

Centre Number	Candidate Number	Name
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/05

Paper 5 Practical Test

May/June 2004

2 hours

Candidates answer on the Question Paper.

Additional Materials: As listed in Instructions to Supervisors

READ THESE INSTRUCTIONS FIRST

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

Answer **all** questions.

At the end of the examination, fasten all your work securely together.

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

Chemistry practical notes for this paper are printed on page 12.

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	
Total	

This document consists of **11** printed pages and **1** blank page.



- 1 You are going to carry out starch tests to find out which plant, **A** or **B**, has been kept in the dark for 48 hours.
- Remove a leaf from plant **A** and cut a strip 1 cm wide from the middle of the leaf as shown in Fig. 1.1.
 - Repeat this with a leaf from plant **B**. During the experiment, take care that you remember which leaf section is from which plant.

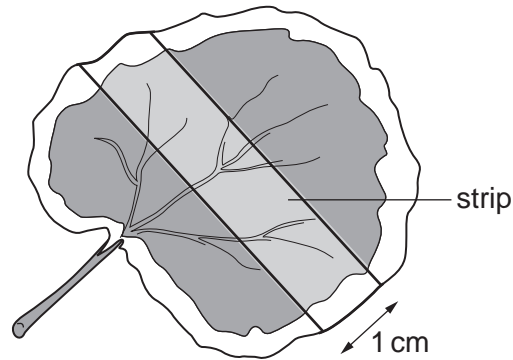


Fig. 1.1

- (a) Draw the leaf sections in the spaces below, labelling clearly the areas where there is chlorophyll.

leaf **A**

leaf **B**

[2]

- Half fill a beaker with water and bring it to the boil. (You may have a water bath instead).
- Using tweezers put the leaf section from plant **A** into the boiling water for one minute.
- Take the leaf section out of the water and put it into a test-tube labelled **A**.
- In the same way boil the section from leaf **B** and put it into a test-tube labelled **B**.

- Turn off your Bunsen burner or other naked flame if you have used one. This is important for safety.
- Add enough alcohol to both tubes to cover your leaf sections and place both tubes into your beaker or water bath of hot water for five minutes. The alcohol may boil while it is dissolving the chlorophyll.
- Carefully remove the tubes from the water, pour off the alcohol into the container provided, then rinse the leaf sections in cold water.
- Spread the leaf sections out on a white tile and cover them with iodine solution.

(b) In the spaces below draw your leaf sections as they appear now. Clearly label the coloured areas.

leaf **A**

leaf **B**

[2]

(c) (i) Which of the leaf sections, **A** or **B**, contains starch?

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Which observation shows you this?

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.....[2]

(ii) Compare your drawings in (a) and (b) of the leaf section that contains starch. What do you notice? Explain the pattern you observe.

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.....[2]

(d) Explain

(i) why the leaf sections are boiled in water at the start,

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.....

(ii) why the chlorophyll is removed from the leaf sections,

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.....

(iii) why the leaf sections are rinsed with cold water after boiling in alcohol.

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.....

[3]

(e) (i) A student wanted to test the white part and the green part of variegated leaves for the presence of reducing sugars. He divided the green parts of the leaves from the white parts. Describe what the student must do next.

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.....
.....[3]

(ii) Which part of the leaves will contain reducing sugar? Explain your answer.

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.....
.....[1]

- 2 A student read that an object floats in water when its average density is less than that of water. When the density of the object is just greater than that of water, it will sink. When the mass in grams of a vessel placed in water is greater than its volume in cm^3 it will sink, since the density of water is $1 \text{ gm}/\text{cm}^3$. You are going to test this suggestion by carrying out the following experiment.

- (a) (i) Measure the height, h , of the polystyrene cup and record its value. See Fig. 2.1

$h = \dots\dots\dots \text{ cm}$ [1]

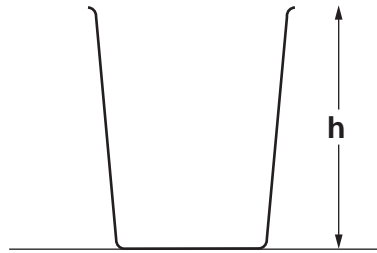


Fig. 2.1

- (ii) You are now required to find the maximum volume of water that the cup will hold. Briefly describe how you did this and record the volume below.

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maximum volume of cup = cm^3 [2]

- (b) (i) Pour water into the large beaker to a height just greater than the height, h , of the cup. Add 50 cm^3 of water to the cup. Place the cup in the beaker of water and do not let go. Allow it to float in an upright position and measure the distance, d , from the level of the water in the large beaker to the top of the cup. See Fig. 2.2.

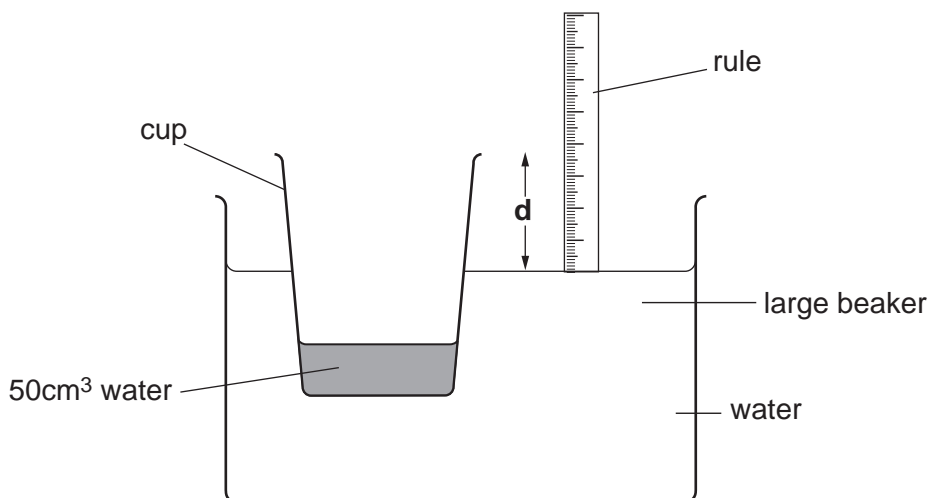


Fig. 2.2

Remove the cup.

Record the distance, **d**, in mm and the volume, **V**, of water in the cup, in Fig. 2.3.

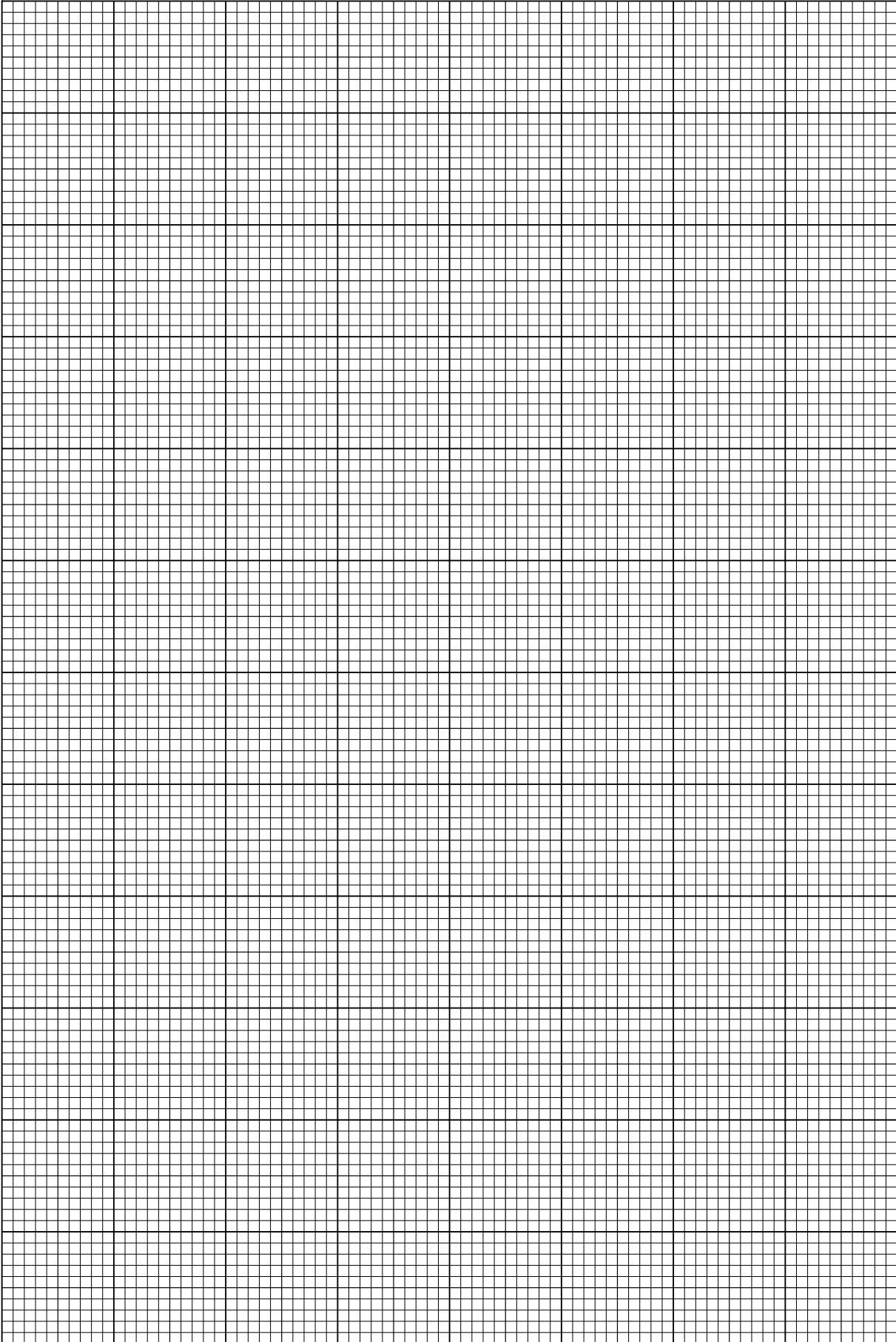
- (ii) Add 20 cm^3 of water to the cup, making 70 cm^3 altogether.
Repeat the above procedure to obtain a new value of **d**.
Remove the cup.
Repeat the procedure four more times, each time recording the total volume, **V**, of water and the distance, **d**, in Fig. 2.3.

volume V/cm³	distance d/mm
50	

Fig. 2.3

[3]

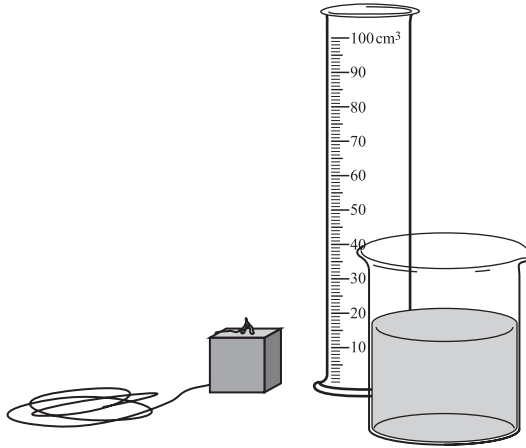
- (c) (i) Plot a graph of volume V (vertical axis) against distance d . Draw the best straight line through your points and extend it to cut both axes.



- (ii) Read off the value of the volume **V** when **d** = 0.

volume **V** = cm³ [2]

- (d) When a metal block is submerged in water, it displaces a volume of water equal to the volume of the block. Using the apparatus shown below, describe how you would measure the volume of the block.



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.....[3]

3 You are provided with two solids **A** and **B**. Carry out the following reactions on both solids. You are not required to identify either solid.

(a) Place about one third of solid **A** in a hard glass test-tube. Heat strongly and continue to heat after it becomes liquid. Test any gas given off with a lighted spill and then with limewater. Record your observations below.

lighted spill

limewater

any additional observation[3]

(b) Place about one third of solid **B** in a hard glass test-tube. Heat strongly, test any gas with a lighted spill and limewater. This solid will not become liquid. Record your observations below.

lighted spill

limewater[2]

(c) Divide the rest of solid **A** into two equal parts.

(i) Dissolve one part of the solid **A** in about 10 cm³ of water. Pour about 5 cm³ of the solution into a test-tube. Add about 2 cm³ of dilute sulphuric acid followed by a few drops of solution **X**. Warm gently and record your observation.

observation on adding solution **X** and warming gently

(ii) Test the other portion of the solution of **A** with Universal Indicator paper and record the result and conclusion.

colour of UI paper pH number

conclusion [4]

(d) Divide the rest of solid **B** into two equal parts.

Dissolve one part of solid **B** in about 10 cm³ water. You may need to warm the water to help the solid dissolve. Test this solution of **B** with Universal Indicator paper and record the result and conclusion.

colour of UI paper pH number

conclusion [2]

(e) Mix together the remaining parts of solid **A** and solid **B** in a test-tube. Add about 2 cm³ of water. Record any observation.

observation[1]

(f) Describe how you would find the volume of gas given off when 1 g of solid **B** is mixed with an excess of solid **A** and water added. A diagram of the apparatus is required.

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[3]

CHEMISTRY PRACTICAL NOTES

Test for anions

<i>anion</i>	<i>test</i>	<i>test result</i>
carbonate (CO_3^{2-})	add dilute acid	effervescence, carbon dioxide produced
chloride (Cl^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide, then aluminium foil; warm carefully	ammonia produced
sulphate (SO_4^{2-}) [in solution]	acidify, then add aqueous barium chloride <i>or</i> aqueous barium nitrate	white ppt.

Test for aqueous cations

<i>cation</i>	<i>effect of aqueous sodium hydroxide</i>	<i>effect of aqueous ammonia</i>
ammonium (NH_4^+)	ammonia produced on warming	–
copper(II) (Cu^{2+})	light blue ppt., insoluble in excess	light blue ppt., soluble in excess, giving a dark blue solution
iron(II) (Fe^{2+})	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) (Fe^{3+})	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc (Zn^{2+})	white ppt., soluble in excess, giving a colourless solution	white ppt., soluble in excess, giving a colourless solution

Test for gases

<i>gas</i>	<i>test and test result</i>
ammonia (NH_3)	turns damp litmus paper blue
carbon dioxide (CO_2)	turns lime water milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	'pops' with a lighted splint
oxygen (O_2)	relights a glowing splint