenclature	Chains and rings up to six-carbon parents; parent choice, locants, substituents, suffixes, punctuation and drawing from names	6-7, 9-13, 16-19, 22
3.3.1.3 Structural isomerism	Definition; chain, position and functional-group isomers; complete isomer sets and duplicate rejection	8, 14-15, 17-18, 20-22
Boundary protected	No mechanisms, curly arrows, E/Z, CIP, reactions or substantial later-topic chemistry	All questions

AQA NAMING LIMIT Every assessed parent chain or ring contains no more than six carbon atoms. Larger total carbon counts arise only from correctly named substituents.

ORIGINALITY Questions are newly written from recurring AQA assessment patterns. No past-paper question has been reproduced.

SECTION A

TEST IT

Secure formula language, structures and basic nomenclature

TEST IT 1

- (a) A compound containing carbon and hydrogen only. [1]
- (b) An atom or group of atoms [1] responsible for the characteristic reactions of a compound [1].
- (c) A family of organic compounds with the same functional group [1] and the same general formula [1].
- (d) Any three: similar chemical properties; gradual trend in physical properties; successive members differ by CH_2 ; relative molecular mass increases by 14 for each successive member. [3]
- (e) Ethanol contains oxygen, so it does not contain carbon and hydrogen only. [1]

Common trap Do not define a hydrocarbon as a molecule containing carbon and hydrogen. The word only is essential.

TEST IT 2

- (a) C_5H_{10} . [1]
- (b) CH_2 . [1]
- (c) C_nH_{2n} . [1]
- (d) A molecular formula gives the actual number of each type of atom in one molecule [1]. A general formula gives the algebraic pattern shared by members of a homologous series [1].
- (e) Structural formula. [1]

TEST IT 3

- (a) $\text{C}_3\text{H}_8\text{O}$. [1]
- (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$. [1]
- (c) Seven C-H bonds. [1]
- (d) Four covalent bonds around each carbon atom. [1]

TEST IT 4

- (a) Seven carbon atoms. [1]
(b) C_7H_{16} . [1]
(c) $CH_3CH_2CH(CH_3)CH_2CH_2CH_3$; an equivalent correct structural formula is accepted. [1]
(d) Carbon symbols are omitted [1] and hydrogen atoms bonded to carbon are omitted [1].

Examiner insight Count every unlabelled end and vertex. Do not count line segments.

TEST IT 5

- (a) A alkene; B haloalkane; C alcohol; D aldehyde; E ketone; F carboxylic acid; G ester; H nitrile. Award one mark for each correct series. [8]

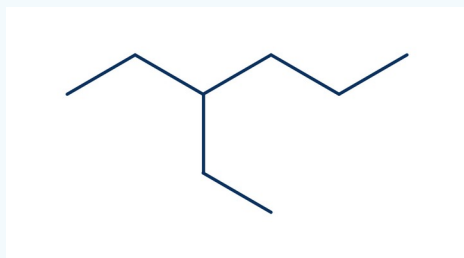
TEST IT 6

- (a) A but-1-ene; B 2-bromobutane; C butan-2-ol; D ethyl ethanoate. Award one mark for each exact name. [4]
Common trap Use but-1-ene and butan-2-ol. The locant sits immediately before the feature it locates.

TEST IT 7

- (a) Six carbon atoms. [1]
(b) 3-ethylhexane: correct parent and substituent [1], correct locant and complete name [1].
(c) The chosen five-carbon route is not the longest continuous carbon chain; a six-carbon parent is available. [1]

Model



3-ethylhexane

TEST IT 8

- (a) Compounds with the same molecular formula [1] but different structural formulae [1].
(b) Chain isomers: the carbon skeleton changes while the molecular formula and functional group stay the same. [2]
(c) Position isomers: the -OH group changes position while the carbon skeleton and functional-group type stay the same. [2]
(d) Functional-group isomers: aldehyde and ketone functional groups differ while the molecular formula stays C_4H_8O . [2]

SECTION B

EXAM STYLE

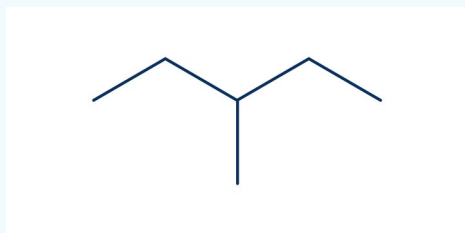
Apply AQA naming and representation skills in linked questions

EXAM STYLE 9

(a) A 3-methylpentane; B 1,2-dimethylcyclobutane; C hex-2-ene; D 2-chloropropan-1-ol. Award one mark each. [4]

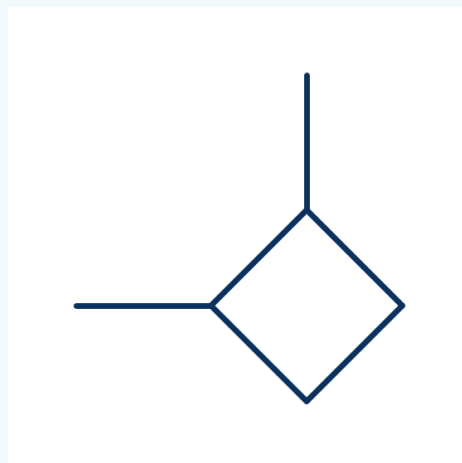
(b) A C_6H_{14} ; B C_6H_{12} ; C C_6H_{12} ; D C_3H_7ClO . Award one mark each. [4]

A



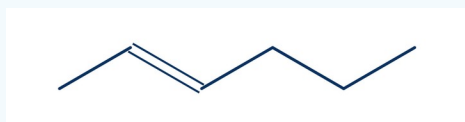
3-methylpentane | C_6H_{14}

B



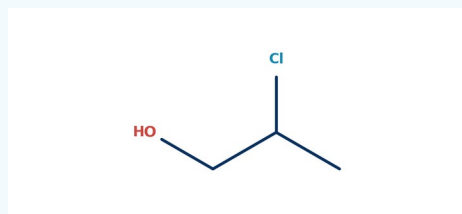
1,2-dimethylcyclobutane | C_6H_{12}

C



hex-2-ene | C_6H_{12}

D

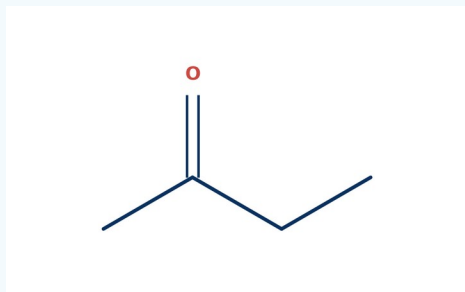


2-chloropropan-1-ol | C_3H_7ClO

EXAM STYLE 10

- (a) C_4H_8O . [1]
 (b) C_4H_8O . The subscripts have no common factor greater than one. [1]
 (c) $CH_3COCH_2CH_3$. [1]
 (d) Ketone / carbonyl within the chain. [1]
 (e) Butan-2-one. [1]
 (f) Four-carbon skeletal chain [1] with $C=O$ on carbon 2 [1].

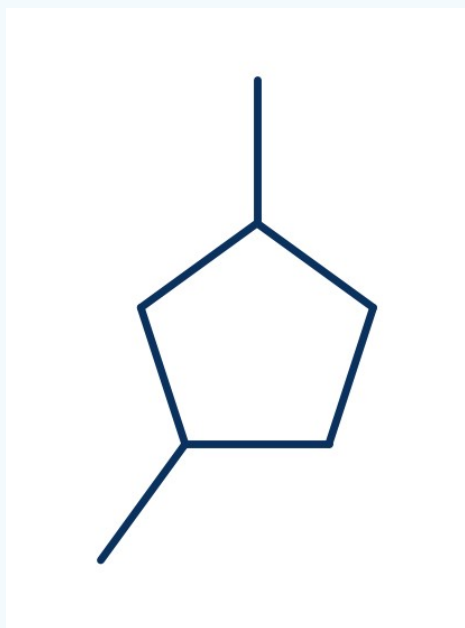
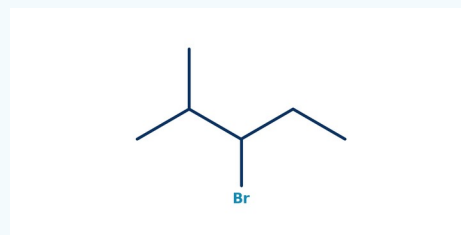
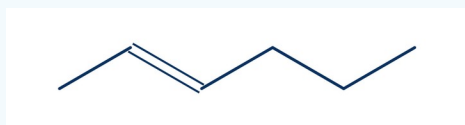
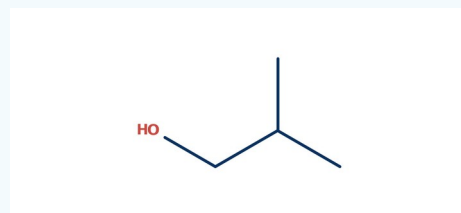
Model skeletal formula



butan-2-one

EXAM STYLE 11

- (a) Five-carbon ring [1] with methyl groups at carbons 1 and 3 [1].
 (b) Five-carbon chain with methyl at carbon 2 [1] and Br at carbon 3 [1].
 (c) Six-carbon chain [1] with C=C between carbons 2 and 3 [1].
 (d) Three-carbon parent containing carbon 1 attached to -OH [1] and methyl at carbon 2 [1].

a**1,3-dimethylcyclopentane****b****3-bromo-2-methylpentane****c****hex-2-ene****d****2-methylpropan-1-ol****EXAM STYLE 12**

- (a) A propanal; B ethyl ethanoate; C propanenitrile; D propan-1-amine. Award one mark each. [4]
 (b) The aldehyde carbon is part of the continuous carbon parent [1]; the nitrile carbon is also part of the continuous carbon parent and is carbon 1 [1].
 (c) $C_4H_8O_2$. [1]
 (d) The alkyl group attached to the single-bonded oxygen is named first. [1]
Common trap CH_3CH_2CN contains three carbon atoms, not two. The nitrile carbon counts.

EXAM STYLE 13

- (a) 2-methylbutane; hex-2-ene; 2-bromo-3-methylpentane. Award one mark each. [3]
 (b) First: number from the nearer end to give methyl locant 2 [1]. Second: give the C=C the lowest locant, 2 rather than 4 [1]. Third: list different substituents alphabetically, so bromo precedes methyl [1].

EXAM STYLE 14

- (a) Pair 1 C_4H_{10} ; Pair 2 $C_4H_{10}O$; Pair 3 C_4H_8O . Award one mark each. [3]
 (b) Pair 1 chain; Pair 2 position; Pair 3 functional group. Award one mark each. [3]
 (c) Pair 1 changes carbon skeleton; Pair 2 changes -OH position; Pair 3 changes aldehyde to ketone. In every case the molecular formula stays the same. Award one mark for each precise comparison. [3]

EXAM STYLE 15

- (a) One mark for each unique valid skeletal structure: straight chain, one methyl branch and the fully branched structure. [3]
 (b) Pentane; 2-methylbutane; 2,2-dimethylpropane. One mark each. [3]
 (c) 3-methylbutane is the same connectivity as 2-methylbutane renumbered from the wrong end. [1]

¹ $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ pentane	² $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$ 2-methylbutane
³ $\text{C}(\text{CH}_3)_4$ 2,2-dimethylpropane	

EXAM STYLE 16

(a) A methylcyclohexane; B 1-ethyl-3-methylcyclopentane; C 3,3-dimethylpentane; D 4-chloro-3-methylhex-2-ene. Award one mark each. [4]

(b) A C_7H_{14} ; B C_8H_{16} ; C C_7H_{16} ; D $\text{C}_7\text{H}_{13}\text{Cl}$. Award one mark each. [4]

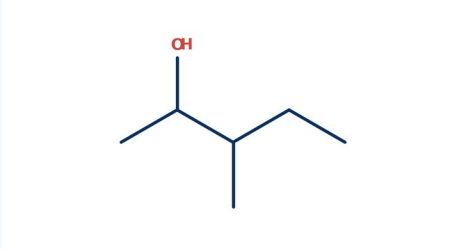
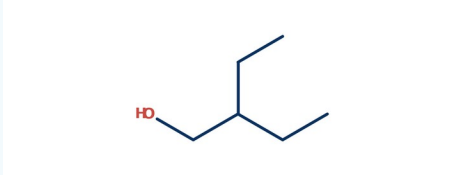
Examiner insight In D, the double bond controls the numbering direction before ordinary substituents are considered.

SECTION C**HARDER MIXED**

Select the route across formulae, names and isomers

HARDER MIXED 17

- (a) 3-methylpentan-2-ol: correct parent and substituent [1], correct -OH locant [1]; $\text{C}_6\text{H}_{14}\text{O}$ [1].
 (b) 3-methylpentan-3-ol. The -OH-bearing carbon is carbon 3 and is bonded to three other carbon atoms. Award correct locants [1] and complete name [1].
 (c) 2-ethylbutan-1-ol: correct structure [1] and exact name [1]. The parent chain must contain the carbon bonded to -OH.
 (d) The two positions are related by reversing the same carbon chain, so the connectivity is unchanged. [1]

^X  3-methylpentan-2-ol	^{Compound Z}  2-ethylbutan-1-ol
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HARDER MIXED 18

- (a) P pentanoic acid; Q ethyl propanoate; R methyl 2-methylpropanoate. Award one correct structure and one exact name for each. [6]
 (b) P and Q have the same molecular formula [1] but different functional groups / structural formulae [1], so they are functional-group structural isomers.
 (c) The group bonded directly to the single-bonded oxygen is ethyl, not propyl; the acid-derived chain is propanoate. [1]

^P $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ pentanoic acid	^Q $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$ ethyl propanoate
^R $\text{CH}_3\text{CH}(\text{CH}_3)\text{COOCH}_3$ methyl 2-methylpropanoate	

HARDER MIXED 19

- (a) II, 3-ethyl-2-methylhexane. [1]
 (b) Name I numbers from the wrong end: the lowest locant set is 2,3, not 4,5. [1]
 (c) The longest continuous chain contains six carbon atoms, not five [1]. When that chain is selected, name III describes 3-ethyl-4-methylhexane, a different connectivity from Figure 6 [1].
 (d) C_9H_{20} . [1]
 (e) $CH_3C(CH_3)_2CH(CH_3)CH_2CH_2CH_3$: correct connectivity [1] and complete structural formula [1]; 2,2,3-trimethylhexane [1].

HARDER MIXED 20

- (a) A hexane; B 2-methylpentane; C 3-methylpentane; D 3-methylpentane. Award one mark for each exact name. [4]
 (b) C and D [1]; they have identical carbon connectivity and differ only in representation / orientation [1].
 (c) $CH_3C(CH_3)_2CH_2CH_3$, 2,2-dimethylbutane [2]; $CH_3CH(CH_3)CH(CH_3)CH_3$, 2,3-dimethylbutane [2]. Award one structural-formula mark and one exact-name mark for each.

Common trap A different orientation is not a new isomer. Compare carbon connectivity before counting structures.

SECTION D**STRETCH / SYNOPTIC**

Deduce unfamiliar structures without importing later organic chemistry

STRETCH / SYNOPTIC 21

- (a) 2-methylbutanal and 3-methylbutanal. Award one correct structure and one exact name for each. [4]
 (b) Pentan-2-one and pentan-3-one. Award one correct structure and one exact name for each. [4]
 (c) Every structure has molecular formula $C_5H_{10}O$ [1], but aldehydes and ketones have different functional groups / structural formulae [1].

X1 $CH_3CH_2CH(CH_3)CHO$ 2-methylbutanal	X2 $CH_3CH(CH_3)CH_2CHO$ 3-methylbutanal
Y1 $CH_3COCH_2CH_2CH_3$ pentan-2-one	Y2 $CH_3CH_2COCH_2CH_3$ pentan-3-one

STRETCH / SYNOPTIC 22

- (a) A 2,2-dimethylbutane; B hex-2-ene; C ethyl ethanoate; D butanoic acid. Award one mark each. [4]
 (b) C_6H_{14} ; C_6H_{12} ; $C_4H_8O_2$; $C_4H_8O_2$. Award one mark each. [4]
 (c) C and D [1]; they have the same molecular formula but different functional groups / structural formulae [1].
 (d) $CH_3C(CH_3)_2CH_2CH_3$. [1]
 (e) Skeletal formula. [1]

Examiner insight C and D are isomers because their molecular formulae match. Similar atom counts are not enough unless every subscript agrees.