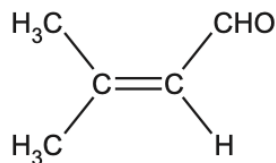


**GCE A level Chemistry A (H432)**  
**H432/02 Synthesis and analytical techniques**

**Question Set 21**

1. This question is about unsaturated aldehydes and alcohols.

(a) 3-Methylbut-2-enal, shown below, is used as a food flavouring.



**3-methylbut-2-enal**

3-Methylbut-2-enal is reacted with hydrogen bromide, forming a mixture of two organic products.

One of the organic products forms in a much greater quantity than the other organic product.

(i) Outline the reaction mechanism for the formation of **one** of the organic products.

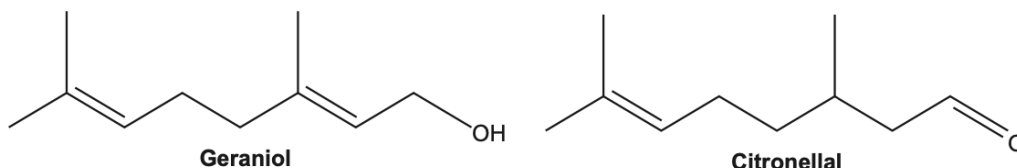
Include curly arrows and relevant dipoles.

[4]

(ii) Explain why one of the organic products forms in a much greater quantity than the other organic product.

[2]

(b) Geraniol and citronellal, shown below, are isomers present in 'citronella oil', used as an insect repellent.



- Geraniol and citronellal are structural isomers of each other.
- They also show stereoisomerism.

(i) Describe how the observations from a chemical test would distinguish between geraniol and citronellal.

[2]

(ii) What is the molecular formula of geraniol?

[1]

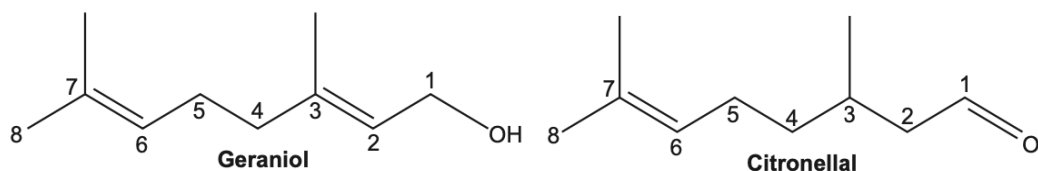
(iii) Explain why geraniol and citronellal are structural isomers of each other.

[1]

(iv) Explain the term **stereoisomerism**.

[1]

- (v) The structures of geraniol and citronellal are repeated below with the carbon atoms numbered.



Explain the types of stereoisomerism shown by geraniol and citronellal.

In your answer,

- refer to the numbered carbon atoms in the structures above
- draw diagrams clearly showing any stereoisomers.

[4]

**Total Marks for Question Set 21: 13**

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