

# Alcohols & Carboxylic Acids

## Question Paper 1

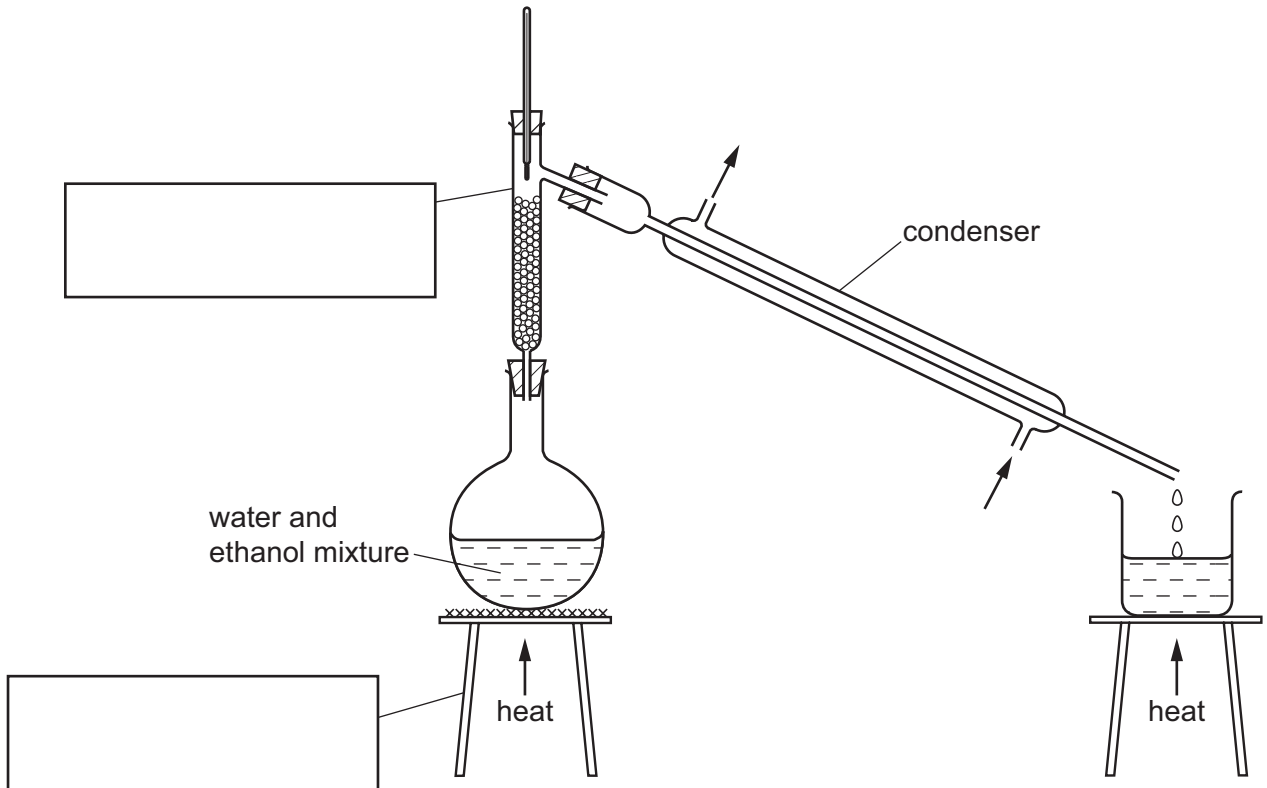
<b>Level</b>	IGCSE
<b>Subject</b>	Chemistry
<b>Exam Board</b>	CIE
<b>Topic</b>	Organic Chemistry
<b>Sub-Topic</b>	Alcohols & Carboxylic Acids
<b>Paper Type</b>	Alternative to Practical
<b>Booklet</b>	Question Paper 1

**Time Allowed:** 41 minutes

**Score:** /34

**Percentage:** /100

- 1 The diagram shows the apparatus used to separate a mixture of water, boiling point  $100^{\circ}\text{C}$ , and ethanol, boiling point  $78^{\circ}\text{C}$ .



(a) Complete the boxes to name the apparatus. [2]

(b) Label the arrows on the condenser. [1]

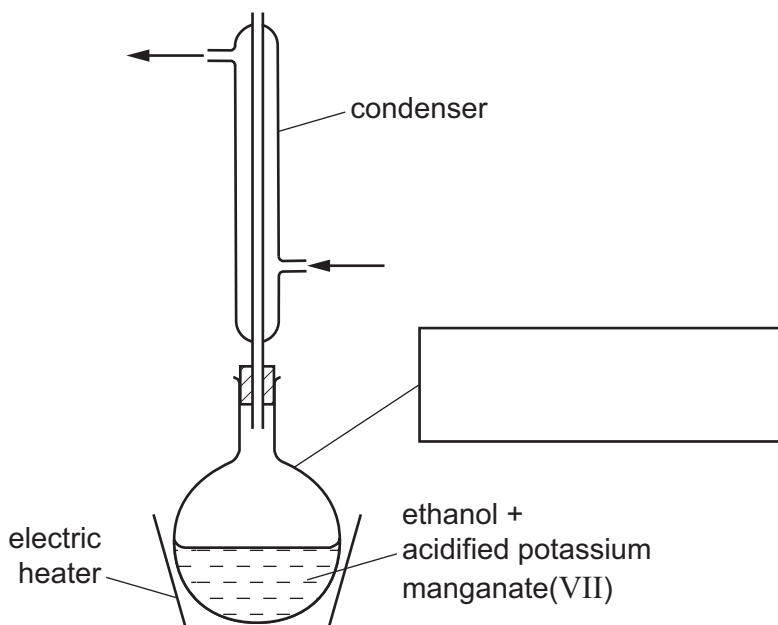
(c) Identify **one** mistake in the apparatus. [1]  
 .....

(d) Which liquid would collect first? Explain your answer. [2]  
 .....  
 .....

(e) Why would it be better to use an electrical heater instead of a Bunsen burner to heat the water and ethanol mixture? [1]  
 .....

[Total: 7]

- 2 Ethanol was reacted with hot acidified potassium manganate(VII) solution using the apparatus below. Ethanoic acid was formed.



(a) Complete the box to identify the piece of apparatus labelled. [1]

(ii) Label the arrows. [1]

(b) Suggest and explain why an electric heater is used to heat this reaction and not a Bunsen burner.

.....  
 ..... [2]

(ii) Suggest why a condenser is necessary.  
 ..... [1]

(c) Complete the table to show the difference in smell between ethanol and ethanoic acid.

	smell
ethanol	
ethanoic acid	

[2]

[Total: 7]

- 3 A student investigated the reaction between two different solids, **C** and **D**, and excess dilute hydrochloric acid.

Five experiments were carried out.

(a) *Experiment 1*

A measuring cylinder was used to pour 30 cm<sup>3</sup> of dilute hydrochloric acid into a polystyrene cup. The temperature of the dilute hydrochloric acid was measured. 1 g of solid **C** was added to the dilute hydrochloric acid and the mixture stirred with a thermometer. The maximum temperature reached by the liquid mixture was measured.

(b) *Experiment 2*

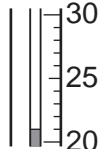
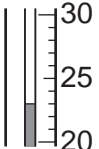
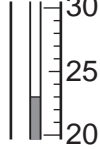
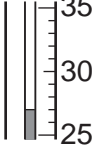
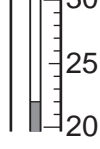
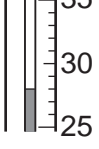
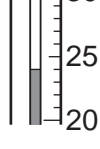
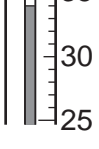
The polystyrene cup was emptied and rinsed with water. Experiment 1 was repeated using 2 g of solid **C**.

(c) *Experiments 3 and 4*

Experiment 2 was repeated using 3 g and then 5 g of solid **C**.

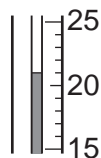
Use the thermometer diagrams to record the results in the table below.

Complete the final column in the table.

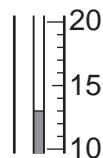
experiment	mass of solid <b>C</b> /g	thermometer diagram	initial temperature of acid /°C	thermometer diagram	maximum temperature reached /°C	temperature difference /°C
1						
2						
3						
4						

**(d) Experiment 5**

Experiment 1 was repeated using solid **D**. Use the thermometer diagrams to record the results in the spaces below.



initial temperature of acid



final temperature of liquid mixture

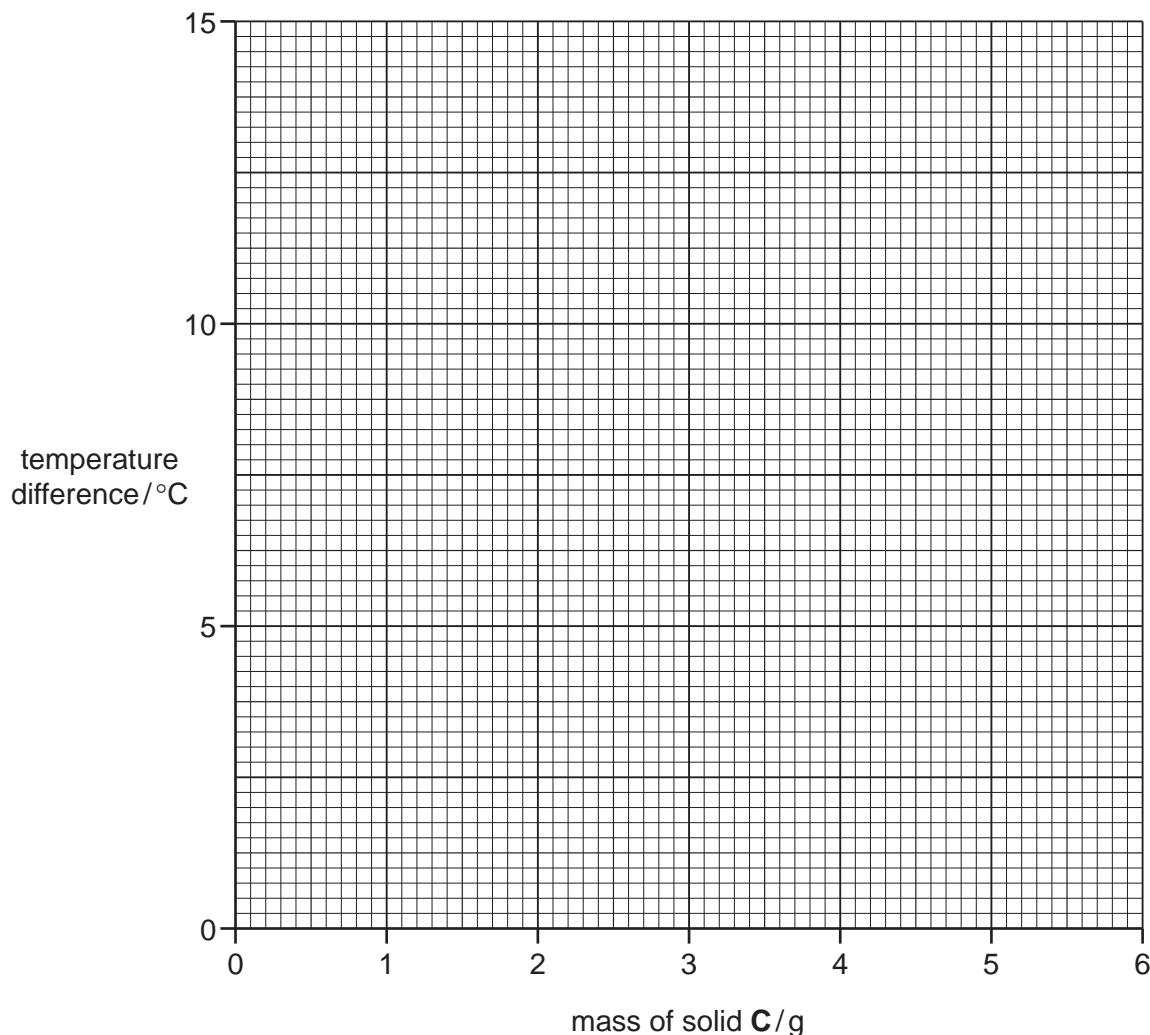
initial temperature of dilute hydrochloric acid = ..... °C

final temperature of liquid mixture = ..... °C

temperature change = ..... °C

[2]

**(e) Plot the results for Experiments 1, 2, 3 and 4 on the grid and draw a straight line graph.**



[4]

- (f) (i) **From your graph**, deduce the temperature of the solution when 6 g of solid **C** is added to 30 cm<sup>3</sup> of dilute hydrochloric acid.  
Show clearly **on the grid** how you worked out your answer.

..... °C [2]

- (ii) **From your graph**, deduce the mass of solid **C** that would give a temperature rise of 9 °C when added to 30 cm<sup>3</sup> of dilute hydrochloric acid.

.....  
..... [2]

- (g) What type of chemical process occurs when solid **D** reacts with dilute hydrochloric acid?

..... [1]

- (h) Suggest the effect on the results if Experiment 3 was repeated using 60 cm<sup>3</sup> of dilute hydrochloric acid.

.....  
..... [2]

- (i) Predict the temperature of the solution in Experiment 4 after 1 hour. Explain your answer.

.....  
..... [2]

- (j) When carrying out the experiments, what would be **one** advantage and **one** disadvantage of taking the temperature readings after exactly one minute?

advantage .....

disadvantage .....

[Total: 20]