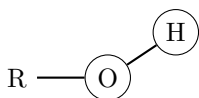


Core Concepts:

- **Alcohols:** A homologous series of organic compounds containing the hydroxyl (**-OH**) functional group. They are generally flammable, soluble in water, and undergo reactions such as combustion, oxidation, and esterification.
- **Carboxylic Acids:** A homologous series of organic compounds containing the carboxyl (**-COOH**) functional group. They are weak acids, meaning they partially ionise in water. They react with metals, carbonates, and bases, and also undergo esterification.
- **Esters:** Organic compounds formed from the reaction between an alcohol and a carboxylic acid (esterification). They are known for their distinctive sweet smells and are used in perfumes and food flavourings.

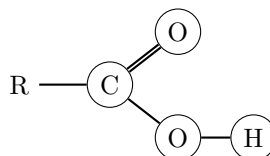
Section A: Key Terms & Concepts

1. Identify the functional groups below by drawing their structures and naming them.



a) Functional group: _____

Structure: _____



b) Functional group: _____

Structure: _____

Figure 1: Common organic functional groups.

2. Complete the following sentences using the most appropriate chemical terms.

- a) Alcohols are a _____ series, meaning they have the same general formula and similar _____ properties.
- b) Carboxylic acids are _____ acids because they only _____ ionise in water, releasing a low concentration of _____ ions.
- c) The reaction between an alcohol and a carboxylic acid to form an ester and water is called _____ and is typically catalysed by a strong _____ (e.g., concentrated sulfuric acid).

Section B: Core Concepts & Explanations

1. Explain why ethanol is a suitable fuel for combustion engines.

2. Describe the reaction of ethanoic acid with sodium carbonate, including the observations you would make and a balanced symbol equation.

3. Explain how ethanol can be oxidised to ethanoic acid, specifying the conditions required for this transformation.

4. Draw a dot-and-cross diagram to show the covalent bonding in a molecule of methanol (CH_3OH). Only outer shell electrons need to be shown.

Section C: Exam Application & Extended Writing

1. The diagram below shows the general reaction for the formation of an ester.

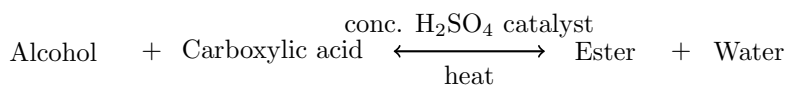


Figure 3: Esterification reaction.

- a) Using the diagram, identify the type of reaction shown and explain why it is considered a reversible reaction.

- b) Ethanol and ethanoic acid are two important organic compounds. Compare and contrast their physical and chemical properties, and their typical reactions. (6 marks)
