

CHAPTER 11 INTRODUCTION TO ORGANIC CHEMISTRY

- 1 The alkanes form an homologous series of hydrocarbons. The first four straight-chain alkanes are shown below.

methane	CH ₄
ethane	CH ₃ CH ₃
propane	CH ₃ CH ₂ CH ₃
butane	CH ₃ CH ₂ CH ₂ CH ₃

- (a) (i) State what is meant by the term *hydrocarbon*.

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- (ii) Give the general formula for the alkanes.

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- (iii) Give the molecular formula for hexane, the sixth member of the series.

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(3 marks)

- (b) Each homologous series has its own general formula. State **two** other characteristics of an homologous series.

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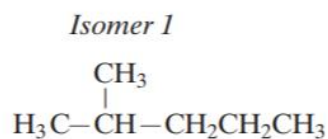
(2 marks)

- (c) Branched-chain structural isomers are possible for alkanes which have more than three carbon atoms.

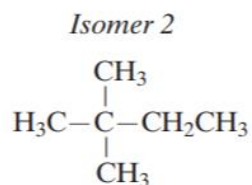
- (i) State what is meant by the term *structural isomers*.

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(ii) Name the **two** isomers of hexane shown below.



Name



Name

(iii) Give the structures of **two** other branched-chain isomers of hexane.

Isomer 3

Isomer 4

(6 marks)

2 (a) Give the systematic chemical name of CCl_2F_2 .

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(1 mark)

(b) Give the systematic chemical name of CCl_4

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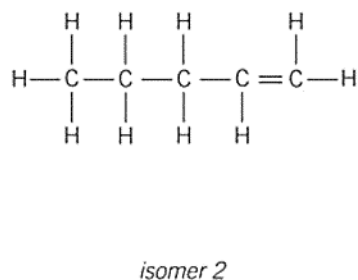
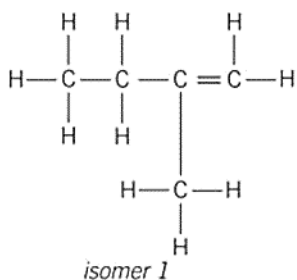
(1 mark)

(c) Give the systematic chemical name of $\text{CHCl}_2\text{CHCl}_2$.

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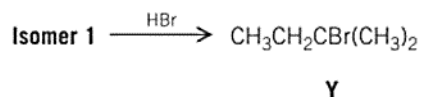
(1 mark)

- 3 There are five structural isomers of the molecular formula C_5H_{10} which are alkenes. The displayed formulae of two of these isomers are given.



- (a) Draw the displayed formulae of two of the remaining alkene structural isomers. (2 marks)

- (b) Consider the reaction scheme shown below and answer the question that follows.

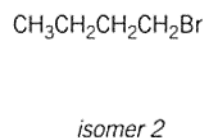
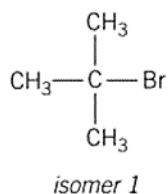


Give the name of compound **Y**.

(1 mark)

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- 4 There are four structural isomers of molecular formula C_4H_9Br . The structural formulae of two of these isomers are given below.

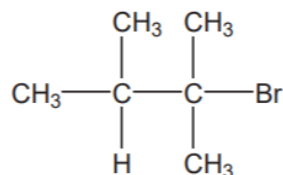


- (i) Draw the structural formulae of the remaining two isomers. (3 marks)

(ii) Name isomer 1.

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5 (a) The structure of the bromoalkane **Z** is



Give the IUPAC name for **Z**.

Give the general formula of the homologous series of straight-chain bromoalkanes that contains one bromine atom per molecule.

Suggest **one** reason why 1-bromohexane has a higher boiling point than **Z**.

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(3 marks)

(b) Draw the displayed formula of 1,2-dichloro-2-methylpropane.
State its empirical formula.

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(2 marks)