

Optical isomerism – A2 2022 Chemistry P3

1. June/2022/Paper_7405/3/No.3

0 3

Under suitable conditions, 2-bromobutane reacts with sodium hydroxide to produce a mixture of five products, **A**, **B**, **C**, **D** and **E**.

Products **A**, **B** and **C** are alkenes.

A is a structural isomer of **B** and **C**.

A does not exhibit stereoisomerism.

B and **C** are a pair of stereoisomers.

Products **D** and **E** are alcohols.

D and **E** are a pair of enantiomers.

0 3 . 1

Give the names of the **two** concurrent mechanisms responsible for the formation of the alkenes and the alcohols.

[2 marks]

Mechanism to form alkenes _____

Mechanism to form alcohols _____

0 3 . 2

Define the term stereoisomers.

[2 marks]

0 3 . 3

Deduce the name of isomer **A**.

Explain why **A** does **not** exhibit stereoisomerism.

[2 marks]

Name _____

Explanation _____

0 3 . 4

Outline the mechanism for the reaction of 2-bromobutane with sodium hydroxide to form alkene **A**.

[3 marks]

0 3 . 5

Deduce the name of isomer **B** and the name of isomer **C**.

Explain the origin of the stereoisomerism in **B** and **C**.

[2 marks]

Names _____

Explanation _____

0 3 . 6

Draw 3D representations of enantiomers **D** and **E** to show how their structures are related.

[2 marks]

0 3 . 7

A student compares the rates of hydrolysis of 1-chlorobutane, 1-bromobutane and 1-iodobutane.

The suggested method is:

- add equal volumes of the three halogenoalkanes to separate test tubes
- add equal volumes of aqueous silver nitrate to each test tube
- record the time taken for a precipitate to appear in each test tube.

State and explain the order in which precipitates appear.

[2 marks]

Order in which precipitates appear _____

Explanation _____
