Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/06**

Paper 6 Alternative to Practical

May/June 2004

1 hour

Candidates answer on the Question Paper.
No additional materials required.

READ THESE INSTRUCTIONS FIRST

Write your name, Centre number and candidate number at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

FOR EXAMINER'S USE	
1	
2	
3	
4	
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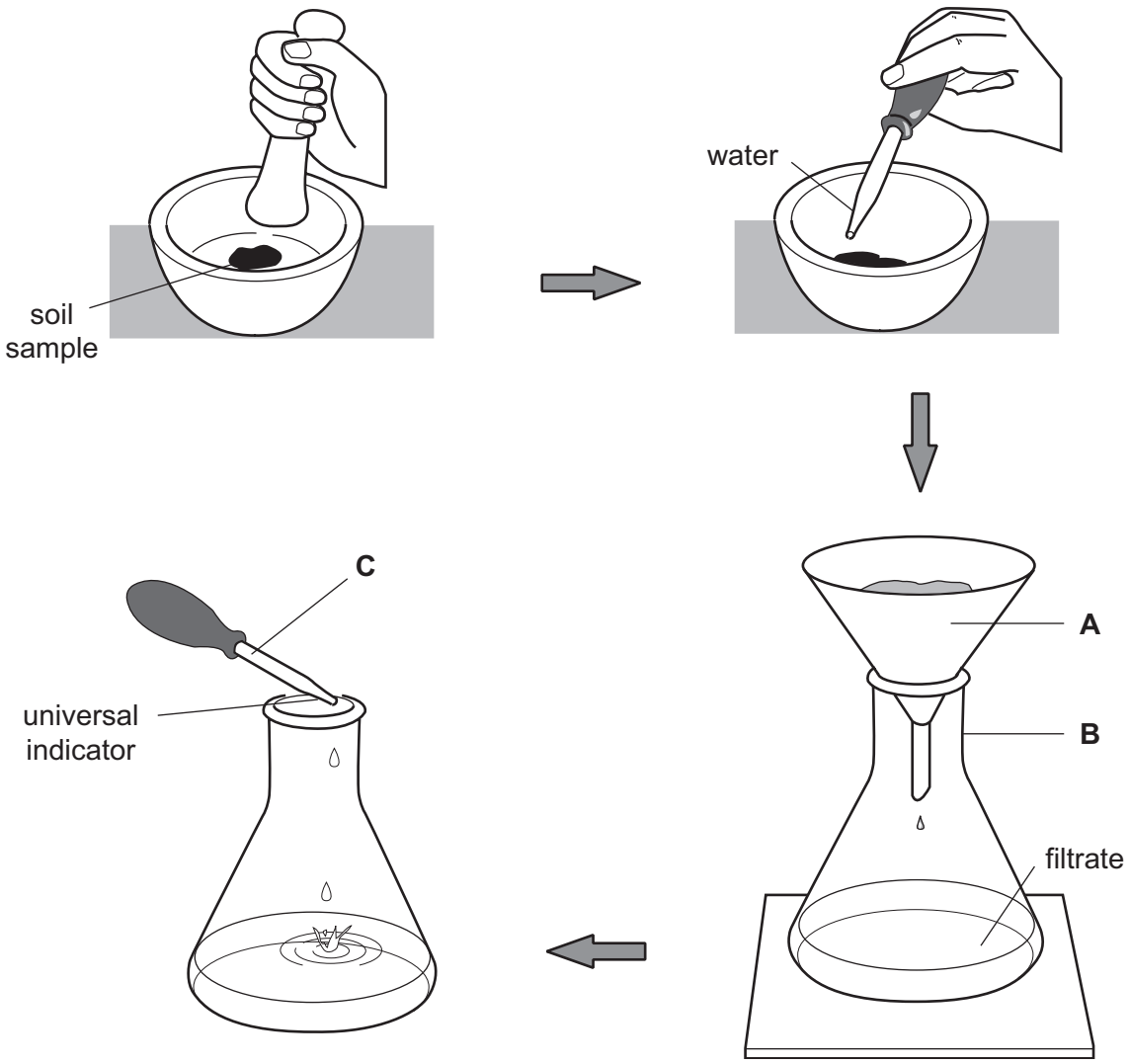
TOTAL	

This document consists of **12** printed pages.

1 An experiment was carried out to find the pH of samples of soil from a farmer's field.



(a) Identify the pieces of apparatus labelled

A, ...

B, ...

C. ..... [3]

(b) Why was the soil crushed?

.....

..... [2]

(c) Why should soil samples be taken from different parts of the field?

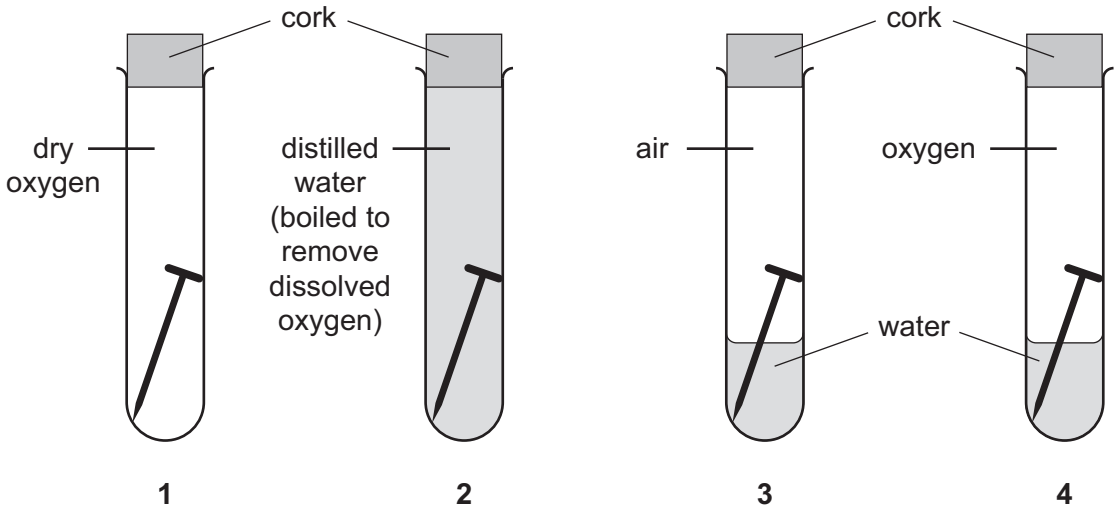
.....

..... [1]

(d) Suggest why it is important to know the pH of soil.

..... [1]

2 The four tubes show an investigation of rusting. Each one of these four tubes contains a nail and the reagents indicated.



(a) Predict the order in which rust would appear.

first .....

second ..... [1]

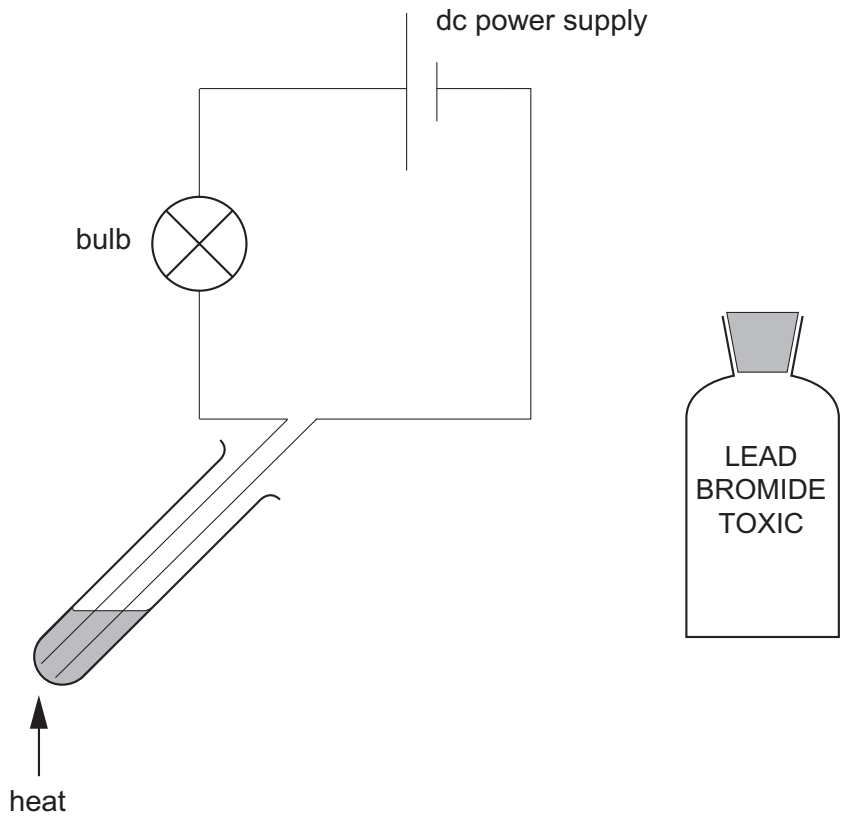
(b) Explain your prediction.

.....

.....

..... [2]

3 Lead bromide was placed in a tube and connected to an electrical circuit as shown below.



The lead bromide was heated until molten. A brown gas was given off.

(a) State one other expected observation.

.....

[1]

(b) (i) Suggest a suitable material for the electrodes.

.....

(ii) Indicate on the diagram the negative electrode (cathode). [2]

(c) Name the brown gas. At what electrode will the gas be given off?

name .....

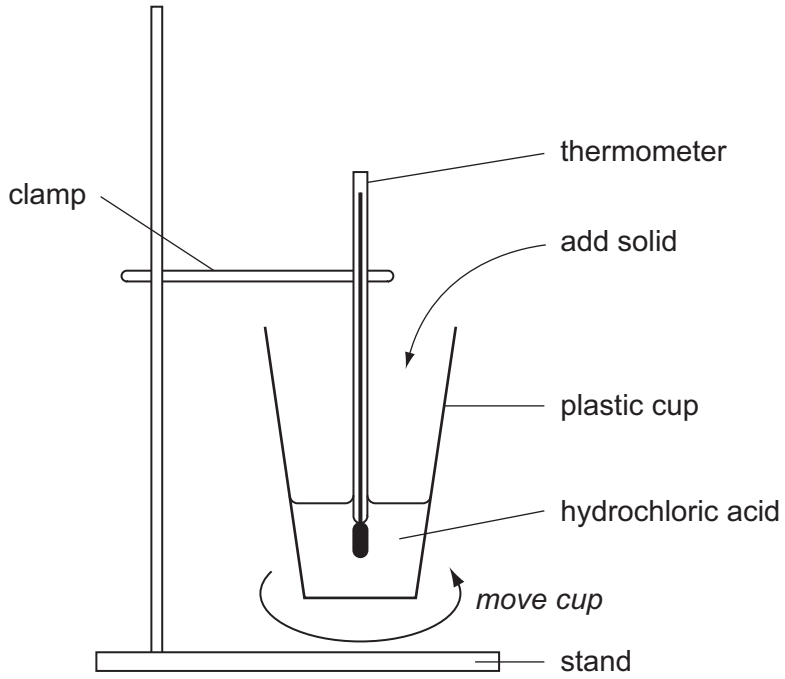
electrode ..... [2]

(d) Why is this experiment carried out in a fume cupboard?

.....

[1]

4 A student investigated the temperature changes that occur when two compounds **A** and **B**, react with hydrochloric acid. The apparatus below was used.



Experiment 1

By using a measuring cylinder, 30 cm^3 of hydrochloric acid was added to the plastic cup.

Use the thermometer diagram to record the initial temperature of the acid in the table. The timer was started, and some of the solid **A** was added to the cup. Immediate effervescence occurred. The mixture was stirred by moving the cup until the fizzing stopped.

More of **A** was then added and the student continued adding **A** in this way until all of solid **A** had been added.

Use the thermometer diagrams to record the temperature of the mixture every half minute.

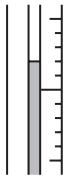
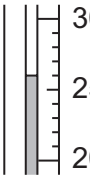
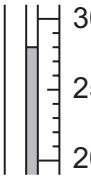
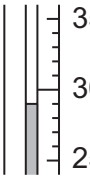
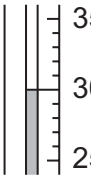
Experiment 2

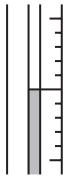
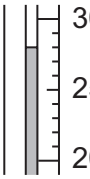
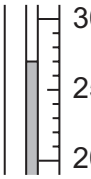
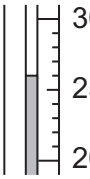
Experiment 1 was repeated using solid **B**. Use the thermometer diagrams to record the temperatures in the table.

[Turn over

Table of results

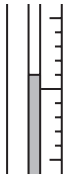
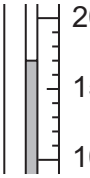
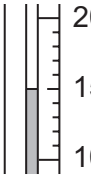
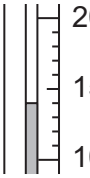
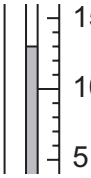
Experiment 1

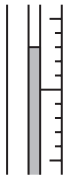
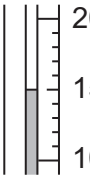
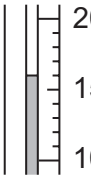
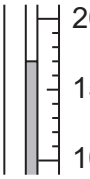
time/min	0.0	0.5	1.0	1.5	2.0	2.5
thermometer diagram						
temperature / °C						

3.0	3.5	4.0	4.5	5.0
				

[2]

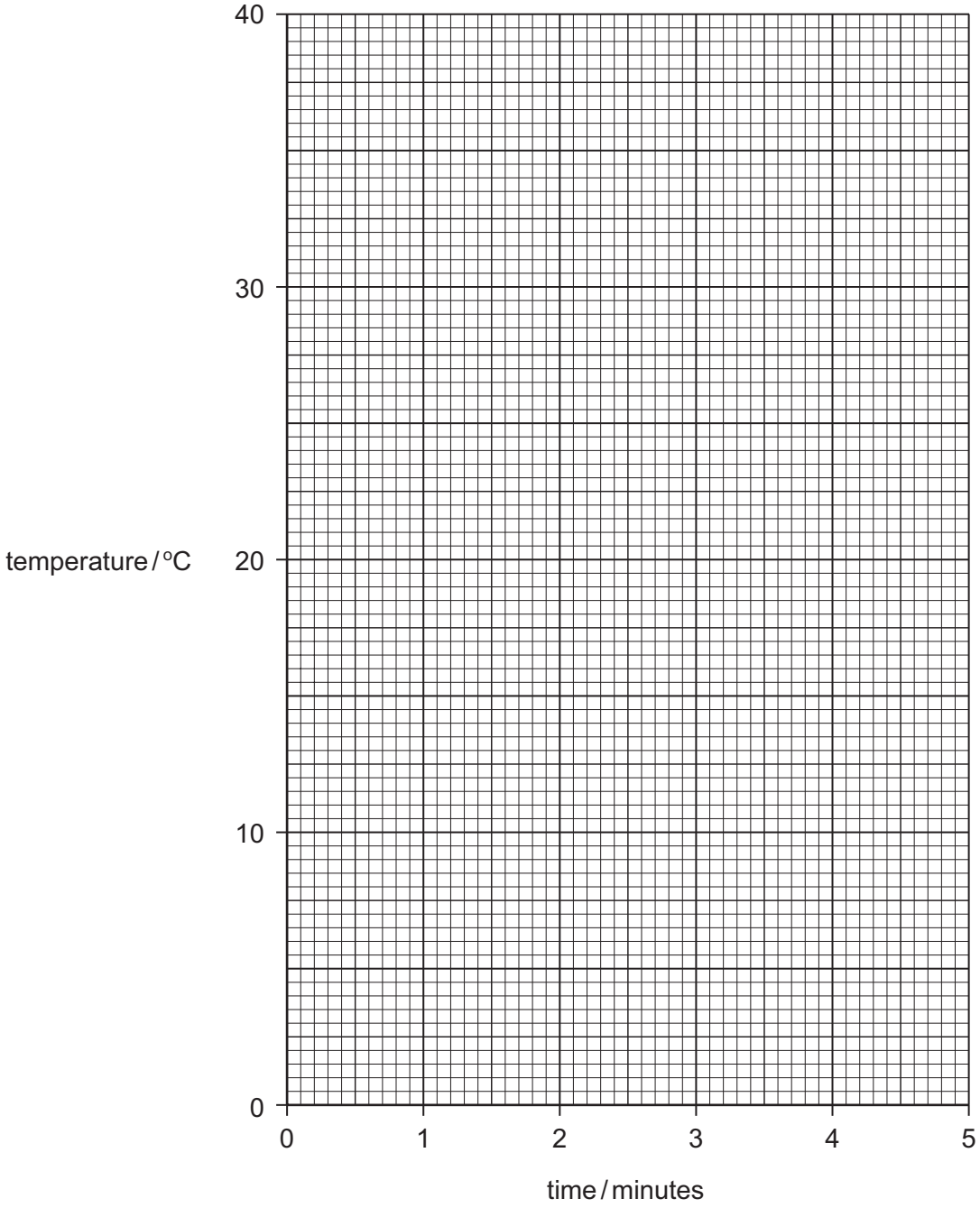
Experiment 2

time/min	0.0	0.5	1.0	1.5	2.0	2.5
thermometer diagram						
temperature / °C						

3.0	3.5	4.0	4.5	5.0
				

[2]

(a) Plot the results from both experiments on the grid below. For each set of results draw a smooth line graph. Indicate clearly which line represents Experiment 1 and which line Experiment 2 [6]



(b) From your graphs;

(i) Find the temperature of the reaction mixture after the hydrochloric acid had reacted for 2 minutes 15 seconds with

solid **A**, ...

solid **B**. ..... [2]

(ii) What type of chemical reaction occurs when

solid **A**, ...

solid **B** .....

reacts with hydrochloric acid? [2]

(c) Suggest what type of compound solids **A** and **B** are. Explain your answer

.....

.....

..... [2]

(d) If the plastic cup and final reaction mixture are left for one hour, predict the temperature at this time for

(i) solid **A** and hydrochloric acid, ...

(ii) solid **B** and hydrochloric acid. .....

Explain your answers.

.....

..... [3]

5 A mixture of two calcium compounds **C** and **D** was tested.

C is partially soluble in water and **D** is soluble in water.

Complete the observations in the table.

tests	observations
The mixture of **C** and **D** was added to distilled water in a boiling tube. The tube was shaken. The mixture was filtered.	
(a) The filtrate was divided into five equal portions.	
(i) To the first portion was added drops of aqueous sodium hydroxide, a little at a time, with shaking.	..... [2]
Excess aqueous sodium hydroxide was added.	..... [1]
(ii) To the second portion was added excess aqueous ammonia, a little at a time.	..... [1]
(iii) To the third portion was added dilute sodium hydroxide and aluminium powder. The mixture was boiled and the gas tested with damp litmus paper.	red litmus went blue
(iv) The pH of the fourth portion was tested with Indicator paper.	pH about 10
(v) Carbon dioxide was bubbled through the fifth portion.	solution turned milky/cloudy

(b) Name the gas given off in **(a)(iii)**.

..... [1]

(c) Suggest an explanation for the observation in **(a)(v)**.

.....

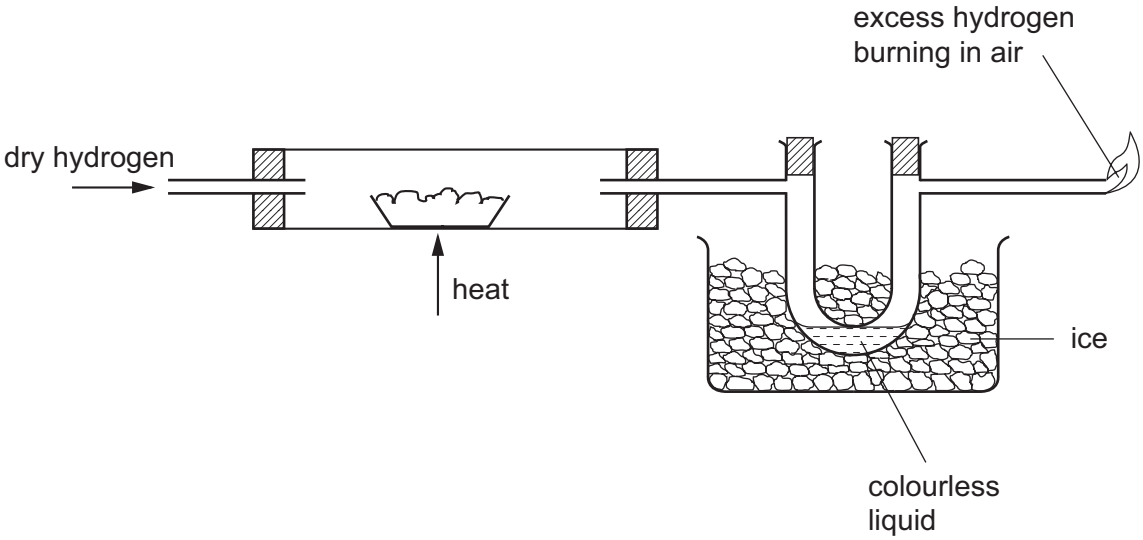
..... [1]

(d) What conclusions can you draw about the identity of the anions in solid **C** and **D**?

.....

..... [2]

6 Copper oxide was reacted with hydrogen using the apparatus shown below.



(a) Indicate on the diagram with an arrow where the copper oxide is placed. [1]

(b) The colour of the copper oxide would change from ..... to ..... [2]

(c) What is the purpose of the ice?

.....

..... [2]

7 Describe a chemical test to **distinguish** between each of the following pairs of substances. An example is given.

potassium chloride and potassium iodide

test: add aqueous lead(II) nitrate

result: potassium chloride gives a white precipitate, potassium iodide gives a yellow precipitate

(a) water and ethanol

test .....

result with water .....

result with ethanol ..... [2]

(b) sulphuric acid and aqueous sodium sulphate

test .....

result with sulphuric acid .....

result with aqueous sodium sulphate ..... [2]

(c) hydrochloric acid and nitric acid

test .....

result with hydrochloric acid .....

result with nitric acid ..... [2]

8 Is manganese(IV) oxide a catalyst?

A catalyst is a substance that speeds up a chemical reaction and remains unchanged.

Hydrogen peroxide, H_2O_2 breaks down to form oxygen. This reaction is very slow without a catalyst. Describe an experiment to show that manganese(IV) oxide is a catalyst for this reaction.

You are provided with the following items.

Hydrogen peroxide solution

Manganese(IV) oxide

Measuring cylinder

Balance

Beaker

Filtration apparatus

Splints/Bunsen burner

Distilled water

.....

.....

.....

.....

.....

..... [6]