Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICAL SCIENCE **0652/05**

Paper 5 Practical Test

May/June 2004

1 hour 30 minutes

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 8.

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	
Total	

This document consists of **8** printed pages.

1 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 $1\,gm/cm^3$.
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. 1.1

h = ... cm [1]

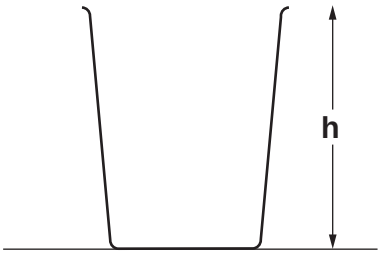

Fig. 1.1

(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. 1.2.

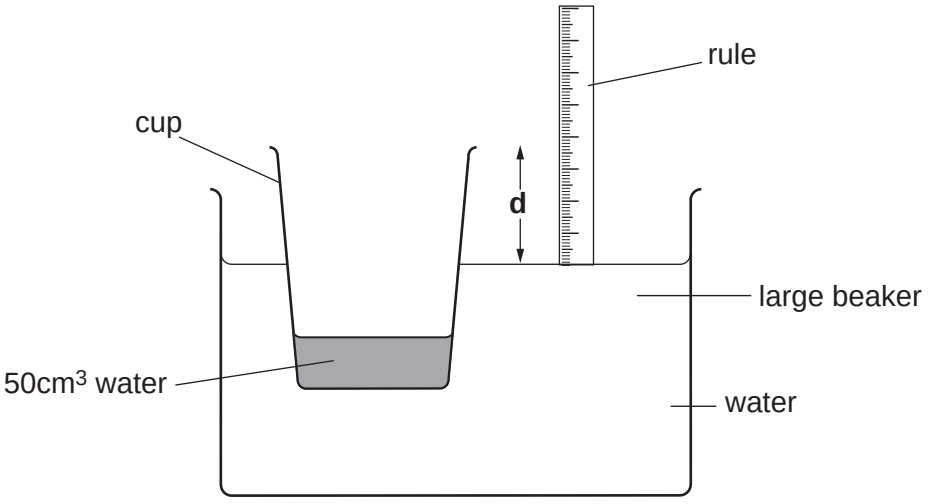


Fig. 1.2

Remove the cup.
Record the distance, **d**, in mm and the volume, **V**, of water in the cup, in Fig. 1.3.

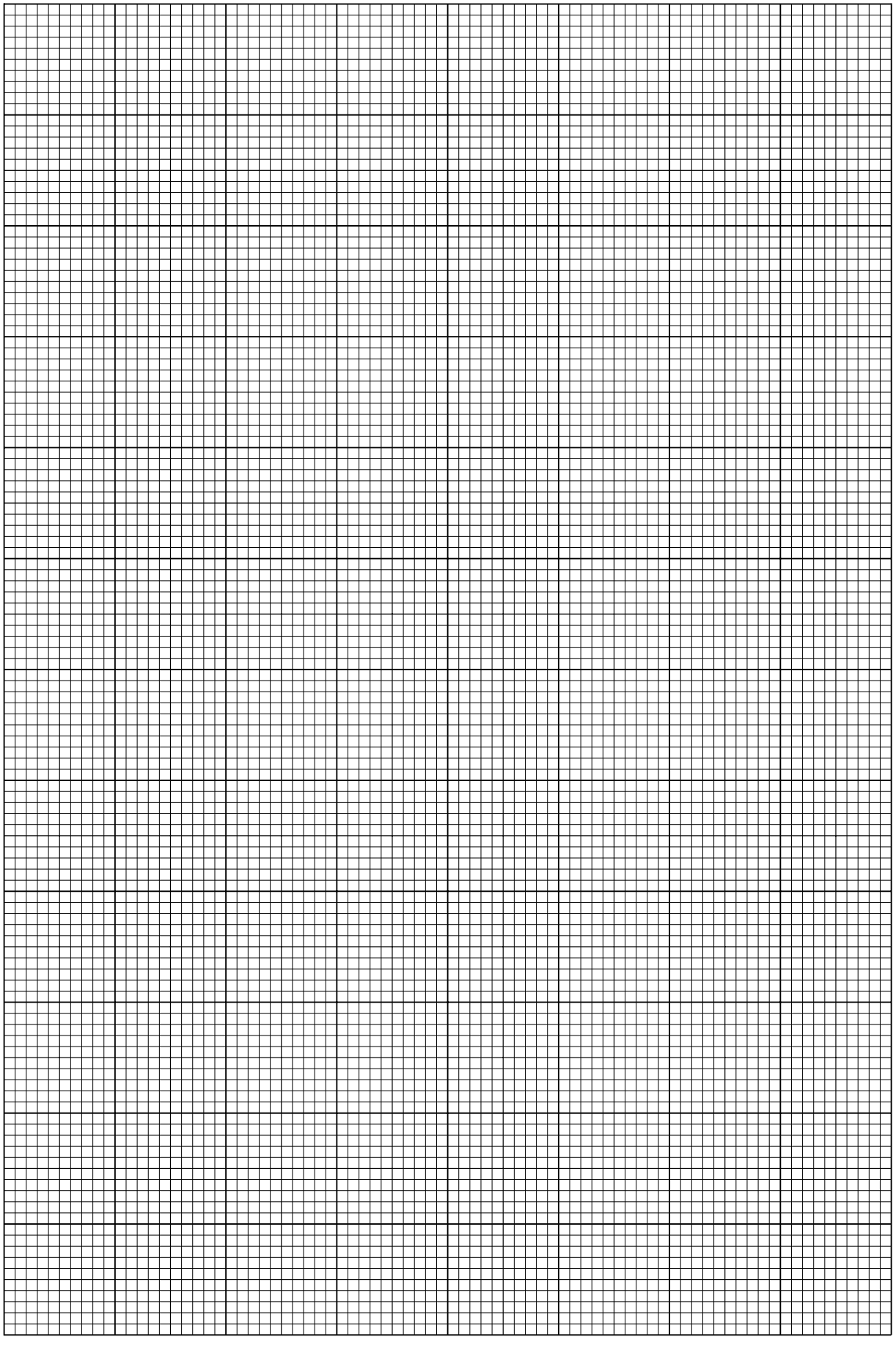
(ii) Add 20 cm^3 of water to the cup, making 70 cm^3 altogether.
Repeat the above procedure to obtain a new value of **d**.
Remove the cup.
Repeat the procedure four more times, each time recording the total volume, **V**, of water and the distance, **d**, in Fig. 1.3.

volume **V**/cm^3	distance **d**/mm
50	

[3]

Fig. 1.3

(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.

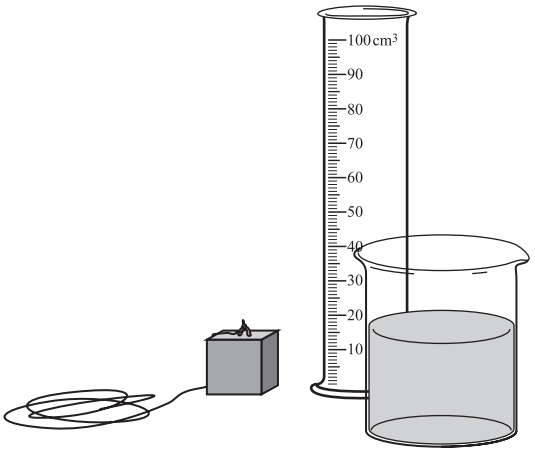


[4]

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

volume **V** = ... cm^3 [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]

2 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 cm^3 of water. Pour about 5 cm^3 of the solution into a test-tube. Add about 2 cm^3 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 cm^3 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 cm^3 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

anion	*test*	*test result*
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 *or* aqueous barium nitrate	white ppt.

Test for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
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

gas	*test and test result*
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