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Student number

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Name _____

Date _____

Attempt/Time taken _____

GCSE CHEMISTRY

Topic Paper: 7.2.3 Alcohols & 7.2.4 Carboxylic acids
Part 1

Time allowed: 30 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

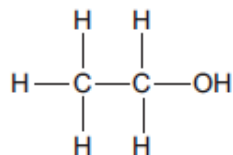
- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



24 Marks

- Q1. (a) The structure of an alcohol is shown in **Figure 1**.

Figure 1



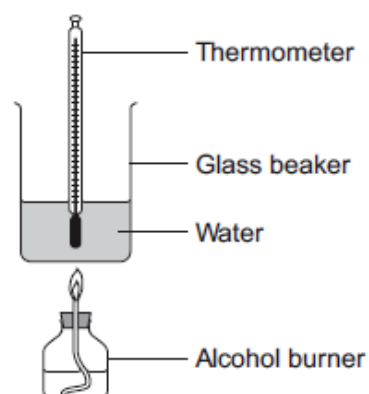
- (i) Draw a circle around the functional group in the structure of the alcohol. (1)
- (ii) What is the chemical name of this alcohol? (1)

- (b) Alcohols are used as fuels.

A student plans an experiment to find the energy released per gram of alcohol burned.

The student uses the apparatus shown in **Figure 2**.

Figure 2



- (i) Suggest **two** ways that this apparatus could be improved to obtain accurate results. (2)



- (ii) Wine left in a glass for several days turns sour.
The sour taste is caused by ethanoic acid.



Complete the sentences.

The ethanoic acid is produced from a reaction between ethanol
and

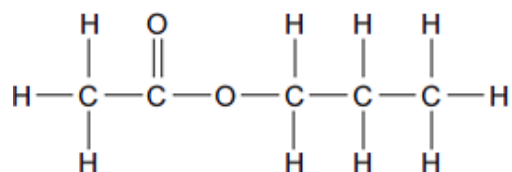
This type of reaction is

(2)

- (b) Propyl ethanoate, a fragrance, can be produced by reacting ethanoic acid with an alcohol.

Propyl ethanoate is a member of a series of organic compounds. The members of the series all have the same functional group.

The displayed structure of propyl ethanoate is:



- (i) Draw a ring around the functional group for this series on the displayed structure of propyl ethanoate.

(1)

- (ii) Name the series of organic compounds with this functional group.

(1)

- (iii) The alcohol used to make propyl ethanoate has the formula $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

Name this alcohol.

(1)

(Total 6 marks)



Q3. Vinegar can be added to food. Vinegar is an aqueous solution of ethanoic acid.



Ethanoic acid is a *weak* acid.

(a) Which ion is present in aqueous solutions of all acids?

(1)

(b) What is the difference between the pH of a *weak* acid compared to the pH of a strong acid of the same concentration?

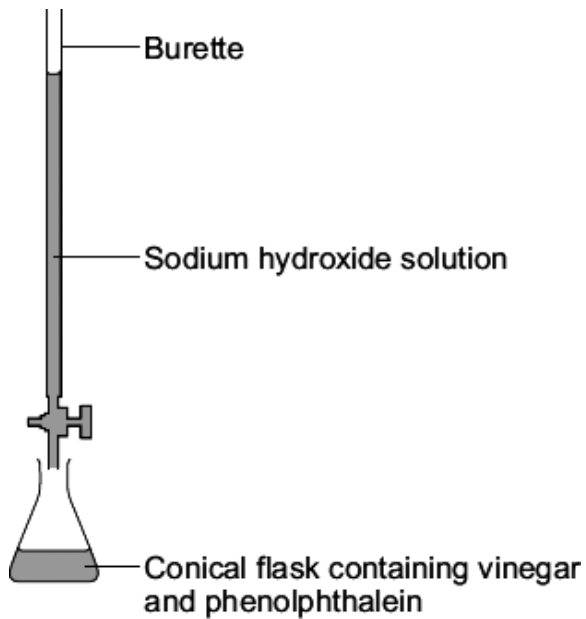
Give a reason for your answer.

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(2)

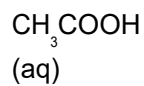


- (c) The diagram shows the apparatus used to find the concentration of ethanoic acid in vinegar.



- (i) Why should phenolphthalein indicator be used for this titration instead of methyl orange?
- (ii) 25.00 cm³ of vinegar was neutralised by 30.50 cm³ of a solution of sodium hydroxide with a concentration of 0.50 moles per cubic decimetre.

The equation for this reaction is:



Calculate the concentration of ethanoic acid in this vinegar.

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Concentration of ethanoic acid in this vinegar = moles per cubic decimetre



- (d) The concentration of ethanoic acid in a different bottle of vinegar was 0.80 moles per cubic decimetre.

Calculate the mass in grams of ethanoic acid (CH_3COOH) in 250 cm^3 of this vinegar.

The relative formula mass (M_r) of ethanoic acid = 60.

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Mass of ethanoic acid = g

(2)
(Total 8 marks)