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— **TUITION** —

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CHEMISTRY

ORGANIC CHEMISTRY

Level & Board

AQA (A-LEVEL)

TOPIC:

HALOGENOALKANES

PAPER TYPE:

QUESTION PAPER - 1

TOTAL QUESTIONS

10

TOTAL MARKS

27

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Halogenoalkanes - 1

1. Trifluorochloromethane, CF_3Cl , is an example of a chlorofluorocarbon, CFC, that was commonly used as a propellant in aerosols.

Nowadays, CFCs have limited use because of the damage caused to the ozone layer.

(a) Draw a diagram to show the shape of a molecule of CF_3Cl .

(1)

(b) Predict an approximate value for the bond angles in a molecule of CF_3Cl .

(1)

(c) Suggest a property that made CF_3Cl suitable as a propellant in an aerosol.

(1)

(d) When CFCs are exposed to strong ultraviolet radiation in the upper atmosphere, homolytic fission takes place to produce free radicals.

Explain what is meant by the term homolytic fission.

(1)

(e) Suggest which bond is most likely to be broken when CF_3Cl is exposed to ultraviolet radiation.

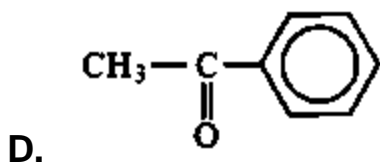
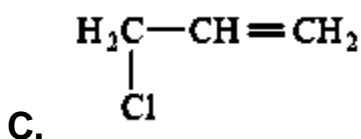
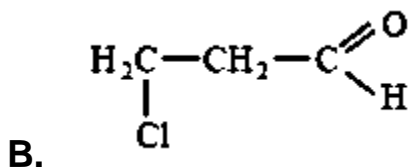
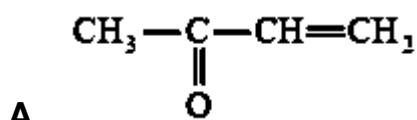
Explain your answer.

(1)

(f) Identify the two free radicals most likely to be formed when CF_3Cl is exposed to ultraviolet radiation.

(2)

2. Which one of the following can react both by nucleophilic addition and by nucleophilic substitution?



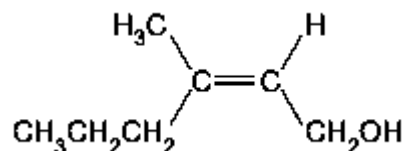
(1)

3. Compound E can be oxidised to form a carboxylic acid.

(a) State a suitable oxidising mixture for this reaction.

(2)

(b) Write a balanced equation for this oxidation of compound E.
Use [O] to represent the oxidising mixture.

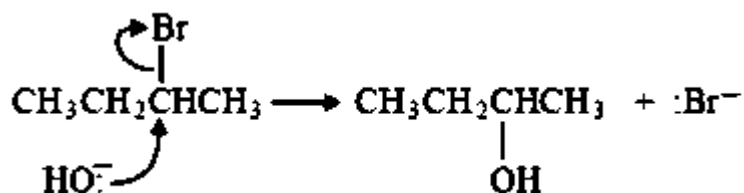


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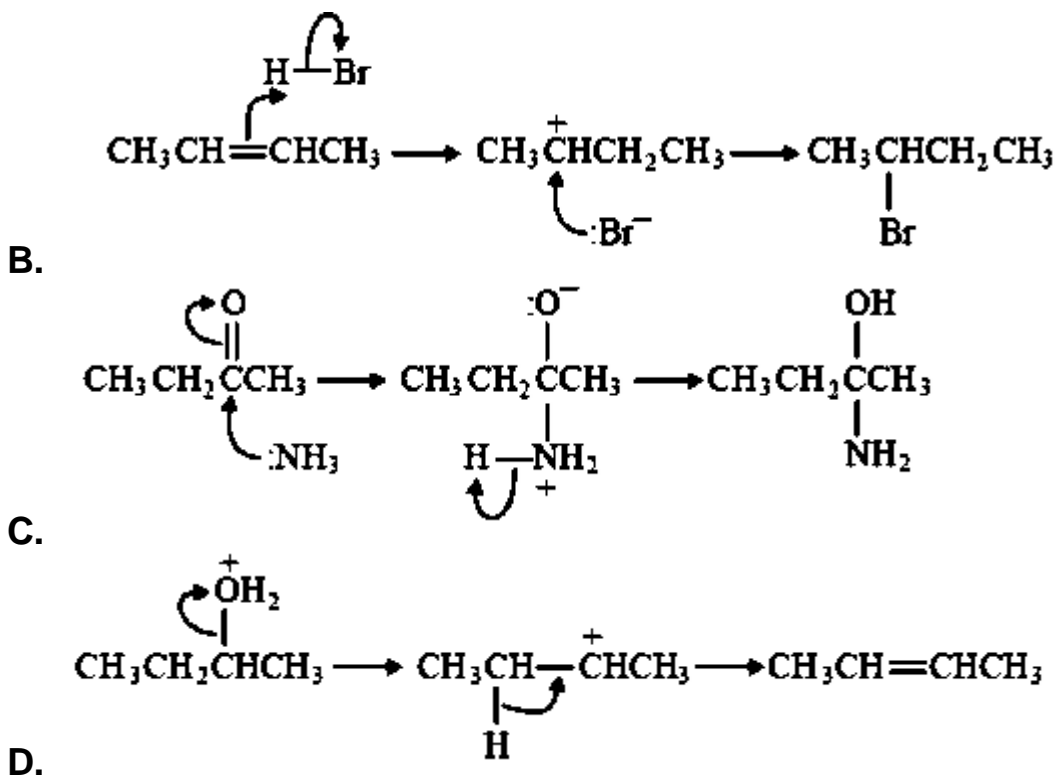
(c) Explain how compound E and the carboxylic acid could be distinguished by infra-red spectroscopy.

(1)

4. In which of the following is a curly arrow used incorrectly?



A.



(1)

5. How many different alkenes are formed when 2-bromo-2-methylbutane reacts with ethanolic potassium hydroxide?

- A. 2
- B. 3
- C. 4
- D. 5

(1)

6. Ethanol, $\text{C}_2\text{H}_5\text{OH}$, can be produced by the fermentation of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$.

Write a balanced equation for the fermentation of glucose.

(2)

7. Which compound is not formed by reacting 3-bromo-3-methylhexane with warm, ethanolic potassium hydroxide?
- A. 2-ethylpent-1-ene
 - B. 3-methylhex-1-ene
 - C. 3-methylhex-2-ene
 - D. 3-methylhex-3-ene

(1)

8. In 1930, an American engineer, Thomas Midgley, demonstrated a new refrigerant.

As part of his demonstration, he inhaled a lung full of dichlorodifluoromethane, CCl_2F_2 , and used it to blow out a candle.

Use Midgley's demonstration to suggest two properties of CCl_2F_2 .

Explain, with a reason, two other uses of chemicals such as CCl_2F_2 , other than as a refrigerant.

(4)

9. Ethanol has a relatively high boiling point.

This can be explained in terms of intermolecular hydrogen bonds.
Draw a second molecule of ethanol alongside the one drawn below and show how a hydrogen bond could be formed.

Clearly show any relevant dipoles and lone pairs of electrons.

(3)

10. The question below refers to the reaction of 1-bromopropane with a solution of potassium cyanide in aqueous ethanol.

What is the organic product of this reaction?

- A. propylamine
- B. butylamine
- C. propanenitrile
- D. butanenitrile

(1)



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- Founder & CEO of Chemistry Online Tuition Ltd.
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