



Oxford Cambridge and RSA

## **A Level Chemistry A**

**H432/03** Unified chemistry

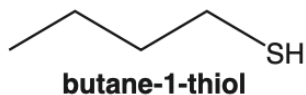
### **Question Set 5**

1

This question is about organic molecules that have a strong smell.

- (a) Thiols are foul-smelling, organic sulfur compounds with the functional group –SH.

Butane-1-thiol, shown below, contributes to the strong smell of skunks.



- (i) Thiols are weak acids.

Write the expression for the acid dissociation constant,  $K_a$ , for butane-1-thiol. [1]

- (ii) Thiols react with carboxylic acids to form thioesters.

Write an equation for the reaction of butane-1-thiol with ethanoic acid.

Use structures for all organic compounds with the functional groups clearly displayed. [2]

- (iii) When beer is exposed to light, 3-methylbut-2-ene-1-thiol is formed, which gives an unpleasant smell and flavour to the beer.

Draw the **skeletal** formula for 3-methylbut-2-ene-1-thiol. [1]

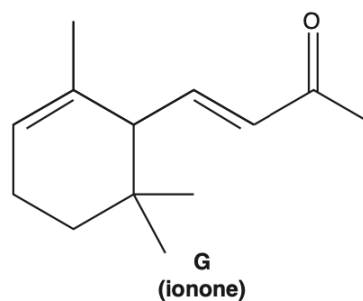
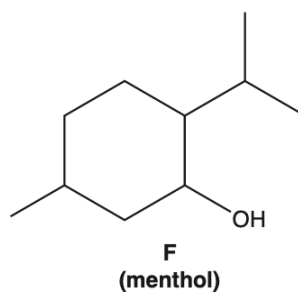
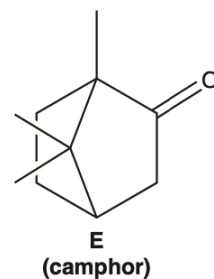
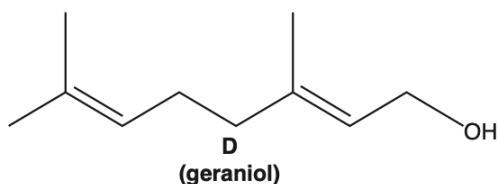
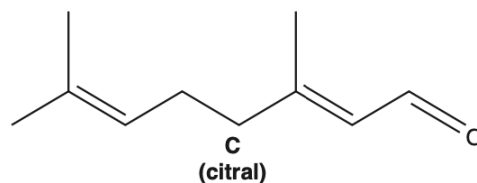
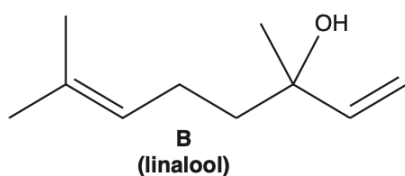
- (iv) Propane-1,3-dithiol reacts with carbonyl compounds in a condensation reaction to form a cyclic organic sulfur product.

Write an equation for the reaction of propane-1,3-dithiol with propanone.

Use structures for organic compounds. [2]

(b)\*

The structures for six naturally occurring organic compounds with pleasant smells, **B–G**, are shown below. The common names in brackets relate to their source and smell.



Explain how chemical tests would allow each compound to be distinguished from the other compounds.

In your answer, include essential details for all test procedures and observations.

Details of apparatus and quantities are **not** required.

[6]

**Total Marks for Question Set 5: 12**

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