Oxford Cambridge and RSA

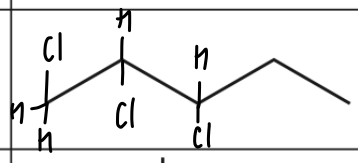
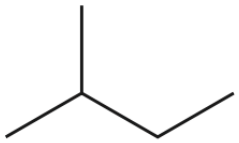
AS Level Chemistry A

H032/01 Breadth in chemistry

Question Set 16

1. (a) This question is about saturated hydrocarbons.

Compounds **A**, **B** and **C** are saturated hydrocarbons.
The structures and boiling points of **A**, **B** and **C** are shown below.

	Isomer	Boiling point /°C
A		36
B		28
C		9

- Use the structures to explain what is meant by the term structural isomer.
- Explain the trend in boiling points shown by **A**, **B** and **C** in the table.

[5]

(1) a) structural isomers are molecules with the same molecular formula but different structural formulae.

A, B and C are all chain isomers, meaning they have different arrangements of the hydrocarbon chain.

As the molecules become more branched the boiling point decreases because the molecules can't pack as closely together and so have weaker van der Waal's forces between the molecules.

(b) Compounds **A**, **B** and **C** all react with chlorine in the presence of ultraviolet radiation to form organic compounds with the formula $C_5H_{11}Cl$.

(i) Name the mechanism for this reaction.

[1]

b)i) free radical substitution

(ii) Complete the table to show the number of structural isomers of $C_5H_{11}Cl$ that could be formed from the reaction of chlorine with **A** and **B**.

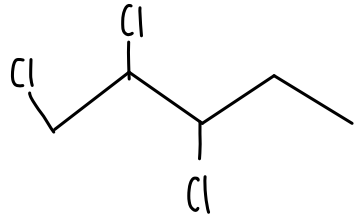
[2]

	A	B
Number of structural isomers	3	4 .....

(iii) The reaction of compound **A** with excess chlorine forms a compound **D**, which has a molar mass of 175.5 g mol^{-1}.

Draw a possible structure for compound **D** and write the equation for its formation from compound **A**. Use molecular formulae in the equation.

[2]



$$C_5H_{12} + \frac{3}{2}Cl_2 \longrightarrow C_5H_9Cl_3$$

Total Marks for Question Set 16: 10