

**AS Level Chemistry A**  
**H032/01 Breadth in chemistry**

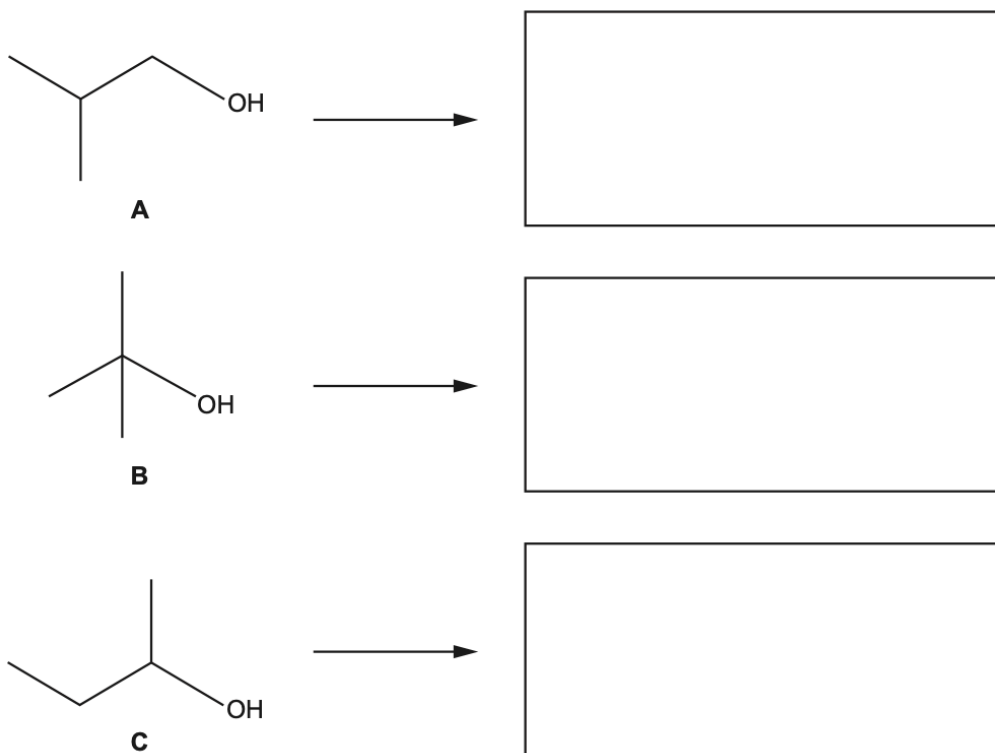
**Question Set 22**

1. This question is about alcohols and alkanes.

(a) Three alcohols **A**, **B** and **C** are structural isomers of  $C_4H_{10}O$ .

Each alcohol is refluxed with acidified potassium dichromate(VI),  $H^+/Cr_2O_7^{2-}$ .

(i) Draw the structures for the organic products.  
If there is no reaction, write '**NONE**'.

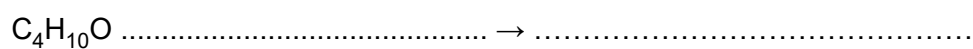


(ii) Write the systematic name for alcohol **C**.

[3]

(iii) Complete the equation below for the complete combustion of alcohol **A**.

[1]



[1]

(b) Under suitable conditions, butane,  $C_4H_{10}$ , reacts with chlorine by radical substitution.  
A mixture of organic compounds is formed, including  $C_4H_9Cl$ , and compounds **D** and **E**.

(i) Complete the table below to show the mechanism for the initiation and propagation stages of the reaction of  $C_4H_{10}$  with chlorine to form  $C_4H_9Cl$ .

<b>Initiation</b>	Equation .....
	Conditions .....
<b>Propagation</b>	..... → .....
	..... → .....

In your equations, use molecular formulae and 'dots' (•) with any radicals.

[3]

(ii) Organic compound **D** is formed by substitution of **all** the H atoms in butane by *Cl* atoms.

Write the equation for the formation of compound **D** from butane. Use molecular formulae.

[1]

(iii) Organic compound **E** is formed by the substitution of **some** of the H atoms in butane by *Cl* atoms.

A chemist found that 0.636 g of compound **E** has a volume of  $78.0\text{ cm}^3$ . Under the conditions used, the molar gas volume is  $32.5\text{ dm}^3\text{ mol}^{-1}$ .

Determine the molecular formula of compound **E**.

[3]

**Total Marks for Question Set 22: 12**

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